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Preface

This 49th volume of *Nordlyd* is a special issue in honor of our colleague and friend Johan Rooryck on the occasion of his 65th birthday. We know Johan as an outstanding linguist and a pillar in the Open Access community. It is only fitting that this Festschrift, which contains articles by contributors from both fields, is published in the diamond open access journal *Nordlyd*. The volume comprises 17 articles by 24 different authors, the wide range of topics of which mirrors Johan's exceptional versatility.

We all know that scholarly publishing is not only authoring – peer review is an important part of it. Johan himself has been an active advocate of proper recognition of peer review in research assessment. The following colleagues contributed with reviews of the articles in this volume:

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Elitzur Bar-Asher Siegal
Margo Bargheer
Gabriela Bîlbîie
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We would like to thank Peter Svenonius, the editor of *Nordlyd*, for all his assistance. We also extend our gratitude to the team at Septentrio Academic Publishing who helped to prepare this volume for digital publication. Finally, Waltraud Paul helped with many things along the way – thank you.

We are extremely proud to dedicate this volume to Johan. Happy birthday, Johan!

Jeroen van Craenenbroeck, Aysa Ekanger, Camil Staps, and Guido Vanden Wyngaerd
June 2026

A Festschrift on the occasion of Johan Rooryck's 65th birthday

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This volume celebrates our colleague and friend Johan Rooryck on the occasion of his 65th birthday. Johan is both known for his achievements in (Romance) linguistics, his widely publicized resignation from Elsevier as the editor of *Lingua* and subsequent foundation of the open access journal *Glossa*, and his strong advocacy for open access. On this special occasion, we briefly revisit his achievements in these three domains.

Perusing Johan's publication list, one cannot help but be struck by his broad intellectual range. A Romance linguist in origin, he started out, rather classically, with a PhD dissertation on control verbs in French. But he soon branched out into other languages and empirical domains, including negation, binding, possession, modality, and evidentiality, to name only the most important ones. There is a remarkable consistency in his output over the duration of his career, which spans several decades. As a testament to the breadth of his work, we can mention an excursion into the culinary domain, in a 1989 paper on fruit, vegetables, and number, which compares *pumpkin* and *lettuce* with *potato* and *carrot*, contrasting the 'metrolinguistic hypothesis' with the 'gastrolinguistic hypothesis' to account for the number properties of fruit and vegetable names. Another excursion ventures into the domain of poetry, with a linguistic analysis of a sonnet by Mallarmé, written for a Festschrift for a colleague in French literature at Leiden University.

In addition to his own publication record, Johan has also been instrumental in fostering the careers of others, as witnessed by the numerous PhD dissertations he has supervised. Such a record of successful PhD completions does not come about out of nowhere. It requires a dedicated supervisor willing to invest significant amounts of time and energy in his students, which is exactly the kind of supervisor that Johan is. Many of his former students have gone on to have a career in linguistics themselves, while others have pursued opportunities elsewhere. One of them even served as Minister of Education in the Portuguese government.

Johan has also been very productive and successful in securing research funding. He has always been very generous with his time when opportunities arose, often helping his students and colleagues to transform the seed of an idea into a viable project proposal. His record of successful grant applications shows that he possesses a unique ability to do just that.

In 2015, Johan's life took a dramatic turn. As an editor of Elsevier's flagship linguistic journal *Lingua* for over 15 years, he had become increasingly dissatisfied with Elsevier's policies. The conflict came to a head, and it resulted in Johan leaving Elsevier to found a new fully open access journal, *Glossa: a journal of general linguistics*. What made this move unique and successful was the fact that Johan was not alone: he was joined at *Glossa* by the entire former Editorial Team and Board of *Lingua*, as well as *Lingua*'s reader and author community. The *Lingua*-to-*Glossa* transition was only possible because Johan was immensely respected by the linguistics community for his work as editor-in-chief of *Lingua*. It was evidently Johan and not the successive managers of Elsevier who had created *Lingua*'s reputation as one of the best venues for linguistic research covering all its subfields.

Two of us, Guido and Waltraud, were involved in the *Lingua*-to-*Glossa* transition from the very beginning. Given that Johan was still bound to Elsevier by a contract, we served as interim co-editors during November and December 2015. We took care of the huge number of submissions that colleagues had withdrawn from *Lingua* in order to submit them instead to *Glossa* and thus support this new diamond journal. The solidarity with *Glossa* was immense and clearly showed the growing frustration and disgust with the aggressive pricing policy that Elsevier had subjected university libraries to. While more and more linguists were no longer willing to give their time and expertise for free to a highly profitable commercial publisher such as Elsevier and had therefore declined to review for *Lingua*, finding reviewers for *Glossa* was extremely easy and a pleasure; colleagues even apologized when for diverse reasons they were unable to accept a review request!

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This period of absolute frenzy was followed by months of preparation as the new journal took shape and started taking off. Since neither Ubiquity Press (the publisher of *Glossa* until 2020) nor their typesetters had experience with linguistics articles, they required extensive training and feedback, especially when it came to correctly presenting the examples with their necessary alignment of the original language material, the glosses, and the idiomatic translations. Johan steered us through these eventful times with his usual calm, competence, and humour. Since the publication of its first four articles on April 1, 2016 (cf. Johan's editorial in Rooryck 2016), *Glossa* has maintained its reputation as a high-quality journal for research in all areas of linguistics. May it continue to thrive!

Glossa was not the only linguistics journal Johan helped move from behind the paywall: he was involved in setting up LingOA (Linguistics in Open Access), a foundation under Dutch law that was officially launched in October 2015. LingOA's original mission was to promote open access in linguistics by helping journals to flip from traditional models of publication to open access. Together with *Glossa*, three other linguistics journals moved to an open access model: *Laboratory Phonology*, *Italian Journal of Linguistics*, and *Journal of Portuguese Linguistics*. Johan has since been engaged in numerous initiatives promoting unrestricted access to scholarly knowledge, and is now widely known in the open access community: his open access CV is no less impressive than his linguistics one, even though it covers a shorter time span. Johan's involvement in cOAlition S added a scholar's voice to this funder-led energetic push for open access. Projects such as DIAMAS, CRAFT-OA, PALOMERA, and ALMASI have been directed at the development of the scholarly infrastructure and standards for open access journals and books – in Europe and beyond. As co-coordinator of the European Diamond Capacity Hub – a multi-faceted programme designed to strengthen the diamond open access community – Johan now builds on the momentum of these projects he has contributed to. In all of these initiatives, Johan has been active in emphasizing quality, sustainability, equity, and the role of community in scholarly communication, and his work capacity and level of enthusiasm and determination continue to amaze people beyond linguistics circles.

In 2022, Johan was awarded an honorary doctorate at UiT The Arctic University of Norway for his work on open access publishing and open science. UiT is the national forerunner in open science initiatives in Norway, and has benefited from Johan's open science advocacy more than once. Audiences at the Munin Conference, a UiT-based international conference focusing on open science, have had the pleasure of hearing him present on several occasions. Johan is also a highly valued member of the scientific advisory board for TROLLing, a curated repository for open data and code – run by UiT and open to linguists from around the world free of charge. And the *Lingua*-to-*Glossa* story is frequently recounted in this university's PhD courses on scholarly publishing.

Given this background, it is only fitting that this Festschrift in honour of Johan is published in a diamond open access linguistics journal, *Nordlyd*, hosted on UiT's non-profit publishing platform for diamond scholarly journals and series, Septentrio Academic Publishing.

With this volume we celebrate Johan's contributions to science, which we hope to continue to enjoy for many years to come.

References

Rooryck, Johan. 2016. Introducing *Glossa*. *Glossa: a journal of general linguistics* 1 1: 1. https://doi.org/10.5334/gjgl.91.

PART 1: LINGUISTICS

Collecting data in understudied language varieties: A methodological note

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Abstract

Eliciting linguistic data from speakers of non-standardized varieties presents well-known challenges. Traditional acceptability judgment tasks have been widely used to probe grammatical knowledge, but task design, such as mode of presentation, response options, and labeling, can strongly influence outcomes. In this study, we investigate a small group of heritage Catalan speakers in Germany and the Netherlands using a repetition-based task rather than a standard judgment task. Our findings indicate that responses to repetition tasks differ significantly from commonly known generalizations on the phenomenon at issue investigated through grammaticality judgment tasks. We conclude that repetition tasks can uncover patterns of grammatical representation that may differ from those captured by judgment tasks, and that they provide deeper insights into grammatical representation than the latter. This suggests that carefully designed elicitation tasks can mitigate common biases and more accurately reveal the grammatical representations of heritage speakers. These findings highlight both the challenges and the potential of alternative methodologies for studying underrepresented languages.

1. Introduction

Collecting data for non-standardized varieties is a challenge for linguists. Data elicitation in the form of acceptability judgments has largely been proved to be effective for English monolingual speakers, most notably by Sprouse et al. (2013) and Sprouse and Almeida (2017). That this might not be the whole story has, however, been noted by Marty et al. (2020), who showed that the task configuration can influence acceptability judgment tasks. This, in turn, means that the replication of the judgments can be affected by the way in which the tasks are designed. Specifically, Marty et al. identify three factors that can influence acceptability judgments: the mode of presentation, the number of response options, and the use of labels. The mode of presentation refers to whether stimuli are presented visually, aurally, or in written form, which can affect comprehension and attention. The number of response options, for example, binary "acceptable/ unacceptable" choices versus Likert scales, can influence how speakers categorize linguistic phenomena, potentially masking subtle gradations in acceptability. Finally, the use of labels concerns whether linguistic terms (e.g., "grammatical", "acceptable") are provided to guide participants' responses; this can alter participants' interpretations of the task and introduce response biases. Taken together, these factors highlight that acceptability judgments are sensitive not only to the linguistic knowledge of participants but also to the design of the task itself.

In this paper, we show further evidence that different tasks might result in slightly different results. Although languages with very few speakers can be problematic for establishing generalizations (see also Leivada et al. 2019, D'Alessandro et al. 2021, and Andriani et al. 2022 on this issue), we will also show that such generalizations can in fact be drawn if appropriate procedural care is applied.

Our empirical base is a small group of heritage Catalan speakers in Germany and the Netherlands. We employ a repetition-based task that indirectly taps into speakers' grammatical knowledge, showing that this approach can produce different results from acceptability judgment tasks and reveal aspects of grammatical representation that might not emerge in explicit judgments. We show that participants' responses are more closely aligned with their underlying grammatical knowledge when the task is formulated to directly engage with these representations. Unlike explicit judgments, which allow for post-interpretive reflection and social bias, the repetition task functions as a reconstructive process. To repeat a sentence accurately, particularly under a cognitive load, speakers must process the stimulus through their own internal grammar before regenerating it. This method provides a window into the speaker's implicit processing, similar to the real-time sensitivity observed in online tasks like self-paced reading (Tokaç-Scheffer et al. 2023). By using an auditory repetition format, we mitigate the literacy biases and "yes-bias"

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common in written acceptability judgment tasks, allowing for a more accurate mapping of the speaker's active grammatical boundaries.

2. The yes-bias

Bilingual respondents routinely display a "yes-bias" (Polinsky 2006) in judgment tasks: a tendency to accept sentences as grammatical or "OK", even when their internal competence would suggest otherwise. The yes-bias, i.e. the "reluctance to reject ungrammatical material" (Polinsky 2018:95) was first described for L2 speakers by Ellis (1991) and observed to be at work also for heritage speakers by Polinsky (2006) in an article on heritage Russian speakers in America. Romano and Guijarro Fuentes (2023) further note that this effect is magnified in metalinguistic judgment tasks for heritage grammars, where practical communication norms are overruled by formal prescriptive standards. The yes-bias is caused by multiple factors:

(i) Deference to the perceived authority of the researcher or stimulus provider.

(ii) Socialized tolerance of variation in bilingual communities.

(iii) Uncertainty about minority-language norms, especially when the heritage language is primarily spoken at home or in informal settings.

For heritage speakers, explicit ratings may thus underrepresent the boundaries of their active grammatical knowledge, and contribute to the "incomplete acquisition" narrative (Polinsky 2006; 2008, Montrul 2002; 2008, but see Putnam and Sánchez 2013) that fails to capture their dynamic competence (cf. Leivada et al. 2023).

Despite variable proficiency, heritage speakers have been shown to retain systematic representations of morphosyntax (Scontras et al. 2018). However, explicit judgments frequently conflict with production and comprehension data; heritage speakers may "accept" ungrammatical forms out of politeness or uncertainty, without producing such forms in spontaneous speech themselves. Studying implicit representations requires methods less reliant on conscious reflection or explicit evaluation. The potential for explicit ratings to underrepresent the grammatical knowledge of heritage speakers is rooted in the high metalinguistic demands of such tasks, which often require speakers to perform conscious evaluations that may not reflect their true underlying competence. As noted by Van Baal (2025), acceptability judgments can be particularly challenging for speakers of heritage or moribund varieties due to yes-bias, prescriptive pressures, or a lack of confidence in formal registers. When heritage speakers appear to accept ungrammatical structures or show high variability in offline ratings, it often fuels the "incomplete acquisition" narrative (Montrul 2008, Polinsky 2018), which interprets these results as a lack of stable mental representations. However, time-sensitive or implicit measures frequently tell a different story. For instance, Tokaç-Scheffer et al. (2023) demonstrated that even when heritage speakers struggle with explicit judgments, their online processing (measured via self-paced reading) reveals real-time sensitivity to grammatical features like evidentiality. By bypassing the "metalinguistic filter" of explicit ratings, alternative methods, such as the repetition task used in this study, can reveal a dynamic competence that remains systematic and robust, even when it does not align with the prescriptive norms measured by standard judgment tasks. This is especially important for phenomena like agreement, where intuitions can be subtle and context-sensitive. To illustrate this point, we present a small experiment on gender in heritage speakers.

2.1. Gender and number agreement in heritage speakers

Gender and number attribution and agreement are widely considered in heritage language studies (see Polinsky 2008, Albirini et al. 2013, Rodríguez and Reglero 2015, Lohndal and Westergaard 2016; 2021, Jegerski and Fernandez Cuenca 2025, Busterud et al. 2025, and others). Our study had the aim of checking whether the generalizations that were found through different kinds of tests, mainly grammaticality judgment tasks, could be replicated by our population. Before going into the details of our study, a terminological note is in order.

The term *agreement* refers to at least three different phenomena in linguistics: the first one is the attribution of lexical gender or number to an item. We will refer to that as "morphological agreement". It is usually assumed (much depending on one's theory of the lexicon) that this kind of gender is assigned directly to the lexical item. For instance, the word for 'chair' in Catalan is *cadira*. This lexical item is feminine singular, and this gender is independent of any agreement relation that this word might entertain with other elements in the clause. Especially in languages like Catalan, which are heavily morphologically gender-marked, gender and number are also visible on all the items occurring within an NP. We refer to that as "NP-internal agreement" or "Concord". For instance, 'the old and beautiful chair' in Spanish is *la cadir**a** vell**a** i bonic**a***, where the feminine singular morpheme *-a* appears on all items within the NP. This phenomenon is similar to "spreading" the ending through the phrase. The third kind of agreement is sentential, of which there are several subtypes. We will not consider agreement that occurs between the subject and the verb in this paper as it is not directly related to gender. A second type of sentential agreement is the sort of agreement that occurs in predicative sentences, for instance, or in secondary predication. The Catalan equivalent of English "Mary considers the chair too old" would be *La Maria considera la cadira massa vella,* where *vella* will be agreeing with *la cadira* in the same way as it would in a simple predicative structure like *La cadira és vella*, translated as "The chair is old". Catalan also has participial agreement, though it is more constrained and less consistently realized than, for example, Italian, so sentential agreement is mostly limited to the subject with the auxiliary, which does not show gender.

In this paper, we will be considering sentential agreement in predicative contexts with the aim of ascertaining whether heritage speakers have stable grammatical representations for long-distance syntactic sentential agreement, or whether their patterns reflect variability when compared to baseline Catalan speakers. Moving away from deficiency-oriented views of heritage speakers, which have been extensively criticized in the literature (Putnam and Sánchez 2013, Kupisch and Rothman 2016, among others), we adopt a non-deficit perspective on heritage grammars by treating differences from baseline varieties as instances of grammatical variability rather than grammatical incompleteness. Moreover, we challenge the problematic comparisons between heritage speakers and monolingual speakers (Rothman et al. 2023) by instead comparing bilinguals with bilinguals, which ensures a more ecologically valid comparison group.

2.1.1. Long-distance agreement and agreement attraction

Agreement and agreement attraction, i.e. the phenomenon whereby speakers accept agreement with the linearly closest intervening element, have been widely studied, both for monolingual speakers and for heritage speakers. Given the limited literature on Catalan as a heritage language, we take as our point of departure a study on Spanish, under the assumption that its findings can be extended to Catalan because of the almost complete overlap in agreement patterns between the two languages. The study is by Scontras et al. (2018), who investigate gender and number agreement in heritage Spanish speakers in the US. Their intent was different from ours: they were trying to check whether features probe separately, and whether principles of featural economy are at work, reducing agreement and bundling together features that normally agree separately. What matters for us is that they found that heritage Spanish speakers present strong deviations with respect to monolinguals when it comes to acceptability judgments. Before we examine Scontras et al.'s results, it is important to underline that the contact language they considered was English, and not German or Dutch. The contact language, as well as the language environment, can also play a role in the output of grammatical change (see for instance the study by Özsoy et al. 2022 on Turkish varieties in different language ecologies). For this short paper, we will set aside these small differences, especially given that both Dutch and German have rather reduced NP-internal agreement and therefore their effect can be considered equivalent to that of English. However, more work needs to be done in this respect.

Scontras et al. (2018) performed an auditory rating task: speakers were asked to rate the acceptability of a grammar on a 1–5 Likert scale. The results are very interesting: grammaticality effects are found only in the feminine, meaning that heritage speakers accept agreement of a feminine with a (default) masculine, but not vice versa. More than the results themselves, what is particularly interesting is that these effects are exactly the same as those found in monolingual speakers. In other words, no difference has been observed in the acceptability of long-distance agreement sentences for gender between monolinguals and heritage

speakers: what is different is that monolinguals consider the ungrammaticality of each feature (number or gender) separately, and therefore are also sensitive to the single featural mismatch, while heritage speakers cluster the two dimensions together.

For what concerns us, the interesting results are that in sentences with a long-distance agreement relationship heritage speakers accept ungrammatical agreement attraction by a linearly closer intervener, though it is also worthwhile considering that monolingual speakers also have the same effect (with respect to gender, not clustering). Scontras et al. reflect on the possibility that this acceptance might not stem only from a yes-bias but also from the heavy computational load that long-distance agreement imposes on speakers.

After considering these results, we set ourselves to check whether they would be the same if a different test were used. Like Scontras et al., we provided auditory stimuli. In order to check whether the speakers' judgments were informed by the yes-bias, by syntactic complexity, or by the task, we decided to perform a production task in the form of repetition and correction: our informants were instructed to correct the sentences that they found ungrammatical, and repeat them correctly. If the problem were only in the length of the sentences, practically equivalent to those in Scontras et al. (2018), we would expect the same results. If different tests yield different results, this would imply that we need to be cautious about the generalizations derived from any elicitation.

Before moving to the description of the test, one disclaimer is in order: our study was a small methodological exercise conducted under severe time constraints. This means that our findings should be regarded as a starting point for further investigation rather than as a solid generalization.

3. The test

3.1. Research questions and hypotheses

The study examined whether elicited imitation tasks could tap into heritage speakers' implicit knowledge of gender and number agreement in Catalan, and whether this method would reveal error patterns different from those observed in judgment tasks. The main predictions were:

1. Heritage speakers would "repair" ungrammatical agreement more often in repetition than acknowledge violations in judgment tasks.
2. The error profiles for number versus gender agreement attraction would help clarify which feature is more vulnerable in heritage grammars.

3.2. Methodology

3.2.1. Participants

A total of 37 informants participated in the present study. They constitute three main groups: Catalan heritage speakers, first-generation Catalan speakers and mainland Catalan speakers. The two immigrant groups (heritage speakers and first-generation speakers) are further subdivided by country of residence: Germany and the Netherlands, thus forming four subgroups. In the larger study for which this data was collected, mainland speakers were also divided between two different generations: a younger generation similar in age to the heritage speakers, and an older generation similar in age to the first-generation speakers. However, the present study does not investigate age-related variation within mainland speakers, and they are therefore treated as a single group. In this section, these subdivisions are described separately to better characterize the participants, but for the purpose of the analysis, we will maintain the division into three main groups.

Heritage speakers, as mentioned, are divided into two subgroups. The German group consisted of 6 speakers (2 male; 3 female; 1 non-binary/other), aged between 21 and 38 (mean age = 28.3; standard deviation [SD] = 6.5), and the Dutch group consisted of 3 speakers (1 male; 2 female), aged between 28 and 43 (mean age = 36.3; SD = 7.6). In terms of linguistic profile, the groups were highly homogeneous. All grew up in households with at least one Catalan parent and were exposed to both the majority language

	Heritage speakers Germany (n = 6)		Heritage speakers Netherlands (n = 3)		First-generation Germany (n = 10)		First-generation Netherlands (n = 10)	
	German	Catalan	Dutch	Catalan	German	Catalan	Dutch	Catalan
Speaking	3.0	2.2	3.0	2.0	2.7	3.0	2.0	2.9
Understanding	3.0	2.8	3.0	2.3	2.8	3.0	2.4	3.0
Reading	2.8	2.0	3.0	1.7	2.7	3.0	2.2	3.0
Mean	2.9	2.3	3.0	2.0	2.7	3.0	2.2	3.0

Table 1: Mean of self-reported ratings of Catalan, German, and Dutch proficiency by speaker group.

(German or Dutch) and Catalan from birth. The only exception was a US-born participant from the German group: although born to two Catalan parents, their exposure to German began at age 2, after moving to Germany. Moreover, all parents originated from the same Catalan region, namely, the province of Barcelona. While three participants had a year of formal Catalan instruction, the entire group was educated in the local majority language and self-identified as being more proficient in German or Dutch than in Catalan.

Language exposure and use were evaluated through two distinct parameters. First, participants identified their five most frequent interlocutors and the languages they used with each of them. The German-based group reported that German dominated their daily interactions (65.6%), with Catalan accounting for only 18.8%, and the remaining 15.6% distributed among English, Spanish, and/or Portuguese.[1] Similarly, the Dutch-based group used Dutch with 75% of their primary contacts, while the remaining 25% of interactions occurred in Catalan. The second parameter involved ranking exposure to German or Dutch and Catalan from 0 'never' to 5 'always' across different contexts (family, friends, reading, TV and series, and radio, music and podcasts). Both heritage groups reported moderate Catalan exposure within the family (mean = 3), but reported significant low levels of exposure in other domains (mean < 2 for Germany; mean < 1 for the Netherlands). Contrarily, exposure to the majority languages was high, especially with friends (mean = 4.17 in Germany; mean = 4.7 in the Netherlands). These metrics confirm a clear dominance in German or Dutch over Catalan. This imbalance is further reflected in participants' self-rated proficiency (scale from 1 'low' to 3 'high') across speaking, listening, and reading. A summary of the results, alongside first-generation speakers' data, is shown in Table 1. As can be observed, both groups reported higher overall competence in the majority language than in their heritage language.

The first-generation immigrant group consists of 20 Catalan speakers: 10 living in Germany (10 female), aged 28–63 (mean age = 46.5; SD = 9.7), and 10 living in the Netherlands (2 male; 8 female), aged 33–63 (mean age = 49.0; SD = 9.9). All emigrated from Catalonia and, in one instance, from the Balearic Islands, between the ages of 18 and 34, and all have resided in Germany or the Netherlands for at least 10 years (Germany: mean length of residence = 19.5; SD = 7.3; Netherlands: mean length of residence = 17.2; SD = 7.0). Geographically, most are from the province of Barcelona, matching the heritage speakers' parents. Only two are from Girona and one is from the Balearic Islands. With the exception of the two oldest participants, all were educated in Catalan; the outliers were schooled during or immediately after the Spanish Francoist dictatorship (1939–1975), a period when education in Catalan was prohibited. Regarding language dominance, 18 participants identified Catalan as their most fluent language, one cited German, and the remaining one English, followed by Dutch.

The evaluation of language exposure and use for first-generation immigrants followed the same parameters as the heritage group. In terms of social interaction, those in Germany reported using German

[1] This suggests a multilingual rather than bilingual background. Although additional languages could potentially influence Catalan attainment and change, analyzing those specific effects is beyond the current study's scope. Consequently, these other languages will be included in the analysis only if the data reveal significant outliers or unexpected deviations.

in 52.5% of daily conversations, Catalan in 27.9%, and Spanish or English in the remaining 19.6%. In contrast, first-generation speakers from the Netherlands used Dutch with only 24.1% of their interlocutors, with Catalan (44.4%) and a combination of Spanish and English (31.5%) making up the rest. Regarding exposure, both groups showed the highest Catalan engagement within the family (mean = 3.7). However, a divergence emerged in other contexts: while the group from Germany reported higher exposure to German than Catalan across all domains, the group from the Netherlands maintained higher Catalan exposure in all contexts except with friends (mean = 1.8). These differences in exposure and use between the two first-generation groups are mirrored in the dominant language proficiency ratings in Table 1, which are higher for German than for Dutch.

The mainland Catalan speakers constitute the control group, which provided an age-matched baseline for the two generations represented in the experimental groups. This group consisted of 8 speakers: a younger subset (n = 4; 2 male, 1 female, 1 non-binary/other) aged 18–25, and an older subset (n = 4; 2 male, 2 female) aged 51–60. All control speakers are from the province of Barcelona, consistent with the heritage speakers' parents and the first-generation group. Catalan is the dominant language for all mainland participants, with only one individual reporting equal dominance in Catalan and Spanish.

First-generation and heritage speakers were recruited through social media and snowball sampling, whereas mainland speakers were reached mainly through the researcher's personal network.

3.2.2. Stimuli

The task consisted of 30 stimuli: 18 experimental items, 4 control sentences, and 8 fillers. Because the task was part of a larger study (Colina Fortuny 2025), we used the filler items to test the phenomenon of interest, namely, sentences that can trigger agreement attraction effects. This specific distribution was thus chosen to provide enough critical stimuli for the agreement attraction analysis while limiting the overall length of the experimental session to prevent participant fatigue.

The stimuli were adapted from the materials of Fuchs et al. (2015), later used in Scontras et al. (2018). With the aim of using a structure where a noun intervenes between the source and target of agreement, and where all agreeing elements are marked for both gender (masculine vs feminine) and number (singular vs plural), they designed sentences with a small clause, with the following syntactic structure:

(1) (Subject) Verb [SC NP1 Prep NP2 Adv ADJ] … (Scontras et al. 2018)

As can be observed in (1), each small clause includes a noun (NP1) that is modified by a prepositional phrase containing a local noun (NP2). The small-clause subject (NP1) agrees with the predicative adjective or participle (ADJ), with the NP2 in between, as a distractor. The sentence is thus only grammatical if agreement of both number and gender takes place between the NP1 and the ADJ.

The stimuli were created by manipulating the number and gender of NP1, NP2, and ADJ, which resulted in grammatical and ungrammatical sentences. Of the 8 stimuli sentences, 4 targeted gender (mis)matches and 4 targeted number (mis)matches. Regarding the gender sentences, half were designed so that the ADJ agreed in both gender and number with the NP1 (grammatical), while matching NP2 only in number. In the other half, the ADJ agreed in both gender and number with the NP2 (ungrammatical), while matching NP1 only in number. In all cases, the two nouns differed in gender but shared the same number, as illustrated in (2).

(2) a. El nen considera l' article de la revista
the kid consider.PRS.3SG the.M/F.SG article.M.SG of the.F.SG magazine.F.SG
completament tràgic.
completely tragic.M.SG

b. *El nen considera l' article de la revista
the kid consider.PRS.3SG the.M/F.SG article.M.SG of the.F.SG magazine.F.SG
completament tràgica.
completely tragic.F.SG
Intended: 'The boy considers the article in the magazine completely tragic.'

The same was done with the sentences targeting number. Two were grammatical, with the ADJ agreeing with NP1 in gender and number, and only in gender with NP2. The other two were ungrammatical, with the ADJ agreeing with the NP2 in gender and number, and only in gender with the NP1. Again, in all cases, the two nouns differed in number but shared the same gender, as in (3).

(3) a. Considero la campana de les escoles excessivament sorollosa.
consider.PRS.1SG the.F.SG bell.F.SG of the.F.PL school.F.PL excessively noisy.F.SG

b. *Considero la campana de les escoles excessivament sorolloses.
consider.PRS.1SG the.F.SG bell.F.SG of the.F.PL school.F.PL excessively noisy.F.PL

Intended: 'I consider the school bell excessively noisy.'

This design allowed us to test whether heritage speakers made more errors in number or in gender, whether these errors were driven by agreement attraction, and whether this pattern was consistent across grammatical and ungrammatical sentences.

3.2.3. Task

The elicited imitation task was administered via a PowerPoint presentation. In each trial, participants first heard a sentence, followed by a short pause during which numbers, figures and letters were displayed on the screen. At the end of this pause, a beep indicated that they could repeat the sentence. This design was chosen because the rationale of this task is that sentence recall does not produce a passive copy but measures implicit linguistic knowledge (Bowles 2011, Ellis 2005, Erlam 2006). Introducing the pause has further been shown to reduce speakers' reliance on working memory (Kostromitina and Plonsky 2022).

The task included two practice sentences (one grammatical, one ungrammatical) to familiarize participants with the procedure. The stimulus sentences were elicited by the experimenter, a mainland Catalan speaker, and were presented in a randomized order to prevent confounding learning effects. Sentences were repeated once, and only twice if requested.

3.2.4. Procedure

The task was administered online via Google Meet. Participants were instructed to use a computer in a quiet environment with a stable internet connection. Sessions were audio-recorded using OBS Studio, and later transcribed and coded for analysis. At the end of each session, demographic information and linguistic history were collected from participants using the survey platform Qualtrics (https://www.qualtrics.com). The demographic information included participants' age, gender, place of birth, and place of residence. The linguistic information was divided into two sections: the first section consisted of general information about language acquisition, fluency, and use, while the second section consisted of information about Catalan and Dutch or German, which included schooling and proficiency levels.

Participants took part in the experiment on a voluntary basis and gave oral consent at the beginning of each session. The study received positive post-hoc advice from the Linguistics Chamber of the Faculty Ethics assessment Committee of the Faculty of Humanities (FEtC-H) (reference number: 25-076-02).

At the beginning of the session, participants were provided with a detailed explanation of the task procedure and were explicitly informed that some sentences might sound strange or unusual, and that they should repeat them as naturally as possible. During the practice phrase, when participants failed to correct the ungrammatical sentence, they were asked if they had noticed anything strange and how they would normally say it. When participants did not correct it, the experimenter simply confirmed that this was the intended approach. This was done following observations from the pilot study, in which participants tended to repeat ungrammatical sentences without correcting them, even when they were aware of the errors, as they interpreted the instructions as requiring verbatim repetition. After the two practice trials, we addressed any remaining questions before starting the main task.

	Mainland speakers (n= 8)			First-generation speakers (n = 19)			Heritage speakers (n = 9)		
	Count	*M* (%)	*SD*	Count	*M* (%)	*SD*	Count	*M* (%)	*SD*
Repeat grammatical	32/32	100.0	0.0	73/75	96.9	9.3	26/33	72.2	42.3
Correct ungrammatical	30/32	93.8	11.6	69/76	90.8	17.1	24/29	82.8	22.7

Table 2: Performance in repeating grammatical sentences and correcting ungrammatical sentences.

During the main task, to mitigate the impact of unstable internet connection, the experimenter always made sure that all stimuli were heard clearly. Participants were instructed to ask for a repetition if any part of a stimulus was unclear or inaudible. Despite this, one participant was unable to complete the task due to auditory difficulties.

3.3. Results

This section presents the results of the elicited imitation task. We begin with an overview of speakers' overall performance, followed by a general overview of the error types, and end with an analysis of agreement attraction effects based on the features of the head noun. Given the limited number of stimuli, we will report the raw counts without statistical results.

3.3.1. Overall performance

The performance of the three participant groups in repeating the grammatical and ungrammatical stimuli is summarized in table 2. For grammatical sentences, responses were considered correct if the resulting sentence was grammatical, whether the participants produced an exact repetition or modified the number and/or gender features of NP1, NP2 and/or ADJ while remaining grammatical. For ungrammatical sentences, responses were considered correct only when participants modified the sentence to make it grammatical. Instead, exact repetitions or changes that lead to an ungrammatical sentence were counted as incorrect. Note that only those sentences that maintained the structure in (1) were kept in the analysis. Changes that led to a different syntactic construction were discarded.

Overall, table 2 shows that mainland speakers, independently of sentence type, achieved the highest accuracy. First-generation speakers were less accurate in their responses, but with comparable results to mainland speakers. In contrast, heritage speakers showed a somewhat lower accuracy, especially when repeating grammatical sentences, where their performance varied considerably.

The relatively large standard deviations observed in some conditions, particularly among heritage speakers, indicate substantial individual variation in overall task performance. Such variability is extensively reported in heritage language populations and is often linked to differences in language exposure, use, and proficiency, among others, which can lead to individual variation exceeding between-group variation (e.g., Özsoy and Blum 2023). Importantly, however, this variation is related to overall accuracy rather than the structural patterns examined in the present study, as it will be shown that the effects related to agreement attraction remain consistent across participants.

To better understand participants' performance, table 3 presents the nature of their responses for each sentence type. Specifically, it shows whether they produced exact repetitions or changed them, and whether those changes resulted in grammatical or ungrammatical outputs. Note that while exactly repeating a grammatical sentence yields a grammatical output, exactly repeating an ungrammatical sentence does not.

Table 3 restates what is observed in table 2, but in greater detail. Mainland speakers show near-ceiling performance: they produced a high percentage of exact repetitions of grammatical sentences and corrected almost all ungrammatical sentences. First-generation speakers followed a similar pattern: they were very accurate in their repetitions of grammatical sentences and corrected most errors. Their only frequent error (although at a very low percentage) was the exact repetition of ungrammatical sentences. In contrast, heritage speakers showed more variability in their data: they generally produced grammatical outputs but struggled more with exact repetition than the other groups. When faced with ungrammatical sentences, they

	Mainland speakers			First-gen speakers			Heritage speakers		
	Count	*M* (%)	*SD*	Count	*M* (%)	*SD*	Count	*M* (%)	*SD*
Grammatical sentence									
Exact repetition	24/32	75.0	18.9	58/75	76.3	27.0	15/33	41.7	41.5
Changed grammatical	8/32	25.0	18.9	15/75	20.6	21.4	11/33	30.6	34.9
Changed ungrammatical	0/32	0.0	0.0	2/75	3.1	9.3	7/33	27.8	42.3
Ungrammatical sentence									
Exact repetition	2/32	6.3	11.6	6/76	7.9	14.6	2/29	9.4	18.6
Changed grammatical	30/32	93.6	11.6	69/76	90.8	17.1	24/29	80.2	22.7
Changed ungrammatical	0/32	0.0	0.0	1/76	1.3	5.7	3/29	10.4	14.6

Table 3: Response types for grammatical and ungrammatical sentences.

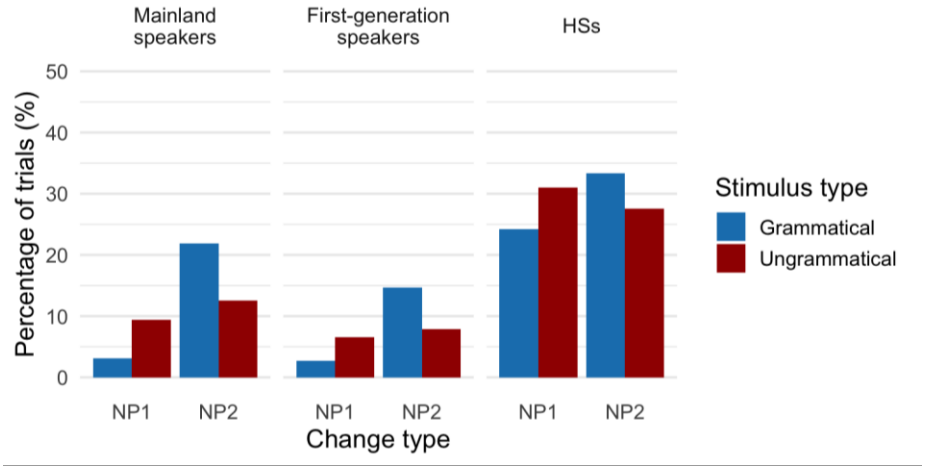

Figure 1: NP1 and NP2 changes grouped by stimulus type.

generally corrected them, but they were just as likely to repeat the error as they were to change it for a different ungrammatical version.

Finally, an important aspect to consider for the analysis is whether participants only changed the number and gender features of the adjective, as expected, or whether they also modified the features of NP1 and/or NP2 in their production. Figure 1 illustrates these changes. Heritage speakers produced the highest proportion of changes overall, followed by mainland speakers, with first-generation speakers producing the lowest proportion. Interestingly, across groups, NP2 was more often changed in grammatical than ungrammatical stimuli, while NP1 showed the opposite pattern, being more often changed in ungrammatical than grammatical stimuli.

3.3.2. Agreement errors type

In this section, we examine the agreement errors in gender and number. These comprise agreement attraction errors, which involve these phi-features, as well as gender errors that follow a masculine-default strategy or a shape-based strategy. The masculine default strategy consists of assigning masculine gender to all nouns, regardless of whether they are masculine or feminine. The shape-based strategy consists of assigning gender on the basis of the phonological, morphological, or orthographic form of the noun (e.g., in Spanish, nouns ending in *-o* are associated with masculine and those ending in *-a* with feminine). The distribution of gender and number error types is summarized in table 4.

	Mainland speakers		First-generation speakers		Heritage speakers	
	Count	%	Count	%	Count	%
Gender errors						
Agreement attraction	1/64	1.6	5/151	3.3	3/62	4.8
Masculine default	0/64	0.0	1/151	0.7	2/62	3.3
Shape-based	0/64	0.0	0/151	0.0	4/62	6.5
Number errors						
Agreement attraction	1/64	1.6	3/151	2.0	1/62	1.6

Table 4: Gender and number error types (counts and proportions).

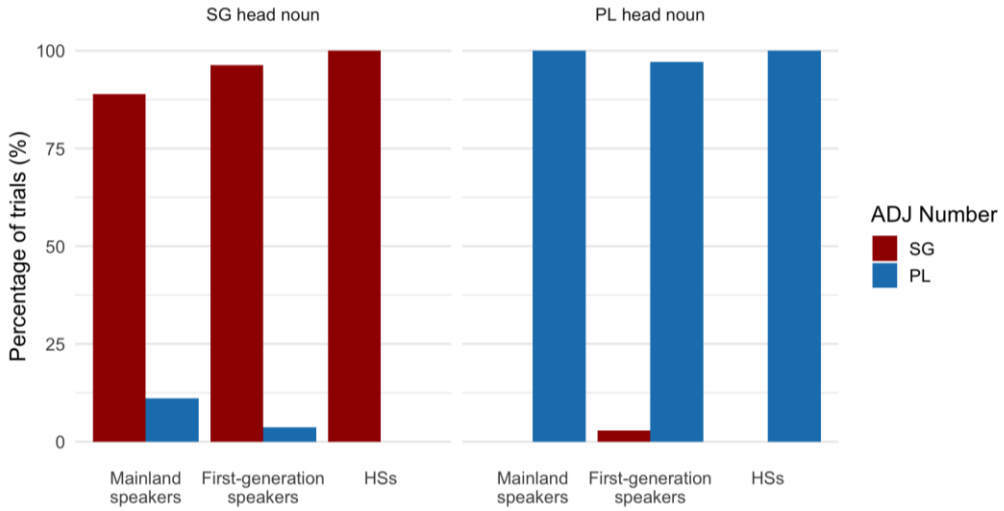

Figure 2: Speakers' production of singular and plural adjectives grouped by NP1 number.

Overall, gender and number errors were limited across speaker groups, with heritage speakers producing more errors, although at low rates. Across groups, gender-related errors were more frequent than number ones. Among the error subtypes, agreement attraction was the most common: it was the only error type produced by mainland speakers and the most frequent one among first-generation speakers. For heritage speakers, however, shape-based errors showed the highest percentage, despite the differences in raw counts being minimal.

3.3.3. Agreement attraction

This section follows Fuchs et al. (2015) and Scontras et al. (2018) in examining agreement attraction effects for number and gender, with the analysis organized by the features of the head noun (NP1), which determines agreement. In order to compare the results of these studies to those of the present one, we will only use those sentences where participants only changed the features of the ADJ in their repetitions, and not those of the NP1 and/or NP2. Based on this criterion, figure 2 shows participants' production of adjective number as a function of NP1 number, while figure 3 presents their production of adjective gender as a function of NP1 gender.

Singular head noun: To avoid possible effects of gender mismatches, gender was kept constant across NP1, NP2, and ADJ. To elicit agreement attraction, NP2 was assigned plural number, in contrast to the singular NP1. Thus, all cases in which the ADJ appeared in the plural reflect agreement attraction. As shown in Figure 1, all groups produced a high percentage of singular adjectives, consistent with the head noun. Performance was at ceiling in the case of heritage speakers. Both mainland and first-generation

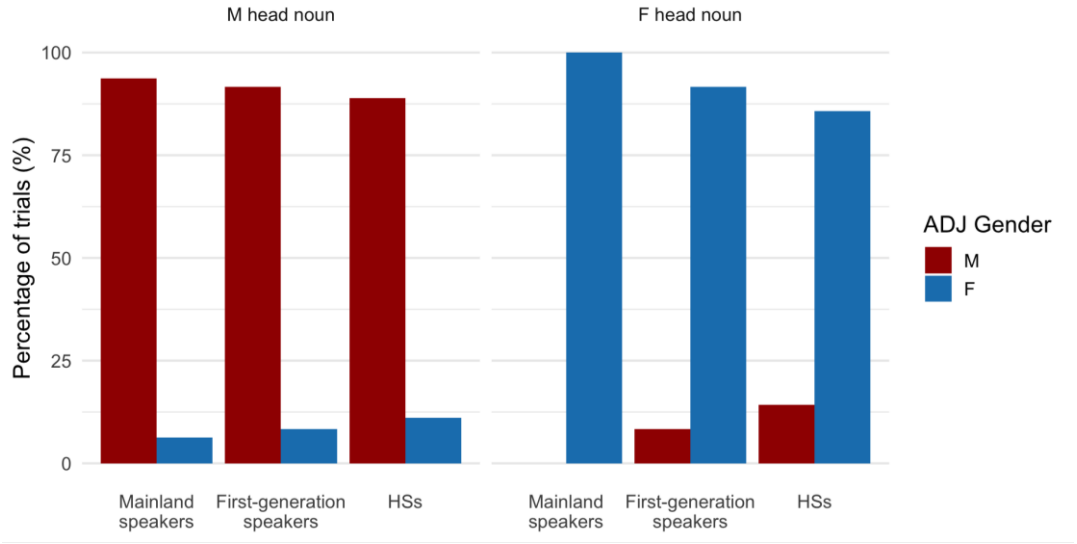

Figure 3: Speakers' production of masculine and feminine adjectives grouped by NP1 gender.

speakers produced plural adjectives due to agreement attraction effects, but the percentage was low. Despite the difference being minimal, mainland speakers were slightly outperformed by the other two groups in this condition.

Plural head noun: As in the singular head noun condition, gender was fixed across NP1, NP2, and ADJ. In this case, the NP2 was singular, in opposition to the head noun. All groups produced a very high percentage of plural adjectives, in agreement with the NP1. Performance was at ceiling for mainland and heritage speakers, with only a few number errors produced by first-generation speakers.
Masculine head noun: To avoid possible effects of number mismatches, number was kept constant across NP1, NP2 and ADJ. To trigger agreement attraction, NP2 was assigned feminine gender, in contrast to the masculine NP1. Consequently, all the cases where the ADJ appeared in the feminine reflect agreement attraction. As can be observed in figure 2, all three groups produced a high percentage of masculine adjectives, with only a small proportion of feminine errors.

Feminine head noun: As with the analysis of masculine head nouns, number was fixed across NP1, NP2 and ADJ. In this case, NP2 was masculine, in contrast with the feminine head noun. Across speaker groups, the percentage of correct agreement between the NP1 and the ADJ was high, reaching ceiling levels for mainland speakers. Both heritage speakers and, to a lesser extent, first-generation speakers produced agreement attraction errors by using a masculine ADJ, although the percentages are low.

4. Discussion, shortcomings, and conclusions

This study departs from the widely recognized challenge that the design and selection of experimental tasks crucially shape the data elicited from speakers of non-standardized varieties. Acceptability judgment tasks, although widely used to probe grammatical knowledge, have been shown to be sensitive to task parameters in ways that can significantly affect outcomes (Marty et al. 2020). To address this issue, we compare two methodologies—acceptability judgments and elicited imitation—to explore heritage speakers' grammatical representations.

Our starting point is the study by Scontras et al. (2018), who investigated gender and number agreement in Spanish heritage speakers in the US using an acceptability judgment task. Their results suggested differences between heritage speakers and monolinguals: while monolinguals rated sentences with a single feature mismatch (gender or number) as more acceptable than those with mismatches in both features, heritage speakers rated both types of violations equally. This was interpreted as evidence that, in

heritage grammars, gender and number features are bundled and valued together. Moreover, they found asymmetries in feature content: both monolinguals and heritage speakers tolerated default masculine adjectives with feminine nouns, but only heritage speakers accepted singular adjectives with plural nouns. This was taken as evidence of feature loss in number, with only plural specified in heritage grammars.

To test whether such findings may be task-dependent, we conducted an elicited imitation task, which is argued to tap into implicit grammatical knowledge. Following the stimulus structure of Scontras et al. (2018) while focusing specifically on feature content, we manipulated gender and number separately across the head noun (NP1), intervener (NP2), and adjective (ADJ), controlling for potential confounds. Contrary to previous findings, our results revealed no evidence of feature loss: heritage Catalan speakers made very few errors, at rates comparable to first-generation and mainland speakers, and they frequently corrected ungrammatical sentences regardless of the features involved. These findings indicate that heritage grammars retain separate values for both number and gender.

The discrepancy between our findings and generalizations derived from previous judgment-based studies suggests that the "incomplete" label often applied to heritage contexts may be an artifact of methodology. While heritage speakers may appear inconsistent in explicit ratings, their performance in the repetition task reveals a systematicity in their morphosyntactic representations. As seen in other heritage contexts (e.g., Tokaç-Scheffer et al. 2023, Van Baal 2025), a speaker may fail to explicitly reject an ungrammatical form while still demonstrating a robust, real-time sensitivity to those same grammatical features during production. As Bayram et al. (2019) point out, a grammar should not be labeled "incomplete" simply because it differs from an arbitrary standard variety. Our study shows that when using an implicit task (repetition), heritage speakers show high accuracy in number and gender agreement, confirming that these features are indeed retained and systematically represented in their minds, even if their performance differs from mainland speakers in other experimental settings. These results support a shift away from deficit-based narratives toward a view of heritage grammars as dynamic and internally consistent systems.

This study has a number of limitations that were listed throughout. First, given the limited literature on Catalan as a heritage language, we considered Spanish as a point of departure, as the syntax of the two languages is similar as far as gender is concerned. Then, the number of speakers is very small, also due to the fact that the Catalan community is of recent immigration. This means that the generalizations are only tentative and cannot be considered 100% accurate.

All in all, however, these outcomes highlight two key points. First, they challenge deficit-based accounts by showing that heritage speakers' feature representations can be robust when tested with tasks targeting implicit knowledge. Second, they demonstrate that methodological choices strongly affect the patterns we observe: while judgment tasks may underestimate heritage competence, repetition-based tasks can reveal richer aspects of grammatical representation. We therefore argue for a multi-method approach in heritage language research, where complementary methodologies are combined to provide a more comprehensive picture of heritage grammars. Only through such an approach can robust theoretical generalizations be drawn and simplistic deficit models be overcome.

Acknowledgments

To Johan: an inspiration, a champion of freedom, a friend, with admiration and affection.

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References

Albirini, Abdulkafi, Elabbas Benmamoun, and Brahim Chakrani. 2013. Gender and number agreement in the oral production of Arabic heritage speakers. *Bilingualism: Language and Cognition* 16 1: 1–18. https://doi.org/10.1017/S1366728912000132.

Andriani, Luigi, Jan Casalicchio, Francesco Maria Ciconte, Roberta D'Alessandro, Alberto Frasson, Brechje van Osch, Luana Sorgini, and Silvia Terenghi. 2022. Documenting Italo-Romance minority languages in the Americas. Problems and tentative solutions. In *Contemporary Research in Minority and Diaspora Languages of Europe*, edited by Andrew Nevins and Matt Coler, no. 6 in Contact and Multilingualism, pp. 9–56. Language Science Press, Berlin. https://doi.org/10.5281/zenodo.4902965.

van Baal, Yvonne. 2025. Acceptability judgments in moribund heritage languages: Mitigating the challenges. *Bergen Language and Linguistics Studies* 15 1: 7–14. https://doi.org/10.15845/bells.v15i1.4548.

Bayram, Fatih, Tanja Kupisch, Diego Pascual y Cabo, and Jason Rothman. 2019. Terminology matters on theoretical grounds too! Coherent grammars cannot be incomplete. *Studies in Second Language Acquisition* 41 2: 257–64. https://doi.org/10.1017/S0272263119000287.

Busterud, Guro, Terje Lohndal, Toril Opsahl, Yulia Rodina, and Marit Westergaard. 2025. Language change and the loss of feminine gender: Grammatical gender and declension class in the Oslo dialect. *Nordic Journal of Linguistics*: 1–26. https://doi.org/10.1017/S0332586525000071.

Colina Fortuny, Laia. 2025. *Object Pronouns in Catalan as a Heritage Language in Germany and in the Netherlands*. Master's thesis, Utrecht University. Available at https://studenttheses.uu.nl/handle/20.500.12932/50261.

Ellis, Rod. 1991. Grammaticality judgments and second language acquisition. *Studies in Second Language Acquisition* 13: 161–86. https://doi.org/10.1017/S0272263100009931.

D'Alessandro, Roberta, David Natvig, and Michael T. Putnam. 2021. Addressing challenges in formal research on moribund heritage languages: A path forward. *Frontiers in Psychology* 12: 700126. https://doi.org/10.3389/fpsyg.2021.700126.

Fuchs, Zuzanna, Maria Polinsky, and Gregory Scontras. 2015. The differential representation of number and gender in Spanish. *The Linguistic Review* 32 4: 703–37. https://doi.org/10.1515/tlr-2015-0008.

Jegerski, Jill and Sara Fernández Cuenca. 2025. Variability in the online processing of subject-verb number agreement in Spanish as a heritage language: The role of lexical frequency. *Languages* 10 9: 211. https://doi.org/10.3390/languages10090211.

Leivada, Evelina, Roberta D'Alessandro, and Kleanthes Grohmann. 2019. Eliciting big data from small, young, or non-standard languages: 10 Experimental challenges. *Frontiers in Psychology* 10: 313. https://doi.org/10.3389/fpsyg.2019.00313.

Leivada, Evelina, Itxaso Rodríguez-Ordóñez, M. Carmen Parafita Couto, and Silvia Perpiñán. 2023. Bilingualism with minority languages: Why searching for unicorn language users does not move us forward. *Applied Psycholinguistics* 44 3: 384–99. https://doi.org/10.1017/S0142716423000036.

Lohndal, Terje and Marit Westergaard. 2016. Grammatical gender in American Norwegian Heritage Language: Stability or attrition? *Frontiers in Psychology* 7: 344. https://doi.org/10.3389/fpsyg.2016.00344.

Lohndal, Terje and Marit Westergaard. 2021. Grammatical gender: Acquisition, attrition, and change. *Journal of Germanic Linguistics* 33 1: 95–121. https://doi.org/10.1017/S1470542720000057.

Marty, Paul, Emmanuel Chemla, and Jon Sprouse. 2020. The effect of three basic task features on the sensitivity of acceptability judgment tasks. *Glossa: a journal of general linguistics* 5 1: 72. https://doi.org/10.5334/gjgl.980.

Montrul, Silvina. 2002. Incomplete acquisition and attrition of Spanish tense/aspect distinctions in adult bilinguals. *Bilingualism: Language and Cognition* 5 1: 39–68. https://doi.org/10.1017/S1366728902000135.

Montrul, Silvina. 2008. *Incomplete Acquisition in Bilingualism: Re-examining the Age Factor*. No. 39 in Studies in Bilingualism. John Benjamins, Amsterdam. https://doi.org/10.1075/sibil.39.

Özsoy, Onur and Frederic Blum. 2023. Exploring individual variation in Turkish heritage speakers' complex linguistic productions: Evidence from discourse markers. *Applied Psycholinguistics* 44 4: 534–64. https://doi.org/10.1017/S0142716423000267.

Özsoy, Onur, Kateryna Iefremenko, and Christoph Schroeder. 2022. Shifting and expanding clause combining strategies in heritage Turkish varieties. *Languages* 7 3: 242. https://doi.org/10.3390/languages7030242.

Polinsky, Maria. 2006. Incomplete acquisition: American Russian. *Journal of Slavic Linguistics* 14: 161–219.

Polinsky, Maria. 2008. Gender under incomplete acquisition: Heritage speakers' knowledge of noun categorization. *Heritage Language Journal* 6 1: 40–71.

Polinsky, Maria. 2018. *Heritage Languages and Their Speakers*. No. 159 in Cambridge Studies in Linguistics. Cambridge University Press, Cambridge. https://doi.org/10.1017/9781107252349.

Putnam, Michael T. and Liliana Sánchez. 2013. What's so incomplete about incomplete acquisition? A prolegomenon to modeling heritage language grammars. *Linguistic Approaches to Bilingualism* 3 4: 478–508. https://doi.org/10.1075/lab.3.4.04put.

Rodríguez, Estrella and Lara Reglero. 2015. Heritage and L2 processing of person and number features: Evidence from Spanish subject-verb agreement. *EuroAmerican Journal of Applied Linguistics and Languages* 2 2: 11–30. https://doi.org/10.21283/2376905X.3.46.

Romano, Francesco and Pedro Guijarro-Fuentes. 2023. Task effects and the yes-bias in heritage language bilingualism. *International Journal of Bilingual Education and Bilingualism* 27 3: 389–409. https://doi.org/10.1080/13670050.2023.2206949.

Rothman, Jason, Fatih Bayram, Vincent DeLuca, Grazia Di Pisa, Jon Andoni Duñabeitia, Khadij Gharibi, Jiuzhou Hao, Nadine Kolb, Maki Kubota, Tanja Kupisch, Tim Laméris, Alicia Luque, Brechje van Osch, Sergio Pereira Soares, Yanina Prystauka, Deniz Tat, Aleksandra Tomić, Toms Voits, and Stefanie Wulff. 2023. Monolingual comparative normativity in bilingualism research is out of "control": Arguments and alternatives. *Applied Psycholinguistics* 44 3: 316–29. https://doi.org/10.1017/S0142716422000315.

Scontras, Gregory, Zuzanna Fuchs, and Maria Polinsky. 2018. In support of representational economy: Agreement in heritage Spanish. *Glossa: a journal of general linguistics* 3 1: 1. https://doi.org/10.5334/gjgl.164.

Sprouse, Jon and Diogo Almeida. 2017. Setting the empirical record straight: Acceptability judgments appear to be reliable, robust, and replicable. *Behavioral and Brain Sciences* 40: e311. https://doi.org/10.1017/S0140525X17000590.

Sprouse, Jon, Carson Schütze, and Diogo Almeida. 2013. A comparison of informal and formal acceptability judgments using a random sample from *Linguistic Inquiry* 2001–2010. *Lingua* 134: 219–48. https://doi.org/10.1016/j.lingua.2013.07.002.

Tokaç-Scheffer, Suzan D., Seçkin Arslan, and Lyndsey Nickels. 2023. Insights into the time course of evidentiality processing in Turkish heritage speakers using a self-paced reading task. *Frontiers in Communication* 8: 1070510. https://doi.org/10.3389/fcomm.2023.1070510.

On the Merge sites of Dutch perception verbs

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Abstract

This paper investigates the syntactic distribution of Dutch perception verbs and argues that their different uses correspond to distinct Merge positions in the clausal spine. Focusing on verbs such as *horen* 'hear' and *kijken* 'look', we distinguish four types: fully lexical perception verbs, ECM-perception verbs, inflected imperatives in dialect Dutch, and perception verbs used as discourse markers. These uses form a cline from lexical to functional status. Evidence for the higher Merge positions comes from a comparison of regular imperatives, inflected imperatives, and discourse-marker uses, evaluated against criteria such as semantic bleaching, argument structure, class size, and morphological defectiveness. Evidence for the lower Merge positions comes from corpus-based ordering and co-occurrence patterns involving perception verbs and auxiliaries, modals, causative verbs, motion verbs, posture verbs, and passive auxiliaries. We propose that ECM-perception verbs are merged in a specialized *v*-position associated with perception and causation, while discourse-marker uses occupy the speech-act layer.

1. Introduction

Perception verbs are well-known for their propensity to undergo meaning shifts, from their literal, sensory meaning into a more abstract, cognitive one (Evans and Wilkins 2000, San Roque et al. 2018). Moreover, these shifts are frequently accompanied by a change in their grammatical behavior, with a particularly clear case being the development of perception verbs into markers of evidentiality or discourse particles (Rooryck 2001a;b, Brinton 2001, Waltereit 2002, Waltereit and Detges 2007, Benjamin 2010, Haegeman 2010, de Villiers 2025). This paper is a case study on Dutch perception verbs. We identify four uses of these verbs, ranging from the fully lexical to the fully functional, and associate a specific Merge position with each type (adopting and extending a proposal by Cardinaletti and Giusti 2001). Evidence in support of this analysis comes from a previously undiscussed imperative construction in dialect Dutch as well as corpus-based co-occurrence and ordering patterns between perception verbs and various types of auxiliaries.

The paper is organized as follows. In the next section we introduce our core proposal: there are four Merge positions for a perception verb like *horen* 'to hear' in the clausal spine of Dutch. The next two sections provide substantiating evidence for this proposal. Section 3 focuses on the higher Merge positions, by comparing three types of imperative(-like) configurations that perception verbs can occur in, while section 4 turns to the lower Merge positions. In that section, we present corpus data on the ordering and co-occurrence patterns of ECM-perception verbs and various types of auxiliaries. Section 5 sums up and concludes.

2. The core proposal: Four Merge positions for Dutch perception verbs

In this section we illustrate the four guises of perception verbs under discussion in this paper.[1] The first is the most canonical use of perception verbs, i.e. when they occur as the main lexical predicate of the clause. The sentence in (1) contains no other verbal predicate, and so the verb *horen* 'to hear' is responsible for θ-role assignment and it forms the lexical core of the clausal spine.

(1) Ik hoor de hond.
I hear the dog
'I hear the dog.'

[1] Unless indicated otherwise, all examples in this paper are from (sometimes colloquial) Standard Dutch.

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In the example in (2) the verb *horen* 'to hear' is used in combination with another lexical predicate, namely *blaffen* 'to bark'. On the one hand, this use of *horen* clearly still carries the basic meaning of 'auditory perception', but on the other it also shows characteristics that are more functional or auxiliary-like. For one, when embedded under the perfective auxiliary *hebben* 'to have', this instance of *horen* undergoes IPP and hence shows up as an infinitive (see also Wurmbrand 2001). This is shown in (3).

(2) Ik hoor de hond blaffen.
I hear the dog bark
'I hear the dog bark.'

(3) Ik heb de hond {horen / *gehoord} blaffen.
I have the dog hear heard bark
'I heard the dog bark.'

The construction shown in (4) is one that only shows up in certain nonstandard varieties of Dutch. Apart from an analysis in van Craenenbroeck and van Koppen (2025) it is a phenomenon that has thus far not received any attention in the theoretical literature (though it is noted in the descriptive dialectological literature, see e.g. van Weel 1904:79 and Weijnen 1966:308). It concerns an ECM-use of a perception verb, but one that shows an otherwise unattested form of agreement, namely with the subject of an embedded infinitival clause. Compared to the use of *horen* in (2), the one in (4) seems to be even further removed from the core lexical use in (1). For instance, the construction is limited to imperatives and cannot be found in any other clause type. Moreover, the type of agreement found on this imperative use of *horen* is very reminiscent of so-called complementizer agreement (van Koppen 2017), a type of ϕ-agreement that shows up on finite complementizers.[2] At the same time, the translation of the example in (4) makes clear that the basic auditory perception reading of *horen* 'to hear' is still present in this example. There is a sense, then, in which this element is not fully functional.

(4) Hoor-e die honden es blaffen!
hear-PL those dogs PRT bark
'Listen to those dogs bark!' Rotterdam Dutch

The fourth and final use case of Dutch perception verbs under investigation in this paper is illustrated in (5). It concerns the use of perception verbs as discourse markers or particles. Here, we are furthest removed from the basic lexical use shown in (1): there is no longer a reading of auditory perception, the element occupies a clause-peripheral position, it can only occur in one form (the imperative), and it never shows agreement (neither in Standard Dutch, nor in the varieties allowing for inflected imperatives).

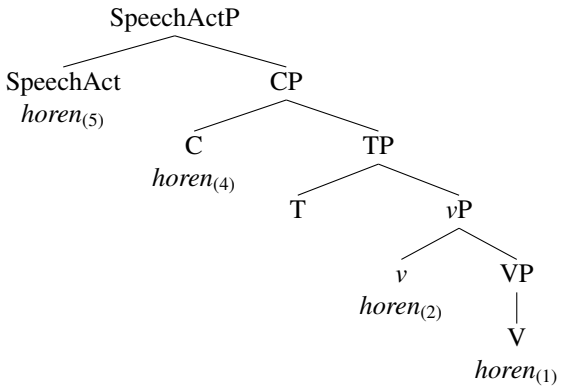
(5) Die honden blaffen, hoor.
those dogs bark hear
'Those dogs bark, you know.'

In this paper, we consider these four use cases of perception verbs to be stages in a grammaticalization process, which we analyze as the transition from purely lexical to purely functional material (Roberts and Roussou 1999, Cardinaletti and Giusti 2001). More specifically, we propose that the four types of perception verb contexts introduced above can be linked to four different (first) Merge positions. This proposal can be schematically represented as in (6).

[2] The agreement ending found on the imperative in (4) is identical to the regular (plural) finite verb inflection in the present tense, as well as the ending found on imperative verbs with an overt plural subject, as in (i) (see Bennis 2006 for detailed discussion).

(i) Eet-e jullie maar lekker verder!
eat-PL you$_{PL}$ PRT nicely further
'Just carry on eating!'

(6)



The bracketed subscripts in this tree structure refer to the examples we gave earlier. Unsurprisingly, and uncontroversially, we propose that the fully lexical version of a perception verb – i.e. its use as a main verb, corresponding to *horen*$_{(1)}$ in (6) – is first merged at the very foot of the tree.[3] The ECM-use of *horen* 'to hear' shown in (2) occupies a position in the verbal functional sequence. Based on ordering and co-occurrence restrictions with a variety of auxiliaries, we will identify this position in section 4 as a little *v*-head that is specialized for perception and causation. Thirdly, the perception verb that features in the Rotterdam Dutch inflected imperative in (4) is merged directly in C, while the discourse marker occupies a specialized speech act related position outside of CP (see also de Villiers 2025, and see Wurmbrand 2001 and Cavirani-Pots 2020 for more general discussion of the lexical-functional divide and the various types of intermediate categories). In the remainder of this paper we further substantiate and refine this proposal. We focus first on the higher positions, by providing a detailed comparison of three types of imperative(-like) structures in section 3. Then, in section 4, we zoom in on the ECM-use of perception verbs, in an attempt to more narrowly define and identify the position occupied by this use case.

3. The higher Merge positions: Imperative perception verbs

As is well-known, discourse markers – at least in Indo-European languages – are often derived from imperative verbs (Brinton 2001, Waltereit and Detges 2007, Benjamin 2010). In light of this we base our exploration of the higher Merge positions of perception verbs on a detailed comparison between three types of imperative or imperative-like constructions. The first is a regular – i.e. non-inflected – imperative, as illustrated in (7).

(7) Hoor die meeuwen es een kabaal maken!
hear those seagulls PRT *a racket make*
'Listen to those seagulls make noise!'

The second imperative structure under discussion in this section are the inflected imperatives introduced in section 2. We provide a second example in (8).

(8) Hoor-e die meeuwen es een kabaal maken!
*hear-*PL *those seagulls* PRT *a racket make*
'Listen to those seagulls make noise!' Rotterdam Dutch

Note that the plural agreement ending on the imperative perception verb is indeed number agreement with the exceptionally case-marked subject of the embedded infinitival (i.e. the DP *die meeuwen* 'those seagulls'). When that subject is replaced by a singular DP, the agreement ending obligatorily disappears:

[3] In this paper we leave open the question of whether lexical items spell out a dedicated Root node or not, as this is orthogonal to our main concerns.

(9) Hoor(*-e) die meeuw es een kabaal maken!
hear-PL that seagull PRT a racket make
'Listen to that seagull make noise!' Rotterdam Dutch

The third type of construction under consideration here is the use of formally imperative perception verbs as discourse markers:

(10) Die meeuwen maken een kabaal, hoor!
those seagulls make a racket hear
'Those seagulls sure make a lot of noise!'

We will now proceed to show that inflected imperatives occupy an intermediate position between the other two constructions with respect to a number of criteria typically associated with grammaticalization (cf. Abney 1987, Hopper and Traugott 1993, Benjamin 2010, Waltereit and Detges 2007). Following Cardinaletti and Giusti (2001) we will take these different degrees of functional versus lexical behavior to be an indication of the first Merge height of the elements involved, with the discourse markers occupying the highest position, followed by the inflected imperatives and finally the regular imperatives, as outlined in the previous section. The criteria we focus on in comparing the three types of imperatives are (i) phonological reduction, (ii) semantic bleaching, (iii) argument structure, (iv) open vs. closed class, and (v) morphological defectiveness. These are criteria used by Abney (1987) and Hopper and Traugott (1993) to distinguish functional from lexical items. In all five cases we will see that perception verbs used as discourse markers clearly qualify as functional elements, while the other two occupy a more nuanced position, with inflected imperatives tending more towards the functional lexicon than regular imperatives.

Let us start by looking at phonological reduction. The idea here is when a morpheme undergoes a change from lexical to functional, its phonological shape may also be reduced. In the case of the perception verbs used as discourse markers, this is indeed what we sometimes find. Consider for example the sentence in (11) (and see Haegeman 2010 for similar examples from the dialect of Lapscheure).

(11) Ze ziet hem daar staan, zè.
she $sees_{unreduced}$ him there stand $see_{reduced}$
'She can see him standing there, you know.' colloquial Belgian Dutch

This example contains an instance of both the ECM-use of the perception verb *zien* 'to see' and its use as a discourse marker. In the latter case the stem vowel of the original verb is shortened, and as a result the form is reduced. By contrast, both regular and inflected imperatives are always form-identical to the main verb use of the perception verb.[4] An illustrative case in this respect is provided by the following examples.

(12) Ik kijk naar televisie.
I look to television
'I watch television.'

(13) Kijk die koeien es gek doen!
look those cows PRT crazy do
'Look at those cows going crazy!'

(14) Kijk-e die koeien es gek doen.
look-PL those cows PRT crazy do
'Look at those cows going crazy.' Rotterdam Dutch

The example in (12) illustrates the main verb use of the perception verb *kijken* 'to look', while the sentences in (13) and (14) show regular and inflected imperatives respectively. In all three cases the form of the verb is identical, and this is representative for the full range of data.

[4] As a reviewer points out, the lack of reduction in (13)–(14) might be due to the imperative clause type, which arguably places extra emphasis on the verb. In other words, the presence of reduction in (11) is more informative than its absence in (13)–(14).

Another typical characteristic of an element undergoing a change from the lexical to the functional domain is the fact that its meaning gets bleached. Once again, this clearly applies to discourse markers derived from perception verbs, in two ways. Consider first the example in (15). Imagine that we are talking about students in Ibiza, but that we cannot see those students. In such a context, an utterance like the one in (15) is perfectly well-formed.

(15) Kijk, die studenten op Ibiza doen gek.
look those students on Ibiza do crazy
'Look, those students on Ibiza are going crazy.'

This shows that the original meaning of 'visual perception' is no longer present in the form *kijk* in (15), i.e. that meaning has been bleached. This conclusion extends to the meaning typically associated with the inflectional form of the verb, i.e. the imperative. When we force the example in (15) in an unambiguously imperative context by embedding it under an explicit speech act, the result is infelicitous:

(16) #Ik beveel je: kijk, die studenten op Ibiza doen gek.
I order you look those students on Ibiza do crazy

In short, the form of the perception verb used as a discourse marker has lost both its lexical meaning and the meaning associated with its inflectional paradigm, and has instead acquired a more general, discourse-functional meaning related to the perspective of the speaker or the mediation of the relationship between speaker and hearer (see also de Villiers 2025). The opposite conclusion holds for regular imperatives of perception verbs. This is shown in (17) and (18).

(17) #Kijk die studenten op Ibiza es gek doen!
look those students on Ibiza PRT *crazy do*
'Look at those students on Ibiza go crazy!'

(18) Ik beveel je: kijk die studenten op Ibiza es gek doen!
I order you look those students on Ibiza PRT *crazy do*
'I order you: look at those students on Ibiza go crazy!'

In the context sketched before – i.e. there is no visual contact with the students on Ibiza – a regular imperative of a perception verb is infelicitous (17). On the other hand, this type of construction can straightforwardly be embedded under an explicit speech act, as shown in (18). Together, this clearly shows that the perception verb found in regular imperatives has not undergone any semantic bleaching: it has its full lexical meaning, and the contribution of the imperative morphology is equally transparent and compositional.

Inflected imperatives occupy a middle ground between these two extremes. On the one hand, they are like regular imperatives in that they are incompatible with a context in which the visual perception reading is absent:

(19) #Kijk-e die studenten op Ibiza es gek doen.
*look-*PL *those students on Ibiza* PRT *crazy do*
'Look at those students on Ibiza go crazy.' Rotterdam Dutch

On the other hand, they cannot be embedded under an explicit directive speech act, just like modal particles derived from perception verbs:

(20) #Ik beveel je: kijk-e die studenten op Ibiza es gek doen!
*I order you look-*PL *those students on Ibiza* PRT *crazy do* Rotterdam Dutch

This suggests that inflected imperatives have undergone a certain degree of semantic bleaching. This conclusion is further supported by the contrast in (21)–(22).

(21) Kijk die koeien door de verrekijker es gek doen.
look those cows through the binoculars PRT *crazy do*
'Look through the binoculars at those cows go crazy.'

(22) #Kijk-e die koeien door de verrekijker es gek doen.
*look-*PL *those cows through the binoculars* PRT *crazy do* Rotterdam Dutch

In these examples we try to modify the perception verb with the adjunct *door de verrekijker* 'through the binoculars'. This goes well in the case of the regular imperative in (21), but not with the inflected imperative in (22).[5] This suggests that even though the basic meaning of visual perception is retained in the latter case, some portion of that meaning is nonetheless missing (see also the discussion of argument structure below). More generally, inflected imperatives occupy a middle position between the fully bleached modal particles on the one hand, and the non-bleached regular imperatives on the other.

The third property under discussion here is argument structure. Functional elements are assumed to have only very limited selectional capabilities. Essentially, all they can do is select the next head in the functional sequence as their complement. Lexical items on the other hand can introduce arguments and thus have more extensive selectional options. We can operationalize this criterion by looking at the presence of a *pro*-subject in the imperative constructions under consideration. Such a subject would be introduced by the perception verb, which in turn would indicate that this verb has its own argument structure. Unsurprisingly, in the case of regular imperatives, there are clear indications that there is indeed a *pro*-subject present. For one, this subject can bind an anaphor in the subject position of the embedded infinitival clause, and secondly, it can also be overtly realized as the second person singular pronoun *jij*. This is illustrated in (23) and (24) respectively.

(23) Kijk pro$_i$ jezelf$_i$ es gek doen!
look yourself PRT *crazy do*
'Look at yourself going crazy!'

(24) Kijk jij die kinderen es gek doen!
look jij those children PRT *crazy do*
'Look at those children going crazy!'

Once again, perception verbs used as discourse markers are at the opposite end of the spectrum: as the examples in (25)–(26) show, there is no way to combine this use case with either an anaphor or an overt second-person subject.

(25) *Kijk, hij ziet jezelf.
look he sees yourself

(26) *Kijk jij, die koeien doen gek.
look you those cows do crazy

Inflected imperatives seem to pattern with discourse markers rather than regular imperatives, in that they do not allow for the presence of an anaphor or an overt subject:[6]

[5] The example in (22) has an irrelevant and pragmatically odd reading in which the crazy behavior of the cows is binocular-related.

[6] Note that the ill-formedness of (27) is not due to a number mismatch between (a hypothetical) *pro* and the anaphor. As shown in (i) and (ii), *jezelf* 'yourself' is the second person anaphor for both singular and plural antecedents.

(i) Je hebt jezelf niets te verwijten.
you$_{SG}$ *have yourself nothing to blame*
'You shouldn't blame yourself.'

(ii) Jullie hebben jezelf niets te verwijten.
you$_{PL}$ *have yourself nothing to blame*
'You shouldn't blame yourselves.'

(27) *Kijk-e jezelf es gek doen!
look-PL yourself PRT crazy do Rotterdam Dutch

(28) *Kijk-e jullie die kinderen es gek doen!
look you those children PRT crazy do Rotterdam Dutch

There is a twist, though: even though an inflected imperative cannot introduce a subject of its own, it does impose restrictions on the DP it agrees with. This is shown in (29) and (30).

(29) Kijk-e {die mensen / #die tafels} es in de weg staan.
look-PL those people / those tables PRT in the way stand
'Look at those {people/#tables} standing in the way.' Rotterdam Dutch

(30) #Kijk-e die koeien es paars zijn.
look-PL those cows PRT purple be
INTENDED: 'Look at those cows be purple.' Rotterdam Dutch

Even though *kijk* 'look' does not take the DP it agrees with as an argument, it nonetheless requires that this DP be agentive. That explains the contrast in (29): while people can willfully and consciously stand in the way, tables cannot. Similarly, on the reading of (30) whereby the only remarkable property of the cows is their color, the use of an inflected imperative is infelicitous, since this would involve a non-agentive reading of the DP *die koeie* 'those cows'. This means that inflected imperatives once again occupy a middle position between regular imperatives on the one hand and discourse markers on the other: like the latter they are not able to select an argument, but at the same time they do impose restrictions on the subject argument of the embedded clause.[7]

The fourth criterion for distinguishing lexical from functional material concerns the question of open versus closed classes. Functional items typically belong to a closed class, whereas prototypical lexical items are part of open lexical classes. Restricting ourselves for the moment to perception verbs, we see differences between the three contexts under consideration as well. Regular imperatives can be formed of any perception verb:

(31) {Hoor / Kijk / Voel / Zie / Ruik} die meeuwen es een rommeltje maken!
hear / look / feel / see / smell those seagulls PRT a mess make
'Listen to/look at/feel/see/smell those seagulls mak(e/ing) a mess.'

With inflected imperatives and perception verbs used as discourse markers, however, there are clear restrictions. The former are only compatible with a small subset of perception verbs:

(32) {Hoor-e / Kijk-e / *Voel-e / *Zie(n)-e / *Ruik-e} die meeuwen een rommeltje maken!
hear-PL / look-PL / feel-PL / see-PL / smell-PL those seagulls a mess make
'Listen to/look at/feel/see/smell those seagulls mak(e/ing) a mess.' Rotterdam Dutch

The same holds for the discourse markers: not only can only a limited subset of perception verbs be used as a particle, their word order patterns also vary, in that some are used clause-finally, while others occur clause-initially (see also de Villiers 2025 for similar observations about Afrikaans).

(33) Kijk, die meeuwen maken een kabaal, {hoor / zè / *voel / *ruik}.
look those seagulls make a racket hear / see / feel / smell
'Look, those seagulls sure make a lot of noise, you know.'

Finally, let us turn to the fifth and final criterion, namely morphological defectiveness. When undergoing grammaticalization, lexical items sometimes undergo a reduction in morphological or morphosyntactic productivity. This is something we see in our data set as well, in particular when we consider the declarative

[7]The restriction on the embedded subject cannot be ordinary semantic selection, since the inflected imperative does not introduce this argument. Instead, it parallels the behavior of causees in causative constructions, see e.g. Pylkkänen (2008).

counterpart of the imperative constructions under scrutiny here. Regular imperatives of perception verbs invariably also have a declarative counterpart:

(34) Jij hoort de mannen roepen.
you hear the men shout
'You hear the men shout.'

This does not hold, however, for inflected imperatives. In other words, the possibility of a perception ECM-verb agreeing with the subject of the embedded infinitival clause only shows up in imperative contexts. This is illustrated in (35).

(35) *Jij hoor-e de mannen roepen.
you hear-PL the men shout Rotterdam Dutch

This restriction to imperative contexts is something we also find with perception verbs used as discourse markers. As is well-known from the literature (Brinton 2001, Waltereit and Detges 2007, Benjamin 2010), it is specifically the imperative form of the verb that is prone to reinterpretation as a discourse particle. Unsurprisingly, then, a declarative counterpart of this use is missing:

(36) *De mannen roepen, jij hoort.
the men shout I hear

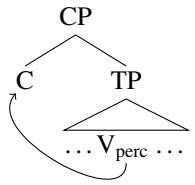
This concludes our comparison of three imperative or imperative-like constructions involving perception verbs: regular imperatives, inflected imperatives, and imperative verbs used as discourse markers. The table in (37) summarizes the data we have surveyed.

(37)

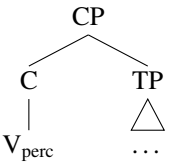
	regular imperative	**inflected imperative**	**imperative as discourse marker**
phonological reduction	–	–	+
bleached meaning	–	+/–	+
lack of argument structure	–	+/–	+
closed class	–	+	+
morphological defectiveness	–	+	+

This table clearly shows that inflected imperatives occupy an intermediate position between regular imperatives on the one hand and imperatives used as discourse markers on the other. While the latter are fully functional and the former have clear lexical properties – though see section 4 below for further discussion – inflected imperatives are more semi-lexical – or semi-functional – in nature.[8] It is this tripartition that we have tried to capture in the analysis outlined in section 2, a more imperative-specific version of which is given in (38)–(40).

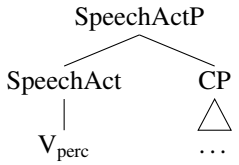
(38) **regular imperatives**



(39) **inflected imperatives**



(40) **discourse markers**



[8] They closely resemble the class of semi-lexical restructuring predicates discussed in Wurmbrand (2001), which combine functional behavior with residual thematic restrictions.

When a perception verb occurs in a regular imperative as in (38), it is merged inside TP – see the next section for a discussion of the first Merge position – and it undergoes head movement to C. Inflected imperatives on the other hand are merged directly in C. This results in a loss of a number of their lexical properties – like the ability to introduce arguments, see above – but at the same time they still occupy the canonical imperative position and as such are still clearly verbal in nature.[9] One rather straightforward indication of this is their inability to occur with another finite verb:

(41) *Kijk-e die jongens doe-n gek!
look-PL those boys do-PL crazy Rotterdam Dutch

Perception verbs that function as discourse markers are yet another step further removed from their verbal origins. As shown in (40), they are no longer merged in the C-position, but occupy a higher functional head dedicated to speech act related information (see de Villiers 2025 and references cited there for recent discussion). As a result, most – if not all – of the verbal, lexical properties are gone and the item functions as a purely functional element. This can again fairly straightforwardly be illustrated by examples such as the one in (42), which shows that in contrast to the inflected imperative in (41), a perception verb used as a discourse marker is perfectly compatible with a finite verb in the canonical V2-position:

(42) Kijk, die jongens doe-n gek.
look those boys do-PL crazy
'You know, those boys are acting crazy.'

This concludes our discussion of the higher Merge positions of perception verbs. In the next section we zoom in on the lower part of the clausal functional sequence and attempt to pinpoint the position of the ECM-use of perception verbs.

4. The lower Merge positions: Lexical vs. ECM-perception verbs

The complements of ECM-perception verbs are well-known to be structurally deficient compared to regular clausal complements (Felser 1999, Wurmbrand 2001), a property that we will argue follows from the fact that an ECM-perception verb is merged in a functional v-position in the verbal functional sequence dominating the lexical verb. In this section we provide supporting evidence in favor of this position. Our line of reasoning is inspired by Bennis and Hoekstra's (1989) famous observation that the ECM-use of perception verbs cannot be passivized:

(43) *Kaatje werd een liedje gehoord/horen zingen.
Kaatje became a song heard/hear sing
INTENDED: 'Kaatje was heard singing a song.'

This is surprising given that (a) there is no ban on passivizing perception verbs as such (44), and (b) nor is there a ban on passivizing ECM-verbs (45).

(44) Zijn stem werd luid en duidelijk gehoord.
his voice became loud and clear heard
'His voice was heard loud and clear.'

(45) a. Ik vind Jan vervelend.
I find Jan annoying
'I find Jan annoying.'

[9] For a fully worked-out technical analysis of inflected imperatives, we refer the reader to van Craenenbroeck and van Koppen (2025). In a nutshell, the embedded subject is the closest goal for the ϕ-Probe on C, which is what allows it to raise into the matrix subject position and trigger agreement on the imperative verb.

b. Jan wordt vervelend gevonden.
Jan becomes annoying found
'Jan is considered annoying.'

Bennis and Hoekstra's analysis relied heavily on theoretical machinery that was *en vogue* at the time – T-chains and government to be precise – but that has since been abandoned. We will take the ill-formedness of (43) to be due to the respective positions of passive morphology and perception verbs in the verbal functional sequence, with the former crucially being merged lower than the latter. This not only rules out the Bennis and Hoekstra example, it also suggests that in their lexical, non-ECM use, perception verbs are merged lower than passive – at the foot of the verbal functional sequence essentially – which explains why cases like (44) are perfectly well-formed. In order to be able to make this point more forcefully – and to get a more fine-grained picture of the Merge position of ECM-perception verbs – we cast our net wider than Bennis and Hoekstra (1989) and focus not just on the co-occurrence possibilities of ECM-perception verbs with passive, but also with perfective auxiliaries, causative verbs, motion verbs, and posture verbs. We do so with data drawn from the Dutch SoNaR-corpus (Oostdijk et al. 2013), more specifically the *Discussion lists*-subcorpus, which consists of 4,395,094 sentences.[10] As pointed out above, we examined the interaction between ECM-perception verbs on the one hand and six types of auxiliaries or light verbs on the other. In each case we looked both for cases where these verb types were embedded under the perception verb and cases where the relation was the other way around, the idea being that ordering restrictions between auxiliaries reflect a fixed hierarchy of functional heads (Cinque 2006). The relative scope relations observed in the corpus can therefore be used to determine the structural position of perception verbs. The table in (46) summarizes the number of hits we found for each verbal subtype.

(46)

	embedding an ECM-perception verb	**embedded under an ECM-perception verb**
perfective auxiliaries	>1000	0
modals	441	0
causative verbs	1	2
motion verbs	65	21
posture verbs	0	12
passive	0	76

Let us examine each of these cases in some more detail. The first two categories yield a clear and categorical result: both perfective auxiliaries and modals invariably outscope ECM-perception verbs, and the inverse order is ill-formed. This is illustrated in (47) and (48).

(47) a. Ik heb Jan zien lachen.
I have Jan see laugh
'I saw Jan laugh.'
b. *I zie Jan gelachen hebben.
I see Jan laughed have
INTENDED: 'I see that Jan has laughed.'

(48) a. Ik moet Jan zien lachen.
I must Jan see laugh
'I have to see Jan laugh.'
b. *Ik zie Jan moeten lachen.
I see Jan must laugh
INTENDED: 'I see that Jan has to laugh.'

[10] All data were extracted via the online GrETEL-interface (Augustinus et al. 2012).

The third category in the table in (46) is less clear-cut: causative verbs do not co-occur with ECM-perception regardless of the hierarchical relation between them. As shown in (46), our corpus search revealed only three potential examples. The two cases of a causative verb embedded under a perception verb are shown in (49) and (50).

(49) Ik zie eerlijk gezegd niet direct de armen de revolutie doen beginnen.
I see honestly said not direct the poor the revolution do start
'To be honest, I can't picture the poor starting the revolution.'

(50) Ik zie me nog niet een Bengaalse tijger laten los lopen.
I see me yet not a Bengal tiger let loose run
'I can't imagine myself letting loose a Bengal tiger.'

As indicated by the translation of these examples, in neither of these cases does the perception verb *zien* 'see' carry its basic meaning of visual perception. Instead, it is used in a more metaphoric sense, which we hypothesize might correspond to a higher Merge position (cf. Cardinaletti and Giusti 2001), thus rendering them orthogonal to our current concerns. The one example whereby a causative verb seems to embed an ECM-perception verb is given in (51).

(51) Dan zal ik je mijn maag laten horen knorren.
then will I you my stomach let hear grunt
'Then I will let you listen to my stomach growl.'

While we have no insights to offer regarding this specific example, it is worth pointing out that minor modifications of it sound considerably worse to our ear:

(52) *Ik laat je het varken horen knorren.
I let you the pig hear grunt
INTENDED: 'I let you listen to the pig grunting.'

Setting aside the one counterexample in (51), then, the generalization seems to be that causative verbs and ECM-perception verbs are in complementary distribution. This accords well with our native speaker intuitions of examples like the ones in (53), where the combination of the two verb types is sharply ill-formed, regardless of the hierarchical relation between them.

(53) a. *Ik zie Jan Piet met Marie doen praten.
I see Jan Piet with Marie do talk
INTENDED: 'I see how Jan is making Piet talk to Marie.'
b. *Ik doe Jan Piet met Marie zien praten.
I do Jan Piet with Marie see talk
INTENDED: 'I'm making Jan watch how Piet talks to Marie.'

If causative and ECM-perception verbs are in complementary distribution, a straightforward analytical hypothesis would be to assume that they are vying for insertion in the same functional head. The idea that there is a privileged relationship between perception and causation is also suggested by Pylkkänen (2000). Consider in this respect the Finnish pair of examples in (54) (Pylkkänen 2000:431).

(54) a. Mikko inhoa-a hyttysi-ä.
Mikko.NOM findDisgusting-3SG mosquitoes-PAR
'Mikko finds mosquitoes disgusting (now or in general).'
b. Hyttyset inho-tta-vat Mikko-a.
mosquitoes.NOM findDisgusting-CAUS-3PL Mikko-PAR
'Mosquitoes disgust Mikko (now).' Finnish

These examples show that experiencer verbs in Finnish can occur both with and without a causative suffix.

The presence of such a suffix not only leads to a realignment of the arguments, it also requires there to be direct perception of the theme by the experiencer: "the semantic import of the causative morpheme is to introduce a causing eventuality which gets interpreted as the perception of the Theme by the Experiencer" (Pylkkänen 2000:431). In other words, just like we see in our corpus data, causation and perception are closely tied together. There is some additional evidence in favor of this link based on the inflected imperatives discussed in the previous section. As the example in (55) illustrates, apart from perception verbs, causative predicates like *laten* 'let' or *doen* 'do' are the only other ones that can partake in this construction.[11] Once again, then, we see a close link between these two verb types.

(55) Laat-e die kinderen es ophouden!
let-PL those children PRT stop
'I wish those children would stop!' Rotterdam Dutch

Our analysis of the different Merge sites of perception verbs wants to capitalize on this parallelism by proposing that ECM-perception and causative verbs are merged in the same little *v*-head, which we will call $v_{\text{perc/caus}}$. We therefore treat this head as a particular flavor of little *v*. The existence of semantically specialized *v*-heads has been independently argued for in the literature on argument structure (Folli and Harley 2007), and the tight link between perception and causation observed here can be seen as another instance of such a parametrized *v*-layer.

Returning to the table in (46), the next type of interaction with ECM-perception verbs is with motion verbs. At first glance, that interaction seems to go both ways, in that we find motion verbs both embedding and being embedded under ECM-perception verbs. Closer inspection reveals however, that all but one of the hits featuring a motion verb embedding an ECM-perception verb involve the future auxiliary *gaan* 'will, going to' (lit. 'to go') and hence, that they represent false positives. A relevant example is given in (56).

(56) Ge gaat mij niet snel op hakken zien lopen.
you go me not fast on heels see walk
'You're not going to see me walking on heels any time soon.'

Genuine motion verbs invariably occur lower than ECM-perception verbs. A representative contrast is provided in (57).

(57) a. Hij ziet mij komen helpen.
he sees me come help
'He sees me come and help.'
b. *Hij komt zien mij helpen.
he comes see me help

The same holds for the final two categories, i.e. posture verbs and passive auxiliaries – the interaction with passive confirms Bennis and Hoekstra (1989)'s original observation.[12] The example pairs in (58) and (59) illustrate this.

(58) a. Hij ziet mij staan wachten.
he see me stand wait
'He sees me standing and waiting.'
b. *Hij staat zien mij wachten.
he stands see me wait

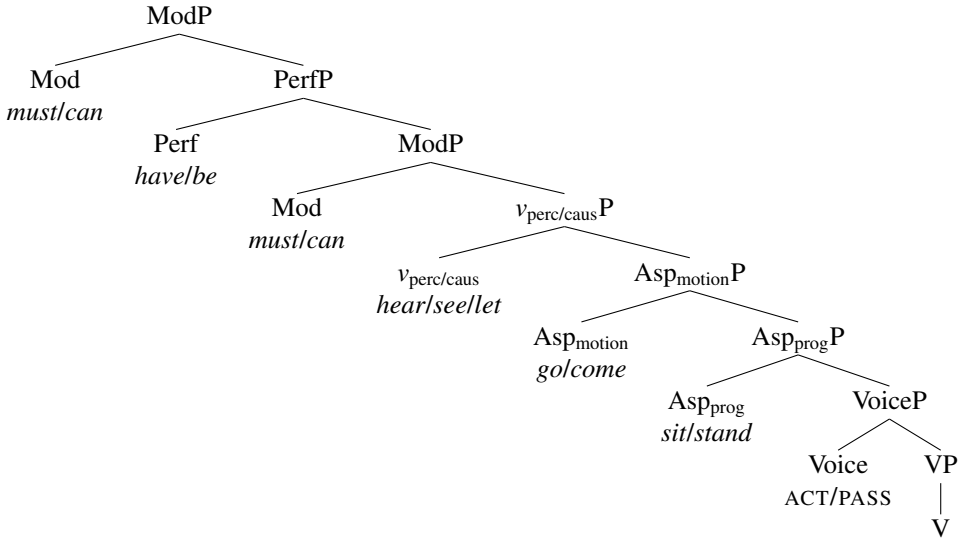
[11] The verb *laten* 'let' even shows a limited form of agreement in Standard Dutch imperatives as well, see Haeseryn et al. (1997: 18.5.4.10).

[12] Note that it is not universally the case that causatives and perception verbs are incompatible with passivization. See for example Miyagawa (1989) for examples from Japanese. Many thanks to a reviewer for raising this point.

(59) a. Hij ziet mij geholpen worden.
he see me helped become
'He see me being helped.'
b. *Hij wordt zien/gezien mij helpen.
he becomes see/seen me help

Taking together all the verbal interactions we have reviewed above, we arrive at the clause structure schematically shown in (60).

(60)



We have used the corpus results as a way to pinpoint the structural position in which the ECM-use of perception verbs is merged, and have identified this position as a specific type of little *v*-head that not only hosts perception verbs but also causative verbs and causative morphology. This position is located lower in the clausal spine than modals and perfective auxiliaries,[13] but higher than motion verbs, posture verbs, and passive auxiliaries. The resulting ordering fits naturally into the articulated functional sequence proposed in Cinque (2006), with perception/causation occupying an intermediate position between higher modal/perfect projections and lower aspectual projections.[14]

In addition to the use of perception verbs as modal particles and inflected imperatives, then, this constitutes a third position in the clausal spine where perception verbs can be merged. The fourth and final such position is that of lexical perception verbs. They occupy the position marked as 'V' in the structure in (60). Accordingly, we predict this use of perception verbs to occur lower than all of the other verb types listed above. As the following set of examples shows, this prediction is borne out.

(61) Het geluid werd door iedereen gehoord.
the sound became by everyone heard
'The sound was heard by everyone.' passive > lexical perception verb

(62) Hij stond naar haar te kijken.
he stood to her to look
'He was looking at her.' posture verb > lexical perception verb

[13]Note that we have included two positions for modals in the structure in (60), one above and one below perfect aspect. This is intended to reflect a different Merge position for epistemic and deontic modals, but nothing hinges on this.

[14]The representation in (60) represents the minimal structure we can propose based on the data we have reviewed. The actual structural representation of the examples given above is arguably more complex. For example, both causative and perception verbs select a complement that contains an external argument. This means that there is an additional *v*P below $v_{perc/caus}$. Similarly for the position hosting non-finite verbal morphology. Many thanks to a reviewer for asking us to clarify this.

(63) Hij komt naar jou luisteren.
he comes to you listen
'He comes to listen to you.' motion verb > lexical perception verb

(64) Ik zie jou naar hem kijken.
I see you to him look
'I see you looking at him.' ECM-perception verb > lexical perception verb

(65) Ik laat jou naar hem kijken.
I let you to him look
'I let you look at him.' causative verb > lexical perception verb

(66) Je moet naar haar luisteren.
you must to her listen
'You have to listen to her.' modal verb > lexical perception verb

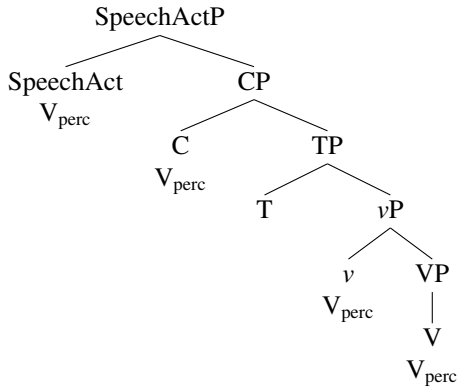
(67) Hij heeft haar gezien.
he has her seen
'He saw her.' perfective auxiliary > lexical perception verb

This concludes our discussion of the lower Merge positions of perception verbs. In the next section we summarize and conclude.

5. Conclusion

Cross-linguistically, perception verbs constitute a verb class that frequently undergoes meaning shifts (Evans and Wilkins 2000, San Roque et al. 2018). Such shifts are frequently accompanied by differences in grammatical behavior, with more abstract, less literal meanings correlating with increasingly functional behavior (Rooryck 2001a;b, Brinton 2001, Waltereit 2002, Waltereit and Detges 2007, Benjamin 2010, Haegeman 2010, de Villiers 2025). In this paper we have examined and exemplified this typological trend from the point of view of a single language, namely Dutch. We have identified four use cases of perception verbs – purely lexical, ECM, inflected imperative, and discourse marker – and in line with generative literature on grammaticalization (Roberts and Roussou 1999, Cardinaletti and Giusti 2001) have analyzed these different use cases as having a distinct first Merge position. Our proposal is summarized in the tree in (68).

(68)



At one end of the spectrum, we find lexical perception verbs, which are merged at the very foot of the clausal spine, in (an equivalent of) a root position. The other extreme is exemplified by perception verbs used as discourse markers. They have developed into purely functional elements and are merged at the outer edge of the left periphery, outside of the clausal core. Inflected imperatives and ECM-perception imperatives occupy an intermediate position. The former are clearly more functional than the latter, though: they are

unable to select arguments and are restricted to imperative contexts. We have proposed to Merge them directly in C. ECM-perception verbs are not fully lexical either. This was suggested by their interaction with various types of auxiliaries and light verbs. Based on their complementary distribution with causative verbs, we have identified the little *v*-position in which they are merged as a causative one.

One angle that was missing from our paper is the diachronic one. It seems tempting to see the transition from purely lexical to purely functional in (68) as distinct steps in a grammaticalization path. Whether or not there is supporting evidence for this type of chronology is a topic we leave for future research, but the fact that the various use cases of perception verbs can co-occur in synchronic (varieties of) Dutch – as shown in (69)–(71) – already suggests that the relationship between them is more complex than that of a mere transition from one to the next.

(69) **Kijke** die boere die koeie es **zien** springen!
look-PL those farmers those cows PRT see jump
'Look at those farmers watching those cows jump!'

(70) Ik **zie** hem zijn dochter **zien**.
I see him his daughter see
'I see him see his daughter.'

(71) Ik **hoor** hem, **hoor**.
I hear him hear
'I hear him, you know.'

More generally, though, this paper has made clear that perception verbs are not just a fruitful research area for linguists interested in lexical semantics, but that it is a topic that has the potential to shed light on the basic architecture of the clause as well.

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It gives us great pleasure to be able to dedicate this paper to Johan Rooryck. Johan was the supervisor of both of our PhD-theses, and he did an exemplary job in that respect. He is a great champion and advocate for his students, both during and after – and in some cases even before – their PhD-track.

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References

Abney, Steven. 1987. *The English Noun Phrase in its Sentential Aspect*. Ph.D. thesis, MIT, Cambridge, Ma.

Augustinus, Liesbeth, Vincent Vandeghinste, and Frank Van Eynde. 2012. Example-based treebank querying. In *Proceedings of the 8th International Conference on Language Resources and Evaluation (LREC-2012)*, pp. 3161–7. Istanbul. https://doi.org/10.63317/29r2ytrq6pdi.

Benjamin, Fagard. 2010. É vida, olha…: Imperatives as discourse markers and grammaticalization paths in Romance: A diachronic corpus study. *Languages in Contact* 10: 245–67. https://doi.org/10.1075/lic.10.2.07fag.

Bennis, Hans. 2006. Agreement, PRO and imperatives. In *Arguments and Agreement*, edited by Peter Ackema, Patrick Brandt, Maaike Schoorlemmer, and Fred Weerman, pp. 101–27. Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780199285730.003.0004.

Bennis, Hans and Teun Hoekstra. 1989. Why Kaatje was not heard sing a song. In *Sentential Complementation and the Lexicon*, edited by Dany Jaspers, Wim Klooster, and Yvan Putseys, no. 13 in Linguistic Models, pp. 11–20. Foris Publications, Dordrecht. https://doi.org/10.1515/9783110878479-004.

Brinton, Laurel J. 2001. From matrix clause to pragmatic marker: The history of look-forms. *Journal of Historical Pragmatics* 2 2: 177–99. https://doi.org/10.1075/jhp.2.2.02bri.

Cardinaletti, Anna and Giuliana Giusti. 2001. "Semi-lexical" motion verbs in Romance and Germanic. In *Semi-Lexical Categories: The Function of Content Words and the Content of Function Words*, edited by Norbert Corver and Henk van Riemsdijk, vol. 59 of *Studies in Generative Grammar*, pp. 371–414. Mouton de Gruyter, Berlin. https://doi.org/10.1515/9783110874006.371.

Cavirani-Pots, Cora. 2020. *Roots in Progress. Semi-Lexicality in the Dutch and Afrikaans Verbal Domain*. Ph.D. thesis, KU Leuven.

Cinque, Guglielmo. 2006. *Restructuring and Functional Heads: The Cartography of Syntactic Structures*, vol. 4. Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780195179545.001.0001.

van Craenenbroeck, Jeroen and Marjo van Koppen. 2025. Inflected imperatives in Dutch dialects. *Nederlandse Taalkunde* 30: 330–45. https://doi.org/10.5117/NEDTAA2025.3.004.CRAE.

Evans, Nicholas and David Wilkins. 2000. In the mind's ear: The semantic extensions of perception verbs in Australian languages. *Language* 76 3: 546–92. https://doi.org/10.2307/417135.

Felser, Claudia. 1999. *Verbal Complement Clauses: A Minimalist Study of Direct Perception Constructions*. No. 25 in Linguistik Aktuell/Linguistics Today. John Benjamins, Amsterdam. https://doi.org/10.1075/la.25.

Folli, Raffaella and Heidi Harley. 2007. Causation, obligation, and argument structure: On the nature of little v. *Linguistic Inquiry* 38 2: 197–238. https://doi.org/10.1162/ling.2007.38.2.197.

Haegeman, Liliane. 2010. West-Flemish verb-based discourse markers and the articulation of the speech act layer. Unpublished manuscript, Ghent University.

Haeseryn, W., K. Romijn, G. Geerts, J. de Rooij, and M. C. van den Toorn. 1997. *Algemene Nederlandse Spraakkunst*. https://e-ans.ivdnt.org, accessed July 15, 2025.

Hopper, P. and Elizabeth Closs Traugott. 1993. *Grammaticalization*. Cambridge University Press, Cambridge.

van Koppen, Marjo. 2017. Complementizer agreement. In *The Wiley-Blackwell Companion to Syntax*, edited by Martin Everaert and Henk van Riemsdijk, pp. 923–62. Wiley-Blackwell, 2 edn. https://doi.org/10.1002/9781118358733.wbsyncom061.

Miyagawa, Shigeru. 1989. *Structure and Case Marking in Japanese*. Academic Press, San Diego, Ca. https://doi.org/10.1163/9789004373259.

Oostdijk, Nelleke, Martin Reynaert, Véronique Hoste, and Ineke Schuurman. 2013. The construction of a 500-million-word reference corpus of contemporary written Dutch. In *Essential Speech and Language Technology for Dutch: Results by the STEVIN-programme*, edited by Peter Spyns and Jan Odijk, Theory and Applications of Natural Language Processing, pp. 219–47. Springer. https://doi.org/10.1007/978-3-642-30910-6_13.

Pylkkänen, Liina. 2000. On stativity and causation. In *Events as Grammatical Objects. The Converging Perspectives of Lexical Semantics and Syntax*, edited by Carol Tenny and James Pustejovsky, pp. 417–44. CSLI Publications.

Pylkkänen, Liina. 2008. *Introducing Arguments*, vol. 49 of *Linguistic Inquiry Monographs*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262162548.001.0001.

Roberts, Ian and Anna Roussou. 1999. A formal approach to grammaticalization. *Linguistics* 37: 1011–41. https://doi.org/10.1515/ling.37.6.1011.

Rooryck, Johan. 2001a. State of the article: Evidentiality, part I. *Glot International* 5 4: 125–33.

Rooryck, Johan. 2001b. State of the article: Evidentiality, part II. *Glot International* 5 5: 161–8.

San Roque, Lila, Kobin H. Kendrick, Elisabeth Norcliffe, and Asifa Majid. 2018. Universal meaning extensions of perception verbs are grounded in interaction. *Cognitive Linguistics* 29 3: 371–406. https://doi.org/10.1515/cog-2017-0034.

de Villiers, Engela. 2025. *The Atoms of Imperatives: Case Studies from Afrikaans*. Ph.D. thesis, KU Leuven and Stellenbosch University. LOT Publications, Amsterdam. https://doi.org/10.48273/LOT0692.

Waltereit, Richard. 2002. Imperatives, interruption in conversation, and the rise of discourse markers: A study of Italian *guarda*. *Linguistics* 40 5: 987–1010. https://doi.org/10.1515/ling.2002.041.

Waltereit, Richard and Ulrich Detges. 2007. Different functions, different histories. Modal particles and discourse markers from a diachronic point of view. *Catalan Journal of Linguistics* 6: 61–80. https://doi.org/10.5565/rev/catjl.124.

van Weel, M. A. 1904. *Het Dialect van West-Voorne*. Brill, Leiden. https://doi.org/10.1163/9789004596474. E-book (PDF), reissue September 2, 2024.

Weijnen, A. 1966. *Nederlandse Dialectkunde*. Van Gorcum, Assen.

Wurmbrand, Susanne. 2001. *Infinitives: Restructuring and Clause Structure*, vol. 55 of *Studies in Generative Grammar*. Mouton de Gruyter, Berlin. https://doi.org/10.1515/9783110908329.

Re: reciprocals — Their internal constitution and external distribution

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Abstract

In languages that have nominal reciprocals, these expressions exhibit morphosyntactic variation. This paper provides a detailed perspective on the range of this variation with the aid of a syntactic analysis that takes the composition of these expressions seriously, modelling their internal structure in the form of a syntax that assigns discrete structural positions to their component parts. In reciprocals juxtaposing a numeral and an alterity word (such as English *one another*), the numeral occupies the specifier and the 'other' part sits in the complement position of a head (overt in PPs, silent elsewhere) that mediates the relationship between the two. Reciprocal pronominals with this Spec–Head–Complement structure are barred from serving as direct arguments of verbs, being construed instead as asyndetic specifiers of a SE clitic pronoun.

1. Introduction

Ways of expressing reciprocity have been investigated to a much more limited extent than ways of expressing reflexivity, both from a typological perspective and in descriptions of individual languages. The few large-scale studies of reciprocals include Frajzyngier and Walker (2000), König and Gast (2008) and especially Nedjalkov *et al*. (2007).

In many of the world's languages, reciprocity is expressed with a variety of non-nominal means — for instance, via verb reduplication or a dedicated verbal inflection (such as the *hitpa'el* of Hebrew), or with the aid of adverbial expressions equivalent to English *mutually* or *reciprocally* (for useful discussion of and references to literature addressing verbal and adverbial reciprocals, see, e.g., Safir 2013, Bar-Asher Siegal 2020:Ch. 5, Bar-Asher Siegal 2024, Evans 2008 and Siloni 2008). Such languages do not concern me in this paper, which focuses on those that have dedicated nominal expressions for this purpose. Among languages using nominal elements to express reciprocity, variation in the nature of the elements used and their behaviour in morphosyntax is rife, understudied, and poorly understood from a theoretical point of view.

Apart from the fact that the distinction between reflexive and reciprocal anaphors is often not formally made (thus, French *les enfants s'aiment* 'the children SE love' is ambiguous between a reflexive and a reciprocal interpretation),[1] within the set of languages with bipartite nominal expressions for reciprocity we find variation between what Bar-Asher Siegal (2020) calls 'one-unit constructions' and 'two-unit constructions' — a distinction active in English (*they praised each other* ~ *they each praised the other*) and also, for instance, in Hebrew (one-unit *exad et ha-šeni* 'one ACC the-second' ~ two-unit *exad ... et ha-šeni* 'one ... ACC the-second').

Bar-Asher Siegal's term 'one-unit construction' does not necessarily make direct reference to syntactic constituency. Indeed, a major point that I wish to argue in this paper is that, although some 'one-unit' reciprocals do indeed form a single nominal constituent (English *each other* is a case in point), upon closer inspection many ostensibly 'one-unit' reciprocals do not.

The primary empirical focus of this paper is on a sample of Indo-European languages, Hebrew, and Hungarian, whose bipartite reciprocal pronominals all share the fact that their second member is an alterity ('otherhood') expression (English *other*, French *l'autre* 'the other', Hungarian *más* 'other', Hebrew *ha-šeni* 'the-second') but which exhibit a range of variation that can be understood with the help of an analysis that takes the bipartite composition of these reciprocals seriously. A key ingredient of the analysis of reciprocals of the *one another* type is the hypothesis that their internal structure is modelled in the form of a syntax in which one part of the complex reciprocal occupies the specifier and the other the complement position of a

[1] On reflexive/reciprocal polysemy, see Kemmer (1993) and Knjazev (1998). Also relevant is the existence of reciprocal/sociative polysemy, discussed in Maslova (2000).

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head (overt in PPs, silent elsewhere) mediating the relationship between the two. Reciprocals with this Spec–Head–Complement structure are prevented from serving as direct arguments of verbs, being construed instead as asyndetic specifiers of a clitic or silent pronoun. This integrated outlook on the internal constitution and external distribution of reciprocal pronominals affords a precise comparative perspective and advances the understanding of reciprocals and linguistic reciprocity.

2. The case of *each other* and *one another*: Constituency and distribution

2.1 Each other *can be a nominal constituent but is not an anaphor*

In the generative tradition, reciprocal pronominals such as English *each other* are commonly thought to belong to the family of anaphors, subject to Condition A of the Binding Theory of Chomsky (1981), which requires that anaphors be locally bound (within their 'governing category', in the standard formulation of the condition). But the distribution of *each other* defies the expectations raised by Condition A.

Thus, it is a well known fact that *each other* readily occurs in the prenominal possessor position, where reflexive *themselves* cannot be found, as shown by the contrast in (1) and (2).

(1) They like each other's parents.

(2) *They like themselves' parents.

And in colloquial English *each other* can also serve as the subject of a finite clause (though this is heavily frowned upon by prescriptivists, whence the '!' diacritic in (3); see Bolinger 1987, Lebeaux 1983).[2]

(3) a. !They think that each other will win.
b. !They don't know what each other will do.

(4) a. *They think that themselves will win.
b. *They don't know what themselves will do.

The grammaticality of (3) is particularly problematic for the standard Binding Theory of Chomsky (1981) if *each other* is subject to Condition A: the local domain for an anaphor in the structural subject position of a finite clause is that finite clause itself, containing the anaphor, the governor of the anaphor (either I or C, depending on which definition of c-command one adopts), and an accessible subject ([+Agr] in I). Chomsky's definition of 'governing category' delivers the right results for the reflexives in (4); but if *each other* is assumed to be subject to Condition A, (3) does not fit. The grammaticality of (1) is also difficult to account for on the basis of the standard Binding Theory if reciprocal pronominals are treated as anaphors: there are strong morphosyntactic parallels between prenominal possessors and subjects of finite clauses (see, e.g., Szabolcsi 1983, Den Dikken 1999, and references there), which make it plausible to assume that 'Saxon genitives' occupy the same type of position in DP as nominative subjects do in CP; assuming so, we can derive the ungrammaticality of **I hate myself's pictures* from Condition A, but the fact that (1) is fine is again irreconcilable with an approach to *each other* as an anaphor.

There is nothing about the overt morphological make-up of *each other* that would lead one to expect it to be an anaphor: neither in its semantics nor in its syntactic distribution is *each* anaphoric as such; and *other* is not an anaphor in the sense of requiring a local sentence-internal antecedent. I will not treat reciprocal pronominals of the *each other* type as anaphors, therefore, and will not implicate Condition A or any other vehicle intended to rein in the distribution of anaphoric expressions in my analysis of these expressions.

[2] The finite verb of the embedded clause in (3) is a non-agreeing modal. With an agreeing verb, the judgement on (3) is less stable; cf. Rizzi (1990), Woolford (1999), Haegeman (2004) on the anaphor agreement effect. Lebeaux (1983:724) notes that *each other* qua subject is more natural in an interrogative finite clause (such as (3b)) than in a declarative one (3a). See also the difference between the lefthand examples in (ia) and (ib–d) in fn. 4, below.

2.2 Silence in the syntax of each other

The syntax of *each other* qua nominal constituent that I advocate treats *each* in its usual way, as a distributive quantifier, and *other* as a modifier of a noun.[3] In (5), this noun is overt, and we are dealing with the structure in (6a). In reciprocal *each other*, the head noun is silent, as in (6b).

(5) a. This is the only house in our street that doesn't have shutters; each other house does.
b. The team captain was the only player wearing pink; each other player was wearing red.
c. They sell coffee for 99 cents on Friday; it costs $1.50 on each other day of the week.

(6) a. [$_{QP}$ *each* [$_{NP}$ *other* [$_{NP}$ N_{overt}]]]
b. [$_{QP}$ *each* [$_{NP}$ *other* [$_{NP}$ $N_{\emptyset}$]]]

What facilitates the silence of the head noun modified by *other* is the fact that English *other* can occur 'bare' in singular indefinite contexts, as in (7):

(7) a. A person's gender can be male, female or *other*.
b. Something or *other* happened that made things much worse.
c. Something *other* than money is needed to help her out.

In (7ab), *other* is plausibly treated as a modifier of a silent noun, similarly to *another gender*/*thing*. If this is right, it lends credence to (6b) as a possible syntax of *each other* in English.

With this in mind, the syntax of *each other* qua reciprocal pronominal can be fleshed out as in (8). In this structure, the anaphoricity of *each other* falls out as a function of the restrictions imposed on the antecedence of the variable *x* in the NP-core of the structure.

(8) [$_{QP}$ *each* [$_{NP}$ *other* [$_{NP}$ MEMBER of *x*'s GROUP]]]

The structure in (8) not only provides a perspective on the internal constitution of *each other* qua reciprocal and on its anaphoricity, it also reinforces the conclusion that *each other* is (or at least can be) a nominal constituent in syntax, which helps us understand (3).

2.3 One another *is not a nominal constituent*

For *one another*, construal as the subject of a finite clause is considerably less comfortable than it is for *each other*: though sentences of the type in (3′) are not entirely non-existent, they both strike speakers as less acceptable and occur much less frequently than sentences such as (3).[4]

[3] By dissecting *each other* into its two component parts, the present analysis follows in the footsteps of Heim *et al.*'s (1991) seminal paper. But for Heim *et al.*, *each* and *other* do not form an underlying constituent — and as a consequence, their proposal has no handle on (3). The Heim *et al.* analysis of *each other* is a logically possible syntax for this reciprocal, not necessarily supplanted by or irreconcilable with (8), below.

[4] The number of tokens of *one another* as the subject of a finite clauses is consistently lower than the number for *each other*. (i) reproduces the relevant figures in COCA (Corpus of Contemporary American English).

(i)	a.	that each other ...	8	that one another ...	0
	b.	what each other ...	87	what one another ...	4
	c.	how each other ...	21	how one another ...	0
	d.	where each other ...	14	where one another ...	1

(3) a. [!]They think that each other will win.
b. [!]They don't know what each other will do.

(3′) a. [?]*They think that one another will win.
b. [?]*They don't know what one another will do.

Consonant with this, Bar-Asher Siegal (2020:105) notes that while Danish *hinanden* (comparable to English *each other* on Bar-Asher Siegal's outlook) is allowed in this position, the Hebrew 'one-unit' reciprocal *exad ha-šeni* 'one the-second' is ungrammatical as the subject of a finite clause.[5]

The contrast in (3a)~(3′a) can be derived from the fact that while *each other* is a possible subpart of a well-formed nominal constituent, *one another* arguably is not. For *each other*, a syntax assimilating it to expressions of the type found in (5) is entirely feasible. But there is no way elsewhere in English syntax in which *one* and *another* can form a single nominal constituent. Indeed, the numeral *one* can never precede the indefinite article *a*(*n*) inside a nominal phrase with an overt head:

(9) a. one thing
b. another thing
c. *one another thing

The postulation of a silent-headed nominal phrase containing *one*, *another* and N∅, on the analogy of (6b), would thus be unsupported.[6]

The conclusion that whereas *each other* can be a nominal constituent, *one another* cannot provides an immediate perspective on the fact that (3) is possible but (3′) is not. For something to serve as the subject of a finite clause, it has to be a single nominal constituent. Since the string *one another* cannot form a syntactic constituent, it cannot be the subject of a finite clause.

Before I proceed to a discussion of a context that appears at first to directly contradict the conclusion that *one another* is not a syntactic constituent, I would like to show that when it comes to its inability to serve as the subject of a finite clause, *one another* behaves on a par with French *l'un l'autre* 'the one the other', German *einander* 'one.other' and Dutch *elkaar* 'each.other'.

2.4 French l'un l'autre*, German* einander*, and Dutch* elkaar *and their non-constituency*

The ill-formedness of the French sentences in (10) is rooted in the same lack of constituency that hobbles English (3′).

(10) a. *Ils pensent que l'un l'autre gagnera.
they think that the one the other will.win
b. *Ils demandent si l'un l'autre gagnera.
they ask if the one the other will.win

It is impossible to squeeze *l'un* 'the one' and *l'autre* 'the other' into a single noun phrase. Two definite articles are, to be sure, accommodable in such complex noun phrases as *la mère de la maire* 'the mother of

[5] Bar-Asher Siegal (2020:110) adds that some Hebrew speakers are innovating the use of *exad ha-šeni* as a nominative subject. These are reported to be the same speakers who also allow *exad ha-šeni* to occur to the right of a preposition (rather than in the split form that the standard language exhibits; see esp. Landau 2025). I will return to this in section 3.5, below.

[6] Landau (2025:1407) suggests that English *one another* CAN be analysed as a single constituent, with *one* in the specifier of a DP headed by *an* and *other* as a modifier of a silent-headed nominal in the complement of D. As the ungrammaticality of (9c) shows, such a syntax is otherwise non-existent in English. In the interest of avoiding any kind of *sui generis* syntax for reciprocals, I therefore reject the possibility that *one another* can be represented as a single DP constituent. For Hebrew *exad ha-šeni* 'one the-second', Landau also postulates an underlying representation in which the two component parts form a single constituent; but that constituent, being symmetrical, is necessarily split in the course of the derivation (in standard Hebrew). On this, see also fnn. 13 and 26, below.

the mayoress', *le fantôme de l'opéra* 'the phantom of the opera' and *la destruction de la cité* 'the destruction of the city'. But apart from complex nominals internal to which an argumental relationship between the constituent parts is established, always mediated by *de* 'of', no single noun phrase can contain two definite articles in French.[7]

For German (11), the cause of its ungrammaticality is not exactly the same as that of (3′) and (10).

(11) a. *Sie denken, dass einander gewinnen wird.
they think that one.other win will

b. *Sie fragen, ob einander gewinnen wird.
they ask if one.other win will

While English *one another* is clearly impossible as a syntactic constituent because *one* cannot precede *a*(*n*) in a DP, the German numeral *ein* 'one' (doubling as the indefinite article) can occur to the immediate left of inflected *ander* 'other' in *ein anderer Mann* 'another man', *eine andere Person* 'another person'. But *ein* plus 'bare', uninflected *ander* cannot form a well-formed DP: the German translation of English (12a) must feature inflection on *ander*. The combination of *ein* and 'bare' *ander* is therefore excluded from the subject position of a finite clause.

(12) a. They think that another will win.

b. Sie denken, dass ein ander*(er) gewinnen wird.

Dutch (13) is also ungrammatical, regardless of the choice of V-inflection (see also Hüning 2006:205). This is interesting in light of the fact that the Dutch reciprocal *elkaar* is morphologically just like its cognate *each other*,[8] which occurs as the subject of a finite clause.

(13) a. *Ze denken dat elkaar gaat/gaan winnen.
they think that each.other goes/go win

b. *Ze vragen of elkaar gaat/gaan winnen.
they ask if each.other goes/go win

[7] Notably, while Italian has *quell'ignorante del dottore* 'that ignoramus of.the doctor' (Napoli 1986:203), it does not have **quell'ignorante il dottore* 'that ignoramus the doctor': the presence of *di* is needed to accommodate two definite determiners.

[8] Dutch *elkaar* and its archaic variant *elkander* (which both behave orthographically like German *einander* in being spelled as a single word; this particular case of univerbation is probably syntactically irrelevant) are the combination of the distributive quantifier *elk* 'each' and *ander* 'other', the latter reduced in the case of *elkaar* to *aar*, via syncope. On *d*-syncope in the *aar* of *elkaar*, see Heeroma (1942:200) (cf. *ader*(*tje*) ~ *aar*(*tje*) 'vein(DIM)', *vader*(*tje*) ~ *vaar*(*tje*) 'father(DIM)', *nader* ~ *naar* 'nearer, to'). Non-reduced *elkander* occurs in dialects (see the map for 'reciprook pronomen' in Barbiers *et al*. 2005). A non-standard but probably older variant of *elkaar* is *mekaar* (also found in dialects as *mekander*; in Afrikaans, *mekaar* is the standard reciprocal), thought to be historically a reduction of *malkander*, deriving from *manlijc ander* 'manly other' (Verwijs and Verdam 1885–1929; Van den Toorn *et al*. 1997:79). In Middle Dutch, *manlijc* and *haerlijc* (the latter built on the accusative of *si* 'they') co-occur with *ander* in a split construction, with *manlijc*/*haerlijc* as the subject and *ander*+case as the object: *manlijc gaf anderen trouwe* 'each gave the other his word of honour'; *haerlijc begonde anderen groeten* 'each started to greet the other'; Hüning 2006:201). On the history of expressions of reciprocity in Dutch, and the diachronic shift from *malkander* to *elkander*>*elkaar*, see Hüning (2006) for detailed discussion. An interesting observation that Hüning (2006:209) makes with particular reference to the work of Dirc Potter (15th century) is that *malcanderen* is much more frequent as the integral complement of a preposition (*bij malcanderen* 'with each other') than *elc anderen* (which is generally split in two by P: *elc op andren* 'each on other'), and that *malcanderen* presents the participants as a collective while *elc anderen* yields a distributive interpretation individuating the participants. In present-day Dutch *mekaar* behaves just like *elkaar* in being impossible to use as the subject of a finite clause or as the focus of a cleft: **ze denken dat mekaar gaat winnen* 'they think that RECIP will win', **het is MEKAAR die ze haten* 'it is RECIP that they hate'.

To the ungrammaticality of (13), Hüning (2006:205) adds that *elkaar* also fails as the focus of a cleft, again in contrast to English *each other*. I find (14) slightly less bad than (13), but I agree with Hüning that it is poor.[9]

(14) *Het is elkaar die ze (het meest) haten.
it is each.other that they the most hate
'It is each other that they hate (the most).'

The key to the ungrammaticality of (13) and (14) is that while English 'bare' *other* is possible in contexts such as those in (7), Dutch 'bare' *ander* cannot be used in (15a) and (15c): the marker *-s* (historically the genitival marker) needs to be added. Though *-s* is absent in (15b), the containing noun phrase paraphrasing English *something or other* is introduced by the neuter definite article *het*, making (15b) irrelevant for (**het*) *elkaar*.

(15) a. Iemands geslacht kan mannelijk, vrouwelijk of *ander*(s)* zijn.
someone's gender can male female or other(-S) be*

b. Er is het één of *ander* gebeurd dat de boel een stuk erger heeft gemaakt.
there is the one or other happened that the lot a chunk worse has made

c. Iets *ander*(s)* dan geld / iemand *ander*(s)* dan hij is nodig om haar te helpen.
s.th. other(-S) than money / s.o. other*(-S) than he is necessary COMP her to help*

The form *anders* occurs as part of a complex indefinite noun phrase, as in (15c), but it does not combine with the distributive quantifier *elk*: **elk anders* is impossible. The forms *elkaar+s* and (archaically) *elkander+s* can serve as the prenominal genitival possessor of a possessive noun phrase (*ze haten elkaars*/ *elkanders ouders* 'they hate each other's parents'), but *elkaars* and *elkanders* have no distribution as stand-alone elements. Unlike English 'Saxon genitives', Dutch possessive genitives must precede an overt noun; silencing the possessum (whether via ellipsis or through the use of a radically silent noun) is impossible in Dutch possessive nominals (*Jans boek is minder goed dan Piets *(boek)* 'Jan's book is less good than Piet's (book)'), and Dutch genitives do not occur by themselves as predicates of copular sentences either (*dit boek is Jans *(boek)* 'this book is Jan's (book)'). Despite the fact that Dutch *elkaar* is a close cognate of English *each other*, therefore, (13) and (14) (in the latter, *elkaar* is underlyingly the subject of *het* 'it') are underivable.

3. Argumenthood and the role of P

3.1 Reciprocals as non-subject arguments

Reciprocals such as *one another*, for which it can be argued that they cannot form a single nominal constituent, are expected not only to be unable to serve as subjects of finite clauses but to fail as arguments altogether. For English *one another*, this would at first blush appear to be false: the sentences in (16) are perfectly well-formed. I will return to this in section 3.3, below.

(16) a. They like one another very much.
b. They like one another's parents.
c. They are fond of one another.
d. They were talking about/to one another.

[9] Camil Staps (p.c.) points out that for him, (14) gets a bit better with plural *zijn* instead of *is*, but remains unacceptable.

But Plank (2017:354) writes that 'especially in its informal spoken form Standard German is very reluctant to actually use *einander* as direct and also indirect object ... and resorts to the reflexive [*sich*] as an ersatz reciprocal in these relations'. König and Kokutani (2006:sect. 4.2) show that *einander* occurs in (in)direct object positions in the cosmas corpus, especially in cases 'where the preferred interpretation of *sich* in the same position would be a reflexive one'; but they confirm Plank's assessment that this is rare in the spoken vernacular.[10]

For French, the conclusion that its reciprocal pronominal *l'un l'autre* 'the one the other' cannot itself serve as an argument of a predicate is confirmed more robustly: *l'un l'autre* cannot be used by itself as the object of a verb; it must be combined with the clitic *se*, the latter serving as an argument whose meaning (vague on the reflexive *vs* reciprocal divide) is disambiguated by the addition of *l'un l'autre*.[11] We see this in the examples in (17). These sentences would also be grammatical without *l'un l'autre* included in them, but in that case they would be ambiguous a reciprocal reading and a reflexive one.

(17) a. Ils *s'*aiment *l'un l'autre*.
they SE love the one the other

b. Ils *s'*accompagnent *l'un l'autre*.
they SE accompany the one the other

c. Ils *s'*accusent *l'un l'autre*.
they SE accuse the one the other

d. Elles *se* contredisent *les unes les autres*.
they.F SE contradict the ones.F the others.F

Even for German *einander* and French *l'un l'autre*, however, it might appear to be wrong to assert, in general, that they can never serve as an argument. In constructions containing a preposition, *einander* directly combines (and is spelled as one word) with the preposition, as shown in (18). Similarly, in French (19), featuring the verb *parler* 'talk' in combination with an *à*-PP, *se* is apparently optional, and in (20), with the verb *penser* 'think' selecting an *à*-PP, the use of *se* would even be ungrammatical.

(18) Sie reden {mit/über/von}*einander*.
they talk with/about/of.one.other
'They are talking to/about one another.'

(19) Ils (*se*) parlent *l'un* à *l'autre*.
they SE talk the one to the other
'They are talking to one another.'

(20) Ils (**se*) pensent *l'un* à *l'autre*.
they SE think the one of the other
'They are thinking of one another.'

In (18) and the French examples in (19)–(20) without *se*, isn't the reciprocal an argument of the preposition (or the combination of the verb and the preposition)?

3.2 Reciprocals of the one another *type in PPs*

Strictly speaking, the answer to this question is 'no': *l'un l'autre* in (20) is not one single argument of the preposition. But what *is* true is that the two *parts* of the reciprocal expression, viz., *l'un* 'the one' and *l'autre* 'the other', each serve as arguments of the relational P. Because *l'un* and *l'autre* are different arguments of

[10] On German *einander* as a prenominal possessor, see section 3.6.

[11] See also Belletti's (1982) observations for Italian *i tuoi colleghi* *(*si*) *odiano l'uno l'altro* 'your colleagues hate each other'. (Vezzosi 2010 reports that Italian has recently grammaticalised an adverbial use of *l'un l'altro*.)

P, they accordingly occur in different argument positions, on opposite sides of P, as in (21).[12] It is thanks to the fact that P is quintessentially a relational category that it is capable of accommodating the two component parts of the bipartite reciprocal expression wholly within its own maximal projection.

(21) [PP *l'un* [P=*à* [*l'autre*]]

So *l'un* 'the one' and *l'autre* 'the other' each serve a discrete argument role. Even in (21), it is not the case therefore that the reciprocal expression as a whole is a single argument of a predicate.

In French (and the other Romance languages), the use of the reciprocal as a dependent of P gives rise exactly to the surface output generated by the structure in (21): a 'split' pattern in which one portion of the reciprocal precedes P (as is expected of a subject) and the other part follows it (as is an object's wont in a head-initial language). In the history of English, the reciprocal expression *one another* also used to behave in this way: an example of this type is given in (22a) (see also Hüning 2006:209 on the diachrony of Dutch *elkaar*; fn. 8, above). Over time (starting at least as early as the 16th century, judging from (22b)), this pattern mostly gave way to what we see in English today.

(22) a. They said *oon to an other* that they durste not come and assaylle hem.
(William Caxton, The Recuyell of the Historyes of Troye, 1474)

b. Aduising it for the best, neuer to make priuy *to one another* of our loues.
(Anthony Munday, The First Book of Primaleon, 1595)

For *each other*, the interception by P of its two component parts is also found in earlier records (see (23a), from 1902); and (23b) is an example found in a 21st-century collection of stories from the American South-East (*The Blue Mountain Review: A Journal of Culture* #10):

(23) a. They spoke *each to the other*, and no one else heard.

b. The eyelids slid open, and Dar would swear forever that their eyes had locked and that in that moment they spoke *each to the other*.

Calle Martín's (2018) assessment that the 'discontinuous construction' survived until the 18th century underestimates the staying power of this pattern. But hold-outs such as (23b) notwithstanding, it is clear that present-day English reciprocals as a rule follow P integrally, and are no longer split by P the way they are in French and other Romance languages.

What is behind this difference between present-day English and French, and the diachronic development of English in this regard? We can think of it as a function of movement. In Landau (2025),[13] a detailed analysis of the facts of Hebrew PP-contained reciprocals is presented according to which it is the first part of the bipartite reciprocal that is undergoing movement, to a position to the left of P, deriving the discontinuous pattern from an underlying P-initial structure.[14] Since my syntax in (21) base-generates the

[12] The structure in (21) may be a simplification: the two arguments of P could be introduced by different heads, just like the two arguments of a transitive/dyadic verb are introduced by different heads (V for the internal argument, *v* or Voice for the external one). (21) could readily be developed further. But for the purposes of the discussion in this paper, it will suffice. What matters here is that *l'un* and *l'autre* are in different argument positions, on opposite sides of the head spelled out as the preposition.

[13] Landau's (2025) paper came to my attention only at the final revision stage of the present paper, so I have not had the opportunity to digest its 'dynamic antisymmetry' approach to the discontinuous PP-pattern in detail. Landau's hypothesis that the two portions of (Hebrew) bipartite reciprocals form an exocentric, symmetrical DP that must be broken up by movement may approximate the hypothesis that the two portions of *one another*-type reciprocals form a 'small clause', if small clauses are modelled (as in Moro 2000) as symmetrical structures. But for reasons independent of the syntax of reciprocals, I advocate an asymmetrical syntax for small clauses (Den Dikken 2006).

[14] Hebrew, Icelandic and Slovenian all exhibit alternations that are interesting to compare to the diachronic change found in English. Bar-Asher Siegal (2020:sect. 3.5) and Landau (2025:sect. 5.1) report that (substandard) Modern Hebrew is currently in the process of innovating a syntax in which the preposition is placed to the left of the first term of the complex reciprocal, *exad* 'one', with the accusative marker either being absent or placed between the two terms: *im exad* (*et*) *ha-šeni* 'with one (ACC) the-second'. Sigurðsson *et al*. (2020) and Messick and Harðarson (2024) report

split pattern, I opt instead for movement of the P-element to a position above the base-generation site of the higher portion of the bipartite reciprocal:

(24) a. [$_{PP}$ *one* [P [*another*]]] (cf. (21))
b. [$_{xPP}$ P [$_{PP}$ *one* [P [*another*]]]

The head-movement analysis offers a connection to developments in the verbal domain. There is good reason to believe that the Theme argument of verbs originates in SpecVP, to the left of the verb's base position (see, e.g., Hale and Keyser 1993). In Old English and early Middle English, the Theme *qua* object of a transitive verb surfaced in pre-verbal position; but in Modern English, Theme objects follow the verb. This could be an indication that (with the exception of root clauses) V used to stay *in situ* but over time shifted to a position above the Theme:

(24′) a. [$_{VP}$ Theme [V (...)]]
b. [$_{xVP}$ V [$_{VP}$ Theme [V (...)]]

If (24′) is a plausible way of modelling the diachronic change in the relative placement of the Theme and V in English, we have a parallel with (24).

Haas (2010:63–8) and Calle Martín (2018:45) characterise *one another* as 'a Late Middle English development of (*the*) *one* + (*the*) (*an*)*other*, where the first element is ... the grammatical subject and the second the object'. The treatment of *one* as a subject and *another* as an object strikes me as correct (see also section 3.5). Bipartite reciprocal expressions such as English *one another* and French *l'un l'autre* take optimal advantage of the relational nature of P by exploiting both the complement of P and its specifier.[15]

3.3 Reciprocals of the one another *type as objects of transitive clauses*

For transitive sentences containing a reciprocal expression as the object of the verb, it would not do to assign the two portions of *one another* the subject and object functions, respectively: (25a) is grammatical but (*a*) it is not reciprocal,[16] and (*b*) it leaves no place for the notional subject of a sentence such as (25b) to occupy. So what do we do with the syntax of the version of (25b) featuring *one another*?

(25) a. One likes the other very much.
b. They like each other/one another very much. (cf. (16a))

Revealing here are the ways in which German can express the message conveyed by (25b). The language offers two options: (26a), featuring the 'bare' reflexive element *sich* (cf. French *se*, seen in (17) and (19)),

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on everyday Icelandic having innovated this pattern over the last 200 years, though standard Icelandic still has P splitting the reciprocal into its two component parts, *hvor*$_{DUAL}$/*hver*$_{PLUR}$ 'each' and *annar* 'other'. (Sigurðsson *et al*. and Messick and Harðarson (see also the references cited there) discuss at length the case behaviour of *hvor*/*hver* in the split and non-split constructions.) Similarly, for Slovenian, Živanović (2016) notes that the standard 'split' pattern alternates with a P-initial syntax in a minority dialect, with some speakers accepting both options. From the English, Hebrew, Icelandic and Slovenian facts, the impression emerges that the P-medial pattern shows a tendency over time to give way to the non-split P-initial order.

[15] German {*mit*/*über*/*von*}*einander* 'with/about/of.one.other' in (18) and other univerbations of a preposition, 'one' and the alterity word could either come about via a syntactic derivation similar to (24b) or be the product of a post-syntactic (PF) process (more precisely, a case of morphological merger *cum* local dislocation, in the terminology of Distributed Morphology). For lack of a clear argument either way, I will leave open the question of how P and German *einander* amalgamate.

[16] Camil Staps (p.c.) questions this for cases such as *as long as one respects the other's religiosity*. We may be dealing here with interference from the impersonal pronoun *one*, circumventable by using *one* inside a PP (where the impersonal pronoun *one* does not like to occur): *I will talk to one about the other* is not reciprocal. With (the equivalent of) *one* adorned with a definite article and in the presence of a hanging topic, reciprocity may arise for sentences of the type in (25a) (e.g., Italian *a proposito di quei ragazzi, l'uno non condivide le idee dell'altro* 'as for those guys, the one does not share the other's ideas'; cf. Bar-Asher Siegal 2020:96). I will set such cases aside here.

and (26b), with *einander*, which is nearly morpheme-by-morpheme identical with English *one another*.[17] The thing to note about (26b) (whose syntax matches the version of English (25b) with *one another*) is that *einander* is not inflected for accusative case in present-day German. This is striking when viewed against the background of (27).

(26) a. Sie mögen *sich* sehr.
they like SE very

b. Sie mögen *einander* sehr.
they like one.other very
both: 'They like each other very much.'

(27) Sie mögen *einen anderen*.
they like an.ACC other.INF
'They like another, they like s.o./s.th. else.'

(27) expresses a non-reciprocal liking relation between the referents of *sie* and 'some other person or thing', instead of a reciprocal liking relation between the members of the group denoted by *sie* 'they'. In (27), case morphology on *ein* and adjectival inflection on *ander* are obligatory.[18]

In earlier varieties of German, the reciprocal could be inflected on just *ander* or on both *ein* and *ander* — though never just on *ein* and not on *ander*.[19] But synchronically, reciprocal *einander* is entirely case-invariant. The fact that *einander* does not case-inflect in present-day German is highly significant in connection with the relationship between the reciprocal and the object position in (26b). I develop this further in the next subsection.

3.4 Asyndetic specification of a reflexive clitic

For the syntax of (26b), I hypothesise that *einander* serves in relation to a silent object — the silent counterpart to *sich* in (26a). French (17) (e.g., *ils s'aiment l'un l'autre*) is once again relevant here: in (17), *l'un l'autre* 'one another' co-occurs with the overt reflexive clitic *se*. In (28), it is the reflexive clitic that gets the accusative case assigned by the verb; but the clitic cannot expone this case overtly (because it is silent or case-invariant).

(28) $[_{VP}$ V $SE_i]$ $[RECIPROCAL_i]$

The reciprocal is not itself the object but something which specifies the content of the reflexive object clitic, hence cannot receive case from the verb directly. And in present-day German there is no indirect way for the reciprocal to 'get' the case assigned by the verb either.

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[17] Recall from section 3.1 that (26b) is rare in spoken German. I return to this at the end of section 3.4, below.

[18] This is not an isolated quirk of the accusative object: the same point can be made, *mutatis mutandis*, for dative, as shown in (i) (which also makes it explicit that the inflections in *ein* and *ander* are not form-identical, whence the difference in the glosses).

(i) a. Sie helfen *einander*.
they help one.other
'They help each other.'

b. Sie helfen *einem anderen*.
they help an.DAT other.INF
'They help another, someone else.'

[19] See https://en.wiktionary.org/wiki/einander. Also see Plank (2017:364–5). The example in (i) (taken from Birkenes and Fleischer 2014:29) illustrates inflection on *ander* (or on the entire complex expression) but not on *ein*:

(i) Er unt sîn wîb chêrten fon einanderen ir lîp. (*Wiener Genesis* 724–7)
he and his wife turned from one.other.INF their body
'He and his wife turned their bodies away from each other.'

It will be instructive to look at this against the background of what we know about how German resolves case in instances of apposition — the juxtaposition of one noun phrase to another, in a specificational relationship. Apposition usually gives rise to case concord in German (see Vater 2006, Heringa 2012, Ott 2016, Onea and Ott 2022 and references cited there for details):

(29) a. Was kann ich ihm, meinem besten Freund, zum Geburtstag schenken?
what can I him.DAT my.DAT best.INF friend to.the birthday give
'What I can give him, my best friend, for his birthday?'

b. Ich fand dich im Bett mit ihm, meinem besten Freund.
I found you.ACC in.the bed with him.DAT my.DAT best.INF friend
'I found you in bed with him, my best friend.'

The fact that there is no case inflection on *einander* suggests that the reciprocal is not connected to the silent object via a relationship of apposition. This need not come as a surprise. Apposition involves a relation between a referential expression and a property-denoting expression, the latter plausibly treated as a predicate nominal. Thus, in both *John, my best friend* and *my best friend, John*, the proper name is referential and *my best friend* denotes a property ascribed to the referent of this proper name — analogously to what we see in the copular sentences *John is my best friend* and *my best friend is John* (the latter an 'inverse copular sentence' in the sense of Moro 1997, Den Dikken 2006). But the connection between SE and the reciprocal in (28) cannot be understood in this way. It is impossible to treat either SE or the reciprocal as a predicate of the other: neither 'bare' reflexive *sich* nor reciprocal *einander* occurs as a predicate nominal (cf. *manchmal hat man das Gefühl, nicht ganz sich* *(*selbst*) *zu sein* 'sometimes has one the feeling not quite SE self to be, i.e., sometimes one has a feeling of not quite being oneself'; **sie sind einander geworden* 'they are each other become; intended: they've turned into one another').

If the relationship between SE and the reciprocal in (28) is not a case of close apposition, then what is it? My answer to this question is that it is a case of specificational asyndetic coordination at a level higher than the noun phrase (see Koster 2000, De Vries 2006): the second conjunct in (30) specifies the content of the 'bare' reflexive SE contained within the first conjunct: "SE, (or) more precisely/specifically, each other". The fact that the reciprocal that is construed as an asyndetic specifier of the content of SE is case-invariant in German can now be understood as a consequence of the size of the second conjunct: it is just the reciprocal (i.e., '(...)' in Conjunct_2 is zero in German (26b)); the reciprocal, all by itself, is not in a case dependency with any case-assigning head, and hence remains uninflected.

(30) $[_{:P}\ [_{\text{Conjunct1}}\ \ldots\ \text{SE}\ \ldots]\ [_{:'}\ \mathbf{:}\ [_{\text{Conjunct2}}\ (\ldots)\ \text{RECIPROCAL}]]]$

The syntax in (30) is helpful not just for an understanding of the case-invariant nature of German *einander*. It also allows us to comprehend the previously noted fact (Plank 2017:354, König and Kokutani 2006:sect. 4.2) that informal spoken German disprefers *einander* in cases in which *sich* is legitimate. The syntax of (26b) is more complex than that of (26a): *sich* requires just the postulation of an object position; *einander* requires the postulation of a silent SE plus an asyndetic coordination relation with *einander*, as in (30). Whenever (26a) suffices to convey reciprocity, it is chosen instead of (26b); but unambiguously reciprocal (26b) serves well where (26a) is not explicit enough or where *sich* would prefer a reflexive reading.

3.5 Case variation as variation in the size of the second conjunct

Not all languages behave alike with respect to the size of the second conjunct of specificational asyndetic coordination structures involving reciprocals. In some languages, the second conjunct is arguably an entire clause (of which only the reciprocal itself surfaces).

To see this, consider first the fact that the Hebrew 'one-unit' reciprocal *exad ha-šeni* 'one the-second' and the Hungarian reciprocal *egymás* 'one.other', which have the same morphological composition as Ger-

man *einander* ‘one.other’, differ markedly from their German counterpart in requiring accusative case marking when serving as the direct object:[20,21]

(31) a. Hem nišku *exad* *(*et*) *ha-šeni*.
they kissed one ACC the-second

b. Megcsókolták/*megcsókoltak *egymás*(*t*).
kiss.PST.3PL.DEF/INDEF one.other.ACC
both: ‘They kissed each other.’

Apart from case marking, another salient property of Hungarian (31b) is that *egymást* controls the definite conjugation of the finite verb: *megcsókolták* (with a long *á*) as opposed to indefinite *megcsókoltak*. This is remarkable in light of the fact that neither of its component parts, *egy* ‘one’ and *más* ‘other’, does so when serving as the accusative object of a transitive verb:

(32) a. Én is akarok/*akarom egyet.
I also want.1SG.INDEF/DEF one.ACC
‘I want one, too.’

b. Mást hiszek/*hiszem.
other.ACC believe.1SG.INDEF/DEF
‘I believe something else.’

The definiteness agreement facts in (31) and (32) make it clear that the reciprocal *egymás*, when it serves interpretively as the object of a transitive verb, is not itself the direct object in syntax: if it were, it would (in light of (32)) be expected to give rise to indefinite inflection on the verb — regardless of whether *egy* ‘one’ or *más* ‘other’ is the head of *egymás*: both parts are demonstrably indefinite. This goes along with the conclusion drawn for French and German that the reciprocal is not the ‘real’ object of the verb. The ‘real’ object of the verb is silent (and definite), and overt *egymást* in (31b) is construed with it.

In French and (covertly) in German, the ‘real’ object of a transitive verb construed with a reciprocal object is a ‘bare’ reflexive, SE. The closest overt counterpart to French *se* and German *sich* in Hungarian is the suffix *-ik*, usually treated as a mediopassive marker but analysed in Den Dikken (2022) as a SE enclitic. We see *-ik* at work as a reflexiviser in (33a), which is semantically near-equivalent to (33b), featuring the accusative ‘reflexive pronominal’ *magát* (an inalienably possessed noun phrase meaning ‘his/her/its core’).[22]

[20] Similarly, when Hungarian *egymás* finds itself in a dative case environment, it must inflect for dative, again attached to the right of *más*: (i). Contrast this with German (ia) in fn. 18, above.

(i) Segítenek egymásnak.
help.3PL.INDEF one.other.DAT
‘They help each other.’

[21] The Russian reciprocal *drug druga* (see Knjazev 2007, Ressue 2015) and the Finnish reciprocal *toinen toise* (mentioned in Evans 2008 and König and Kokutani 2006), both concatenations of two alterity words (‘other/second’), pattern with Hungarian *egymás* and standard Hebrew *exad ha-šeni* in having the second component of the complex reciprocal inflect for the case expected on the basis of the reciprocal’s grammatical function. (On substandard Hebrew *et exad ha-šeni*, with *et* ‘ACC’ preceding the first part, see Landau 2025:1404.)

Note that though the second component of bipartite reciprocals whose structure is large (*à la* (35)) always bears the case predicted by the reciprocal’s grammatical function, the first part is not necessarily caseless/nominative: in sentences with a ‘quirky case’ subject, the first part is expected to expone the matrix subject’s quirky case.

[22] See Rákosi (2002) for important discussion.

(33) a. János borotválkozik minden nap.
János shave.FREQ.SE every day

b. János borotválja magát minden nap.
János shave.3SG.DEF himself.ACC every day
both: 'János shaves himself every day.'

The hypothesis for (31b) is that it features a silent allomorph of *-ik*. Overt *-ik* does not combine with (in)definiteness inflection. But *-ik* does arguably have a silent allomorph (Den Dikken 2022), and this silent *-ik* interacts with def inflection in an interesting way. The surface distribution of overt *-ik* is confined to simple-present sentences with a third person singular subject. In all other contexts, no *-ik* shows up — but the ghost of *-ik* can still be felt, in the form of a peculiar pattern of inflection on the verb. Almost the entire paradigm of the inherently reflexive verb *borotválkoz-* 'shave.FREQ' in (34) (which is representative of the class of '*-ik* verbs') evinces INDEF inflection. But in the first person singular, DEF inflection is the prescriptive norm (though INDEF is common in colloquial spoken Hungarian).

(34) a. borotválkoz*om*/[!]borotválkoz*ok*
shave.1SG.DEF/INDEF
'I shave, am shaving'

b. borotválkoz*ol*
shave.2SG.INDEF
'you$_{SG}$ shave, are shaving'

c. borotválkoz*ik*
shave.IK
'(s)he shaves, is shaving'

d. borotválkoz*unk*
shave.1PL.INDEF
'we shave, are shaving'

e. borotválkoz*tok*
shave.2PL.INDEF
'you$_{PL}$ shave, are shaving'

f. borotválkoz*nak*
shave.3PL.INDEF
'they shave, are shaving'

Though a complete understanding of this pattern is not within reach, it makes good analytical sense to treat (34a) with DEF *-om* as forming a pair with (34c), except that it has a silent reflexive clitic — the 1SG counterpart to *-ik*. This silent *-ik* can then be thought to give rise to the otherwise mysterious DEF inflection that we see in the *-om* version of (34a). And this may then lead us back to DEF inflection in (31), which on the silent *-ik* approach may then be a function, not of the presumed definiteness of *egymást* (which, recall, cannot be distilled from its component parts: (32)) but of the presence of an abstract SE in the syntax of (31).

With all of this in mind, let me return to the fact that, unlike German *einander*, the reciprocals of standard Hebrew (*exad ha-šeni* 'one the-second' in (31a)) and Hungarian (*egymás* 'one.other' in (31b)) must inflect for accusative case when serving interpretively as the object of the verb, and that this accusative case inflection manifests itself only on *ha-šeni* 'the-second' (in standard Hebrew) and *más* 'other', not on *exad* 'one' and *egy* 'one' (as well).

Using a specificational asyndetic coordination structure to establish the connection between the reciprocal and the silent object, we can account for case inflection on the reciprocal as a function of the size of the second conjunct in (30). For German, the discussion in the foregoing led to the conclusion that the size of the second conjunct is small: just the reciprocal; as a result, the reciprocal is not in a case dependency with anything, and receives default case (which in German is nominative). Suppose now that in Hebrew and Hungarian, the second conjunct contains the reciprocal but is larger in that it also contains (at least) the verb and 'little *v*'.[23] Then case inflection on the reciprocal will be obligatory, and it will manifest itself only on the alterity word ('other').

Concretely, assume that Conjunct$_2$ in the syntax of Hebrew and Hungarian reciprocal constructions of the type in (31) is an entire clause, in parallel to the overt Conjunct$_1$, with a subject, realised as *exad*/*egy* 'one', and an object, realised as *et ha-šeni* 'ACC the-second'/*más*+*-t* 'other+ACC'. This is depicted in (35) (with Hungarian lexical items used for illustration).

[23] This additional structure is not expected to have any consequences for the interpretation of the reciprocal itself or the sentence as a whole: the extra material (V, 'little *v*' and possibly I as well; see (35)) is semantically identified with matching material in the first conjunct, and adds no additional meaning.

(35) [:P [Conjunct1=IP ... V_i ... SE ...] [:′ : [Conjunct2=IP [Subj *egy*] [vP *v* [VP V_i=∅ [Obj *más*+*-t*]]]]]]]

What (35) says is that there is an event, at a certain point in time, involving a reflexive act such that one event participant performs this act on another. This gets the meaning of reciprocity close to right. There is no explicit marking of exhaustivity or symmetry (i.e., 'each') — but that is all right because symmetry is arguably not in the semantics of reciprocals but a pragmatic strengthening effect, likely similar to the conversational implicature of exhaustivity in (pseudo-)clefts.[24]

Morphosyntactically, what (35) gets exactly right is the fact that structural accusative marking is present, and spelled out on *ha-šeni* 'the-second' and *más* 'other', not (also) *exad*/*egy* 'one'. This follows directly from the fact that in $Conjunct_2$, the object function is played by *ha-šeni*/*más*, while *exad*/*egy* is the subject, not in the Agree-domain of accusative-assigning *v*. The syntax in (29) thus derives in a principled way the fact that accusative marking on both portions of the complex reciprocal has never been possible in Hungarian (**egy-et-más-t* 'one-acc-other-acc'). In the history of German, by contrast, such double hosting of case morphology did occur (recall the text below (27) and the reference given in fn. 19).[25]

If indeed (35) is a reasonable approximation of the syntax of reciprocal *exad ha-šeni* in standard Hebrew and *egymás* in Hungarian (and similiar such bipartite reciprocals in other languages — see fn. 21), this makes it radically impossible for these expressions to occur in subject or object positions. Indeed, the equivalent of (3a) in standard Hebrew and Hungarian is ungrammatical: see (36) (of which (36a) was taken from Landau 2025:1379; see also Bar-Asher Siegal 2020:104–5). And though (31ab) are fine, I have just argued, based on the Hungarian DEF agreement facts, that (31b) does not feature *egymást* in the verb's direct object position.

[24] See Dalrymple *et al*. (1998) for an extensive typology of reciprocal scenarios, several of them non-symmetrical (e.g., seriatives such as *the turtles are standing on top of one another* or *the letters of the alphabet follow one another*). Evans (2008) talks at some length about symmetry as a cancellable implicature in reciprocal constructions of languages with non-verbal means of signalling reciprocity (the use of verbal morphology to express reciprocity typically gives rise to a stronger sense of symmetry). Bar-Asher Siegal (2020:sect. 7.7) argues particularly forcefully that the basic meaning of nominal reciprocals regarding symmetry is weak rather than strong, taking a firm stand against the strong symmetry hypothesis advocated by typologists (Lichtenberk 1985; Kemmer 1993) and some semanticists (most notably, Heim *et al.* 1991). Relevant as well is Onea and Ott's (2022:370) discussion of the default exhaustivity of nominal appositions.

[25] A morphological fact that (35) does not immediately deliver on a silver plate is the fact that both component parts of the Hungarian reciprocal *egymás* are unadorned with the nominal suffix *-ik*, unlike what we see when *egy* and *más* serve as separate arguments of a dyadic predicate. Thus, compare (i) with (ii). Den Dikken (2022) treats Hungarian nominal *-ik* (found on ordinal numerals) in the same morphosyntactic way as the *-ik* on verbs, as an instantiation of the clitic SE. It would appear to be very helpful to have this SE=*-ik* represented in the reciprocal to facilitate the anaphoric linking of the reciprocal to the antecedent. If *-ik* is *structurally* present in the subject and object of (35), it must fail to get a PF exponent. In the verbal domain as well, there are several circumstances under which a structurally present SE clitic is forced to remain unexponed. Thus, the reflexive clitic *-ik* is only ever overt in the simple present, and even there it systematically remains silent when the subject is not a third person or when the subject is third person PLURAL. In Romance, too, SE is not always exponed. French and Spanish *se* can occasionally remain silent embedded under causative *faire*/*hacer* (*elle a fait* (*se*) *taire Jean* 'she made Jean shut up'), and Italian even forces reflexive *si* to be 'dropped' under causative *fare* (*Maria ha fatto lavare*/**lavarsi Gianni* 'Maria made Gianni wash himself'; Burzio 1981). I do not understand the lexicalisation restrictions imposed on SE cross-linguistically or within a single language. These restrictions are an important topic for future study. (A more radical approach to the absence of *-ik* from (i) would be to say that SE=*-ik*, even when it combines with a nominal rather than with a verbal host, is always structurally represented on the clausal spine, and that the forced absence of *-ik* in (i) is a consequence of the relatively small size of Conjunct2 in (35), truncated below the position of SE.)

(i) Nagyon szeretik egymást/*egy-ik-más-ik-at.
very like.3PL.DEF one.other.ACC/*one-IK-other-IK-ACC*

(ii) Az egy-ik nagyon szereti a más-ik-at.
the one-IK very like.3PL.DEF the other-IK-ACC

(36) a. *Ha-yeladim ka'asu še-exad ha-šeni rimu.
the-children were.angry that-one the-other cheated.3PL
intended: 'The children were angry that each other had cheated.'

b. *Azt hiszik, hogy egymás győzni fog(nak).
it.ACC think.3PL.DEF that one.other win will(3PL)
intended: 'They think that each other will win.'

At this point, the astute reader may recall from fn. 5 that Bar-Asher Siegal (2020:110) notes that some Hebrew speakers have started to use *exad ha-šeni* as a nominative subject, and that these speakers also allow *exad ha-šeni* to occur to the right of a preposition or the accusative marker *et* (as in substandard *et exad ha-šeni* 'acc one the-other'). Viewed from the perspective of the present paper's discussion of the syntactic distribution bipartite reciprocals, this must mean that the Hebrew speakers in question have innovated a syntax for *exad ha-šeni* that treats it as a single nominal constituent — perhaps the same structure as that proposed in section 2.2 for English *each other*, given in (6b)/(8). Such a syntax will force Ps and the accusative case particle to surface to the left of the entire string *exad ha-šeni*, and will at the same time permit this string to occupy any positions in which DPs are licit, including the structural subject position of the clause. For more traditional speakers of Hebrew, however, *exad ha-šeni* is not a single nominal constituent: the two component parts of the bipartite reciprocal occupy the subject and non-subject position, respectively, of a complex syntactic structure.[26]

For PP constructions, the syntax makes room available for both component parts of the complex reciprocal, just as for French *l'un* P *l'autre*, discussed previously. But while in the case of French and standard Hebrew, the P-element separates the two parts of the reciprocal (*l'un à l'autre* 'the one to the other'), in Hungarian, a postpositional language, it follows the second part and shows up to the right of the entire reciprocal: *egymás*-{*nak*/*kal*/*ra*/*ról*/...} 'one.other-to/with/towards/from/...'. This is not a quirk of the reciprocal: Hungarian PPs are always head-final on the surface.

3.6 A note on bipartite reciprocals as prenominal possessors

German *einander*, for which section 3.4 proposed a structure of the type in (30) with a small second conjunct, is excluded from the prenominal possessor position. To express the message that ungrammatical (37) seeks to convey, German can resort to an adverbial strategy, as in (38a) (the use of *gegenseitig* 'mutually' is also a common way of disambiguating sentences with object-*sich*: see König and Kokutani 2006:sect. 4.1), or use (38bc), where the alterity word by itself occurs in postnominal position in the (remote/close) company of *jeweils* 'respectively'.[27]

(37) *Sie mögen/hassen *einander*s Eltern.
they like/*hate one.other.GEN parents*
'They like/hate each other's/one another's parents.'

[26] Landau (2025) derives the placement of *et* 'ACC' before the second part by assimilating the syntax of the accusative case particle to that of prepositions that split the Hebrew reciprocal in PPs, treating *et* as the exponent of a case head, 'K', in whose specifier position *exad* lands. I cannot evaluate the ACC=K analysis for Hebrew, but there are languages for which such an approach to structural accusative case can be shown on reasonably strong grounds to be infeasible. Den Dikken and Dékány (2025) show for Udmurt (a Uralic language spoken in Russia) that P-elements (postpositions) that take a simple DP complement obligatorily attract the possessive marker of their possessive-nominal complement up to them, in a process involving clitic climbing. Importantly, such clitic climbing is systematically impossible in the case of accusative-marked possessive nominals, indicating that structural accusative case (at least in Uralic) does not involve a K-head outside DP which can provide a landing-site for movement.

[27] Thanks to Katrin Axel-Tober and Kalle Müller for their help with these German data.

(38) a. ?Sie mögen/hassen ihre Eltern gegenseitig.
they like/hate their parents mutually

b. Sie mögen/hassen jeweils die Eltern des/der anderen.
they like/hate respectively the parents of.the$_{SG/PL}$ other.INF

c. Sie mögen/hassen die Eltern des jeweils anderen.
they like/hate the parents of.the$_{SG/PL}$ respectively other.INF

That (37) is ungrammatical might at first be thought to be a consequence of the fact that SE, the first conjunct of the asyndetic coordination structure in (30), is barred from the prenominal possessor position in German:

(39) *Sie mögen/hassen *sich*s Eltern.
they like/hate SE.GEN parents

But the equivalent of (39) is also impossible in Dutch (see (40)), and yet Dutch does have a direct translation equivalent for English *they like/hate each other's parents*, as shown in (41).

(40) *Ze mogen/haten *zich*s ouders.
they like/hate SE.GEN parents

(41) Ze mogen/haten *elkaar*s ouders.
they like/hate each.other.GEN parents

The contrast between German (37) and Dutch (41) must therefore be rooted in something other than the distribution of SE. The allowable size of the *second* conjunct is likely to hold the key.

In German, the second conjunct of the asyndetic specification structure underlying constructions with *einander* is small, providing no case assigner for the reciprocal. Consequently, genitive case cannot be locally asssigned to the reciprocal in the prenominal possessor position. Nor can the reciprocal play host in the PF component to a genitival case marker that attaches to the entire asyndetic coordination structure in (30): unlike in English, the genitive in German is not a phrasal suffix or clitic (there is no equivalent of *the Queen of England's hat* with a prenominal possessor). And of course exponence of the genitive case particle on silent SE (the first conjunct of the asyndetic coordination structure) is impossible as well. In possessive noun phrases featuring *einander* as the prenominal possessor, there is, therefore, nothing to host the obligatory genitival case particle: SE is silent, the entire **:**P is too large to host *-s*, and the second conjunct makes no case assigner available for the reciprocal. This is why (37) fails.

That variation in the size of the second conjunct of (30) is indeed a likely factor behind variation in the grammaticality of bipartite reciprocals that do not form a nominal constituent as prenominal possessors is suggested by the facts of Hungarian *egymás* 'one.other'. This reciprocal is grammatical in both of the prenominal possessor positions of the language's possessive DP, with unmarked ('nominative') case or, to the left of the definite determiner, with dative case — but the latter is appreciably less good than the former (something to which I return later in this section):

(42) a. Szeretik/utálják *egymás* szüleit.
like/hate.3PL.DEF one.other parents.ACC

b. ?Szeretik/utálják *egymás*nak a szüleit.
like/hate.3PL.DEF one.other.DAT the parents.ACC
both: 'They like/hate each other's parents.'

For Hungarian, we have previously established that the second conjunct of the asyndetic coordination structure of its non-constituent bipartite reciprocal is large. In (35), above, the second conjunct is an entire clause, accommodating case assignment to the second component of the reciprocal (*mást* 'other.ACC'). For (42) we do not need a whole clause, but we do want a PP. This PP then serves to specify the content of SE, which is itself PP-contained because, *qua* possessor, it is enveloped in the predicate for the possessum. The structure is depicted in (43).

(43) [DP D [RP [POSS'UM *szülei*] [R′ relator [POSS'OR=:P [Conjunct1=PP [POSS'OR SE] P_{DAT}] [:′ **:** [Conjunct2=PP [*egy*] [P′ [*más*] P_{DAT}]]]]]]]

The entire **:**P is the possessor of the possessive noun phrase. Its first conjunct is a PP containing silent SE, which gets its content specified by the second conjunct, another PP, accommodating both *egy* and *más*. When P in the second conjunct is spelled out as DAT *-nak*, we obtain *egymásnak*. In that case (as is generally true for dative possessors in Hungarian), the possessor is placed in SpecDP, surfacing to the left of the definite article, as in (42b). When P is silent, the possessor is situated in a position between D and RP (as is generally the case for unmarked, 'nominative' possessors in Hungarian), delivering (42a).

That (42b) is marked compared to (42a) is an effect of the fact that only one of the conjuncts of the conjunction phrase in SpecDP is explicitly marked for case. Relevant in this connection is the pair in (44a) and (44b):

(44) a. [János és Mari] szülei
János and Mari parents
'[János and Mari]'s parents'

b. *[[János és Mari]nak] a szülei
János and Mari.DAT the parents

It is perfectly fine for two unmarked ('nominative') possessors to be coordinated and placed in the prenominal possessor position. But when the conjoined possessors precede the determiner *a* 'the', it is impossible to mark dative case only after the second conjunct: (44b) is ungrammatical. This weighs down on (42b), where silent SE is not case-marked. That (42b) is nonetheless not as bad as (44b) has to do with the fact that not only is there no case-marking on the first conjunct (SE), the first conjunct as a whole is silent in (42b), hence it could not have been marked for case in the first place. This partially amnesties the violation to which (44b) falls prey.

If this account of the German and Hungarian facts is on the right track, it lends support for the idea that bipartite reciprocals that cannot form a single nominal constituent are asyndetic coordinate structures. It also brings into focus again the idea that languages differ with respect to the size of the second conjunct of this asyndetic coordination: in German, the second conjunct cannot be large enough to accommodate all of *ein*, *ander* and the possessor's case, causing (37) to fail; in Hungarian, the second conjunct can be larger, licensing a reciprocal possessor.

Unlike in the case of German *einander*, it is grammatical to use the Dutch reciprocal *elkaar* and English *one another* as reciprocal prenominal possessors.[28] The discussion of the contrast between German and Hungarian in the preceding paragraphs directs us towards the conclusion that the asyndetic coordination structure for *elkaar* and *one another* can accommodate a relatively large second conjunct, able to contain a case assigner for the reciprocal. I am not aware of any independent evidence that this is the case.

One general question therefore remains: Are there any independent indications that there is a difference in the size of $Conjunct_2$ in (30) between individual languages with bipartite reciprocals which cannot form a single nominal constituent (*one another*/*einander*/*elkaar*/*l'un l'autre*/*egymás*)? Put differently, how can we tell apart small and large(r) containers for asyndetically coordinated reciprocals, other than by inspecting the environments in which these expressions are grammatical? This is a pressing question from the perspective of language acquisition and historical linguistics (on the latter, see Bar-Asher Siegal 2020). Unfortunately, I must leave it unanswered here for want of ideas.

4. Conclusion

With a focus on a sample of Indo-European languages, Hebrew, and Hungarian, I have canvassed some of the peculiar variation in the morphosyntax of bipartite nominal expressions of reciprocity. The centrepiece

[28] Of course, *each other* is, too — but this is unrevealing: as we saw in sections 2.1 and 2.2, *each other* can form a single nominal constituent; nominals of any complexity are licit in the 'Saxon genitive' position in English: [*the Queen of England*]*'s hat*, [*the man who I ran into at the office*]*'s accent*.

of this paper is an analysis which models their internal structure in the form of a syntax that assigns discrete structural positions to their component parts, exploiting the syntax of Spec–Head–Complement structures, (overt or silent) SE clitic pronouns, and asyndetic specification, with variation in the size of the specificational conjunct.

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References

Bar-Asher Siegal, Elitzur. 2020. *The NP-Strategy for Expressing Reciprocity: Typology, History, Syntax and Semantics*. No. 127 in Typological Studies in Language. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.127.

Bar-Asher Siegal, Elitzur. 2024. Verbal strategies for expressing reciprocity – the case of Hebrew. *Glossa: a journal of general linguistics* 9. https://doi.org/10.16995/glossa.10274.

Barbiers, Sjef, Hans Bennis, Gunther De Vogelaer, Magda Devos, and Margreet van der Ham. 2005. *Syntactic Atlas of the Dutch Dialects: Volume I: Pronouns, Agreement and Dependencies*. Amsterdam University Press, Amsterdam.

Belletti, Adriana. 1982. On the anaphoric status of the reciprocal construction in Italian. *The Linguistic Review* 2: 101–37. https://doi.org/10.1515/tlir.1982.2.2.101.

Birkenes, Magnus Breder and Jörg Fleischer. 2014. Intetkjønn med referanse til personer: To ulike normeringstradisjoner i nynorsk og tysk. *Orð og tunga* 16: 25–46.

Bolinger, Dwight. 1987. *Each other* and its friends. In *Another Indiana University Linguistics Club Twentieth Anniversary Volume*, edited by Dwight Bolinger, Jeanette Gundel, and Steven Cushing, pp. 1–36. Indiana University Linguistics Club, Bloomington, In.

Burzio, Luigi. 1981. *Intransitive Verbs and Italian Auxiliaries*. Ph.D. thesis, MIT, Cambridge, Ma.

Calle Martín, Javier. 2020. 'We kissed one another and parted good friends.' On the expression of reciprocity in Early Modern English. *Onomázein* 48: 45–68. https://doi.org/10.7764/onomazein.48.03.

Chomsky, Noam. 1981. *Lectures on Government and Binding*. Foris, Dordrecht.

Dalrymple, Mary, Makoto Kanazawa, Yookyung Kim, Sam Mchombo, and Stanley Peters. 1998. Reciprocal expressions and the concept of reciprocity. *Linguistics and Philosophy* 21: 159–220. https://doi.org/10.1023/A:1005330227480.

den Dikken, Marcel. 1999. On the structural representation of possession and agreement. The case of (anti-)agreement in Hungarian possessed nominal phrases. In *Crossing Boundaries: Theoretical Advances in Central and Eastern European Languages*, edited by István Kenesei, no. 182 in Current Issues in Linguistic Theory, pp. 137–78. John Benjamins, Amsterdam. https://doi.org/10.1075/cilt.182.10dik.

den Dikken, Marcel. 2006. *Relators and Linkers*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/5873.001.0001.

den Dikken, Marcel. 2022. Ordinals, reflexives and unaccusatives: Unification by predication. *Journal of Uralic Linguistics* 1: 216–39. https://doi.org/10.1075/jul.00010.dik.

den Dikken, Marcel and Éva Dékány. 2025. On the order of case and possessive agreement in Udmurt. Paper presented at the *Congressus XIV Internationalis Fenno-Ugristarum* (14th International Congress for Finno-Ugric Studies), Tartu, 19 August 2025.

Evans, Nicholas. 2008. Reciprocal constructions: Towards a structural typology. In *Reciprocals and Reflexives: Theoretical and Typological Explorations*, edited by Ekkehard König and Volker Gast, no. 192 in Trends in Linguistics. Studies and Monographs, pp. 33–104. Mouton de Gruyter, Berlin. https://doi.org/10.1515/9783110199147.33.

Frajzyngier, Zygmunt and Traci Walker (eds.). 2007. *Reciprocals: Forms and Functions*. Nos. 40–41 in Typological Studies in Language. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.40 and https://doi.org/10.1075/tsl.41.

Haas, Florian. 2010. *Reciprocity in English. Historical Development and Synchronic Structure*. Routledge Studies in Germanic Linguistics. Routledge, London.

Haegeman, Liliane. 2004. A DP-internal anaphor agreement effect. *Linguistic Inquiry* 35: 704–12. https://doi.org/10.1162/ling.2004.35.4.704.

Hale, Kenneth and Samuel Jay Keyser. 1993. On argument structure and the lexical expression of syntactic relations. In *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, edited by Kenneth Hale and Samuel Jay Keyser, pp. 53–104. MIT Press, Cambridge, Ma.

Heeroma, Klaas. 1942. Elkaar. *De nieuwe taalgids* 36: 218–22.

Heim, Irene, Howard Lasnik, and Robert May. 1991. Reciprocity and plurality. *Linguistic Inquiry* 22: 63–101.

Heringa, Herman. 2012. *Appositional Constructions*. Ph.D. thesis, University of Groningen.

Hüning, Matthias. 2006. Reciprociteit in het Nederlands: De geschiedenis van *elkaar* en *mekaar*. *Nederlandse taalkunde* 11: 185–217.

Kemmer, Suzanne. 1993. *The Middle Voice*. No. 23 in Typological Studies in Language. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.23.

Knjazev, Jurij P. 1998. Towards a typology of grammatical polysemy: Reflexive markers as markers of reciprocity. In *Typology of Verbal Categories: Papers Presented to Vladimir Nedjalkov on the Occasion of his 70th Birthday*, edited by Leonid Kulikov and Heinz Vater, no. 382 in Linguistische Arbeiten, pp. 185–93. Niemeyer, Tübingen. https://doi.org/10.1515/9783110913750.185.

Knjazev, Jurij P. 2007. Reciprocal constructions in Russian. In *Reciprocal Constructions*, edited by Vladimir P. Nedjalkov, Emma Š. Genišienė, and Zlatka Guentchéva, no. 71 in Typological Studies in Language, pp. 673–708. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.71.22knj.

König, Ekkehard and Volker Gast (eds.). 2008. *Reciprocals and Reflexives: Theoretical and Typological Explorations*. No. 192 in Trends in Linguistics. Studies and Monographs. Mouton de Gruyter, Berlin. https://doi.org/10.1515/9783110199147.

König, Ekkehard and Shigehiro Kokutani. 2006. Towards a typology of reciprocal constructions: Focus on German and Japanese. *Linguistics* 44: 271–302. https://doi.org/10.1515/LING.2006.010.

Koster, Jan. 2000. Extraposition as parallel construal. Ms., University of Groningen.

Landau, Idan. 2025. Reciprocal shift and symmetry breaking. *Natural Language & Linguistic Theory* 43: 1365–415. https://doi.org/10.1007/s11049-024-09640-6.

Lebeaux, David. 1983. A distributional difference between reciprocals and reflexives. *Linguistic Inquiry* 14: 723–30.

Lichtenberk, Frantisek. 1999. Reciprocals without reflexive. In *Reciprocals: Forms and Functions*, edited by Zygmunt Frajzyngier and Traci Walker, vol. 2, no. 41 in Typological Studies in Language, pp. 31–62. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.41.03lic.

Maslova, Elena. 2000. Reciprocals and set construal. In *Reciprocals: Forms and Functions*, edited by Zygmunt Frajzyngier and Traci Walker, vol. 2, no. 41 in Typological Studies in Language, pp. 161–78. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.41.08mas.

Messick, Troy and Gísli Harðarson. 2024. E-raising reconsidered: Constituency, coordination and case-matching reciprocals. *Linguistic Inquiry* 1–22. https://doi.org/10.1162/ling_a_00515.

Moro, Andrea. 1997. *The Raising of Predicates*. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511519956.
Moro, Andrea. 2000. *Dynamic Antisymmetry*. MIT Press, Cambridge, Ma.
Nedjalkov, Vladimir P., Emma Š. Genišienė, and Zlatka Guentchéva (eds.). 2007. *Reciprocal Constructions*. No. 71 in Typological Studies in Language. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.71.
Onea, Edgar and Dennis Ott. 2022. Nominal appositives in grammar and discourse. *Language* 98: 359–91. https://doi.org/10.1353/lan.2022.0004.
Ott, Dennis. 2016. Ellipsis in appositives. *Glossa: a journal of general linguistics* 1. https://doi.org/10.5334/gjgl.37.
Plank, Frans. 2017. Thoughts on the origin, progress, and pronominal status of reciprocal forms in Germanic, occasioned by those of Bavarian. *Linguistic Typology* 21: 347–73. https://doi.org/10.1515/lingty-2017-1003.
Rákosi, György. 2002. Hungarian reciprocals. Paper presented at the Anaphora Typology Workshop, Utrecht, November 2002.
Ressue, Lauren. 2015. *Reciprocity in Russian: An Investigation of the Syntactic, Semantic and Pragmatic Interfaces*. Ph.D. thesis, The Ohio State University, Columbus, Oh.
Rizzi, Luigi. 1990. On the anaphor agreement effect. *Rivista di linguistica* 2: 27–42.
Safir, Ken. 2013. Syntax, binding, and patterns of anaphora. In *The Cambridge Handbook of Generative Syntax*, edited by Marcel den Dikken, pp. 515–76. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511804571.020.
Sigurðsson, Halldór Ármann, Jim Wood, and Einar Freyr Sigurðsson. 2020. *Hvor* 'each' reciprocals and distributives in Icelandic: E-raising + short main verb movement. *Linguistic Inquiry* 53: 571–88. https://doi.org/10.1162/ling_a_00411.
Siloni, Tal. 2008. The syntax of reciprocal verbs: An overview. In *Reciprocals and Reflexives: Theoretical and Typological Explorations*, edited by Ekkehard König and Volker Gast, no. 192 in Trends in Linguistics. Studies and Monographs, pp. 451–98. https://doi.org/10.1515/9783110199147.451.
Szabolcsi, Anna. The possessor that ran away from home. *The Linguistic Review* 3: 89–102. https://doi.org/10.1515/tlir.1983.3.1.89.
van den Toorn, M. C., W. J. Pijnenburg, J. A. van Leuvensteijn, and J. M. van der Horst (eds.). 1997. *Geschiedenis van de Nederlandse taal*. Amsterdam University Press, Amsterdam.
Vater, Heinz. 2006. Kasus in Appositionen. *Lyon Linguistique Allemande* (*LYLIA*) 8.
Verwijs, Eelco and Jacob van Dam. 1885–1929. *Middelnederlandsch woordenboek*. Nijhoff, The Hague.
Vezzosi, Letizia. 2010. Micro-processes of grammaticalization: The case of Italian *l'un l'altro*. In *Grammaticalization: Current Views and Issues*, edited by Katerina Stathi, Elke Gehweiler, and Ekkehard König, no. 199 in Studies in Language Companion Series. pp. 343–72. John Benjamins, Amsterdam. https://doi.org/10.1075/slcs.119.18vez.
de Vries, Mark. 2006. The syntax of appositive relativization: On specifying coordination, false free relatives, and promotion. *Linguistic Inquiry* 37: 229–70. https://doi.org/10.1162/ling.2006.37.2.229.
Woolford, Ellen. 1999. More on the anaphor-agreement effect. *Linguistic Inquiry* 30: 257–87. https://doi.org/10.1162/002438999554057.
Živanović, Sašo. 2016. Quo vadis, Slovenian bipartite pronouns? In *Formal Studies in Slovenian Syntax: In Honor of Janez Orešnik*, edited by Franc L. Marušič, and Rok Žaucer, no. 236 in Linguistics Today, pp. 313–28. John Benjamins, Amsterdam. https://doi.org/10.1075/la.236.13ziv.

Theoretical linguistics with clinical reach: Two case studies in morphological development in children with hearing loss

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Abstract

This paper examines how theoretical linguistics and clinical research can inform one another through the study of language acquisition in children with hearing loss. It focuses on how perceptual constraints, such as reduced auditory input, shape the development of grammatical systems.

The first case study investigates Dutch-speaking children with cochlear implants and their acquisition of past tense morphology. It compares the single-route model (a frequency-driven learning mechanism) and the dual-route model (a rule-based and memory-based system). Data from spontaneous speech and elicited production show that these children lag behind their hearing peers and display patterns not fully explained by either model. This suggests the need for approaches that integrate perceptual and morphosyntactic factors.

The second case study explores determiner acquisition at the prosody–morphology interface. While typically developing children use prosodic cues to acquire indefinite articles, children with cochlear implants show a reversed pattern, producing definite articles earlier due to limited access to pitch cues.

Together, the findings demonstrate that combining theoretical and clinical perspectives improves our understanding of grammar and supports more effective assessment and intervention strategies.

1. Introduction

Language development has long been a testing ground for linguistic theory, offering a window into how abstract grammatical systems take root in the minds of children. From Brown's (1973) pioneering study of morpheme acquisition to more recent cross-linguistic accounts, research on child language has continually challenged adult-based models of grammar. A well-known example is provided by research on subject omission in early child language. Children acquiring non–null subject languages such as English frequently produce sentences without overt subjects (e.g., *want cookie*, *is raining*). This observation posed a challenge to the Null Subject Parameter in generative grammar and led to refinements of the theory, such as the proposal that early grammars allow root null subjects due to constraints on clause structure (Hyams 1986, Rizzi 1994). Another example comes from work on the acquisition of genitive and dative clitic pronouns in Romanian. Based on child language data, Avram and Coene argue that such clitics emerge relatively late and function as a "last resort" strategy in the developing grammar, suggesting that their use depends on the prior acquisition of the relevant syntactic licensing conditions (Avram and Coene 2002). Analyses of this type have been used to inform theoretical debates about the syntactic status of clitics and the interaction between case, agreement, and functional structure in the clause. At the same time, clinical populations such as children with hearing loss provide valuable opportunities to further refine these models of language acquisition, revealing how perceptual and cognitive constraints shape developmental trajectories.

We focus on children with hearing loss, a population for whom language acquisition is profoundly shaped by auditory limitations. Through two case studies, we examine how theoretical frameworks of morphology and prosody inform the study of this group. The first case study investigates the acquisition of past tense morphology in Dutch-speaking children with cochlear implants (CIs), putting two competing language acquisition models to the test. The second case study explores the interface of prosody and morphology in determiner acquisition, showing how fine-grained theoretical insights yield concrete implications for clinical audiology and educational practice.

Together, the two studies aim to demonstrate the productive dialogue between theoretical linguistics and clinical application – a dialogue that broadens our understanding of language while addressing real world communicative challenges.

To situate these investigations, it is crucial to understand how children with hearing loss experience language acquisition differently from their peers with typical hearing. The following section outlines the

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auditory, cognitive, and linguistic constraints that shape their developmental trajectories, providing context for the empirical findings presented in the two case studies.

1.1. Introducing children with hearing loss

Childhood hearing loss affects at least one in every 1000 children in developed nations (Davis, Davis, and Mencher 2009). Thanks to universal newborn hearing screening, diagnosis can occur early, allowing timely intervention. Mild to moderate hearing loss is typically addressed with hearing aids, while children born deaf or with severe loss often receive CIs. These devices transmit sound directly to the auditory nerve through electrical stimulation, bypassing the outer and middle ear. Although CIs restore auditory access, the signal remains qualitatively degraded compared to natural hearing.

Early auditory experience is crucial for language development. Children must first discriminate the speech sounds of their native language, which form building blocks for syllables, words, and phrases. Before CIs, many deaf children could not acquire spoken language at a level sufficient for full participation in an auditory-oral society. With early implantation, however, children often reach language levels comparable to peers with normal hearing (Nicholas and Geers 2007), facilitating social integration and mainstream education (Van der Straaten 2021).

Children with hearing loss acquire language under fundamentally different conditions. Reduced auditory input would intuitively be expected to mainly affect the acquisition of phonology, since limited access to the speech signal constrains children's ability to perceive and reproduce segmental contrasts. However, the consequences of degraded auditory input extend beyond phonology. Restricted access to the acoustic signal also reduces the availability of fine-grained phonetic and prosodic cues that signal grammatical structure, such as weak function words, morphological markers, and prosodic prominence. As a result, reduced auditory input affects all domains of language development, and its impact is often particularly visible in morphosyntax. The linguistic signal is impoverished relative to natural hearing (Coene and Govaerts 2014), limiting opportunities to extract regularities and build robust morphosyntactic representations. Longitudinal studies show that auditory limitations impact not just the rate but also the quality of language development, with effects persisting even after early implantation (Tomblin et al. 2005).

Despite these constraints, children with hearing aids or CIs generally follow a delayed but broadly typical developmental trajectory. Preschoolers acquire early grammatical morphemes and sentence structures in the same order as peers with normal hearing, but later and with lower accuracy (Szagun 2002 2004). Vulnerabilities become more apparent with age: school-aged children and adolescents often struggle with verbal inflection (tense and agreement), function words (articles, auxiliaries), and complex syntactic constructions (Hammer 2010, Hammer and Coene 2016, Huysmans et al. 2017). Fine-grained analyses confirm ongoing morphosyntactic challenges and difficulties processing complex structures such as embedded clauses and syntactic ambiguities (Coene and Govaerts 2014, Nittrouer and Lowenstein 2021; 2023).

Individual outcomes of children with hearing loss vary widely, influenced by factors such as age at diagnosis, timing and consistency of amplification, residual hearing (i.e. remaining auditory functioning, with or without hearing aids or cochlear implants), intervention quality (type and frequency of intervention), and the linguistic environment (the quantity and quality of language input) (Nicholas and Geers 2007, Tomblin et al. 2005). Children implanted before 12 months generally show more favourable morphosyntactic outcomes, highlighting sensitive periods for language acquisition. Vocabulary growth is closely linked to grammatical development: larger vocabularies often support more advanced morphosyntax, whereas early lexical delays can cascade into later grammatical difficulties (Marchman and Bates 1994, Coene et al. 2011).

Importantly, morphosyntactic difficulties in children with hearing loss do not simply reflect a uniform developmental delay but often show systematic patterns of weakness. For instance, children with hearing loss have been shown to produce less complex syntax in spontaneous speech than hearing peers (Werfel et al. 2021), while difficulties are particularly pronounced for low-salience grammatical morphology, such as finite verb inflection (Hammer and Coene 2016). Such findings support the view that morphosyntactic

development in this population is selectively shaped by the perceptual accessibility of grammatical cues in the input, rather than being uniformly delayed across the grammatical system.

In sum, children with hearing loss show systematic morphosyntactic deviations rather than uniform delays, highlighting how auditory limitations shape grammar acquisition. The following case studies on past tense marking and determiners illustrate this interaction. The first study examines past tense morphology, a domain where language acquisition models make contrasting predictions. By analyzing how children with cochlear implants acquire past tense forms, we can test the validity of dual-route versus single-route accounts in a population subject to atypical auditory input.

2. Case study I – Putting language acquisition models to the test: Past tense acquisition

2.1. Introduction

Our first case study examines the development of past tense in children with hearing loss. The results are an adapted version of Chapter 6 of the first author's doctoral dissertation (Hammer 2010). The production of past tense is a well studied phenomenon in (typical) language development. Particularly errors such as 'comed', 'falled' and 'maked', observed in the Brown corpus (1973), have attracted the attention of researchers. These innovative past tense forms do not occur in the linguistic input, but rather reflect children's own creative processes. Their emergence suggests that children have identified a morphological rule or regularity, which they then overextend to irregular verbs. Such forms are therefore classified as overgeneralizations.

These so-called overgeneralizations, instances in which irregular past tense forms are regularized, offer important insights into the mechanisms underlying the acquisition of past tense morphology. On a theoretical level, two accounts have been advanced to explain the emergence of such errors. The first, the dual-route model (Pinker 1999), posits that overgeneralizations arise once children acquire the rule-based mechanism responsible for past tense marking. According to this model, the onset of overgeneralizations coincides with the mastery of the rule for past tense formation (Marcus et al. 1992). The dual route model assumes two distinct mental pathways for past tense formation: a rule-based route, in which regular forms are generated through morphological concatenation (verb stem + *-ed*), and a memory-based route, in which irregular forms are stored and retrieved as whole lexical items. The second pathway is a memory-based route, where irregulars are stored as whole items in memory (Pinker 1999). By contrast, the single-route model contends that regular and irregular past tenses are processed within the same associative network. As the child's lexicon expands, the increasing dominance of regular verbs reshapes the network's connection strengths. This shift produces temporary overgeneralizations, as the network extends the newly reinforced regular pattern to irregular verbs already presented in memory (Rumelhart and McClelland 1986).

The models diverge in their assumptions regarding the role of input in the acquisition of regular and irregular past tense forms. The single-route model proposes that children acquire the regular past tense pattern due to the predominance of regular verbs in the linguistic input relative to irregulars. Supporting this view, Rumelhart and McClelland (1986) demonstrated with their connectionist model that increased exposure to regular verbs led to overgeneralization of irregular forms. However, the increased exposure of regulars does not correspond well to the child's linguistic environment. Analyses of the Brown corpus by Marcus et al. (1992) revealed no significant change in the proportion of regular verbs in the input before and after the onset over overgeneralizations. This raises the question of whether and to what extent linguistic input serves as a primary trigger in children's acquisition of past tense morphology? To answer this question, children with hearing loss provide a valuable test case, as they have reduced access to the speech around them.

The present study aims to examine the acquisition of past tense morphology in Dutch-speaking children with cochlear implants. In Dutch, the regular past tense morphemes are /-de/ and /-te/. The distributions of these morphemes are phonologically conditioned. The former morpheme attaches to a stem ending in a voiced consonant (e.g., *spelen – speelde* (sg), *speelden* (pl) 'to play'), the latter to an unvoiced

consonant (e.g., *werken – werkte* (sg), *werkten* (pl) 'to work'). The irregulars involve a vowel change (e.g., *komen – kwam* (sg), *kwamen* (pl) 'to come') (Booij and Van Santen 1998).

2.2. Past tense production in spontaneous speech

Our first analysis examined the spontaneous speech of 30 children with CI, aged between five and seven years, in order to gain preliminary insights into their use of past tense morphology. Previous research has shown that children acquiring Dutch tend to prefer past participles when referring to past events (e.g. *Gisteren heb ik een taart gebakken* 'Yesterday I have baked a cake' vs. *Gisteren bakte ik een taart* 'Yesterday I baked a cake') (see De Houwer 1997), a pattern that is also observed in the speech of Dutch adults. Moreover, children pass through a developmental phase in which they refer to past events using present tense forms (Kuczaj 1977).

The data for this study were drawn from a corpus of spontaneous language samples specifically compiled to investigate the grammatical development of children with CI (see Coene 2005–2010). Each child was recorded for a period of 15 to 30 minutes. During these recordings, children were encouraged to talk about daily activities and events outside the here and now. All recordings were made in a quiet room at the audiology centre or at the schools the children attended. The resulting samples were transcribed following the CHAT conventions (MacWhinney 2000). From each transcript, the first 50 utterances were extracted for analysis. Pure repetitions (echoes of adult speech), unintelligible utterances, idioms (e.g. *weet ik niet* 'I don't know'), and elliptical answers were excluded. Within this subset, all instances of grammatically encoded past tense forms were identified and examined.

Results revealed that the overall number of paste tense productions among children with CI was found to be very low. The median number of past tense tokens in a sample of 50 utterances amounted to 2, 3, and 1 for the five-, six-, and seven-year-olds, respectively. Notably, all the past tense productions involved irregular forms. The most frequently produced forms were the auxiliaries *zijn* 'to be' and *hebben* 'to have', alongside more than ten tokens of *gaan* 'to go' and *moeten* 'must'. These verb forms are among the most frequent items in the input. Furthermore, a significant positive correlation was observed between past tense tokens in the speech of children with CI and that of adults (Pearson r= .534, p=.018).

However, our analysis also revealed that children with CI exhibit preferences for particular verbs and constructions in reference to past events that cannot be accounted for solely by input frequency. For example, the past tense productions of *gaan* 'to go' and *moeten* 'must' do not occur relatively more often in the language input than other past tense types such as *zullen* 'shall' and *vinden* 'to find'. Interestingly, the past tense of *gaan* 'to go' occurred most often in the construction of *gingen* 'went' + infinitive, as is shown in the following example.

(1) En toen ging de kapitein zijn hoed aan Berend geven.
and then went the captain his hat to Berend give
'And then the captain gave his hat to Berend.'

This construction is not highly frequent in adult speech and may, in fact, reflect a delay in past tense formation. De Jong (1999) demonstrated that children with developmental language disorder (DLD) also produce this construction more often than their typically developing peers. He proposed that the use of '*gaan*' (to go) in such contexts functions as an alternative strategy for marking tense; the auxiliary carries the tense maker while contributing minimal semantic content to the main predicate.

Overall, the findings of this study suggest that children with CI exhibit delayed development of past tense morphology. Their spontaneous speech contained neither regular past tense forms nor overgeneralizations, and the production of irregular forms was largely restricted to high-frequency verbs with minimal semantic content. It should be noted, however, that the conversational context may have constrained opportunities for the use of past tense forms. To address this limitation, we subsequently designed an elicitation task.

Figure 1: Screenshot from the Bob & Boris movie to elicit the past tense forms.

2.3. Past tense elicitation

In this study, we examined children within the same age range as in our first study (5–7 years). This age group was chosen for two reasons: first, children need sufficient cognitive and linguistic maturity to perform an elicited production task reliably; second, in Germanic languages, the production of past tense morphology around this age is a well-established clinical marker of language delay (Krok and Leonard 2015). We included a control group of children with normal hearing and typical language development (N=71), matched in age to the 14 children with CI who participated in this study (5-year-olds N=14, 6-year-olds N=8, 7-year-olds N=9). To assess past tense knowledge, we designed an elicitation task modelled on Berko's (1958) well known Wug experiment. In this task, children were prompted to produce the past tense of a nonce verb. The experimenter would say '*This is a man who knows how to spow. He is spowing. He did the same thing yesterday. What did he do yesterday? Yesterday he....*'. Berko showed that English-speaking children as young as four years old already exhibit knowledge of regular past tense formation.

In our elicitation task, we produced a short movie in which two characters, Bob and Boris, are building a sandcastle, see figure 1. The task included six regular and six irregular verbs, equally divided into items for which past tense forms are relatively high- versus low-frequent in adult speech. Additionally, four nonce verbs were created by altering the onset of the first syllable while preserving the rhyme (e.g. [*b*]*otsen* – [*w*]*otsen*). Our analysis focused on two primary questions: 1) the ability of children with CI to produce regular past tense forms and to inflect novel verb forms and 2) the extent to which they overgeneralize regular past tense formation to irregulars.

All responses were classified as either target-like or non-target-like. Target-like responses corresponded to the adult past tense forms. In the pie charts below, the proportion of target-like responses is indicated by the dark grey shading. For nonce verbs, responses of adult informers were obtained in a pilot study. The non-target-like responses were further analyzed according to a set of pre-defined categories, which varied slightly depending on the type of verb (i.e. regular, irregular or nonce). A description of the categories is provided in the figures.

Analysis of the responses to *regular verbs* (see figure 2) reveals that children with normal hearing and typical language development demonstrate a steady increase in the production of target-like regular past tense forms, which largely replaces the use of present tense forms. In contrast, children with CI exhibit a substantially different pattern, predominantly producing present tense form or null responses, with minimal evidence of target-like regular past tense production.

Two response categories are particularly noteworthy for *irregular verbs*: target-like responses and overgeneralizations, the latter represented by the wave pattern in the pie charts in figure 3. Interestingly,

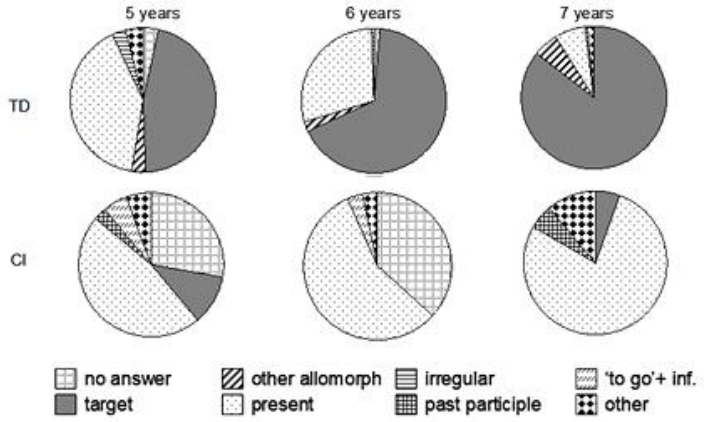

Figure 2: Proportion of target-like responses and non-target-like responses from the total number of regular verbs (i.e. 6).

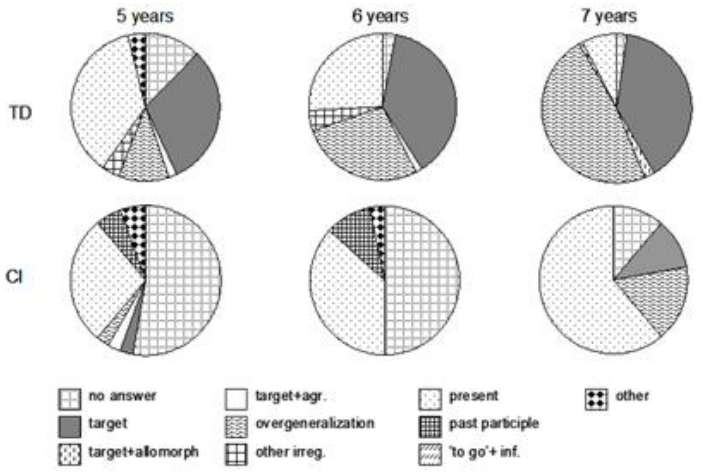

Figure 3: Proportion of target-like responses and non-target-like responses from the total number of irregular verbs (i.e. 6).

children in the control group show both an increase in target-like irregular forms and a simultaneous rise in overgeneralizations. Interestingly, children in the control group show an increase in both target-like irregular forms and overgeneralizations, consistent with the early phase of the U-shaped developmental trajectory described in previous research (e.g. Cazden 1968, Marcus et al. 1992). In contrast, an early phase of a U-shaped trajectory is not observed in the data of children with CI. Similar to the pattern observed for regular past tense, they predominantly produce null responses or present tense forms. Nevertheless, by age seven, some overgeneralizations emerge at a rate roughly equivalent to target-like past tense forms, suggesting the initial stages of mastery of the regular past tense rule.

So far, our results indicate that children in the control group are in the process of acquiring past tense morphology between the ages of five and seven. Children with CI on the other hand appear to initiate this process only around age seven, and even at this age, their production of target-like past tense forms remains lower than that of five-year-old children with normal hearing. *Nonce verbs* provide a particularly informative test of past tense acquisition, as these items cannot be retrieved as unanalyzed lexical wholes;

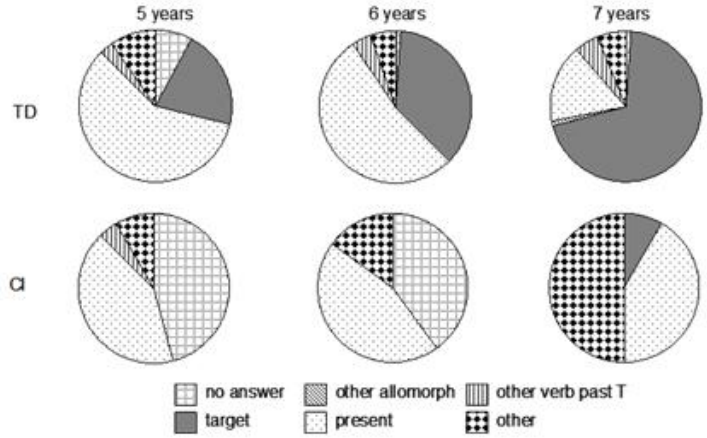

Figure 4: Proportion of target-like responses and non-target-like responses from the total number of nonce verbs (i.e. 4).

successful inflection requires application of morphological rules or analogical reasoning. Results for the nonce verbs are presented in figure 4.

For the control group, there is an increase in target-like responses accompanied by a corresponding decrease in present tense forms, mirroring the pattern observed with existing regular verbs and confirming that normal hearing children are beginning to acquire past tense morphology. This pattern is not evident in children with CI. As with familiar verbs, they predominantly produce null responses or present tense forms. However, by age seven, some target-like responses begin to emerge. At this stage, null responses largely disappear, and children instead produce alternative stems without past tense suffixes (categorized as 'other'; e.g. *grammen* as a past tense of the nonce verb *grallen*). This may reflect the impact of their hearing loss, which could render them uncertain about their perception of unfamiliar verbs.

Did frequency of occurrence influence the production of past tense forms? For children in the control group, no effect of frequency was observed for regular past tense forms. That is, children with normal hearing were not more accurate in producing high-frequency regular forms compared to low-frequency ones. However, for irregular verbs, target-like responses were significantly higher for high-frequency items relative to low-frequency items at ages five and six. By age seven, this frequency effect was no longer evident. Among children with CI, no significant effects of frequency were observed, probably caused by the low number of target-like responses in the elicitation task.

2.4. Implications for theory and practice

The results of this study indicate that children from a clinical population may exhibit patterns of past tense acquisition that deviate from predictions derived from models of language development based on data from typically developing children. In the elicitation task, children with normal hearing produced results consistent with the dual-route model, which predicts frequency effects only for irregular past tense forms and not for regular forms, which is precisely the pattern observed in our data. This contrasts with the single-route model, in which the acquisition of both regular and irregular past tense is assumed to be frequency driven.

The performance of children with CI, however, is not readily accounted for by either model. From a connectionist perspective, the acquisition of past tense is closely linked to the size of the child's verb lexicon, with generalization of past tense rules occurring once a critical mass of verbs has been reached (Marchman and Bates 1994). Although children with CIs generally show relatively strong vocabulary skills (Walker, Redfern, and Oleson 2019), they may reach this critical mass later than their hearing peers, contributing to delayed past tense acquisition. However, their deficits go beyond a simple delay: while children with DLD have been shown to perform similarly to typically developing children about two years

younger, the 7-year-old children with CIs in our study performed below 5-year-old controls. One possible reason is that children with CI have difficulty perceiving the low-salient past tense morpheme, a hypothesis previously suggested to account for language delays in children with DLD (Leonard et al. 2003). Notably, the children in our study were perfectly able to discriminate between a verb's present tense form and regular past tense form (e.g. *werk – werkte* 'work – worked'), suggesting that perceptual discrimination alone cannot account for the observed difficulties.

Taken together, input-based accounts like the single-route model are insufficient to explain the outcomes of children with CI. Generative accounts such as the dual-route model similarly fail to clarify why these children encounter persistent challenges in acquiring morphosyntactic structures. These findings underscore the need for models of language development that integrate perceptual, lexical, and morphosyntactic factors to account for acquisition in populations with atypical auditory experience.

It is now well established that morphosyntactic difficulties represent a core feature of the language challenges experienced by children with hearing loss. For speech-language therapists and special education professionals, linguistic evidence such as that provided in the present study is essential in identifying the relative strengths and weaknesses in the language development of children with hearing loss. Such evidence informs the design of targeted interventions and supports the implementation of individualized therapy programs within educational settings.

Building on insights from past tense acquisition, we turn to another domain where theoretical linguistics intersects with clinical relevance: the acquisition of determiners at the morphology–prosody interface. Just as auditory input shapes morphosyntactic development, limitations in pitch perception affect prosody-driven grammatical cues, offering a parallel lens through which to study language acquisition in children with hearing loss.

3. Case study II – From comparative linguistics to audiological practice: Determiners at the morphology-prosody interface

3.1. Introduction

The present case study builds upon our first demonstration of how theoretical linguistic inquiry can have direct and far-reaching consequences for applied domains. Once again, we aim to show that what may initially appear to be highly abstract pursuits in formal linguistics ultimately provide crucial insights for understanding child language development, and by extension, for shaping both clinical audiology and technological design. The specific empirical domain under investigation here is the prosody–morphology interface.

Prosody is commonly defined as the suprasegmental structure of speech, encompassing rhythm, intonation, stress, and phrasing (Selkirk 1984, Nespor and Vogel 1986). It constitutes the "melody of speech", but far from being a merely ornamental layer, prosody interacts systematically with other components of the grammar. In particular, it plays a central role in organizing morphosyntactic units into prosodic phrases and in signaling discourse-related distinctions such as focus, topic, and information status (Gussenhoven 2004). A growing body of research has established that prosody is not autonomous but tightly integrated with syntax and morphology in shaping linguistic meaning and communicative function.

The goal of this case study is to trace a structured argumentative trajectory: beginning with fundamental linguistic insights from cross-linguistic studies of the prosody–morphology interface (with special attention to Dutch and Romanian), proceeding to developmental data that reveal how prosody guides the early acquisition of determiners in children, and culminating in clinical applications that demonstrate how deficits in pitch perception – most notably in children with CIs – lead to altered acquisition trajectories. By following this path, we illustrate how fine-grained theoretical analysis not only enriches our understanding of the human language faculty but also generates practical knowledge that directly informs clinical intervention and technological innovation, thereby addressing specific communicative challenges faced by hearing-impaired populations.

3.2. Encoding discourse information and the nominal left periphery

Human communication encodes information structure through multiple channels, of which prosody and word order are among the most salient. Cross-linguistic research highlights a typological divide in how languages encode focus. In many Romance languages, focus is often associated with syntactic movement to the left periphery of the clause, a region that Rizzi (1997) formalizes through the functional projection FocusP. Here, constituents in focus are fronted to occupy the specifier of FocusP, signaling their discourse prominence, while prosody typically plays a secondary, demarcative role (Zubizarreta 1998, Cinque 1993). By contrast, in Germanic languages such as English and Dutch, focused constituents tend to remain in situ, and focus is primarily marked through prosodic prominence, particularly pitch accents (Selkirk 1995). In these languages, word order is less directly involved in encoding focus. The contrast becomes clear in the following examples.

(2) a. I have [$_{+\text{FOCUS}}$ INSTRUCTIONS] to leave. (Newman 1946)
b. Ho [$_{+\text{FOCUS}}$ istruzioni] di LASCIARE. (Cinque 1993)

The concept of a nominal left periphery mirrors the more widely studied clausal left periphery. Analogous to the CP, the DP can host functional projections such as FocusP and TopicP, which serve to encode discourse-related roles (Giusti 1996, Bernstein 2001, Cornilescu 2011, Corver and van Koppen 2006). This functional layering within the DP provides a mechanism through which determiners can interact with pragmatic and prosodic information, effectively linking morphology, syntax, and discourse in a unified framework.

Prosodic focus marking can also apply to presentational focus. Unlike contrastive focus, presentational focus introduces discourse-new material without any opposing element, and is pragmatically defined as either not c(ontext)-construable (Rochemont 1986) or D(iscourse)-delinked (Pesetsky 1987).

There is a well-established link between the prosodic structure of DPs and the information status of the nominal referent. Discourse-given items tend to be deaccented, whereas discourse-new items are typically made intonationally prominent, with a rising pitch on the stressed syllable of the noun. Perception studies show that listeners are highly sensitive to such local intonation cues: for instance, Terken and Noteboom (1987) demonstrate that Dutch listeners respond significantly faster to accented, discourse-new items.

At the same time, morphosyntactic factors also correlate with information status. Discourse-new items are more likely to bear the theme role, occupy object positions, and appear as full DPs introduced by an indefinite determiner. This suggests an indirect connection between determiner choice and prosodic marking: in many cases, pitch-accented nouns co-occur with indefinite articles, reflecting the discourse-new status of the referent:

(3) Yesterday, I saw [$_{\text{FocP}}$ a black CAT] in our garden. The cat was trying to catch a bird that had fallen from the nest.

3.3. From child-directed speech to the acquisition of determiners

From a theoretical perspective, these findings suggest that the highest projections of the DP involve at least three interacting interfaces: morphosyntactic, pragmatic, and prosodic. Overgeneralizing slightly, one could say that the choice of D is influenced both by intonational patterns and by discourse information. This raises a crucial question for language acquisition: to what extent are prosodic features accessible to children as they acquire their mother tongue? In particular, how closely are acoustic correlates of discourse prominence linked to determiner choice in child-directed speech? And finally, does it also correlate with the acquisition of determiners by young children?

To answer these questions, a corpus of Dutch child-directed speech was analyzed consisting of 1,930 minimal pairs of definite and indefinite DPs. The acoustic analysis was done by means of Praat, a software program designed for detailed speech analysis (Boersma et al. 2023). A comparison of the fundamental frequencies (F0) at the start, the middle and the end of the noun showed that whereas at the start of the noun F0 did not differ between indefinite and definite article contexts (Md Indef: 247 HZ, Def: 250 Hz, p =.92),

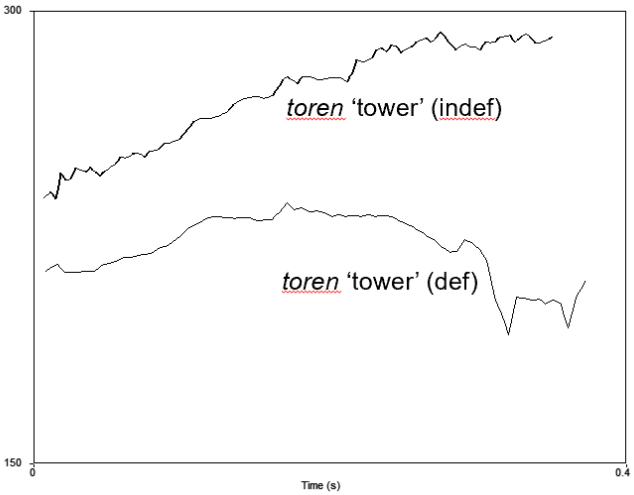

Figure 5: Pitch contour for the noun *toren* 'tower' in (4). Horizontal axis: time (s); vertical axis: F0 (Hz).

a statistically significant difference was found for F0 at the middle of the noun (Md Indef: 306 Hz, Def: 234 Hz, p =.02) and at the end of the noun (Md Indef: 340 Hz, Def: 236 Hz, p = .002).

The following example from spontaneous Dutch adult speech illustrates how this indefinite vs definite distinction is reflected intonationally. In minimal pairs where the same noun appears with either an indefinite or a definite article, the indefinite DP is marked by a rise in F0 on the stressed syllable of the noun:

(4) a. Hier, we gaan een toren maken.
here we go a tower make-INF
'Look, we're going to make a tower.'

b. We kunnen ook gewoon de toren een beetje afbreken.
we can also just the tower a little break-INF
'We can also just deconstruct the tower a little.'

The difference between the rising pitch on the stressed syllable of an indefinite noun and the absence thereof in the context of its definite counterpart, is depicted for example (4) in figure 5.

An important question is whether the observed prosodic prominence of discourse-new items in child directed speech influences child language acquisition. We propose that pitch marking on the noun affects the acquisition of determiner morphology, in the sense that it influences the order in which indefinite and definite determiners are acquired.

Several studies in first-language acquisition have suggested that young children use prosodic cues to bootstrap morphosyntactic information (Höhle 2009). Building on this, our hypothesis is that prosodic prominence directs the child's attention to discourse-new referents. Since new referents are typically introduced with indefinite DPs, children are expected to attend to indefinite rather than definite determiners during the early stages of language development. Evidence from the literature further suggests that the order of determiner acquisition reflects differences in how specificity is encoded. The observed pattern of indefinite determiners appearing before definite ones in children's speech has been linked to a stepwise feature valuation, in which the /number/ feature of noun phrases is acquired before the /person/ feature (see Coene for a comparative study of 4 Romance languages).

From these combined insights, we predict that indefinite articles will emerge in the child's grammar before definite articles. In other words, the natural order of determiner acquisition is influenced, at least in part, by the prosodic prominence of the DP.

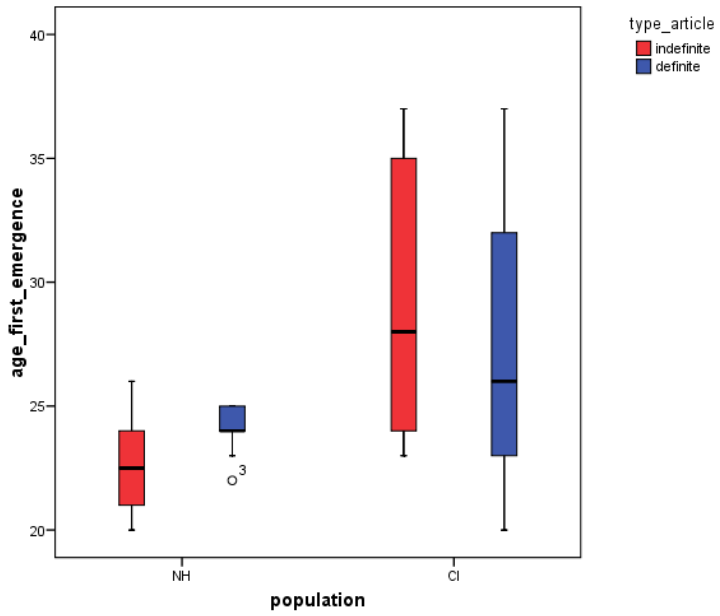

Figure 6: Age at first emergence (in months) of indefinite and definite articles in children with CIs.

This prediction is supported by a longitudinal corpus study of 12 typically developing Dutch-speaking monolingual children. For each child, we examined monthly recordings of spontaneous speech and compared the age of first emergence of indefinite and definite articles across three consecutive months. The median age for the first use of the indefinite article was 22.5 months, whereas the definite article appeared roughly 1.5 months later.

3.4. Determiner acquisition in children with cochlear implants

Unlike hearing aids, which amplify sound, CIs bypass damaged hair cells and convert acoustic signals into electrical impulses transmitted to the auditory nerve. Despite their transformative role, CIs have important limitations. They provide reduced spectral resolution and limited transmission of fundamental frequency (F0), the main acoustic correlate of pitch. As a result, CI users often struggle with fine-grained pitch discrimination, intonational contrasts, and musical tones. Studies indicate that they frequently perform at near-chance levels when asked to distinguish rising from falling pitch contours in connected speech.

These limitations have significant implications for prosody-driven aspects of grammar acquisition. In line with this expectation, a striking difference emerges when comparing determiner acquisition in normally hearing children and children with CIs. Analysis of a longitudinal dataset of spontaneous speech from 10 Dutch-speaking children with CIs revealed that at the group level, definite determiners appeared at a mean age of 26 months, whereas indefinite determiners emerged later, around 28 months. A paired analysis confirmed that this order of acquisition is generally held at the level of individual children (see figure 6).

This reversed trajectory likely reflects the absence of reliable pitch information in CI auditory input. The findings confirm that prosody acts as a bootstrapping mechanism in typical acquisition: without prosodic cues, children with CIs are more likely to attend to forms that are less dependent on pitch marking.

Controlled experiments support this conclusion. We tested 32 CI users and 52 hearing controls on two prosodic reception tasks. The first task involved 16 pairs of low-pass filtered words differing in F0 patterns, mimicking natural speech intonation (see Heeren et al. 2010 and Schauwers et al. 2012 for more details).

The second task presented unfiltered nouns bearing rising or falling pitch accents corresponding to definite and indefinite article contexts (see Coene et al. 2010). Whereas hearing participants achieved above 80% accuracy, CI users often performed near chance. Across both tasks, CI children consistently underperformed relative to controls, confirming a general deficit in pitch perception that shapes their grammar acquisition.

Because children with CIs cannot reliably access the prosodic cues linking indefinite determiners to presentational focus, they miss out on the prosodic bootstrapping mechanisms typically available to hearing children during language development.

3.5. Implications for therapy, education and technology

First and foremost, the results of this case study underscore fundamental theoretical and developmental principles. They point to the potential presence of discourse-related projections in the DP, such as FocusP, and illustrate how prosodic prominence serves as a bootstrapping mechanism for grammatical acquisition. In hearing children, prosody guides attention toward new referents and shapes determiner emergence, whereas in children with CI's, the absence of these cues forces reliance on alternative strategies, fundamentally altering the developmental path. This interplay between prosody, syntax, and discourse suggests that prosody is an important factor in shaping the child's acquisition of lexical elements with morphosyntactic significance (i.e., functional elements), with its influence on broader grammatical organization being indirect rather than structural.

These linguistic insights have clear implications for both therapy and education. Traditional approaches often rely on the child's sensitivity to prosody, but for CI users, alternative strategies are necessary. Therapists and educators can emphasize syntactic and pragmatic cues – such as word order or contextual markers of focus – that are less dependent on pitch. Visual signals, including gestures and facial expressions, can also act as supplementary markers of discourse prominence, providing children with additional pathways to recognize new referents. Furthermore, explicit contrastive practice with definite and indefinite determiners can help compensate for the lack of prosodic guidance, supporting children in mastering distinctions that are naturally cued through intonation in hearing peers.

The findings also point toward directions for technological innovation. Cochlear implants could be optimized to better convey the pitch and intonational contours that underpin prosody-driven grammar acquisition. Enhanced pitch coding algorithms, hybrid electro-acoustic devices, and training software that simulates natural prosodic variation could all help CI users access cues that are crucial for language development. By bridging the gap between technological design and linguistic insight, these innovations offer a way to support children in acquiring grammar in a manner closer to typical developmental trajectories.

Ultimately, this case study demonstrates the power of an interdisciplinary perspective, linking theoretical linguistics, developmental psycholinguistics, clinical audiology, and biomedical engineering. By tracing how subtle theoretical constructs – prosodic bootstrapping, DP left periphery, and focus marking – manifest in real-world acquisition, we see that linguistics can inform practical interventions, technological solutions, and educational strategies. In doing so, it bridges the gap between fundamental research and the lived experiences of children with hearing loss, offering a roadmap for improving communication, therapy, and overall quality of life.

4. Conclusion

The two case studies presented here illustrate how developmental and clinical linguistics can fruitfully inform one another. In the domain of past tense morphology, we saw that data from children with cochlear implants do not neatly align with either single-route or dual-route accounts, underscoring the need for models that integrate perceptual, lexical, and morphosyntactic factors. At the morphology–prosody interface, we showed how prosodic prominence shapes determiner acquisition in typically developing children, and how prosodic perception deficiency in cochlear implant users alters developmental trajectories in systematic ways.

Taken together, these findings highlight two key insights. First, theoretical constructs – whether morphosyntactic rules or prosodic bootstrapping mechanisms – provide indispensable tools for understanding the particular difficulties faced by children with hearing loss. Second, clinical data in turn challenge, refine, and extend our models of language development, reminding us that these must ultimately account for the full diversity of human linguistic experience.

Acknowledgements

The two authors have had the pleasure of collaborating on the theme of linking theoretical linguistics to clinical realities, both within the framework of an NWO-funded project and several EU-funded projects. This collaboration has been shaped by stimulating discussions and a particularly enjoyable and productive exchange of ideas, which have profoundly informed the dual perspective we bring to the present contribution.

This perspective resonates strongly with the intellectual spirit celebrated in this volume. Johan Rooryck's work exemplifies a broad and open-minded approach to linguistics: it not only advances formal theory but also explores how linguistic insights can illuminate applied domains, ranging from language disorders to technological applications.

More broadly, this reciprocal movement between theory and application reflects the spirit of his scholarship. Throughout his career, he has combined a commitment to formal precision with a keen interest in how language is acquired, used, and sometimes impaired. His expansive view of linguistics consistently bridges domains – across languages, theoretical frameworks, and applied settings.

It is in this spirit that the present contribution is offered: as an illustration of how fundamental linguistic analysis, when extended to new empirical and clinical contexts, not only advances our scientific understanding but also has meaningful implications for real-world communication and care.

References

Avram, Larisa and Martine Coene. 2002. Genitive/Dative clitics as last resort. *Balkanistica* 15: 1–34.

Berko, Jean. 1958. The child's learning of English morphology. *WORD* 14 2–3: 150–77. https://doi.org/10.1080/00437956.1958.11659661.

Bernstein, Jean. 2001. The DP hypothesis: Identifying clausal properties in the nominal domain. In *The Handbook of Contemporary Syntactic Theory*, edited by Mark Baltin and Chris Collins, pp. 536–61. Blackwell, Oxford. https://doi.org/10.1002/9780470756416.ch17.

Boersma, Paul and David Weenink. 2023. Praat: Doing phonetics by computer [Computer program]. Version 6.3.87. Available at http://www.praat.org/.

Booij, Geert and Ariane van Santen. 1998. *Morfologie: De Woordstructuur van het Nederlands*. Amsterdam University Press, Amsterdam.

Brown, Roger. 1973. *A First Language: The Early Stages.* Harvard University Press, Cambridge, Ma. https://doi.org/10.4159/harvard.9780674732469.

Cazden, Courtney B. 1968. The acquisition of noun and verb inflections. *Child Development* 39 2: 433–48. https://doi.org/10.2307/1126956.

Cinque, Guglielmo. 1993. A null theory of phrase and compound stress. *Linguistic Inquiry* 24 2: 239–97.

Coene, Martine. 2005. On the acquisition of the indefinite article: A cross-linguistic study of French, Italian, Romanian and Spanish child speech. *Belgian Journal of Linguistics* 19 1: 121–43. https://doi.org/10.1075/bjl.19.07coe.

Coene, Martine (Principal Investigator). 2005–2010. *The Morphosyntactic Development of Children with Cochlear Implants. A Comparison with Children using Hearing Aids, Normally Hearing Children, and Children with Specific Language Impairment*. VIDI project no. 276-75-004, Netherlands Organization for Scientific Research (NWO).

Coene, Martine, Paul Govaerts, Johan Rooryck, and Kristin Daemers. 2010. The role of low frequency hearing in the acquisition of morphology. *Cochlear Implants International* 11 Suppl. 1: 272–7. https://doi.org/10.1179/146701010X12671177989156.

Coene, Martine, Karen Schauwers, Steven Gillis, Johan Rooryck, and Paul Govaerts. 2011. Genetic predisposition and sensory experience in language development: Evidence from cochlear-implanted children. *Language and Cognitive Processes* 26 8: 1083–101. https://doi.org/10.1080/01690965.2010.520540.

Coene, Martine and Paul Govaerts. 2014. The development of oral language in children with bilateral hearing loss: From speech perception to morphosyntax. *Lingua* 139: 1–9. https://doi.org/10.1016/j.lingua.2013.12.005.

Cornilescu, Alexandra and Alexandru Nicolae. 2011. Nominal peripheries and phase structure in the Romanian DP. *Revue roumaine de linguistique* 56 1: 35–68.

Corver, Norbert and Marjo van Koppen. 2006. A focus projection in the left periphery of DP: Evidence from noun ellipsis. Paper presented at *Edges in Syntax*, Nicosia, Cyprus.

Davis, A., Davis, K., Mencher, G. 2009. Epidemiology of permanent childhood hearing impairment. In *Paediatric Audiological Medicine*, edited by Valerie E. Newton, pp. 1–28. John Wiley & Sons, Hoboken, NJ.

de Houwer, Annick. 1997. The role of input in the acquisition of past verb forms in English and Dutch: Evidence from a bilingual child. In *Proceedings of the 28th Stanford Child Language Research Forum*, edited by Eve Clark, pp. 153–62. CSLI Publication, Stanford, Ca.

de Jong, Jan. 1999. *Specific Language Impairment in Dutch: Inflectional Morphology and Argument Structure.* Ph.D. thesis, University of Groningen, Groningen. Available at https://hdl.handle.net/11370/d3055f3b-699d-41ef-88ca-fc56112ad303.

Giusti, Giuliana. 1996. Is there a Focus and a Topic in the noun phrase structure? *University of Venice Working Papers in* Linguistics 6 2: 105–28.

Gussenhoven, Carlos. 2004. *The Phonology of Tone and Intonation.* Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511616983.

Hammer, Annemiek. 2010. *The Acquisition of Verbal Morphology in Cochlear-Implanted and Specific Language Impaired Children*. Ph.D. thesis, Leiden University, Leiden. LOT, Utrecht. Available at https://www.lotpublications.nl/the-acquisition-of-verbal-morphology-in-cochlear-implanted-and-specifi-the-acquisition-of-verbal-morphology-in-cochlear-implanted-and-specific-language-impaired-children.

Hammer, Annemiek and Martine Coene. 2016. Finite verb morphology in the spontaneous speech of Dutch-speaking children with hearing loss. *Ear and Hearing* 37 1: 64–72. https://doi.org/10.1097/AUD.0000000000000205.

Heeren, Willemijn, Bart Vaerenberg, Martine Coene, Kristin Daemers, Kristin, Paul Govaerts, Andrei Avram, Anna Cardinaletti, Geert de Ceulaer, Luca Bo, Steven Gillis, Alexandru Pascu, Johan Rooryck, Karen Schauwers, Vincent van Heuven, and Francesca Volpato. 2010. Linguistic Assessment Tools for the Digisonic® Dual Electric-Acoustic Speech Processor. *Cochlear Implants International* 11 Suppl 1: 306–11. https://doi.org/10.1179/146701010X12671177989435.

Höhle, Barbara. 2009. Bootstrapping mechanisms in first language acquisition. *Linguistics* 47 1: 1–30. https://doi.org/10.1515/LING.2009.013.

Huysmans, Elke. 2017. *Where Language and Hearing Meet: Consequences of Congenital Hearing Impairment on the Production and Reception of Language in Adults*. Ph.D. thesis, Vrije Universiteit Amsterdam, Amsterdam. Available at https://hdl.handle.net/1871/55180.

Hyams, Nina. 1986. *Language Acquisition and the Theory of Parameters.* Reidel, Dordrecht.

Krok, Windi C. and Laurence B. Leonard. 2015. Past tense production in children with and without specific language impairment across Germanic languages: A meta-analysis. *Journal of Speech, Language and Hearing Research* 58: 1326–40. https://doi.org/10.1044/2015_JSLHR-L-14-0348.

Kuczaj, Stan II. 1977. The acquisition of regular and irregular past tense forms. *Journal of Verbal Learning and Verbal Behavior* 16 5: 589–600. https://doi.org/10.1016/S0022-5371(77)80021-2.

Leonard, Laurence B., Patricia Deevy, Carol A. Miller, Leila Rauf, Monique Charest, and Robert Kurtz. 2003. Surface forms and grammatical functions: Past tense and passive participle use by children with specific language impairment. *Journal of Speech, Language, and Hearing Research* 46 1: 43–55. https://doi.org/10.1044/1092-4388(2003/004).

MacWhinney, Brian. 2000. The CHILDES project: Tools for analyzing talk. *Child Language Teaching and Therapy* 16 2: 147–54. https://doi.org/10.1177/026565909200800211.

Marchman, Virginia A. and Elizabeth Bates. 1994. Continuity in lexical and morphological development: A test of the critical mass hypothesis. *Journal of Child Language* 21 2: 339–66. https://doi.org/10.1017/S0305000900009302.

Marcus, Gary F., Steven Pinker, Michael Ullman, Michelle Hollander, John Rosen, Fei Xu, and Harald Clahsen. 1992. Overregularization in language acquisition. *Monographs of the Society for Research in Child Development* 57 4. University of Chicago Press, Chicago, Il. https://doi.org/10.2307/1166115.

Nespor, Marina and Irene Vogel. 1986. *Prosodic Phonology*. Foris, Dordrecht.

Newman, Stanley. 1946. On the stress system of English. *WORD* 2 3: 171–87. https://doi.org/10.1080/00437956.1946.11659290.

Nicholas, Johanna and Ann Geers. 2007. Will they catch up? The role of age at cochlear implantation on the spoken language development of children with severe to profound hearing loss. *Journal of Speech, Language and Hearing Research* 50: 1048–62. https://doi.org/10.1044/1092-4388(2007/073).

Nittrouer, Susan and Joanna Lowenstein. 2021. When language outgrows them: Comprehension of ambiguous sentences in children with normal hearing and children with hearing loss. *International Journal of Pediatric Otorhinolaryngology* 141: 110514. https://doi.org/10.1016/j.ijporl.2020.110514.

Nittrouer, Susan and Joanna Lowenstein. 2023. Recognition of sentences with complex syntax in speech babble by adolescents with normal hearing or cochlear implants. *Journal of Speech, Language, and Hearing Research* 66 3: 1110–35. https://doi.org/10.1044/2022_JSLHR-22-00407.

Pesetsky, David. 1987. Wh-in-situ: Movement and unselective binding. In *The Representation of (In)definiteness,* edited by Eric J. Reuland and Alice ter Meulen, Current Studies in Linguistics, pp. 98–129. MIT Press, Cambridge, Ma.

Pinker, Steven. 1999. *Words and Rules: The Ingredients of Language*. Basic Books, New York, NY.

Rizzi, Luigi. 1994. Early null subjects and root null subjects. In *Syntactic Theory and First Language Acquisition: Cross-Linguistic Perspectives*, vol. 2: *Binding, Dependencies, and Learnability*, edited by Barbara Lust, Gabriella Hermon, and Jaklin Kornfilt, pp. 249–72. Lawrence Erlbaum Associates, Inc., Hillsdale, NJ. (Reprinted from Teun Hoekstra and Bonnie D. Schwartz (eds.). 1994. *Language Acquisition Studies in Generative Grammar*, no. 8 in Language Acquisition and Language Disorders, pp. 151–76. John Benjamins, Amsterdam. https://doi.org/10.1075/lald.8.09riz.)

Rizzi, Luigi. 1997. The fine structure of the left periphery. In *Elements of Grammar: A Handbook of Generative Syntax,* edited by Liliane Haegeman, pp. 281–337. Kluwer, Dordrecht. https://doi.org/10.1007/978-94-011-5420-8_7.

Rumelhart, David E. and James L. McClelland. 1986. On learning the past tenses of English verbs. In *Parallel Distributed Processing: Explorations in the Microstructure of Cognition*, vol. 2: *Psychological and Biological Models*, edited by James L. McClelland, David E. Rumelhart, and the PDP Research Group, pp. 216–71. MIT press, Cambridge, Ma. https://doi.org/10.7551/mitpress/5237.003.0008.

Sarant, Julia, David Harris, and Lisa Bennet. 2015. Academic outcomes for school-aged children with severe-profound hearing loss and early unilateral and bilateral cochlear implants. *Journal of Speech, Language and Hearing Research* 58: 1017–32. https://doi.org/10.1044/2015_JSLHR-H-14-0075.

Schauwers, Karen, Martine Coene, Willemijn Heeren, Luca Del Bo, Alexandru Pascu, Bart Vaerenberg, and Paul Govaerts. 2012. Perception of pitch changes in hearing-impaired adults with aided and unaided hearing loss. *Journal of Hearing Science* 2 3: 25–34. https://doi.org/10.17430/883510.

Selkirk, Elisabeth. 1984. *Phonology and Syntax: The Relation between Sound and Structure*. MIT Press, Cambridge, Ma.

Selkirk, Elisabeth. 1995. Sentence prosody: Intonation, stress, and phrasing. In *The Handbook of Phonological Theory*, edited by John A. Goldsmith, pp. 550–69. Blackwell, Oxford.

Szagun, Gisela. 2002. The acquisition of grammar in young German-speaking children with cochlear implants and with normal hearing. In *Language Acquisition in Very Young Children with a Cochlear Implant*, edited by Karen Schauwers, Paul J. Govaerts, and Steven Gillis, no. 102 in Antwerp Papers in Linguistics, pp. 41–60. University of Antwerp, Antwerp.

Szagun, Gisela. 2004. Learning by ear: On the acquisition of case and gender marking by German-speaking children with normal hearing and with cochlear implants. *Journal of Child Language* 31 1: 1–30. https://doi.org/10.1017/S0305000903005889.

Terken, J. and S. G. Noteboom. 1987. Opposite effects of accentuation and deaccentuation on verification latencies for given and new information. *Language and Cognitive Processes* 2 3: 145–63. https://doi.org/10.1080/01690968708406928.

Tomblin, Bruce, Melody Harrison, Sophie Ambrose, Elizabeth Walker, Jacob Oleson, and Mary Pat Moeller. 2015. Language outcomes in young children with mild to severe hearing loss. *Ear and Hearing* 36 Suppl 1: 76S–91S. https://doi.org/10.1097/AUD.0000000000000219.

van der Straaten, Tirza F. K., Jeroen J. Briaire, Evelien Dirks, Wim Soede, Carolien Rieffe, and Johan H. M. Frijns. 2021. The school career of children with hearing loss in different primary educational settings—A large longitudinal nationwide study. *Journal of Deaf Studies and Deaf Education* 26 3: 405–16. https://doi.org/10.1093/deafed/enab008.

Walker, Elizabeth, Alexandra Redfern, and Jacob Oleson. 2019. Linear mixed-model analysis to examine longitudinal trajectories in vocabulary depth and breadth in children who are hard of hearing. *Journal of Speech, Language, and Hearing Research* 62 3: 525–42. https://doi.org/10.1044/2018_JSLHR-L-ASTM-18-0250.

Werfel, Krystel, Gabriella Reynolds, Sarah Hudgins, Marissa Castaldo and Emily Lund. 2021. The production of complex syntax in spontaneous language by 4-year-old children with hearing loss. *American Journal of Speech-Language Pathology* 30 2: 609–21. https://doi.org/10.1044/2020_AJSLP-20-00178.

Zubizarreta, Maria. 1998. *Prosody, Focus, and Word Order*. MIT press, Cambridge, Ma.

Topic fronting in Spanish and English codeswitching: A cross-community perspective

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Abstract

This pilot study examines how topic preposing interacts with codeswitching in Spanish-English bilingual speech in Puerto Rico and Gibraltar, two communities with markedly different sociolinguistic profiles. In Puerto Rico, Spanish remains the dominant language of everyday life, while English occupies a socially stratified institutional role and bilingual proficiency is unevenly distributed across socioeconomic groups. Gibraltar, conversely, exhibits a long-term, intergenerational shift toward English dominance, with Spanish functioning largely as a heritage language and the locally rooted contact variety *Llanito* extending beyond spontaneous codeswitching. Using written acceptability judgments, the study compares English-style topic preposing and Spanish-style Clitic Left Dislocation (CLLD) across clauses where Spanish or English provides the structural frame. Results show greater acceptability for topic preposing in Spanish-framed clauses and reduced acceptability in English-embedded contexts, reflecting known syntactic constraints. Crucially, however, bilinguals in both communities exhibit a degree of structural alignment, producing intermediate acceptability ratings in codeswitched utterances. These findings highlight the combined influence of matrix language selection and sociolinguistic context on topic-fronting strategies in bilingual speech. The data suggest that despite divergent histories of language contact, dominance, and prestige, bilingual speakers deploy a shared, highly adaptive discourse strategy that bridges the cognitive demands of the syntax-information structure interface.

1. Introduction

Codeswitching, the alternation between two or more languages within a single discourse or utterance (Beatty Martínez et al. 2025), remains a central empirical domain for investigating multilingual competence and the architecture of bilingual grammar (Torres Cacoullos and Travis 2015, Lipski 1985, Poplack 1980; 2001, López 2020). Rather than a peripheral or unpredictable behavior, codeswitching provides a crucial window into how bilingual speakers integrate syntactic, prosodic, and pragmatic information during real time language production (Cedden, Meyer, Özkara, and von Stutterheim 2024, Kaushanskaya and Crespo 2019). Recent research has underscored the importance of examining this phenomenon at linguistic interfaces, particularly the interface between syntax and information structure, to refine our understanding of the constraints and strategies that guide bilingual sentence formation (Bustin, Muntendam, and Sunderman 2024, Deuchar 2012, González Vilbazo and López 2011; 2012, González Vilbazo and Ramos 2019, Koronkiewicz 2023, Merchant 2015, Muntendam and Parafita Couto 2024, Olson and Ortega Llebaría 2010, Stoianov, Silva, and Nevins 2023, among others).

In this pilot study, we examine the relationship between topic preposing and codeswitching in two completely different contact settings, Puerto Rico and Gibraltar. Although both contexts involve sustained interaction between Spanish and English, their sociolinguistic ecologies are fundamentally distinct (García Caba 2022, Gerke 2018, González Rivera 2020; 2021, González Rivera and Ortiz López 2018, Lara Bermejo 2025, Levey 2006a; 2006b; 2008, Pousada 2008, Weston 2012, Vázquez Amador 2018). In Puerto Rico, Spanish remains the dominant and unmarked language of everyday life across the island, while English occupies a socially stratified and often symbolic position tied to institutional settings such as the judiciary, government administration, and specific economic sectors (Carroll 2016a, Schmidt 2014, Suárez 2005, Valdez 2014). The island's history of contested language policy, along with persistent ideological associations between Spanish, identity, and political belonging, has shaped a context in which most Puerto Ricans do not consider themselves bilingual in a functional sense (Shenk 2012, Domínguez-Rosado 2015). Although English is a compulsory subject in the public school system, instruction typically occurs in Spanish, opportunities for meaningful communicative use are limited, and teachers are not always specialized in English language pedagogy (Mari and Carroll 2020, Morales Lugo 2020, Pérez Casas 2008,

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Guzzardo Tamargo et al. 2018). As a result, access to bilingual proficiency correlates strongly with private education and higher socioeconomic status, and lower- and working-class Puerto Ricans tend to be monolingual in Spanish, a pattern documented consistently in previous research (González Rivera 2020, Schmidt 2014, Vélez 1999). Notably, younger Puerto Ricans are more likely than older generations to engage in Spanish-English alternation. Within this uneven sociolinguistic landscape, Spanish and English code switching emerges as a marked practice concentrated among particular bilingual communities, although its syntactic dimensions remain underexamined, especially at the interface with information structure (Guzzardo Tamargo and Vélez Avilés 2017).

Gibraltar presents a different configuration. Spanish and English bilingual practices labeled as *Llanito* or *Yanito* include a historically rooted contact variety influenced by Andalusian Spanish, British English, and other Mediterranean languages. Although Llanito incorporates code witched elements, it constitutes a broader linguistic repertoire rather than a codeswitching system per se (Rodríguez García 2022). At the same time, recent work documents a rapid shift toward English dominance and a reduction in intergenerational Spanish use, with older speakers showing more frequent alternation than younger ones (Macdonald 2024, Seoane 2023). These differences between a socially stratified bilingual setting such as Puerto Rico and a setting experiencing language shift such as Gibraltar provide a framework for examining how topic fronting operates across distinct bilingual grammars.

Our primary aim is to investigate how bilingual speakers in Puerto Rico and Gibraltar process and judge sentences involving the fronting of topics, either through English-type topic preposing or Spanish-type Clitic Left Dislocation (CLLD), in matrix and embedded clauses. In what follows, the term "matrix language" is used descriptively to refer to the language that supplies the morphosyntactic frame of the clause. This study explicitly does not adopt the theoretical assumptions or morpheme-election mechanisms of the Matrix Language Frame (MLF) model (Myers-Scotton 1993); the terminology functions purely to identify the provider of the structural constraints governing the utterance.

We test whether the acceptability of topic preposing is shaped by the language that provides the structural frame and by the constraints that follow from it. English, with its rigid SVO word order and its restriction of topic fronting to root contexts, is expected to inhibit topic movement in embedded environments. Spanish, by contrast, permits greater syntactic flexibility, including CLLD in both root and all types of embedded clauses (Jiménez-Fernández and Miyagawa 2014). Our hypothesis is therefore that topic preposing will be more acceptable when Spanish provides the frame of the clause, and that embedded topic preposing in English environments will be dispreferred due to its status as a root phenomenon in this language.

To test this hypothesis, we designed a written acceptability judgment task using a four-point Likert scale, administered to 21 Puerto Rican and 37 Gibraltarian bilinguals. The stimuli included monolingual Spanish and English sentences, as well as code switched sentences varying in matrix language, clause type, and topic position. By comparing responses across communities and conditions, we assess how strategies of information packaging such as topic fronting are shaped by the grammatical properties of the matrix language and by the sociolinguistic context in which bilingualism unfolds.

The remainder of the paper is organized as follows. Section 2 provides a comparative overview of the sociolinguistic and grammatical contexts of Spanish and English code switching in Puerto Rico and Gibraltar, with particular attention to previous research. Section 3 briefly outlines the theoretical background relevant to topic preposing in English and Spanish. Section 4 presents the experimental design, including methodology, participant demographics, and test items. Section 5 discusses the results in light of current work on code switching and information structure. Section 6 offers the conclusions and some directions for future research.

2. Codeswitching in Puerto Rico and Gibraltar

Spanish-English bilingualism has produced complex and uneven linguistic ecosystems in Puerto Rico and Gibraltar. Although both communities maintain long-standing connections to Spanish and English, the nature of bilingual practices differs substantially across the two contexts. Puerto Rico displays a socially stratified pattern of bilingualism shaped by education, socioeconomic status, and language ideologies,

whereas Gibraltar encompasses a historically rooted contact repertoire in which Spanish, English, and other Mediterranean influences have long coexisted, including the variety known as Llanito. Because these settings diverge in demographic patterns, generational language use, and the sociopolitical positioning of each language, the forms and functions of codeswitching also differ across the two communities. This section provides an overview of bilingual practices in Puerto Rico and Gibraltar and reviews previous research on Spanish-English alternation in each setting, laying the groundwork for the cross-community comparison developed in sections 2.1, 2.2, and 2.3.

2.1. Spanish-English bilingualism in Puerto Rico

Puerto Rico illustrates a historically layered and politically complex case of Spanish-English contact shaped by more than a century of cultural and administrative ties to the United States (Carroll 2016b, Domínguez Rosado 2015, González Rivera 2020; 2021, González Rivera and Ortiz López 2018, Pousada 1999, Shenk 2015, Torres González 2002). The island's contact history begins following the cession of Puerto Rico from Spain to the United States in 1898, an event that inaugurated prolonged debates over linguistic legitimacy, educational policy, and political identity. Although English has held institutional visibility since the early twentieth century, its societal penetration has remained limited. Research consistently shows that Puerto Rico does not constitute a functionally bilingual society, and that the distribution of English proficiency is highly unequal across social groups (Shenk 2012, Domínguez-Rosado 2015). Spanish has continued to serve as the dominant and unmarked language across virtually all domains of everyday life, including interpersonal communication, commerce, media consumption, and local governance.

One of the clearest indicators of unequal access to bilingual proficiency is the structure of public education. English is formally taught as a single subject from kindergarten through twelfth grade, yet instructional practices overwhelmingly favor Spanish as the primary medium of instruction, translation-based activities, and decontextualized grammar drills (Carroll 2016a, Pérez Casas 2016, Suárez Vázquez 2020). In many schools, English courses are delivered by teachers trained in other languages, a reality that constrains both curricular effectiveness and opportunities for students to engage in meaningful communicative use of English. Exposure to English outside the classroom remains limited for most students, especially in rural municipalities and working-class communities. Consequently, English proficiency correlates strongly with private schooling, socioeconomic advantage, and urban concentration, particularly in metropolitan regions such as San Juan (González Rivera and Ortiz López 2018, Guzzardo Tamargo et al. 2018). Lower- and working-class Puerto Ricans tend to be monolingual Spanish speakers, a pattern well documented in sociolinguistic work (González Rivera 2020, Schmidt 2014, Vélez 1999). In contrast, younger speakers in metropolitan areas, especially those with access to private or specialized language education, are more likely to report higher levels of bilingual competence and to use English in informal, digital, or semi-professional contexts. Recent policy initiatives have sought to expand bilingual education through pilot programs in public schools, including the implementation of Spanish–English instructional models and targeted teacher training in collaboration with the University of Puerto Rico; however, these efforts remain limited in scope and are still in early stages of implementation

Within this highly stratified linguistic landscape, Spanish-English codeswitching (CS) does not constitute a generalized societal norm but rather a marked and localized practice, concentrated among bilingual subgroups. Earlier studies emphasized ideological and attitudinal dimensions of CS. Guzzardo Tamargo and Vélez Avilés (2017) found that university students generally viewed CS favorably in informal registers, even as broader societal ideologies continued to associate Spanish with authenticity and cultural belonging (cf. Guzzardo Tamargo et al. 2018). Pérez Casas (2016), drawing on ethnographic work, showed that speakers strategically mobilize CS to position themselves within professional and social networks, suggesting that alternating between languages allows them to negotiate membership, authority, and stance. Clachar (2016) similarly documented CS among return migrants and bilingual youth in online discourse, demonstrating its function as a resource for identity alignment, narrative structuring, and rhetorical emphasis.

Recent work expands this line of inquiry by incorporating prosodic, syntactic, and pragmatic perspectives. Carrasco (2023) provides a multidimensional analysis of bilingual Puerto Rican speech,

examining code-switching through a combined syntactic, prosodic, and sociopragmatic framework and segmenting bilingual discourse into intonation units (IUs). This approach allows for the examination of switch placement relative to prosodic boundaries and syntactic structure (e.g., *se la llevó un tipo rico // and he's making a really cheap excuse*; *it was a very weird conversation que ellos tuvieron ahí*). Building on prior research, Carrasco situates Puerto Rican bilingual speech within a broader body of work showing that switches frequently align with prosodic boundaries, particularly where syntactic units reach completion, while also highlighting the role of bilingual competence and discourse organization in shaping switching patterns.

From a discourse-functional perspective, CS in Puerto Rico fulfills a range of communicative purposes. Speakers use alternation to emphasize key information, elaborate on ideas, introduce stance, and manage informational flow. CS may fill lexical gaps within a particular genre, mark a shift in footing, or index changes in audience orientation. Importantly, CS behavior varies by genre, with narrative and spontaneous speech eliciting distinct configurations of switch placement, pragmatic motivation, and discourse segmentation.

Taken together, these studies reveal that Spanish-English code switching in Puerto Rico is shaped by a constellation of structural, ideological, and social factors. While earlier research focused primarily on identity, attitudes, and sociopolitical meanings, recent work incorporating interface-sensitive approaches adds a crucial grammatical dimension to the field. Integrating syntax, information structure, prosody, and pragmatics provides a more comprehensive account of bilingual competence and illustrates how Puerto Rican bilinguals coordinate multiple levels of linguistic structure in real-time interaction. Furthermore, the highly stratified distribution of bilingualism on the island underscores that CS practices emerge within specific demographic and sociolinguistic profiles, rather than as a generalized feature of the speech community. This sociolinguistic patterning has direct implications for cross-community comparison, particularly when contrasted with the distinct bilingual ecology of Gibraltar explored in the following section.

2.2. Spanish-English bilingualism in Gibraltar

Gibraltar presents a sociolinguistic configuration markedly different from that of Puerto Rico. Spanish and English have coexisted on the Rock for centuries, but their interaction has produced a distinctive contact repertoire rather than a socially stratified bilingual divide. The most emblematic outcome of this history is the variety commonly known as *Llanito*, a locally anchored linguistic system that draws primarily from Spanish and English while incorporating lexical and structural influences from Mediterranean languages, including Italian and Hebrew (Levey 2006a; 2006b; 2008, Moyer 1992, Loureiro-Porto and Suárez-Gómez. 2017). Although Llanito includes practices that resemble codeswitching, scholars have emphasized that it also displays characteristics associated with mixed or hybrid contact varieties, such as morphophonological integration and lexical items whose etymological origins have become opaque due to structural adaptation (Macdonald 2024). Words such as *dentica* 'identity card' and *focona* 'four corners' illustrate this deeper level of convergence (in the sense of Torres Cacoullos and Travis 2015) and local innovation (with thanks to one reviewer for the examples). For this reason, Llanito cannot be reduced to codeswitching alone, but instead reflects a historical layering of linguistic resources that extends beyond alternation between Spanish and English.

The sociolinguistic distribution of Llanito has shifted considerably across generations. Historical evidence indicates that Spanish was the dominant vernacular until the mid-twentieth century, functioning as the principal language of domestic life, informal interactions, and early schooling through religious institutions (Oda Ángel 2024). This situation changed dramatically following the educational reforms associated with the WWII evacuations. The Clifford Report of 1944 recommended English as the sole medium of instruction and relegated Spanish to a foreign language taught only after age eleven. These policies inaugurated a generational rupture that limited the intergenerational transmission of Spanish, progressively eroding bilingualism and establishing English as the primary language of institutional and public life. As a consequence, Llanito is now strongly associated with older speakers, while younger

Gibraltarians tend to exhibit English dominant bilingual profiles and more limited productive command of Spanish (Macdonald 2024, García Caba 2022).

This generational divide has also influenced local ideologies and linguistic insecurities. Political figures, including Chief Minister Fabian Picardo and Deputy Chief Minister Joseph Garcia, have framed Llanito as a repository of cultural memory and communal identity, even as they acknowledge the ongoing anglicization of the younger generations (Macdonald 2024). Cases in which grandparents and grandchildren require English to communicate illustrate the extent of this linguistic shift. These dynamics contribute to a tension between the symbolic value of Spanish as a heritage resource and its decreasing functional presence in everyday domains.

Codeswitching in Gibraltar therefore operates within a complex ideological and identity charged environment. Earlier work by Moyer (1992; 1998; 1999) and Levey (2008) documented the structural and pragmatic patterns of bilingual alternation, showing that speakers employ Spanish and English to mark stance, organize discourse, and index conversational alignment. More recent studies have expanded this perspective by examining attitudes and ideologies surrounding bilingual practices. García Caba's (2022) analysis of the satirical newspaper column "Calentita" reveals ambivalent attitudes toward bilingualism. Llanito is celebrated for its humor, flexibility, and symbolic distinctiveness, yet Spanish is often treated with linguistic insecurity or rendered comically through nonstandard orthography. The column's rapid intra sentential switching and playful calques such as *Espanish hellection* (*Español* and *Spanish*, and *hell* and *election* respectively) parody both languages while reinforcing the high prestige status of English.

The marginalization of Spanish in public domains is also connected to broader geopolitical tensions. Oda Ángel (2024) describes Spanish as a heritage language whose decline reflects not only shifting preferences but also longstanding institutional policies that restricted its educational presence and diminished its prestige. Chevasco (2021) further notes that Gibraltarians often view overtly Spanish linguistic practices with ambivalence, balancing a desire to preserve bilingualism with concerns that strong Spanish affiliation may be perceived as politically compromising. Surveys conducted by Chevasco show that while most young Gibraltarians support the idea of bilingual education, many doubt the long-term viability of Spanish-English bilingualism.

Despite this uncertainty, certain bilingual practices remain robust among younger speakers. One example is the use of the discourse marker *bueno* within English-dominant interactions. Rodríguez García and Goria's (2023) analysis shows that *bueno* is especially frequent in clause-initial position and often appears in dialogical sequences, where it serves turn-taking, topic-shifting, and discourse-organizing functions. These patterns align with Muysken's (2013) concept of backflagging, in which speakers retain specific discourse markers from a receding language as interactional anchors within a dominant language frame. The authors show that *bueno* occurs much more often than its English counterpart *well* in the bilingual corpus, which suggests that its pragmatic utility remains salient even under conditions of language shift. The presence of collocations such as *pero bueno*, *pues bueno*, and *bueno espérate* points to pragmatic routinization and high cognitive availability of this marker. From a theoretical perspective, these findings challenge the assumption that bilingual practices in advanced language shift settings are purely symbolic, instead showing that speakers integrate Spanish resources into English discourse in structurally patterned ways.

Recent work by Vázquez Amador (2018) further complements this picture. Her analysis of oral narratives demonstrates a high density of intra-sentential and inter-sentential switches across genres, often motivated by pragmatic needs, affective emphasis, or lexical availability. Generational differences also play a role, with younger speakers showing more syntactic interference and increased reliance on English lexical items embedded within Spanish morphosyntactic structures. Certain English words such as *tea*, *army*, and *comprehensive* remain stable in their original form across contexts, reflecting local cultural salience.

These studies portray Gibraltar as a community in which bilingualism, CS, and language ideologies are deeply intertwined. Llanito now occupies an increasingly constrained space, valued as a cultural emblem yet threatened by the dominance of English and by historical policies limiting Spanish transmission. At the same time, contemporary bilingual practices show that Spanish continues to function as a pragmatic and interactional resource, even among speakers with limited productive command of the language. This evolving landscape provides an essential point of comparison for Puerto Rico, where

bilingualism follows a different trajectory shaped by stratification rather than language shift. The contrasts between these contexts form the basis for the cross-community analysis developed in section 2.3.

2.3. Cross-community comparison

The bilingual settings of Puerto Rico and Gibraltar offer complementary perspectives on Spanish-English contact, yet they differ significantly in their sociolinguistic foundations, historical trajectories, and patterns of everyday bilingual practice. Although both communities exhibit Spanish and English in sustained interaction, the conditions motivating bilingualism, the distribution of each language across social domains, and the availability of bilingual repertoires vary widely. These contextual differences shape not only linguistic attitudes and ideologies but also the structural configurations that speakers activate during codeswitching.

In Puerto Rico, Spanish is the dominant and unmarked language for nearly all domains of daily life, while English holds a socially stratified and often symbolic position tied to governmental, judicial, and professional institutions (Carroll 2016a; 2016b, González Rivera 2020; 2021, Shenk 2015). Because English instruction in public schools is limited to a single course that rarely promotes meaningful communicative competence (Pérez Casas 2016, Suárez Vázquez 2020), access to high levels of bilingual proficiency correlates strongly with socioeconomic privilege and private education (Mari and Carroll 2020, Guzzardo Tamargo et al. 2018). Consequently, codeswitching is not a generalized societal norm but instead a marked practice concentrated within particular bilingual networks, especially among younger, urban, and socioeconomically advantaged populations.

The sociolinguistic landscape of Gibraltar stands in sharp contrast. Spanish once served as the dominant vernacular throughout much of the nineteenth and early twentieth centuries, but educational reforms implemented during and after the WWII evacuations, most notably those stemming from the Clifford Report of 1944, established English as the sole language of instruction and relegated Spanish to a secondary subject taught later in schooling (Oda-Ángel 2024). These policies produced a generational shift that limited the intergenerational transmission of Spanish, promoting an English-dominant profile among younger speakers (Macdonald 2024, García Caba 2022). Llanito continues to index cultural identity and communal belonging, yet is increasingly associated with older members of the community. Younger Gibraltarians typically understand Llanito passively but rarely produce it with the fluency observed in previous generations (Macdonald 2024).[1]

These divergent histories yield fundamentally different bilingual ecologies. Puerto Rico represents a stratified model in which bilingualism arises unevenly across sectors of the population, whereas Gibraltar illustrates a community undergoing a long-term language shift in which English has expanded across public institutions, education, and media. These trajectories influence not only symbolic valuations of Spanish and English but also the structural environments in which codeswitching occurs. For instance, in Puerto Rico, Spanish remains the primary matrix language for bilingual speech, with English typically inserted in contexts related to stance-taking, emphasis, or lexical availability (Guzzardo Tamargo and Vélez Avilés 2017, Pérez Casas 2016, Carrasco 2023). In Gibraltar, however, English more frequently serves as the structural frame for bilingual discourse, even as speakers retain Spanish discourse markers such as *bueno* as interactional anchors within English-dominant exchanges (Rodríguez García and Goria 2023). These differences align with broader sociolinguistic patterns: Spanish serves as a majority community language in Puerto Rico, whereas in Gibraltar it increasingly functions as a heritage language with limited institutional support (Oda-Ángel 2024).

[1] We take Llanito as a variety characterized by Spanish-English CS, but this assumption is far from criticism. As a reviewer points out, Llanito is a historically rooted contact variety that incorporates elements of Andalusian Spanish, British English, and other Mediterranean languages (notably Italian, Genoese, Maltese, and Hebrew; see Rodríguez García 2022). Over time, Llanito has developed structural and lexical features that may go beyond spontaneous code-switching. However, for our study this does not pose any problem since we are interested just in the switch between English and Spanish, using more local (but neutral) English and Spanish vocabulary in the relevant examples (see the appendix).

Dimension	Puerto Rico	Gibraltar
Historical trajectory of contact	Contact with English began after U.S. annexation in 1898, involving contested educational and governmental policies (Carroll 2016b, Domínguez-Rosado 2015).	Longstanding contact between Spanish, English, and Mediterranean languages; Spanish was historically the dominant vernacular until mid-20th century (Levey 2006a, Oda-Ángel 2024).
Dominant language in everyday life	Spanish is the dominant and unmarked language across all social domains.	English is increasingly dominant in public, educational, and administrative contexts (Macdonald 2024, García Caba 2022).
Role and status of English	Symbolic and institutional; socially stratified; linked to higher SES and private education (Mari and Carroll 2020, Guzzardo Tamargo et al. 2018).	High-prestige language; institutionalized through monolingual English schooling since 1944; expanding generationally.
Role and status of Spanish	Majority community language; ideologically tied to identity and belonging (Shenk 2015).	Functions as a heritage language, declining in active use among younger generations (Oda-Ángel 2024, Macdonald 2024).
Educational model	Public schools teach English as a single subject with limited communicative practice; instruction largely in Spanish; access to effective bilingual education restricted to private schools (Pérez Casas 2016, Suárez Vázquez 2020).	Monolingual English-medium system instituted after Clifford Report (1944); Spanish relegated to late foreign-language instruction.
Distribution of bilingual proficiency	Highly stratified; bilingualism concentrated among younger, urban, and higher-SES groups (Guzzardo Tamargo et al. 2018).	Strong generational divide; older speakers maintain Llanito/Spanish competence, younger speakers are English-dominant (Macdonald 2024).
Nature of bilingual repertoire	Spanish-dominant bilingualism; English incorporated primarily for stance, emphasis, or lexical access (Pérez Casas 2016, Carrasco 2023).	English-dominant bilingualism; residual use of Spanish discourse markers (e.g., *bueno*) and certain culturally salient lexicon (Rodríguez García and Goria 2023).
Status of codeswitching	Marked localized practice; not a community-wide norm; used strategically by specific bilingual populations (Guzzardo Tamargo and Vélez Avilés 2017).	Embedded within a broader contact repertoire; includes both codeswitching and features of a hybrid variety (Llanito).
***Llanito* / hybrid code**	Not applicable.	Locally rooted variety integrating Spanish, English, and Mediterranean elements; shows morphophonological integration and lexical innovation (Levey 2008, Macdonald 2024).
Ideologies and attitudes	Spanish linked to authenticity and identity; CS stigmatized in some contexts but increasingly accepted among youth.	Ambivalence toward Spanish; *Llanito* valued culturally but declining; English associated with modernity and prestige (García Caba 2022, Chevasco 2021).
Generational patterns	Younger bilinguals use more CS; older generations overwhelmingly Spanish-monolingual (Shenk 2015).	Older generations maintain Spanish/*Llanito*; younger speakers shift toward English with passive knowledge of Spanish (Macdonald 2024).
Matrix language tendencies in CS	Spanish usually provides the structural frame; English is typically inserted.	English often provides the frame; Spanish provides discourse markers and lexical insertions.
Relevance for topic-preposing study	Spanish flexibility in topic fronting (CLLD) may increase acceptability of fronted constituents even in bilingual sequences.	English constraints on root phenomena may limit acceptability of embedded topic fronting in bilingual utterances.

Table 1: Comparative overview of Spanish-English contact in Puerto Rico and Gibraltar.

Despite extensive sociolinguistic research in both settings, few studies have directly compared their grammatical behavior in code-switched contexts, and even fewer have examined how discourse-related strategies, such as topic fronting, interact with syntactic constraints during bilingual speech. This gap is notable given that English and Spanish differ substantially in how topic structures are licensed. As we have observed earlier, Spanish permits Clitic Left Dislocation in both root and embedded clauses, while English generally restricts Topic Preposing to root contexts, reflecting its status as a root phenomenon (Jiménez-Fernández and Miyagawa 2014, Jiménez-Fernández 2020, Yang 2024). These contrasts provide a productive testing ground for examining how speakers in different bilingual communities respond to syntactic environments that require the integration of discourse features with structural constraints.

Our study engages directly with this interface. Rather than assuming structural convergence, a claim that requires evidence of systematic diachronic grammatical change in one language due to contact (cf. Torres Cacoullos and Travis 2015), we investigate whether bilingual speakers in Puerto Rico and Gibraltar display synchronic structural alignment by showing sensitivity to the syntactic constraints of the matrix language when evaluating topic-preposed structures in code-switched sentences. Because matrix language selection differs across the two communities, and because English and Spanish impose distinct limits on topic movement, a cross-community comparison can reveal whether bilingual speakers adjust their acceptability judgments in line with the structural properties of the language providing the clause frame. This approach allows us to identify patterns of structural alignment without making claims about permanent grammatical change or contact-induced convergence.

To summarize the sociolinguistic and grammatical contrasts discussed in the preceding sections, table 1 offers a comparative overview of the two contact settings. The table highlights key dimensions relevant to codeswitching, including patterns of language dominance, institutional support for bilingualism, functional uses of each language, and the degree of flexibility available for topic-related constructions within bilingual discourse. These contrasts establish the empirical foundation for our experimental design. The following section develops the theoretical framework, focusing on how topic preposing operates in English and Spanish and on the syntactic and discourse-pragmatic constraints most relevant to bilingual speech.

3. Topic preposing in English and Spanish

The Information Flow Principle is associated with the regular ordering of information in discourse, moving from given information to new information (Chafe 1976). Following this principle, in any written or oral production this means that there will be a special position at the end of the sentence reserved for the most important information, whereas the first position in the sentence is devoted to information which links said sentence with the previous context.

To illustrate, let's pay attention to the following mini-dialogue, from Jiménez-Fernández (2020:86), which consists of a question and two possible answers:

(1) Q: Where did you see Mary?
A. *I saw her* <u>in the supermarket</u>.
A′. <u>In the supermarket</u> *I saw her*.

In the two replies, the old information is marked in italics and the new information is underlined. The answer in A is more natural and appropriate than the one in A′ since it obeys the Information Flow Principle. The background portion of the sentence is given at the beginning, whereas the constituent satisfying the information request in the question is placed at the end, thereby standing up as the focus of the sentence (Bierner 1994, Leech and Svartvik 2013).

Behind this splitting of information in terms of old and given, we also find the classical division of the sentence in terms of topic and comment (Chafe 1987, Prince 1981). The topic portion is made up of given information and is the starting point of the message that the speaker wants to deliver. According to Reinhart (1982), the topic is what the sentence is about. Actually, the comment part is the information offered to somehow qualify the topic constituent (Krifka 2007, Cruschina et al. 2022). For example, in (2),

the fronted DP object *that kind of behaviour* occupies the topic position, marking the point at which the speaker will comment on it. This instantiates the phenomenon of topic fronting in English:

(2) That kind of behaviour, we cannot tolerate in a civilised society. (Radford 2009:329)

However, in Spanish the discourse-induced placement of a constituent as topic in the left periphery (LP) triggers the insertion of a resumptive clitic if the topic is an object (Zubizarreta 1999, López 2009, Leonetti 2014, Fernández-Sánchez 2017, among many others). Hence, the phenomenon is generally known as Clitic Left Dislocation (CLLD), which is illustrated in (3):

(3) El cordero, yo lo hago al horno con menta.
the lamb I CL-ACC.3SG.MSC COOK-PRES.1SG to.the oven with mint
'Lamb, I usually cook it with mint and in the oven.'
(adapted from Fernández-Sánchez 2017:3)

We may observe that the DP object *el cordero* 'the lamb' has been fronted to a topic position and it is resumed by the clitic *lo* 'it'.

The phenomenon of Topic Preposing or Topicalization is attested both in simple sentences (2)–(3) and in subordinate clauses within complex sentences in the two languages under examination. Additionally, concerning complex sentences, the topic is an element belonging to the embedded clause, but it can surface in the LP of either the subordinate clause or the matrix clause. The following sentences illustrate this distribution in English complex sentences, namely topic in the embedded clause (4a) and topic in the matrix clause (4b), both adapted from Radford (2009):

(4) a. The president announced [that that kind of behaviour, we cannot tolerate in a civilised society].

b. That kind of behaviour, the president announced [that we cannot tolerate in a civilised society].

The following set replicated the very same situation in Spanish, adapted from Jiménez-Fernández (2020:93, ex. (19a)):

(5) a. El Presidente dice que *ese tipo de comportamiento* no lo
the president say-PRES.3SG that this kind of behaviour not it
podemos tolerar en una sociedad civilizada.
can-PRES.1PL to.tolerate in a society civilized
'The President says that this kind of behaviour, we can't tolerate in a civilised society.'

b. *Ese tipo de comportamiento*, el Presidente dice que no lo
this kind of behaviour the president say-PRES.3SG that not it
podemos tolerar en una sociedad civilizada.
can-PRES.1PL to.tolerate in a society civilized
'This kind of behaviour, the President says that we can't tolerate in a civilised society.'

Taking into account the examples in (4)–(5), English and Spanish seem to show similar behaviour with respect to the distribution of topics. However, it is widely known that this type of information structural phenomenon has root properties. They are classified as root transformations (Emonds 1969; 2004) or Main Clause Phenomena (Haegeman 2012). This licensing in embedded contexts is crucial in our study since at least some root phenomena are subject to parametric variation (Jiménez-Fernández and Miyagawa 2014, Jiménez-Fernández 2018; 2023).

A number of recent works have analyzed the composition and extent of phrasal hierarchies of different clause types, distinguishing between root, root-like and different types of embedded clauses, and the relevant discourse phenomena which are permitted in each of these contexts (cf. Hooper and Thompson 1973, Emonds 1970; 1976; 2004, Haegeman 2002, Meinunger 2004, Heycock 2006, Jiménez-Fernández and Miyagawa 2014, Miyagawa 2017, Jiménez-Fernández 2018, Frascarelli and Jiménez-Fernández 2016). These linguists have claimed that some discourse-based phenomena are licensed in root or root-like clauses.

Concentrating on the category of topic, Jiménez-Fernández and Miyagawa (2014) have shown that some types of topics that in English are banned from subordinate contexts are indeed allowed in other languages such as Spanish or Japanese. Let's illustrate with the sentences in (6)–(7), where a Contrastive Topic has been fronted:

(6) a. We saw that each part he had examined carefully. (E)
(Hooper and Thompson's 1973 example (125))

b. *It was impossible that each part he had examined carefully. (C)
(Hooper and Thompson's 1973 example (99))

(7) a. Sé que tu libro no lo has terminado todavía.
know-PRES.1SG that your book not CL have-PRES.3SG finished yet
'I know that you haven't finished the book yet.'
(Jiménez-Fernández and Miyagawa 2014, ex. (38))

b. Es probable que ese coche lo haya conducido Juan sólo una vez.
be-PRES.3SG probable that that car CL have-PRES.SUBJ.3SG driven Juan only one time
'It's probable that Juan has driven that car just once.'
(Jiménez-Fernández and Miyagawa 2014, ex. (21a))

In English a topic can be preposed in a subordinate clause which is interpreted as asserted or non-factive, as Hooper and Thompson (1973) show. This explains why (6a) is well-formed, whereas (6b) is not. However, in Spanish this restriction does not hold and CLLD is allowed in both factive and non-factive embedded contexts.[2]

In our next section, we present the pilot study we have carried out, based on the fronting of a topic in root clauses and in subordinate clauses.

4. Methodology and experimental design

This study employed an experimental approach to examine the acceptability of topic-preposed structures in Spanish-English code-switched utterances. The methodology was designed to compare bilingual speakers from Puerto Rico and Gibraltar, focusing on their grammatical intuitions in contexts involving intra-sentential switching and discourse-level operations. The experiment consisted of an acceptability judgment task constructed to test theoretical predictions about topic preposing in bilingual speech.

4.1. Participants

A total of 58 adult bilingual speakers participated in the study, including 21 Puerto Rican university students from the University of Puerto Rico at Mayagüez (RUM), aged between 18 and 22, and 37 Gibraltarian bilinguals, aged between 20 and 60. The Gibraltarian group included some university students, but was composed primarily of professionals such as teachers, lawyers, and administrators. Recruitment was conducted through personal networks and community referrals, focusing on individuals who regularly engage in codeswitching.

[2] Topic fronting is subject to parametric variation. The theoretical analysis that Jiménez-Fernández and Miyagawa (2014) put forth is based on the notion of feature inheritance and competition for the same position in the Left Periphery. Avoiding technicalities, we can reduce the analysis to the different position targeted by topics in English and Spanish. The specifier of the Complementizer Phrase is the slot where English topics move, whereas the specifier of the Tense Phrase area is the position occupied by (at least some types of) Spanish topics. This leads to the different well-formedness situations described in the text above. For a full account, see Jiménez-Fernández and Miyagawa (2014) and references therein.

To assess eligibility, participants completed a brief sociolinguistic background questionnaire covering domains such as age of acquisition for each language, frequency of language use in different contexts (home, school, media), and self-rated fluency. All participants reported frequent exposure to and use of codeswitching in informal settings.

4.2. Materials and stimulus design

The experimental materials were designed to allow a detailed analysis of how topic preposing is evaluated in code-switched constructions, depending on matrix language, clause type, and topicalization structure. Stimuli were tailored to reflect local codeswitching patterns from two bilingual communities: Puerto Rico and Gibraltar. The sentence stimuli varied by matrix language (Spanish vs. English), embedded language (Spanish vs. English), lexical type (monolingual vs. code-switched), word order (canonical vs. non-canonical), presence/absence of articles, and sentence complexity (simple vs. embedded clause). They included culturally specific food terms for each community (Puerto Rico: *rice and beans*, *arroz con habichuelas*; Gibraltar: *fried squids*, *chocos fritos*) [3] and were randomized across all combinations of these factors. Notably, the Puerto Rican Spanish stimuli frequently had bare noun phrases (DPs without a definite article). While historical linguistic analyses confirm that standard Peninsular Spanish heavily grammaticalized the definite article for generic or abstract reference (Alonso 1951), Antillean Caribbean varieties exhibit unique tolerances. In Puerto Rican Spanish, lexicalized cultural compounds such as *arroz con habichuelas* are perfectly acceptable as bare preposed topics.[4] Retaining these bare DPs ensured that participants were reacting to the syntactic manipulation of topic fronting rather than countering an artificial artifact that felt foreign to their local dialect. Sentences such as (8)–(9) give us an idea of the items that informants had to judge, but see the appendix for a full account of these sentences:

(8) El rice and beans Ana lo odiaba de pequeña, pero le gustaba la pasta.
the ... Ana CL.ACC hated of small but CL.DAT liked the pasta
'Ana hated rice and beans as a child, but she liked pasta.'

(9) Antonio dijo que el rice and beans lo detestaba cuando era pequeño.
Antonio said that the ... CL.ACC hated when was small
'Antonio said that he hated rice and beans when he was a child.'

In contexts of codeswitching the preposed topic was in one language whereas the rest of the sentence was uttered in the other language.

[3] The examples of the two surveys had sentences where the lexicon was adapted to the relevant geographical area, based on real restaurant menus. Therefore, while the PR experiment used the preposed topic *el rice and beans*, the Gibraltarian one had the constituent *los fried squids*. Gender was controlled so all DPs were masculine, hence avoiding the controversial issue of masculine preference even for naturally feminine nouns (cf. Seoane 2023).

[4] A reviewer points out that bare DPs as preposed topics are not allowed in Spanish. We are aware of this constraint in Standard Spanish (**Pan, no* (*lo*) *quiero* 'Bread, I don't want'; Real Academia Española y Asociación de Academias de la Lengua Española 2010). However, the use of these bare preposed topics is quite prolific in Puerto Rican Spanish. A small follow-up acceptability questionnaire was designed to probe the naturalness of candidate bare preposed-topic structures in Puerto Rican Spanish. The instrument consisted of short context–sentence pairs built around a shared family-gathering scenario, with each item including a brief discourse context followed by a target sentence featuring a bare preposed topic. We recruited 12 informants. These participants were asked to provide a binary Yes/No judgment as to whether they would say the sentence. Despite the mixed results, a few items showed a high degree of acceptability, including *Arroz con dulce, lo hacía mi abuela bien rico para las fiestas* ('Sweet rice pudding, my grandmother used to make it really well for the holidays'), *Arroz con gandules, lo comíamos mucho en Navidad* ('Rice with pigeon peas, we used to eat it a lot at Christmas'), *Tostones, los comíamos siempre con un buen asopao de gandules* ('Fried plantains, we would always eat them with a good pigeon-pea stew'), and *Empanadillas, las vendían allí cerquita* ('Turnovers, they used to sell them very nearby'). These data provide preliminary support for the acceptability of bare preposed-topic structures in Puerto Rican Spanish.

The test included 35 randomized tokens containing examples where the matrix language was either English or Spanish (see examples (8)–(9) for PR) and examples where there was no code-switching ((10)–(11) for PR).

(10) Rice and beans Ana hated as a child, but she liked pasta.

(11) The rice and beans Ana hated as a child, but she liked pasta.

To mitigate participant fatigue and prevent the development of predictive answering strategies during the task, 6 filler sentences were strategically interspersed throughout the survey. These acted as attention checks, ensuring that participants remained cognitively engaged with the target syntactic manipulations.

4.3. Procedure

Participants were instructed to read each sentence and rate it according to how natural or acceptable it would be in typical bilingual speech, as used in their community. Participants were presented with each sentence and asked to rate its acceptability in terms of everyday bilingual speech. Ratings were collected using a 4-point Likert scale, visually represented by smiley faces: 😊 (completely acceptable), 🙂 (somewhat acceptable), 😟 (somewhat unacceptable) and ☹️ (completely unacceptable). This format was chosen to facilitate intuitive judgments. The task was administered via Qualtrics in written form, with all instructions presented in a code-switched format to reflect and reinforce the bilingual context under investigation. Prior to the main task, a brief training section familiarized participants with the rating scale. The task was self-paced and conducted entirely online using the Qualtrics platform).

4.4. Data analysis

Responses were compared across the two bilingual communities as well as across language contexts (Spanish as ML, English as ML, and unilingual controls). Mean acceptability ratings were calculated for each syntactic type and condition, allowing for cross-linguistic and regional comparisons. Because this research functions as an exploratory pilot study with a restricted sample size (N=58 across communities), the data analysis relies strictly on descriptive statistics (mean acceptability ratings). Conducting formal inferential significance tests on underpowered pilot data is methodologically perilous; it significantly inflates the risk of Type II errors and frequently leads to the establishment of inappropriate conclusions (Kunselman 2024). Therefore, the descriptive means are utilized to map structural trends and establish baseline variance to inform future, fully powered statistical analyses.

4.5. Results

The results suggest that bilingual informants generally fall into an intermediate position regarding the acceptability of code-switched sentences. This middle-ground tendency is skewed slightly toward greater acceptability, rather than dispreference or rejection. This pattern is consistent with prior findings on bilingual acceptability judgments (cf. Stadthagen González et al. 2017 for this tendency among bilingual informants; Jiménez-Fernández 2023 for bilinguals in PR; Lewis 2023 for bilinguals in an English-speaking community in Yaiza, Lanzarote).

4.5.1. English as matrix language (codeswitched sentences)

As shown in figure 1, when English served as the matrix language, bilingual participants from both Puerto Rico and Gibraltar rated topic preposing as moderately acceptable in root clauses. However, acceptability declined in subordinate contexts and reached the lowest levels when the topicalized constituent appeared across clausal boundaries.

These results suggest that topic preposing is most acceptable in root contexts, aligning with the analysis of Topic Fronting in English as a root transformation (Emonds 1969, Haegeman 2012, Jiménez-Fernández and Miyagawa 2014, Jiménez-Fernández 2020; 2023). However, bilinguals rated even some embedded cases as marginally acceptable, indicating possible flexibility in bilingual competence.

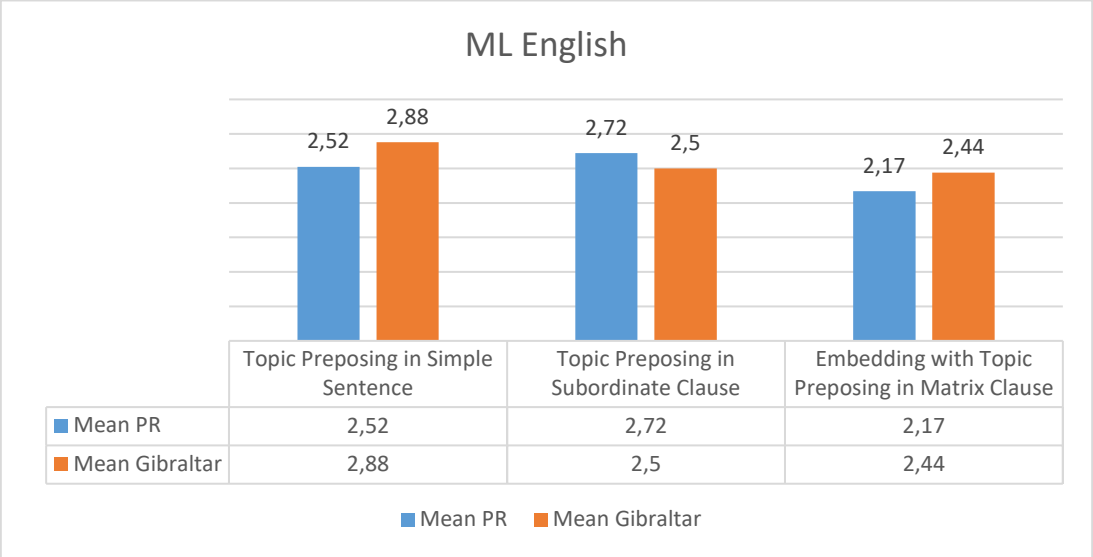

Figure 1: Acceptability ratings for topic preposing with English as the Matrix Language.

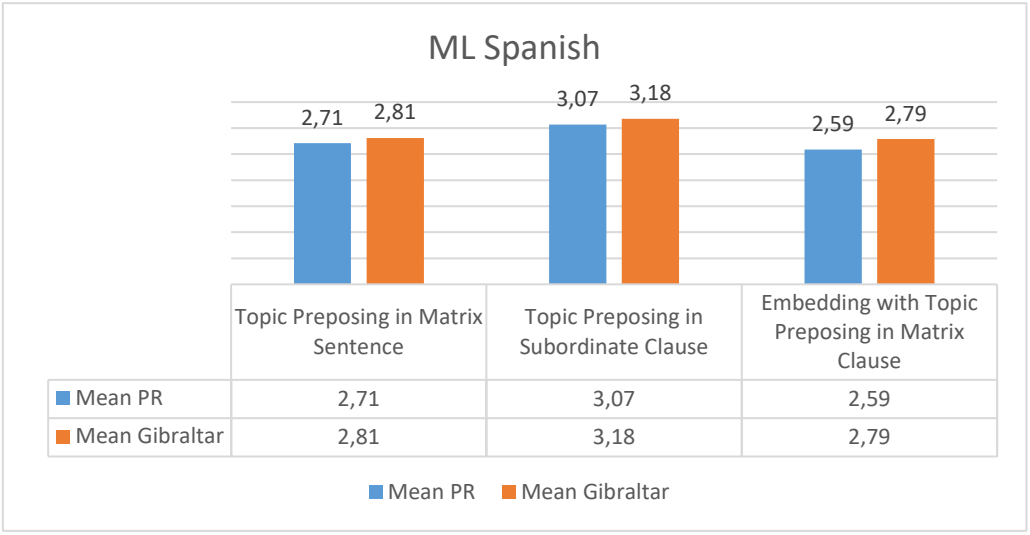

Figure 2: Acceptability ratings for Clitic Left Dislocation with Spanish as the Matrix Language.

4.5.2. Spanish as matrix language (codeswitched sentences)

Figure 2 displays results for the same syntactic conditions with Spanish as the matrix language. Ratings were consistently higher than in the English ML condition, particularly for topic preposing in subordinate clauses.

These results reflect the greater syntactic flexibility of Spanish CLLD, which is not constrained to root clauses. The high ratings for subordinate structures confirm previous analyses that CLLD is a non-root phenomenon (cf. Blokzijl et al. 2017, Parafita Couto and Gullberg 2020, Vaughan Evans et al. 2020, Parafita Couto et al. 2024).

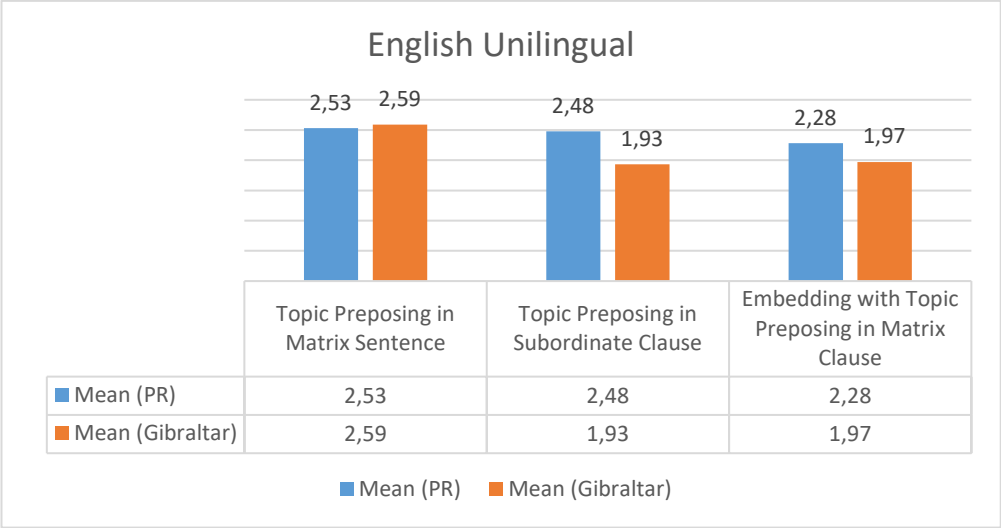

Figure 3: Acceptability ratings for Topic Fronting in Unilingual English contexts.

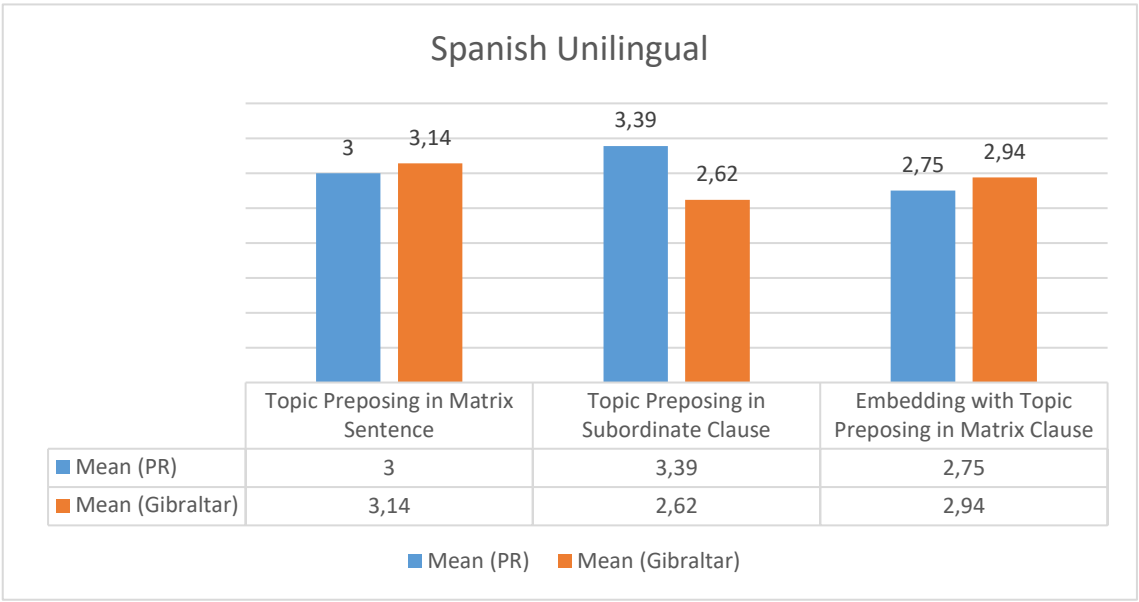

Figure 4: Acceptability ratings for Clitic Left Dislocation in Unilingual Spanish contexts.

4.5.3. Unilingual English conditions

Figure 3 provides data from unilingual English sentences. Topic Fronting in matrix contexts received the highest ratings, while acceptability declined in subordinate and embedded contexts – particularly among Gibraltarian speakers. As observed here, monolingual Topic Fronting is fully acceptable in root clauses, its acceptability decreases when the topic is preposed inside the embedded clause and it reaches the worst outcome when fronting trespasses the clausal boundary. We connect this result with the status of root transformation that Topic Fronting has in English (Emonds 1969, Haegeman 2012, Jiménez-Fernández and Miyagawa 2014, Jiménez-Fernández 2020) and show that informants had the English grammar internalized.

These results are consistent with well-established constraints on English Topic Fronting, which is typically limited to root contexts. The particularly low ratings in Gibraltar suggest a more conservative application of this grammatical restriction in that community.

4.5.4. Unilingual Spanish conditions

Figure 4 presents the results for monolingual Spanish constructions. Here, Clitic Left Dislocation was judged highly acceptable across all syntactic environments, supporting its analysis as a discourse-linked but syntactically flexible construction.

These data confirm that CLLD in Spanish is not restricted to root contexts and is generally perceived as natural in both matrix and embedded structures (cf. Jiménez-Fernández and Miyagawa 2014, Jiménez-Fernández 2020, Yang 2023).

4.5.5. Spanish and English in contrast

Two major patterns emerge when comparing English and Spanish data, both in unilingual and bilingual contexts:

i. Information structure mismatch in unilingual contexts: Spanish CLLD received higher acceptability ratings (mean ≈ 3/4) compared to English Topic Fronting (mean ≈ 2.5/4). This reflects structural asymmetries in how the two languages license topicalization.
ii. Structural alignment in bilingual contexts: in bilingual constructions, ratings for Spanish CLLD (mean ≈ 2.7/4) and English Topic Fronting (mean ≈ 2.5/4) become more aligned. This suggests that bilingual speakers may apply a compromise grammar or exhibit flexible representations shaped by both systems.

When framing the results of our study in the context of bilingualism, the observed acceptability patterns point to similarities in bilingual grammar, not dependable on language exposure or community-specific sociolinguistic factors. In other words, bilinguals tend to show a similar behaviour in the two languages which is not corelated with standard differences between monolingual Spanish and English speakers. The similarities between the speakers in Puerto Rico and Gibraltar do not reflect distinct histories of language contact, dominance, or prestige, as far as our results are concerned.[5]

5. Conclusions and future research

This study offers preliminary insights into the syntax-discourse interface in bilingual communities in Puerto Rico and Gibraltar. The central finding is that sentences involving codeswitching are generally judged acceptable by bilingual informants, regardless of the matrix language. This outcome challenges the initial hypothesis that expected differential acceptability based on the syntactic rigidity of English versus the flexibility of Spanish in topic preposing structures.

An important exception to this trend emerges with topic preposing in English embedded clauses, where lower acceptability ratings suggest sensitivity to the root phenomenon constraint in English. This aligns with well-established analyses identifying Topic Fronting in English as a root transformation, subject to parametric variation across languages (cf. Emonds 1969, Haegeman 2012, Jiménez-Fernández and Miyagawa 2014). Despite this exception, the broader pattern points to a dynamic structural alignment in the information structure (IS) strategy employed by bilingual speakers. Specifically, topic preposing

[5] We are aware that participant fatigue and the neutral response bias are common in grammaticality or acceptability judgment tasks, as one reviewer points out. When participants are exposed to a large number of structurally similar or repetitive stimuli, especially without breaks or feedback, response exhaustion can set in. This fatigue often leads participants to default to neutral ratings rather than carefully discriminating among subtle grammatical contrasts. As a result, apparent patterns of what we have called moderate acceptability may reflect task fatigue or uncertainty rather than genuine grammatical tolerance or language use. However, as observed earlier, to avoid this bias, our survey contained randomized items, included fillers, counterbalanced conditions. For discussion, see Schütze (1996) and Wasow and Arnold (2005).

appears to be broadly acceptable across different syntactic contexts, suggesting that bilingual grammars may accommodate or negotiate the constraints of both input languages. This aligns with prior work that emphasizes the dynamic and adaptive nature of bilingual competence (cf. Muntendam and Parafita Couto 2024). Furthermore, the cross-community comparison yields deeply revealing implications regarding the limits of sociolinguistic influence on core syntax. Puerto Rico and Gibraltar represent vastly different sociolinguistic ecologies. One might logically hypothesize that Gibraltarian speakers, heavily dominant in English, would forcefully impose English SVO rigidity onto Spanish frames. Instead, the acceptability patterns between the two communities were remarkably aligned. This suggests that while macro-sociolinguistic context heavily dictates *when* and *why* a bilingual chooses to codeswitch, the underlying cognitive mechanisms governing the syntax-information structure interface are universally shared across advanced bilinguals.

This study opens a promising new line of research at the intersection of codeswitching, syntax, and discourse. By examining topic fronting in code-switched environments, we contribute to a deeper understanding of how bilingual speakers manage structural and pragmatic constraints across languages. Expanding the empirical base to larger participant cohorts from other bilingual contexts such as Belize, the American Virgin Islands, New Mexico, the Philippines, and Miami will test whether informants similarly accept fronted topics in the discourse-linked (DL) language when the matrix language differs and facilitate inferential statistical modelling. Additionally, corroborating these isolated acceptability judgments with robust, spontaneous corpus data (Parafita Couto et al. 2023) will clarify whether the intermediate cognitive acceptance of embedded fronting translates into actual verbal production. In sum, the overall tendency toward uniformity in the acceptability of topic preposing points strongly toward a shared, highly adaptive cognitive architecture operating within all bilingual grammars.

Appendix: Study materials

Items to test (Puerto Rico):

Spanish as matrix language (ML) and English as Embedded Language (EL):

1. Rice and beans Ana lo odiaba de pequeña, pero le gustaba la pasta.
2. Rice and beans lo odiaba Ana de pequeña, pero le gustaba la pasta.
3. El rice and beans Ana lo odiaba de pequeña, pero le gustaba la pasta.
4. El rice and beans lo odiaba Ana de pequeña, pero le gustaba la pasta.
5. The rice and beans Ana lo odiaba de pequeña, pero le gustaba la pasta.
6. The rice and beans lo odiaba Ana de pequeña, pero le gustaba la pasta.

Monolingual Spanish (control):

1. El arroz con habichuelas lo odiaba Ana de pequeña, pero le gustaba la pasta.
2. El arroz con habichuelas Ana lo odiaba de pequeña, pero le gustaba la pasta.
3. Arroz con habichuelas lo odiaba Ana de pequeña, pero le gustaba la pasta.
4. Arroz con habichuelas Ana lo odiaba de pequeña, pero le gustaba la pasta.

English as ML and Spanish as EL:

1. El arroz con habichuelas Ana hated as a child, but she liked pasta.
2. Arroz con habichuelas Ana hated as a child, but she liked pasta.
3. The arroz con habichuelas Ana hated as a child, but she liked pasta.

Monolingual English:

1. Rice and beans Ana hated as a child, but she liked pasta.
2. The rice and beans Ana hated as a child, but she liked pasta.

Spanish as ML and English as EL (complex sentences):

1. Antonio dijo que el rice and beans lo detestaba cuando era pequeño.
2. El rice and beans Antonio dijo que lo detestaba cuando era pequeño.
3. Antonio dijo que rice and beans lo detestaba cuando era pequeño.
4. Rice and beans Antonio dijo que lo detestaba cuando era pequeño.
5. Antonio dijo que the rice and beans lo detestaba cuando era pequeño.
6. The rice and beans Antonio dijo que lo detestaba cuando era pequeño.

Monolingual Spanish:

1. Antonio dijo que el arroz con habichuelas lo detestaba cuando era pequeño.
2. El arroz con habichuelas Antonio dijo que lo detestaba cuando era pequeño.
3. Antonio dijo que arroz con habichuelas lo detestaba cuando era pequeño.
4. Arroz con habichuelas Antonio dejo que lo detestaba cuando era pequeño.

English as ML and Spanish as EL (complex sentences):

1. Antonio said that el arroz con habichuelas he hated as a child.
2. El arroz con habichuelas Antonio said that he hated as a child.
3. Antonio said that arroz con habichuelas he hated as a child.
4. Arroz con habichuelas Antonio said that he hated as a child
5. Antonio said that the arroz con habichuelas he hated as a child.
6. The arroz con habichuelas Antonio said that he hated as a child.

Monolingual English:

1. Antonio said that rice and beans he hated as a child.
2. Rice and beans Antonio said that he hated as a child.
3. Antonio said that the rice and beans he hated as a child.
4. The rice and beans Antonio said that he hated as a child.
5.

Items to test (Gibraltar):

Spanish as matrix language (ML) and English as Embedded Language (EL):

1. Fried squids Mary los odiaba de chica, pero le gustaba la pasta.
2. Fried squids los odiaba Mary de chica, pero le gustaba la pasta.
3. Los fried squids Mary los odiaba de chica, pero le gustaba la pasta.
4. Los fried squids los odiaba Mary de chica, pero le gustaba la pasta.

Monolingual Spanish (control):

1. Los chocos fritos los odiaba Mary de chica, pero le gustaba la pasta.
2. Los chocos fritos Mary los odiaba de chica, pero le gustaba la pasta.
3. Chocos fritos los odiaba Mary de chica, pero le gustaba la pasta.
4. Chocos fritos Mary los odiaba de chica, pero le gustaba la pasta.

English as ML and Spanish as EL:

1. Los chocos fritos Mary hated them as a child, but she liked pasta.
2. Chocos fritos Mary hated them as a child, but she liked pasta.
3. Los chocos fritos Mary hated as a child, but she liked pasta.
4. Chocos fritos Mary hated as a child, but she liked pasta.

Monolingual English:

1. Fried squids Mary hated as a child, but she liked pasta.
2. The fried squids Mary hated as a child, but she liked pasta.

Spanish as ML and English as EL (complex sentences):

1. Tony dijo que los fried squids los odiaba cuando era pequeño.
2. Los fried squids Tony dijo que los odiaba cuando era pequeño.
3. Tony dijo que fried squids los odiaba cuando era pequeño.
4. Fried squids Tony dijo que los odiaba cuando era pequeño.

Monolingual Spanish:

1. Tony dijo que los chocos fritos los odiaba cuando era pequeño.
2. Los chocos fritos Tony dijo que los odiaba cuando era pequeño.

English as ML and Spanish as EL (complex sentences):

1. Tony said that chocos fritos he hated them as a child.
2. Los chocos fritos Tony said that he hated them as a child.
3. Tony said that los chocos fritos he hated as a child.
4. Los chocos fritos Tony said that he hated as a child.

Monolingual English:

1. Tony said that fried squids he hated as a child.
2. Fried squids Tony said that he hated as a child.
3. Tony said that fried squids he hated them as a child.
4. Fried squids Tony said that he hated them as a child.

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References

Beatty-Martínez, Anne L., M. Carmen Parafita Couto, Felix K. Ameka and Enoch O. Aboh. 2025. Codeswitching. In *Reference Module in Social Sciences*. https://doi.org/10.1016/B978-0-323-95504-1.00503-2.

Bustin, Amy, Antje Muntendam, and Gretchen Sunderman. 2024. Subject pronouns in Spanish-English code-switching: A test of two models. *Linguistic Approaches to Bilingualism* 14 3: 310–39. https://doi.org/10.1075/lab.21058.bus.

Carrasco, Mildred. 2023. *La alternancia de códigos español-inglés en Puerto Rico: Un acercamiento sintáctico-prosódico-sociopragmático*. Ph.D. thesis, Universidad de Puerto Rico, Recinto de Río Piedras. Available at https://repositorio.upr.edu/handle/11721/3589.

Carroll, Kevin S. 2016a. Understanding perceptions of language threat: The case of Puerto Rico. *Caribbean Studies* 44 1/2: 167–86. https://doi.org/10.1353/crb.2016.0006.

Carroll, Kevin S. 2016b. Language policies in Puerto Rican higher education: Conflicting assumptions of bilingualism. *Current Issues in Language Planning* 17 3–4: 260–77. https://doi.org/10.1080/14664208.2016.1201186.

Cedden, Gülay, Patric Meyer, Bazak Özkara, and Christiane von Stutterheim. 2024. The "code-switching issue": Transition from (socio)linguistic to cognitive research. *Bilingualism: Language and Cognition* 28 5: 1446–59. https://doi.org/10.1017/S1366728924000737.

Chafe, Wallace. 1987. Cognitive constrains on information flow. In *Coherence and Grounding in Discourse*, edited by Russell Tomlin, no. 11 in Typological Studies in Language, pp. 21–51. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.11.03cha.

Chevasco, David. 2021. *Contemporary Bilingualism, Llanito and Language Policy in Gibraltar: A Study*. No. 13 in Monografías. Filología y Lingüística. Editorial Universidad de Cádiz, Cádiz.

Clachar, Arlene. 2016. Codeswitching among African-American English, Spanish, and Standard English in computer-mediated discourse: The negotiation of identities by Puerto Rican students. In *Spanish-English Codeswitching in the Caribbean and the US*, edited by Rosa E. Guzzardo Tamargo, Catherine M. Mazak, and M. Carmen Parafita Couto, no. 11 in Issues in Hispanic and Lusophone Linguistics, pp. 61–80. John Benjamins, Amsterdam. https://doi.org/10.1075/ihll.11.03cla.

Cruschina Silvio, Ion Giurgea, and Eva-Maria Remberger. 2022. Information structure. In *Cambridge Handbook of Romance Linguistics*, edited by Adam Ledgeway and Martin Maiden, pp. 784–814. Cambridge University Press, Cambridge. https://doi.org/10.1017/9781108580410.031.

Domínguez Rosado, Brenda. 2015. *The Unlinking of Language and Puerto Rican Identity: New Trends in Sight*. Cambridge Scholars, Newcastle.

Durán Urrea, Delfina Evelyn. 2012. *A Community-Based Study of Social, Prosodic and Syntactic Factors in Code-Switching*. Ph.D. thesis, The Pennsylvania State University. Available at https://etda.libraries.psu.edu/files/final_submissions/7130.

García Caba, Marta. 2022. Estudio sociolingüístico del uso del español y el inglés en el *code-switching* escrito de Gibraltar. *Études Romanes de Brno* 43 1: 165–82. https://doi.org/10.5817/ERB2022-1-11.

Gerke, Amanda Ellen. 2018. Discursive boundaries: Code-switching as representative of Gibraltarian identity construction in M. G. Sanchez' *Rock Black*. *Miscelánea: A Journal of English and American Studies* 57: 35–57. https://doi.org/10.26754/ojs_misc/mj.20186321.

González-Rivera, Melvin. 2021. Language attitudes towards Spanish and English in Puerto Rico. *Revista de Filología y Lingüística de la Universidad de Costa Rica* 47 2: e47006. https://doi.org/10.15517/rfl.v47i2.47006.

González-Rivera, Melvin. 2020. El consenso del no consenso o el fracaso de una política lingüística en Puerto Rico. *Hispania* 103 2: 211–24. https://doi.org/10.1353/hpn.2020.0033.

González-Rivera, Melvin and Luis A. Ortiz López. 2018. El español y el inglés en Puerto Rico: Una polémica de más de un siglo. *Centro Journal* 30 1: 106–31.

González-Vilbazo, Kay and Luis López. 2011. Some properties of light verbs in code-switching. *Lingua* 121 5: 832–50. https://doi.org/10.1016/j.lingua.2010.11.011.

González-Vilbazo, Kay and Luis López. 2012. Little v and parametric variation. *Natural Language and Linguistic Theory* 30 1: 33–77. https://doi.org/10.1093/oxfordhb/9780198712398.013.21.

González-Vilbazo, Kay and Sergio E. Ramos, S. 2019. Codeswitching. In *The Oxford Handbook of Ellipsis*, edited by Jeroen van Craenenbroeck and Tanja Temmerman, pp. 458–476. Oxford University Press, Oxford. https://doi.org/10.1093/oxfordhb/9780198712398.013.21.

Guzzardo Tamargo, Rosa. E. and Jessica Vélez Avilés. 2017. La alternancia de códigos en Puerto Rico: Preferencias y actitudes. *Caribbean Studies* 45 1–2: 43–76. https://doi.org/10.1353/crb.2017.0003.

Guzzardo Tamargo, Rosa E., Verónica Loureiro-Rodríguez, Elif F. Acar, and Jessica Vélez-Avilés. 2018. Attitudes in progress: Puerto Rican youth's opinions on monolingual and code-switched language varieties. *Journal of Multilingual and Multicultural Development* 40 1: 1–18. https://doi.org/10.1080/01434632.2018.1515951.

Jiménez-Fernández, Ángel L. 2018. Negative Preposing: Intervention and parametric variation in complement clauses. *Atlantis: Revista de la Asociación Española de Estudios Anglo-Norteamericanos* 40 1: 11–37. https://doi.org/10.28914/Atlantis-2018-40.1.01.

Jiménez-Fernández, Ángel L. 2023. English/Spanish relatives and their relative information structure: A view from language contact in Puerto Rico. *Catalan Journal of Linguistics* 22 1: 29–70. https://doi.org/10.5565/rev/catjl.339.

Jiménez-Fernández, Ángel L. 2025. To move or not to move: Is focus on the edge*? Journal of Linguistics* 61 3: 571–602. https://doi.org/10.1017/S0022226724000343.

Jiménez-Fernández, Ángel L. and Shigeru Miyagawa. 2014. A feature-inheritance approach to root phenomena and parametric variation. *Lingua* 145: 275–302. https://doi.org/10.1016/j.lingua.2014.04.008.

Kaushanskaya, Margarita and Kimberly Crespo. 2019. Does exposure to code-switching influence language performance in bilingual children? *Child Development* 90 3: 708–18. https://doi.org/10.1111/cdev.13235.

Koronkiewicz, Bryan. 2023. Inalienable possession in Spanish-English code-switching: Acceptability data from U.S. heritage speakers of Spanish. *Spanish as a Heritage Language* 3 2: 5–42. https://doi.org/10.5744/shl.2023.1949.

Krifka, Manfred. 2007. Basic notions of information structure. In *Interdisciplinary Studies on Information Structure*, vol. 6: *The Notions of Information Structure*, edited by Caroline Féry, Gisbert Fanselow, and Manfred Krifka, no. 632 in Working Papers of the SFB, pp. 13–55. Universitätsverlag Potsdam, Potsdam.

Kunselman, Allen R. 2024. A brief overview of pilot studies and their sample size justification. *Fertility and Sterility* 121 6: 899–901. https://doi.org/10.1016/j.fertnstert.2024.01.040.

Lara Bermejo, Víctor. 2025. *El español en el estrecho de Gibraltar y el Magreb*. No. 56 in Lengua y Sociedad en el Mundo Hispánico. Iberoamericana – Vervuert, Madrid. https://doi.org/10.31819/9783968697178.

Leonetti, Manuel. 2014. Gramática y pragmática en el orden de palabras. *Lingüística en la Red* 12: 1–25. Available at https://hdl.handle.net/10017/23258.

Levey, David. 2006a. Gibraltar: Language situation. In *Encyclopedia of Language and Linguistics*, edited by Keith Brown, 2nd ed., vol. 5, pp. 78–80. Elsevier. https://doi.org/10.1016/B0-08-044854-2/01799-5.

Levey, David. 2006b. Yanito. In *Encyclopedia of Language & Linguistics*, edited by Keith Brown, 2nd ed., vol. 13, pp. 724–5. Elsevier. https://doi.org/10.1016/B0-08-044854-2/05201-9.

Levey, David. 2008. *Language Change and Variation in Gibraltar*. No. 23 in IMPACT: Studies in Language, Culture and Society. John Benjamins, Amsterdam. https://doi.org/10.1075/impact.23.

Lipski, John M. 1985. *Linguistic Aspects of Spanish-English Language Switching*. Center for Latin American Studies, Arizona State University, Tempe, Az.

López, Luis. 2020. *Bilingual Grammar: Toward an Integrated Model*. Cambridge University Press, Cambridge. https://doi.org/10.1017/9781108756181.

Loureiro-Porto, Lucía and Cristina Suárez-Gómez. 2017. Language contact in Gibraltar English: A pilot study with ICE-GBR. *Alicante Journal of English Studies* 30: 94–120. https://doi.org/10.14198/raei.2017.30.04.

Macdonald, Sophie. 2024. In defence of Llanito: Gibraltar in a state of linguistic transition. *The Round Table* 113 3: 289–94. https://doi.org/10.1080/00358533.2024.2363044.

Mari, Vanessa and Kevin S. Carroll. 2020. Puerto Rican teachers' and students' beliefs toward Spanish use in the English classroom as a way to motivate students. *Latin American Journal of Content & Language Integrated Learning* 13 2: 289–311. https://doi.org/10.5294/laclil.2020.13.2.6.

Merchant, Jason. 2015. On ineffable predicates: Bilingual Greek-English code-switching under ellipsis. *Lingua* 166: 199–213. https://doi.org/10.1016/j.lingua.2015.03.010.

Morales Lugo, Katherine. 2024. The bilingual styles of young Puerto Rican adolescents online. *International Journal of the Sociology of Language* 2024 286: 53–85. https://doi.org/10.1515/ijsl-2023-0024.

Moyer, Melissa G. 1992. *Analysis of Code-Switching in Gibraltar*. Ph.D. thesis, University of Barcelona.

Moyer, Melissa G. 1998. Bilingual conversation strategies in Gibraltar. In *Codeswitching in Conversation: Language and Identity*, edited by Peter Auer, pp. 215–34. Routledge, London.

Moyer, Melissa G. 1999. Entre dos lenguas: Contacto de inglés y español en Gibraltar. *Foro Hispánico: Revista Hispánica de Flandes y Holanda* 13: 9–26. https://doi.org/10.1163/9789004488960_003.

Muntendam, Antje and M. Carmen Parafita Couto. 2024. Code-switching at the interfaces. *Languages* 9 8: 258. https://doi.org/10.3390/languages9080258.

Muysken, Pieter. 2013. Language contact outcomes as the result of bilingual optimization strategies. *Bilingualism: Language and Cognition* 16 4: 709–30. https://doi.org/10.1017/S1366728912000727.

Oda-Ángel, Francisco. 2024. Llanitoland o Gibraltar: Un caso singular de español como lengua de herencia. *Glosas* 10 6: 89–100.

Olson, Daniel and Marta Ortega-Llebaría. 2010. The perceptual relevance of code-switching and intonation in creating narrow focus. In *Selected Proceedings of the 4th Conference on Laboratory Approaches to Spanish Phonology*, edited by Marta Ortega-Llebaría, pp. 57–68. Cascadilla Proceedings Project, Somerville, Ma. Available at https://www.lingref.com/cpp/lasp/4/paper2367.pdf.

Pérez Casas, Marisol. 2008. *Codeswitching and Identity among Island Puerto Rican Bilinguals*. Ph.D. Thesis, Georgetown University, Washington, DC. Available at https://hdl.handle.net/10822/553245.

Pérez Casas, Marisol. 2016. Codeswitching and identity among island Puerto Rican bilinguals. In *Spanish-English Codeswitching in the Caribbean and the US*, edited by Rosa E. Guzzardo Tamargo, Catherine M. Mazak, and M. Carmen Parafita Couto, no. 11 in Issues in Hispanic and Lusophone Linguistics, pp. 37–60. John Benjamins, Amsterdam. https://doi.org/10.1075/ihll.11.02per.

Poplack, Shana. 1980. Sometimes I'll start a sentence in Spanish y termino en español: Toward a typology of code-switching. *Linguistics* 18 7–8: 581–618. https://doi.org/10.1515/ling.1980.18.7-8.581.

Poplack, Shana. 2001. Code-switching (Linguistic). In *International Encyclopedia of the Social and Behavioral Sciences*, edited by Neil Smelser and Paul Baltes, pp. 2062–5. Elsevier. https://doi.org/10.1016/B0-08-043076-7/03031-X.

Pousada, Alicia. 1999. The singularly strange story of the English language in Puerto Rico. *Milenio* 3: 33–60.

Pousada, Alicia. 2008. The complexities of bilingualism: Focus on Puerto Rico. Paper presented at the Harvard University–University of Puerto Rico Winter Institute, San Juan, PR.

Prince, Ellen. 1981. Towards a taxonomy of given-new information. In *Radical Pragmatics*, edited by Peter Cole, pp. 223–56. Academic Press, New York.

Real Academia Española y Asociación de Academias de la Lengua Española. 2010. *Nueva gramática de la lengua española*. Espasa, Madrid.

Rodríguez García, Marta. 2022. Hacia una nueva definición del yanito: Análisis desde la perspectiva de los jóvenes adultos de Gibraltar. *Boletín Hispánico Helvético* 39–40: 391–420. https://doi.org/10.36950/bhhd.vi39-40.10098.

Rodríguez García, Marta and Eugenio Goria. 2023. Backflagging revisited: A case study on bueno in English–Spanish bilingual speech. *Journal of Pragmatics* 215: 113–30. https://doi.org/10.1016/j.pragma.2023.07.008.

Seoane, Elena. 2023. Tejiendo vínculos entre lengua y sociedad: El desarrollo sociohistórico de las lenguas de Gibraltar. Paper presented at Instituto Cervantes, Utrecht.

Schmidt, Jorge R. 2014. *The Politics of English in Puerto Rico's Public Schools*. First Forum Press, Boulder, Co. https://doi.org/10.1515/9781685855369.

Schütze, Carson T. 1996. *The Empirical Base of Linguistics: Grammaticality Judgments and Linguistic Methodology*. University of Chicago Press, Chicago, Il.

Shenk, Elaine. 2012. Puerto Rico's language officialization debates: Perspectives from a mountain corridor community. *Centro Journal* 24 1: 90–113.

Shenk, Elaine. 2015. El engañol y el cuco: Metaphors in the nexus between language and status in Puerto Rico. *Journal of Language and Intercultural Communication* 15 3: 324–40. https://doi.org/10.1080/14708477.2015.1015349.

Stoianov, Diane, Anderson Almeida Silva, and Andrew Nevins. 2023. Reiterative code-switching: Argument-marking in Cena. *Sign Language Studies* 23 3: 386–423. https://doi.org/10.1353/sls.2023.a899424.

Suárez, Sandra L. 2005. Does English rule? Language instruction and economic strategies in Singapore, Ireland, and Puerto Rico. *Comparative Politics* 37 4: 459–78. https://doi.org/10.2307/20072904.

Suárez Vázquez, Gabriel E. 2020. Análisis multimodal del discurso publicitario en billboards de Puerto Rico: Identidades e ideologías sociales. *Acta Hispanica, Supplementum* II: 805–13. https://doi.org/10.14232/actahisp.2020.0.805-813.

Torres Cacoullos, Rena and Catherine E. Travis. 2015. Gauging convergence on the ground: Code-switching in the community. *International Journal of Bilingualism* 19 4: 365–86. https://doi.org/10.1177/1367006913516046.

Torres González, Roamé. 2002. *Idioma, bilingüismo y nacionalidad: La presencia del inglés en Puerto Rico*. Editorial de la Universidad de Puerto Rico, San Juan, PR.

Vázquez Amador, María. 2018. Introducción al yanito de Gibraltar. *E-AESLA: Revista de la Asociación Española de Lingüística Aplicada* 4: 323–30.

Vélez, Jorge. 1999. Toward a language policy that addresses Puerto Rican reality. *Milenio* III: 74–83.

Wasow, Thomas and Jennifer Arnold. 2005. Intuitions in linguistic argumentation. *Lingua* 115 11: 1481–96. https://doi.org/10.1016/j.lingua.2004.07.001.

Weston, Daniel A. 2012. Code-switching variation in Gibraltar. *International Journal of Bilingualism* 17 1: 3–22. https://doi.org/10.1177/1367006911429526.

Compounds split by silence: Compound pruning in Dutch synthetic adjectival compounds

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Abstract

We describe a novel ellipsis phenomenon attested in Dutch synthetic adjectival compounds, whereby the right part of the compound undergoes ellipsis and the left part gets realised. Such partial realisation of the compound is standardly accompanied by clausal ellipsis of some sort (fragment formation, sluicing or gapping). After inventorising the morphosyntactic properties of the phenomenon, we argue that the ellipsis targeting the right part of the compound is not coordination reduction (Booij 1985), but standard ellipsis. We settle for an account for the facts that is based on the observation that synthetic adjectival compounds in Dutch are not word-level units but syntactic phrases, within which the stranded first part is a syntactic phrase itself. Its phrasehood allows it to undergo A-bar movement out of the compound to form a remnant of clausal ellipsis, while clausal ellipsis needs to be present to allow the affixal second part to be non-realised.

1. Introduction

Compounds are words, and as such they fall under the *Lexical Integrity Hypothesis*, which holds that syntactic processes do not have access to word parts. Standard ellipsis (such as clausal ellipsis, VP ellipsis or N/N' ellipsis) is a syntactic operation and therefore cannot target part of a word: it is impossible to elide part of a derived word (cf. (1)) or part of a compound, be that a synthetic compound like *meat eater* (2a) or a primary compound like *schoolbag* (2b) (see Bosque 2019 among others).

(1) *John liked the play, and Mary dis-__ it. (*disliked*) (Bresnan and Mchombo 1995)

(2) a. Meat consumption should be discouraged. *__ eaters should pay more. (*meat eaters*)
b. *Travel bags are more expensive than school __. (*schoolbags*)

There is a systematic – and to our knowledge hitherto unnoticed – exception to the generalisation that parts of compounds cannot be targeted by ellipsis, which is found in the realm synthetic adjectival compounds in Dutch, as shown in (3) and (4). In these examples, a compound such as *achtpotig* 'eight-legged', *driebaans* lit. 'three-laned', *groenogig* 'green-eyed' is only half present: the first part is pronounced, the second part is missing, indicated by the __ sign. In addition, the utterance also contains an elided subject and the verb, in a manner that resembles fragment answers in (3) and gapping in (4). The absence of the subject and verb is indicated by the Δ sign.

(3) a. A: Spinnen zijn zespotig.
spiders are six.leg.ADJ
'Spiders have six legs.'
B: Nee, acht__ Δ.
no eight
'No, they have eight legs.'

b. A: De N36 is driebaans.
the N36 is three.lane.ADJ
'Road N36 has three lanes.'
B: Nee, vier__ Δ.
no four
'No, it has four lanes.'

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c. A: Kevin is blauwogig.
Kevin is blue.eye.ADJ
'Kevin has blue eyes.'

B: Nee, groen__ Δ.
no green
'No, he has green eyes.'

d. A: Deze hoed is doosvormig.
this hat is box.shape.ADJ
'This hat has the shape of a box.'

B: Nee, piramide__ Δ.
no pyramid
'No, it has the shape of a pyramid.'

(4) a. Insecten zijn zespotig en spinnen acht__ Δ.
insects are six.leg.ADJ and spiders eight
'Insects have six legs and spiders eight.'

b. De N36 is tweebaans en de N40 vier__ Δ.
the N36 is two.lane.ADJ and the N40 four
'Road N36 has two lanes and road N40 four.'

c. Kevin is blauwogig en Lucas groen__ Δ.
Kevin is blue.eye.ADJ and Lucas green
'Kevin is blue-eyed and Lucas green-eyed.'

d. Deze hoed is doosvormig en die piramide__ Δ.
this hat is box.shape.ADJ and that pyramid
'This hat has the shape of a box and that one the shape of a pyramid.'

We will refer to the ellipsis phenomenon in (3)–(4), which silences the second part of a synthetic adjectival compound, as *compound pruning*. Compound pruning removes the right part of synthetic adjectival compounds and leaves behind only the left part, which is interpreted contrastively with respect to a correlate in an antecedent clause.

Sentences like those in (3) and (4) are characteristic of informal language use, they would not be used in formal writing. In formal language, these examples involving corrective fragments or gapping would be realised with the compounds pronounced in full, as *achtpotig*, *vierbaans*, *groenogig* and *piramidevormig*.

(5) a. A: Spinnen zijn zespotig.
spiders are six.leg.ADJ
'Spiders have six legs.'

B: Nee, achtpotig Δ.
no eight.leg.ADJ
'No, they have eight legs.'

b. A: De N36 is driebaans.
the N36 is three.lane.ADJ
'Road N36 has three lanes.'

B: Nee, vierbaans Δ.
no four.lane.ADJ
'No, it has four lanes.'

	ADJECTIVIZER	Example	Gloss	English translation
Num–N–ADJ	*-s*	*drie-baan-s*	three-lane-ADJ	'three-lane' (e.g. road)
	-ig	*zes-del-ig*	six-part-ADJ	'six-part' (e.g. composition)
Q–N–ADJ	*-s*	*meer-persoon-s*	more-person-ADJ	'multi-person' (e.g. household)
	-ig	*veel-zijd-ig*	many-side-ADJ	'multifaceted' (e.g. summary)
N–N–ADJ	*-ig*	*doos-vorm-ig*	box-form-ADJ	'box-shaped' (e.g. shape)
A–N–ADJ	*-ig*	*groen-og-ig*	green-eye-ADJ	'green-eyed' (e.g. boy)

Table 1: Synthetic adjectival compounds in Dutch.

(6) a. Insecten zijn zespotig en spinnen achtpotig Δ.
insects are six.leg.ADJ and spiders eight.leg.ADJ
lit. 'Insects are six-legged and spiders eight-legged.'

b. Kevin is blauwogig en Lucas groenogig Δ.
Kevin is blue.eye.ADJ and Lucas green.eye.ADJ
'Kevin is blue-eyed and Lucas green-eyed.'

As mentioned above, compound pruning can be found with synthetic adjectival compounds in Dutch. Synthetic adjectival compounds are a type of compound in which a derivational affix is added to the combination of two roots, the first of which is variably a numeral or quantifier, a noun or an adjective, and the second of which is always a noun. The derivational affix in our examples is always the adjectiviser *-ig* or *-s* (often comparable in function to the English *-ed* suffix), see table 1 for an overview. We address the internal structure of these compounds in section 4.1.

Compound pruning in Dutch is subject to considerable individual variation. We established the existence of three groups of Dutch speakers in informal consultation sessions: for some speakers (including the second author of this article) all examples in (3) and (4) are fully grammatical; for a second group of speakers (including a reviewer) all examples are fully ungrammatical; and for a third group some examples are acceptable and others are not. For this third group, the (ab) examples with a stranded numeral tend to fare better than the (cd) examples, which strand an adjective or a noun, and the fragment examples in (3) fare better than the gapping ones in (4).

To confirm this, we also conducted a small online questionnaire study in March 2026 with 34 Dutch natives on a voluntary basis (no compensation offered), who were first year students of the BA *Linguistics* programme in Leiden.[1] Participants were asked to rate 27 sentences on a scale from 1 to 5, where the end points were labelled under each example, as *helemaal goed* 'completely right' for 5 and the *helemaal fout* 'completely wrong' for 1. The 27 sentences contained examples (3a–d), (4a–d) as well as example (42) (see section 4.1. below) as well as fillers, which were among others the non-pruned versions of each example as well as a fully grammatical and ungrammatical control.

The results of the questionnaire back up the results of our informal data collection. We provide the percentage of the participants who gave a rating of 4 or 5 to the tested examples, which correspond to (3a–d) and (4a–d) above, in table 2.

As the reader can see, the fragment examples are on the whole rated better than the gapping examples, and the compounds with a numeral first part were rated better than compounds with a non-numeral remnant, except for the case of (4d), whose rating was surprisingly high compared to (3d). Since numeral remnants are the best type of remnants (3ab, 4ab), in section 4 of the paper we will center our account on examples with numeral remnants. We return to the difference between the (ab) and (cd) examples in (3) and (4) in section 4.1.

[1] The students at this point had little training in formal syntax and morphology. In addition, they were not informed about the linguistic nature of the data or the theoretical implications of the study.

			% of speakers with a rating of 4–5
fragment	(3a)	Spinnen zijn zespotig. – Nee, acht.	61
	(3b)	De N36 is driebaans. – Nee, vier.	55
	(3c)	Kevin is blauwogig. – Nee, groen.	52
	(3d)	Deze hoed is doosvormig. – Nee, piramide.	29
gapping	(4a)	Insecten zijn zespotig en spinnen acht.	38
	(4b)	De N36 is tweebaans en de N40 vier.	26
	(4c)	Kevin is blauwogig en Lucas groen.	23
	(4d)	Deze hoed is doosvormig en die piramide.	44

Table 2: Rating of compound pruning in fragments and gapping.

It is important to stress that compound pruning is only available with synthetic adjectival compounds, and cannot take place with other types of compounds. It is much more difficult to construct grammatical examples in ways similar to compound pruning either with primary compounds (cf. (7ab)) or synthetic verbal compounds (cf. (7c)):

(7) a. A: Mijn medaille is olijfgroen.
my medal is olive.green
'My medal is olive green.'
B: *Nee, gif__ Δ.
no poison
'No, poison green.' (*gifgroen* 'poison green')

b. *Ik heb keelontsteking en jij oor__ Δ.
I have throat.infection and you ear
'I have a throat infection and you an ear infection.' (*ooronsteking* 'ear infection')

c. ?*Wij zijn bierdrinkers en jullie wijn__ Δ.
we are beer.drinker.PL and you.PL wine
'We are beer drinkers and you wine drinkers.' (*wijndrinker* 'wine drinker')

The purpose of our paper is twofold: we describe the properties of compound pruning and we attempt to explain why it affects synthetic adjectival compounds and how it comes about. In section 2, we begin by defining the specific syntactic properties of compound pruning sentences. We show on the basis of these properties that compound pruning is not an instance of conjunction reduction, but involves standard ellipsis. In section 3 and 4 we introduce two accounts of how ellipsis comes about in these sentences, one in terms of Extra deletion and one in terms of a *move-and-delete* derivation of ellipsis. We show that Extra deletion cannot explain all properties of compound pruning, while the *move-and-delete* analysis comes a long way in doing so. Section 5 summarizes the findings. Our approach to the data is minimalist in nature (Chomsky 1995; 2000), and uses the late-insertion model of vocabulary items (as in Distributed Morphology).

2. Morphosyntactic properties and the elliptical nature of compound pruning

2.1. Morphosyntactic properties of compound pruning

Sentences in which compound pruning occurs have three key characteristic properties.

The first is that compound pruning can only apply to an adjectival compound that is in predicative position, i.e. when it is complement to a copula verb. All our examples above were such cases. Compound pruning is impossible if the adjective is an attributive modifier of a noun inside a noun phrase. As the following examples show, ungrammaticality obtains regardless of whether the modified noun is overt or itself elided, as in (8a) and (8b) respectively. We return to (8b) in section 3, where it will have particular relevance, and in section 4, where we derive this pattern and similar ones.

(8) a. *Lucas is [DP een groenogig jongetje], en Tim [DP een blauw__ jongetje] Δ.
Lucas is a green.eye.ADJ boy and Tim an blue boy

b. *Lucas is [DP een groenogig jongetje], en Tim [DP een blauw__ [N' ~~N~~]] Δ.
Lucas is a green.eye.ADJ boy and Tim an blue
'Lucas is a green-eyed boy and Tim is a blue-eyed boy.'

The second characteristic property concerns the coordinative configuration in which compound pruning is found: the elided compound must be a predicate in a clause that is directly coordinated to a clause with a similar compound (as is usual in gapping), or it should be a predicate in an elliptical clause that is formed across utterances, as for example in question/answer pairs (9a) or as fragmentary responses to declaratives (9b). This is not surprising as in some accounts (Reich 2007, Boone 2014), ellipsis in gapping and fragments are formed in similar ways under parallel discourse relations between antecedent and ellipsis clause.

(9) a. A: Is de A4 driebaans?
is the A4 three.lane.ADJ
'Does the highway A4 have three lanes?'

B: Nee, vier__ Δ. compound pruning as fragment answer
no four
'No, it has four lanes.'

b. A: De A4 is driebaans.
the A4 is three.lane.ADJ
'The highway A4 has three lanes.'

B: Nee, vier__ Δ. compound pruning as fragmentary correction
no four
'No, it has four lanes.'

The need for parallel discourse relations and clausal coordination also means that compound pruning cannot be found in contexts where the adjectival compounds are directly coordinated to each other, as in (10), or where the adjectival compounds are not occupying parallel syntactic positions in coordinated clauses, as in (11).

(10) *Deze liften moeten respectievelijk [&P vijfpersoons en zeven__] zijn.
these lifts must respectively five.person.ADJ and seven be
'These lifts must be for five and seven persons respectively.'

(11) *Dit zijn liften die vijfpersoons zijn en die liften daar zijn zeven__.
this are lifts that five.persons.ADJ are and those lifts there are seven
'These are lifts which are for five persons and those lifts are for seven persons.'

The third property of compound pruning is that in addition to omission of the second part of the compound, it also standardly involves ellipsis of a large constituent, which involves minimally the verb phrase but can also be a whole TP. The first type was illustrated by the gapping examples in (4),[2] the second by the

[2] That gapping in Dutch can involve ellipsis of only a verb phrase and not the TP, is evidenced by the grammaticality of examples in which a negated modal auxiliary takes scope over both conjunctions, which some of our informants accept. As Potter et al (2017) argue, these examples necessitate a treatment in terms of small conjunct coordination and ellipsis of a *v*P constituent.

(i) Jan kan niet naar Hawaii op vakantie en zijn zoon naar Noordwijk.
Jan can not to Hawaii on vacation and his son to Noordwijk
'It cannot be the case that Jan is going to Hawaii on vacation and his son to Noordwijk.'

The same can also be observed with compound pruning:

(ii) *Context*: Two robotics engineers are debating how many legs their robots should have. One says to the other:
Jouw robot kan niet vierpotig zijn en de mijne drie. Dat is niet eerlijk!

fragmentary responses in (3). In section 4, we will also provide further examples of clausal ellipsis, namely sluicing. In all cases of ellipsis, the first part of the compound forms an ellipsis remnant that carries contrastive focus, and the missing second part of the compound is given.

The presence of clausal ellipsis is not absolute: in some restricted contexts it is possible to find a configuration that resembles gapping but with the verb also present, see (12) as illustration. Sentences of this sort are in general degraded compared to their gapped equivalent. For some speakers (12) fares worse than compound pruning in (4), but is still acceptable. For others it is ungrammatical. We indicate this with the % sign before the verb in the second conjunct.

(12) De weg is eerst tweebaans, maar (%wordt) later vier.
the road is first two-laned but becomes later four
'The road has first two lanes, later four.'

We will return to these three characteristic properties of compound pruning in section 4, when we suggest an analysis for the phenomenon. In the next section (section 2.2) we use these three characteristics and some others to point out that compound pruning is not an instance of conjunction reduction, a known type of ellipsis that can target parts of compounds. In section 2.3 we provide evidence that compound pruning does involve ellipsis.

2.2. Compound pruning is not an instance of conjunction reduction

Compound pruning cannot be classified as the elliptical process that can target any type of coordinated compound (or larger coordinated phrase or sentence), namely conjunction reduction (Booij 1985 and Bosque 2012 among others). When it operates on coordinated compounds, conjunction reduction eliminates either the first part of a compound in a second coordinand or the second part of a compound in a first coordinand, two patterns that are illustrated in (13) on a two-part compound with parts X and Y (see actual examples in (14)).[3]

(13) Patterns of conjunction reduction
a. X<Y> & XY
b. XY & <X>Y

As Booij (1985) cogently argues based on data from Dutch, conjunction reduction does not violate the Lexical Integrity Hypothesis when it operates on compounds because it is not a syntactic process, but prosodic in nature (a 'late PF-ellipsis' in the terminology of Lipták and Güneş 2022).[4] Its signature property is that it elides a domain that corresponds minimally to prosodic words. If compound pruning is a case of conjunction reduction, we understand why it allows for deletion.

When we compare compound pruning, however, to conjunction reduction affecting compounds, we find that the two have starkly different properties.

---

your robot can not four.leg.ADJ be and the mine three that is not fair
'It cannot be the case that your robot has four legs and mine only three. That's not fair.'

We thank an anonymous reviewer for calling our attention to these data.

[3] Conjunction reduction can also operate on coordinated phrases as well as clauses, such as the case of backward conjunction reduction, usually referred to as RNR in (i) and (ii). See Broekhuis and Corver (2019) for discussion.

(i) Jan heeft een boek en Piet heeft een tijdschrift gelezen.
Jan has a book and Piet has a newspaper read
'Jan has read a book and Piet a newspaper.'

(ii) Jan heeft een dik en Piet heeft een dun boek gelezen.
Jan has a thick and Piet has a thin book read
'Jan has read a thick book and Piet a thin one.'

[4] See also Kenesei (2008) for arguments for the prosodic nature of conjunction reduction in Hungarian.

To start, the domain of application in the case of compound pruning is much smaller than that of conjunction reduction in compounds. Compound pruning only operates on synthetic adjectival compounds, and no other compound type, while conjunction reduction can affect compounds and complex words of many types, without categorial and size restrictions. Most crucially for us, conjunction reduction can happily target compounds that cannot show up with compound pruning (compare with the examples in (7) above):

(14) a. Mijn medaille is olijf__ of gifgroen.
my medal is olive and poison.green
'My medal is olive or poison green.'

b. Ik heb keel__ of oorontsteking.
I have throat or ear.infection
'I have a throat or ear infection.'

c. Wij zijn bierdrinkers en verkopers.
we are beer.drinker.PL and seller.PL
'We are beer drinkers and sellers.'

In addition, conjunction reduction can elide any kind of category, such as adjectives (cf. (14b)), a verb (as in *in__ en uitrijden* in and out.drive 'drive in and out') or prepositions (*voor__ of achterin* (*de boot*) before or behind.in (the boat) 'in the front or back (of the boat)'), see Broekhuis and Corver (2019). Compound pruning on the other hand can only eliminate a noun and the adjectiviser in a synthetic adjectival compound.

Concerning the syntactic position of the gap inside the compound and other morphosyntactic properties, compound pruning and conjunct reduction are totally different. Firstly, conjunction reduction can operate on coordinated words (as in the previous examples) in addition to operating on larger constituents (phrases or sentences), while compound pruning is ill-formed when two compounds are directly coordinated, recall the ungrammaticality of (10) above. Secondly, conjunction reduction results in a gap that is in adjacent position to an (overt or covert) coordinator (recall (13)), while in compound pruning, the coordinator and the gap are never adjacent: they are separated minimally by the stranded first part, and possibly another constituent like a subject, cf. (4a) repeated here:

(15) Insecten zijn zespotig en spinnen acht__ Δ. (=4a)
insects are six.leg.ADJ and spiders eight
'Insects have six legs and spiders eight.'

In addition, conjunction reduction can target adjectival compounds with predicative function, but also adjectives with attributive function inside NPs, as in (16), while compound pruning cannot target attributive adjectives, as we have shown in example (8) above:

(16) Dit zijn hand-gemaakte en geschilderde artikelen.
this are hand-made and painted products
'These are hand-made and painted products.'

Last but not least, conjunction reduction can leave non-existing words behind, such as *schei,* the root of the verb *scheiden* 'separate', which is not an independent word of the language. Such words cannot be found in compound pruning type sentence structures, as (17) shows.[5]

[5] This example has a structure that resembles compound pruning, but does not involve a synthetic adjectival compound. We are not aware of synthetic adjectival compounds whose first part is a non-existing word.

	conjunction reduction	**compound pruning**
compound type	any type	synthetic adjectival
elided category	any lexical category (N, A, V, P)	N-ADJ
type of coordination	any level	clausal
targetable adjective	predicative or attributive	predicative
stranded word	existing / non-existing	existing
position of missing part in compound	adjacent to coordinator	non-adjacent to coordinator

Table 3: Properties of compound pruning and conjunction reduction.

(17) a. schei__ en natuurkunde (*scheikunde* 'chemistry')
and nature.study
'chemistry and physics'

b. *Zijn analyse is natuurkundig en mijne schei__.
his analysis is physics.ADJ and my chemistry.ADJ
'His analysis is within physics and my analysis is within chemistry.'

The above comparison shows that compound pruning does not track the properties of conjunction reduction, as summarised at a glance in table 3. Unlike conjunction reduction, compound pruning operates exclusively on synthetic adjectival compounds and eliminates the noun and an adjectiviser; it can only take place in clauses that are coordinated or form discourse turns; it can only target predicative adjectives; it always leaves existing words behind and the position of the missing compound part is not adjacent to the coordinator. We conclude that conjunction reduction and compound pruning involve distinct ellipsis processes.

2.3. Compound pruning involves ellipsis

Before turning to the question of how compound pruning comes about, in this section we entertain the question of whether sentences with compound pruning involve an ellipsis operation that applies specifically to a compound to begin with. While we have assumed this so far, it is important to demonstrate this point and to establish beyond doubt that our sentences contain compounds split into half by ellipsis.

The output of compound pruning in a clause can a priori be assumed to correspond to two syntactic structures. In one, the clause contains a predicative compound that is split by ellipsis as shown in (18a–c), where the stranded first part of the compound forms the remnant of clausal ellipsis. Clausal ellipsis is indicated by $[_{TP}\ \Delta\ ]$ to the right of the remnant, following the move-and-delete analysis of Dutch fragments and gapping (Temmerman 2011, Aelbrecht 2007, Boone 2014). Alternatively, it can be the case that this clause does not contain a compound, rather it contains a numeral/adjectival/nominal constituent that functions as a clausal predicate in its own right and is the remnant of clausal ellipsis (marked again as $[_{TP}\ \Delta\ ]$). The difference between the two types of structures concerns the syntactic category of the bolded constituent: in (18a–c) we have a split compound, which is an adjective; in (19a–c), the bolded unit is a numeral, an adjective or a noun.

(18) *first clause* *second clause*

a. $[_{CP1}\ldots[_{Adj}$ NUM-N-ADJ $]\ldots\ ]$ & $[_{CP2}\ldots[\ _{AP}$ **NUM** ~~**N-ADJ**~~ $]\ [_{TP}\ \Delta\ ]\ ]$

b. $[_{CP1}\ldots[_{Adj}$ A-N-ADJ $]\ldots\ ]$ & $[_{CP2}\ldots[\ _{AP}$ **A** ~~**N-ADJ**~~ $]\ [_{TP}\ \Delta\ ]\ ]$

c. $[_{CP1}\ldots[_{Adj}$ N-N-ADJ $]\ldots\ ]$ & $[_{CP2}\ldots[\ _{NP}$ **N** ~~**N-ADJ**~~ $]\ [_{TP}\ \Delta\ ]\ ]$

(19) a. $[_{CP1}\ldots\ [_{Adj}$ NUM-N-ADJ $]\ldots\ ]$ & $[_{CP2}\ldots[\ _{NumP}$ **NUM** $]\ [_{TP}\ \Delta\ ]\ ]$

b. $[_{CP1}\ldots\ [_{Adj}$ A-N-ADJ $]\ldots\ ]$ & $[_{CP2}\ldots[\ _{AP}$ **A** $]\ [_{TP}\ \Delta\ ]\ ]$

c. $[_{CP1}\ldots\ [_{Adj}$ N-N-ADJ $]\ldots\ ]$ & $[_{CP2}\ldots[\ _{NP}$ **N** $]\ [_{TP}\ \Delta\ ]\ ]$

There are several arguments to be made for the case that underlyingly, we are dealing with structure (18) and not (19), that is to say what we call compound pruning contains a compound word underlyingly.

The first argument comes from meaning considerations. Our examples are interpreted with the meaning of a predicative compound in it. To illustrate, a sentence like (4c), repeated here as (20), is predominantly interpreted to mean that Lucas is a person who is green-eyed and not someone who happens to be green e.g. because he got green paint all over his clothes. This is due to the strict syntactic parallelism between the two elements *groenogig* and *groen*, which is the remnant of gapping.

(20) Kevin is blauwogig en Lucas groen__ Δ. (=4c)
Kevin is blue.eye.ADJ and Lucas green
(i) 'Kevin is blue-eyed and Lucas is green-eyed.' (corresponds to structure (18b))
(ii) #'Kevin is blue-eyed and Lucas is green.' (corresponds to structure (19b))

The second argument comes from the observation that (19a) and (19b) cannot be correct structures as numerals and bare singulars (with the exception of names of professions) in Dutch cannot be predicates in a clause (complement to a copula verb). (21a) shows that a numeral cannot be a predicate, unless in the context of arithmetic or when used to specify one's age, as (21b).

(21) a. *Deze apples zijn zeven.
these apples are seven
lit. 'These apples are seven.'

b. De derdemachtswortel uit 64 is 4.
the cube.root out 64 is 4
'The cube root of 64 is 4.'

A similar argument can be construed observing the type of negation used in compound pruning sentences. When used to express arithmetic relations, predicative numerals are compatible with either sentential negation (*niet* 'not') or constituent negation (*geen* 'no') in utterances like (22a). The choice does not affect the meaning of the sentence in any way. Adjectival predicates are only compatible with sentential negation (*niet* 'not') and not constituent negation (*geen* 'no'), as shown by (22b).

(22) a. 2x2 is {niet / geen} vijf.
2x2 is not no vijf
'2x2 is not five.'

b. Spinnen zijn {niet / *geen} zespotig.
spiders are not no six.leg.ADJ
'Spiders are not six-legged.'

In sentences with compound pruning, the numeral is not compatible with constituent negation (*geen* 'no'), either, which follows if the numeral is underlyingly part of an elliptical adjectival compound. The choice of negation does not follow if the numeral is a predicative numeric expression in the clause.

(23) Dit beestje is zespotig, {niet / *geen} acht__ Δ.
this creature is six.leg.ADJ not no eight
'This creature is six-legged, not eight-legged.'

The fourth argument supporting the structures in (18) concerns the syntactic category of the remnants. The category of the remnant is clearly adjectival according to the evidence of later pronominal reference: to refer back to the predicate Dutch uses the pronominal anaphor *dat*, which can refer back to adjectives (among others), cf. (24). Pronominal *zoveel* 'so.many', which can refer to numeral predicates, cannot be used in compound pruning:

(24) a. Dit beestje is zespotig. Dat beestje is *dat* ook.
this creature is six.leg.ADJ that creature is that too
lit. 'This creature is six-legged. That creature is that, too.'

b. Dit beestje is zespotig. Deze spin acht__ Δ. En die spin is *dat* ook.
this creature is six.leg.ADJ this spider eight and that spider is that too
lit. 'This creature is six-legged. This spider is eight-legged. And that spider is that, too.'

(25) a. 4x4 is zestien. En zoveel is 8+8 ook.
4x4 is sixteen. and so.many is 8+8 too
'4x4 is sixteen. And 8+8 is also so many.'

b. Dit beestje is zespotig. Deze spin acht__ Δ. *En die spin is ook *zoveel*.
this creature is six.leg.ADJ this spider eight and that spider is too so.many
lit. 'This creature is six-legged. This spider is eight-legged. And that spider is so many, too.'

In this section we provided four pieces of evidence for the claim that compound pruning contains a compound that is missing its second part in an elliptical process of some sort: interpretational parallelism, the absence of predicative function with numerals and bare nouns, the specific form of negation applying to the remnant and category restrictions on pronominal reference to this item. The results dovetail and indicate that compound pruning contains a compound that is only partially pronounced.

This conclusion is also in line with the observation that compound pruning observes the recoverability condition that is characteristic of standard ellipsis (surface anaphora), namely that the elided material – the content of the missing TP and more importantly also the missing compound part – should be e-GIVEN (Merchant 2001) and be syntactically isomorphic to an antecedent (Chung 2006). This requires that compound pruning should be preceded by a linguistic antecedent in which the compound is present in full. This was the case in all our examples as the reader can ascertain. All examples contained a correlate to the elliptical compound with the same noun and adjectiviser (N+ADJ) sequence.

When there is no such antecedent available, compound pruning fails. To see this, consider first the sentence in (26) and its structural representations in (26i) and (26ii). The antecedent contains the noun *poot* 'leg' in the plural, but not the form *-potig* 'leg-ADJ'. Due to this, *Deze spin acht* 'this spider eight' is derived from the underlying structure that is isomorphic to the antedent clause *Deze spin heeft acht poten* 'This spider has eight legs', with gapping and N-ellipsis of the noun *poten* (26i). The sequence does not correspond to the clause *Deze is spin is achtpotig* 'This spider is eight-legged', as shown in (26ii).

(26) Dit beestje heeft zes poten. Deze spin acht.
this creature has six leg.PL this spider eight
'This creature has six legs. This spider eight.'

i. Dit beestje heeft zes poten. Deze spin [$_{NP}$ acht [$_{N'}$ ~~poten~~]] [$_{TP}$ ~~heeft~~]
this creature has six leg.PL this spider eight leg.PL has

ii. Dit beestje heeft zes poten. Deze spin [$_{AP}$ acht~~potig~~] [$_{TP}$ ~~is~~]
this creature has six leg.PL this spider eight.leg.ADJ is

Evidence for the unavailability of the predicative underlying structure in (26b) comes from the category of pronominal reference to the elliptical *acht*: it can be followed by a pronominal form that is of the numeral category, but not one that is an adjective.

(27) Dit beestje heeft zes poten. Deze spin acht Δ.
this creature has six leg.PL this spider eight
✓En die spin heeft er ook *zoveel*.
and that spider has ER also so.many
#En die spin is *dat* ook.
and that spider is that too
lit. 'This creature has six legs. This spider eight. And that spider has so many, too.'

This in turn shows that (26ii) is the wrong representation. We conclude that a compound pruning clause must be anteceded by an isomorphic structure, in line with its elliptical nature.

Having stated the existence of compound pruning and having listed its properties, in the next two sections we investigate how partial pronunciation of the compound comes about. Our analysis needs to account for the three properties of compound pruning listed in section 2.1: the predicative nature of the adjectival compound, the presence of clausal coordination/turn-taking across sentences and the standard

presence of clausal ellipsis in these sentences. In addition, the analysis must explain why compound pruning applies only to synthetical adjectival compounds, and not to any other compound.

In section 3, we sketch an account that is capable of explaining a subset of these properties but not all, namely Extra deletion. We find it important to consider Extra deletion because our data resemble to a considerable degree data in other languages that received an analysis in terms of this type of ellipsis process. In section 4 we propose an alternative account that we believe is capable of accounting for all key properties of compound pruning, and which is built on two claims that we substantiate independently: the fact that synthetic adjectival compounds are not word level units but phrases, and the fact that clausal ellipsis can repair ungrammatical sentences by eliminating (i.e. blocking the insertion of) forms that cause the ungrammaticality.

3. Compound pruning as Extra deletion

3.1. Extra deletion

Extra deletion is an elliptical phenomenon identified relatively recently by Duk-ho An (see An 2016; 2019; 2025). Extra deletion is the optional non-constituent deletion of material inside the remnant of a clausal ellipsis operation such as fragments or gapping. When clausal ellipsis creates a gap and leaves behind the remnant, schematically illustrated in (28), the string of deleted elements can optionally be extended beyond what is initially marked for deletion, namely the TP. When it is extended into parts of the remnant, it can delete non-constituents. Shading marks elision.

(28) [… **[** X Y **]** [Δ] TP]
remnant clausal ellipsis

For illustration, consider the following example from Korean, which illustrates the various forms of fragmentary answers that can be given to a constituent question:

(29) Q: John-i nwukwu-uy tongsayng-ul manna-ss-ni? (An 2019, ex. (43))
John-NOM *who-GEN* *brother-ACC* *meet-PAST-Q*
'Whose brother did John meet?'

A1: Mary-uy tongsayng-ul [TP Δ]

A2: Mary-uy tongsayng-ul [TP Δ]

A3: Mary-uy tongsayng-ul [TP Δ]

A4: Mary-uy tongsayng-ul [TP Δ]
Mary-GEN *brother-ACC*
'(John met) Mary's brother.'

Korean is an agglutinative language with case markers. The constituent that answers the *wh*-phrase is the remnant in the fragment and contains an accusative suffix on the remnant noun phrase and a genitive suffix on the possessor noun phrase inside that. In the context of clausal ellipsis, this remnant is optionally pronounced either fully (29A1); without the final accusative affix (29A2); without the possessed noun (29A3) or only spelling out the possessor without a case marker (29A4). The optional Extra deletion steps are illustrated by gray shading. Shaded material is always e-GIVEN.

Clearly, these shaded parts of the remnant do not form a syntactic constituent, while they invariably form a single continuous linear string. As An (2016; 2019; 2025) argues, this pattern cannot be captured in syntactic terms, and should be captured in terms of linear order: the non-pronunciation of the case markers and the possessed noun is due to PF-deletion that takes place right at or shortly after linearization before vocabulary insertion (An 2025). Sensitivity to linear order is evident as it is always an unbroken, contiguous string of morphemes that elides. In other words, deletion of the leftmost word or affix is dependent on deletion of the ones that follow it, consider (30).

(30) Q: nwu-ka nwukwu-lul manna-ss-ni? (An 2016, ex. (71); 2019, ex. (3))
who-NOM who-ACC meet-PST-Q
'Who met whom?'

A1: Cho-ka Yang-ul [$_{TP}$ Δ]

A2: Cho-ka Yang-ul [$_{TP}$ Δ]

A3: *Cho-ka Yang-ul [$_{TP}$ Δ]
Cho-NOM Yang-ACC
'Cho (met) Yang.'

Erschler (2022) provides data from Turkish, Ossetic, and Eastern Armenian in another syntactic domain, namely gapping, and puts forward the claim that gapping contexts in these languages can also feature the late PF-process of Extra deletion, which he refers to as *slending*. The example in (31) (Erschler 2022: (11d), with our bracketing) is a case of Turkish gapping, in which clausal ellipsis is extended into the remnant *küçük ızının evine* small daughter-3SG-GEN house-3SG-DAT and eliminates two possessed nouns and their case markers. These units do not form a syntactic constituent.

(31) Can büyük kız-ın-ın ev-in-e gelmiş,
Can big daughter-3SG-GEN house-3SG-DAT arrived
Ayşe ise [[küçük ız-ın-ın] ev-in-e]] [$_{TP}$ gelmiş]
Ayshe CTR small daughter-3SG-GEN house-3SG-DAT arrived
'Can arrived at his eldest daughter's house, and Ayshe, at her youngest one's.'

3.2. Compound pruning as the result of Extra deletion

Section 2.3 argued that compound pruning sentences contain an elliptical clause in which in addition to clausal ellipsis, we also find partial pronunciation of a compound, as in (32), repeated from (18) above.

(32) *first clause* *second clause* (=18)

a. [$_{CP1}$…[$_{Adj}$ NUM-N-ADJ]…] & [$_{CP2}$ … [$_{AP}$ NUM ~~N-ADJ~~] [$_{TP}$ Δ]]

b. [$_{CP1}$…[$_{Adj}$ A-N-ADJ]…] & [$_{CP2}$ … [$_{AP}$ A ~~N-ADJ~~] [$_{TP}$ Δ]]

c. [$_{CP1}$…[$_{Adj}$ N-N-ADJ]…] & [$_{CP2}$ … [$_{NP}$ N ~~N-ADJ~~] [$_{TP}$ Δ]]

The structural representation of the elliptical clause as given greatly resembles the configuration in which Extra deletion is possible in languages like Korean and Turkish, illustrated in the previous section. For this reason, we need to ask whether compound pruning is a case of Extra deletion, whereby clausal ellipsis is extended into a predicative compound and eliminates the right part of the compound, eliding not a syntactic unit, but a morphological one, namely part of a word, as shown in (33).

(33) a. Insecten zijn zespotig en spinnen achtpotig [$_{TP}$ Δ]
insects are six.leg.ADJ and spiders eight.leg.ADJ
lit. 'Insects are six-legged and spiders eight-legged.'

b. Deze weg is tweebaans. Die weg vierbaans [$_{TP}$ Δ]
this road is two.lane.ADJ that road four.lane.ADJ
'This road has two lanes. That one four.'

With this analysis in place, we would gain in understanding why compound pruning is standardly accompanied by clausal ellipsis: this would follow from the parasitic nature of Extra deletion on the presence of an independently created clausal deletion site. The need for clausal ellipsis in turn explains why compound pruning only operates under clausal coordination/turn-taking: coordination must be at the level of the clause to create room for clausal ellipsis to take place in the elliptical clause.

Despite its initial plausibility, we believe that there is reason to think that Extra deletion is not what gives rise to compound pruning in Dutch. To begin with, we are not aware of other syntactic contexts in which Extra deletion can be attested in this language. Consider for example a syntactic context similar to

the Korean (29A4). In fragment formation clausal ellipsis cannot be extended into a possessive noun phrase and eliminate the possessed noun and the possessive marker *-s*:

(34) Q: Wiens fiets heeft Piet geleend?
whose bike has Piet borrowed
'Whose bike did Piet borrow?'

A: *Mijn vaders fiets [$_{TP}$ Δ].
my father.POSS bike
'My father.'

Putting the problem of non-attestation aside for a moment, and assuming that Extra deletion can take place in Dutch for the sake of the argument, we still run into other problems. One is that this analysis would predict that compound pruning can target compounds in attributive position as well, provided that the noun that this adjective modifies is elided, as was also the case in (31) above. Since the noun and the right part of the compound form an unbroken, contiguous string, clausal ellipsis should be extendable to this string, if the only condition on Extra deletion is adjacency to a clausal ellipsis site. This prediction is wrong, as we showed in example (8b) above, repeated here as (35). Compound pruning cannot target a compound inside a noun phrase, under any condition.

(35) *Lucas is [$_{DP}$ een groenogig jongetje], en Tim [$_{DP}$ een blauwogig jongetje] [$_{TP}$ Δ]
Lucas is a green.eye.ADJ boy and Tim a blue.eye.ADJ boy
'Lucas is a green-eyed boy and Tim is a blue-eyed boy.' (=8b)

Another problem concerns the position of the remnant. For Extra deletion to take place, the compound must be the final element in the clause. While standardly this is the case (see our examples so far), non-initial remnants can be constructed with some effort and while degraded, they are not fully ungrammatical, as they should be if ellipsis applying to the compound is Extra deletion. The same applies to example (42), which will be discussed in the next section.

(36) ??Vijfpersoons moet deze lift worden, en zeven__ die [$_{TP}$ Δ].
five.people.ADJ must this lift become.INF and seven that
'This lift must be able to carry five people, and that lift must be able to carry seven people.'

In a similar manner, as we mentioned in section 2, we can also find examples like (12), repeated in (37) where clausal ellipsis does not take place and which are degraded, but for some speakers acceptable.

(37) %De weg is eerst tweebaans, maar wordt later vier__. (=12)
the road is first two-laned but becomes later four
'The road has first two lanes, later four.'

For speakers who accept an example like (37), non-pronunciation of the right part of the compound is not parasitic on clausal ellipsis taking place in the same clause. These speakers allow for the verb to be overt.

The last important point we raise against an analysis in terms of Extra deletion is the selectivity of compound pruning when it comes to the ellipsis target. As we pointed out in section 1, compound pruning can only apply to compounds that are adjectival and synthetic in nature, such as those in table 1. Other compounds, primary and synthetic ones, do not yield well-formed cases of ellipsis. This is unexplained if part of the compound is missing due to Extra deletion, the only condition on which is adjacency to a clausal ellipsis site.

(38) a. *Mijn medaille is olijfgroen, en de jouwe gifgroen [$_{TP}$ Δ].
my medal is olive.green and the yours poison.green
'My medal is olive green and yours poison green.' (*gifgroen* 'poison green')

b. ?*Wij zijn bierdrinkers en jullie wijndrinkers [$_{TP}$ Δ].
we are beer.drinker.PL and you.PL wine.drinker.PL
'We are beer drinkers and you wine drinkers.' (*wijndrinker* 'wine drinker')

One could argue that the application of Extra deletion to word-part elements is constrained in some ways, so that the difference between (33) and (38) would follow. To rule out (38), we would need to say that Extra deletion cannot delete an adjective (*groen*) or a noun (*drinkers*) when these are subwords but can delete a morpheme such as *-potig, -baans* or *-ogig*, which are bound morphemes. The status of such a restriction on Extra deletion is presently unclear.

Having considered Extra deletion, we conclude that it cannot provide a full explanation for the phenomenon: it leaves important generalisations unexplained, among which that these compounds are syntactically predicates and not attributive modifiers.

4. The 'move-and-delete' analysis

In this section an analysis is presented that is capable of answering the question why compound pruning can only target synthetic adjectival compounds and what the role of clausal ellipsis is. We provide an account in which compound pruning is the result of *move-and-delete* type of remnant formation, in which the remnant of ellipsis undergoes movement as a phrasal syntactic constituent. To support this analysis, in section 4.1 we argue that synthetic adjectival compounds can have the structure of phrases. In section 4.2, we show how the derivation proceeds and we explain the need for independent ellipsis with reference to the need to eliminate an otherwise ill-formed affix.

4.1. The structure of synthetic adjectival compounds

We contend that the reason why compound pruning shows up with synthetic adjectival compounds is that this type of compound formation allows a phrasal derivation in the syntax. The phrasal nature of the compound formation is most clear for compounds where the first part is a numeral (examples 3a-b, 4a-b). In this section we present our evidence and some background information on the structure of synthetic adjectival compounds as discussed in the existing literature.

Synthetic compounds, where a single derivational affix is added to a combination of multiple units, are notoriously difficult to analyse. The structural relation between the constituent parts is not evident, in addition it is often the case that the syntactic constituency and the semantic constituency are not isomorphic, i.e. such compounds may present bracketing paradoxes.

Van Santen and Booij (1998) specifically offers four distinct ways to analyse synthetic adjectival compounds such as the adjectives *blauwogig* (blue.eye.ADJ) 'blue-eyed' or *tweebaans* (two.lane.ADJ) 'having two lanes' in Dutch. These expressions can be the product of derivation, with the adjectiviser attaching to a syntactic phrase (39a) or with it attaching to a compound (39b). The expression can also be the product of compounding (39c) or the product of a combination of derivation and compounding in an unusual ternary structure (39d). Van Santen and Booij (1998) argue that some analyses suit some synthetic compounds better than others and that some synthetic compounds may allow more than one structure.

(39) a. *derivation: ADJ affix attaches to a phrase (NP)* (van Santen and Booij 1998)
[$_A$ [$_{NP}$ blauw oog]-ig]
[$_A$ [$_{NP}$ twee baan]-s]

b. *derivation: ADJ affix attaches to a compound*
[$_A$ [$_{A\text{-}N}$ blauw-oog]-ig]
[$_A$ [$_{Num\text{-}N}$ twee-baan]-s]

c. *compounding: ADJ affix attaches to N, A forms a compound with another head*
[$_A$ [$_A$ blauw] [$_A$ [$_N$ oog][-ig]]]
[$_A$ [$_{Num}$ twee] [$_A$ [$_N$ baan][-s]]]

d. *compounding+derivation: ADJ affix attaches to A and N at the same time*
[$_A$ [$_A$ blauw] [$_N$ oog] [-ig]]
[$_A$ [$_{Num}$ twee] [$_N$ baan] [-s]]

While (39a), based on a phrasal derivation is a prominent approach to synthetic compound formation in Germanic languages (Botha 1984, Neef 2015), Booij (2019) discards this option for Dutch with reference

to the fact that no morphological evidence can be found for the phrasal combination of the first two parts: adjectival inflection is present in syntactic phrases, cf. *de lange-e arm* (the long-AGR arm 'the long arm') but is never found in compounds, cf. *lang*(*-*e*)*armig* long.arm.ADJ 'long-armed'. Instead, Booij (2009) argues for the correctness of the compound structure in (39c), where the adjective or numeral modifies the base of the complex adjectival head formed by the noun and the adjectiviser (N+ADJ). The noun+adjectiviser can, but need not, be an existing word of the language.

For the kind of synthetic adjectives we attest in compound pruning, namely those types listed in table 1, we accept Booij's conclusion that (39c) is the best representation, but we do this with a twist: while we agree with Booij that the first and the second element do *not* form a syntactic phrase, we contend that the initial element on its own *can* form a phrase. When it does form a phrase, the entire construct is also an adjectival phrase syntactically, since a phrase cannot be contained in a head. This proposal is shown in (40) (see Kenesei 1995/96 for a similar proposal for Hungarian).

(40) Synthetic adjectival phrases in our account

a. $[_{AP}\ [_{NumP}$ twee$]\ [_{A}$ baan-s $]]$

b. $[_{AP}\ [_{AP}$ blauw$]\ [_{A}$ og-ig $]]$

c. $[_{AP}\ [_{NP}$ piramide$]\ [_{A}$ vorm-ig $]]$

Inside the AP, the adjectiviser *-s*, *-ig* form a head-type unit together with a noun yielding *-baans*, *-ogig* or *-vormig*. We treat these as affixes, because many of such forms do not exist as free morphemes in Dutch, or not with the meaning they have in the compound. We also take the view that wordhood is a phonological phenomenon, and we allow for phrasal structures like (40) to become word-sized units once PF spells them out as a single prosodic word.[6] Finally, with respect to lack of adjectival inflection in synthetic compounds (cf. *lang*(**e*)*armig* long.arm.ADJ 'long-armed'), we believe this due to the fact that adjectival inflection is only present when the adjective is part of a determiner phrase (Belk 2019), which is not the case in synthetic adjectives as they do not contain a determiner layer.

Having sketched our structural proposal, we now list three reasons for treating the first part of the compound as a syntactic phrase in our examples. Two of these reasons concern adjectival compounds with a numeral (40a) and one concerns adjectival compounds with a noun (40c).

The first argument for the phrasal status of the initial element is that this element can be an information-seeking *wh*-phrase (a type of quantificational element). This is possible in compounds with an initial numeral or quantifier when these are used as clausal predicates, as shown in (41) (the example comes from the internet). The *wh*-question involving *hoeveelbaans* clearly has the import of a regular question, i.e. the *wh*-phrase *hoeveel* inside it denotes a variable and is answered in (41B) either by the full adjectival compound or its elliptical, compound pruning version.

(41) A: Hoeveelbaans wordt de A4?
how.many.lane.ADJ *become.3SG* *the* *A4*
lit. 'How many-laned will the highway A4 be?'

B: Vier(baans) Δ.
four.lane.ADJ
'Four.'

Since *wh*-replacement is allowed in the initial position of the compound, it comes as no surprise that we can construct a compound pruning example with sluicing as well. The sluiced remnant is the *wh*-phrase, which corresponds to a correlate in which the initial element is a quantificational indefinite, as in (42). 22 of our 34 informants (64%) accepted this sentence.

[6] That natural language can convert syntactic phrases into word-size units has been demonstrated by Compton and Pitman (2015) among others.

(42) Dit beestje is veelpotig, maar ik weet niet hoeveel__ precies Δ.
this creature is many.leg.ADJ but I know not how.many exactly
lit. 'This creature is many-legged, but I don't know how many exactly.'

Clearly, there is no other way to analyse expressions as *hoeveelpotig* and its ilk than as syntactic phrases. Compounds, regardless of type (synthetic or primary) cannot contain wh-phrases, which attests to the conclusion that they are not phrasal syntactic units. Consider the ungrammatical forms in (43). In these examples (43ab) show that a NN and NA compound cannot have a nominal wh-phrase in it. (43c) shows that the first part of a primary compound cannot be given as answer to a phrasal question, either.

(43) a. *Watdrinkers zijn jullie? (intended answer: *wijndrinkers* wine.drink.ER.PL)
what.drink.ER.PL be.3PL you.PL
lit. 'What drinkers are you?, i.e. What kind of alcoholic drink do you drink?'

b. *Watgroen is je medaille? (intended answer: *olijfgroen* olive.green)
what.green be.3SG your medal
lit. 'What kind of green is your medal?'

c. A: Wat soort groen is je medaille?
what kind green be.3SG your medal
lit. 'What kind of green is your medal?'

B: *Olijf. (intended answer: *olijfgroen* olive.green)
Olive
'Olive green.'

It is also telling that a *wh*-containing word can hardly take part in further compound formation, for example by the addition of a noun: while *tweebaansweg* 'two.lane.road' is a well-formed compound in Dutch, *hoeveelbaansweg* is not, cf. (44).[7]

(44) ??Een hoeveelbaansweg wordt de A4?
an how.many.lane.ADJ.road become.3SG the A4
lit. 'A how many-laned road will the highway A4 be?'

The second reason for assuming the syntactic phrasehood for the compound is that the initial element can itself be a complex syntactic constituent. This again concerns numeric items. Consider the bracketed constituents *drie à vijf* 'three to five' or *meer dan twee* 'more than two'. These units are clearly phrases because they are multi-word units, and they contain functional material, such a preposition (*à* in 45a) and a complementiser (*dan* in 45b).

(45) a. Deze weg is [drie à vijf]baans.
this road is three to five.lane.ADJ
'This road has three to five lanes.'

b. De doorgaande wegen zijn vaak [meer dan twee]baans.
the main road.PL are often more than two.lane.ADJ
'The main roads often have more than two lanes.'

Again, it can be shown that such complex units are not allowed in other types of compounds such as compounds consisting of a numeral and a noun:

(46)

vierhoek	zeshoek	*vier-à-zes-hoek	*meer-dan-vier-hoek
four.angle	*six.angle*	*four-to-six-angle*	*more-than-four-angle*
'square'	'hexagon'	'a shape with 4 to 6 sides'	'a shape with more than 4 sides'

[7] We gloss *tweebaansweg* and similar forms here and below as containing the adjective *tweebaans* in it. This is not the only choice: the *-s* affix can also be treated as a linking morpheme that is characteristic of compounds (De Haas and Trommelen 1993). The gloss in this case would be *tweebaansweg* two.lane.LNK.weg.

The last argument for synthetic adjectival phrases comes from data in which the initial element is a fully referential proper name. In our adjectives, we can find referential proper names in initial position, as (47ab) show ((47a) was a headline in *NRC* on September 1, 2023). That the proper name is used as a referential expression is shown by the fact that pronominal reference is possible to this form in (47b): *hij* 'he' can refer back to (former Dutch prime minister) Mark Rutte.

(47) a. Wie vult het Mark Rutte-vormige gat in de politiek?
who fill.3SG the Mark Rutte-shaped.AGR hole in the politics
'Who will fill the Mark Rutte-shaped hole in politics?'

b. Er is een Mark Rutte$_i$-vormig gat ontstaan in de politiek, maar *hij*$_i$ ontkent het.
there is a Mark Rutte-shape.ADJ hole appeared in the politics but he deny.3SG it
'There appeared a Mark Rutte$_i$-shaped hole in politics, but he$_i$ denies it.'

The availability of a proper name in adjectival compounds is in line with our claim that such compounds can have a phrasal structure, as it is standardly assumed that the non-head of a compound cannot be a referential expression or contain a D-layer that would be responsible for the referential reading (Hoeksema 1988, Harley 2009). At the same time, the presence of a proper name is the weakest of our arguments, as recently De Belder (2022) brought to light that Dutch compounding can feature a referential non-head, in so-called referential compounding. This is illustrated by *zonshoogte* sun.s.height 'the height of the sun', where *zon* has unique and specific reference, and pronominal reference is possible to it.

(48) ?De zon$_i$shoogte is opvallend deze ochtend, ook al is hij$_i$ nog maar net op.
the sun.s.height is striking this morning even if is he only PRT just up
'The height of the sun is striking this morning, even if it (i.e., the sun) has only just gone up.'

Taking stock, what transpires from our discussion is that some synthetic adjectival compounds can have the structure of phrases. We have supplied two strong arguments for the claim that the initial constituent can have phrasal properties for adjectival compounds that start with a numeral or a quantifier (40a). For such forms, the availability of a wh-phrase or a complex syntactic constituent in initial position is indubitable evidence that the initial element can be a phrase and that the entire form therefore can have the structure of a phrase, with the N+ADJ attaching to it as an affix. For adjectival compounds that start with a noun (40c), we observed that proper names can be initial elements, which is expected under a phrasal analysis as well. For adjectival compounds that start with an adjective (40b), we cannot demonstrate that the initial item is undoubtably a phrase, but we believe this option is present to the speaker via analogical extension.

We can now return to the elliptical pattern we call compound pruning and link the behaviour of adjectival compounds to the available data patterns. As we mentioned in section 1, compounds with a numeric initial element give rise to the best examples of compound pruning. In this section we have seen that this type of compound exhibits strong evidence for syntactic derivation as a phrase. We interpret this by stating that the availability of a phrasal derivation for the compound correlates with the availability of compound pruning, and it does so because it is a condition on it. Compound pruning is best for all our speakers with numeric remnants (examples (3ab), (4ab)), because such remnants can be easily formed as syntactic phrases. We hypothesise that speakers who accept compounds with an adjectival or nominal initial elements in compound pruning (examples (3cd), (4cd)), also construct these compounds as phrases, upon analogy.

4.2. A-bar movement and ellipsis 'repair' via non-insertion

We argued in the previous section that the application of compound pruning is restricted to phrasal adjectival compounds because these are compounds that are syntactic phrases underlyingly. This explains why compound pruning applies only to synthetic adjectival compounds, and not to any other type. In this section, we argue that their phrasal nature also means that they do not present a violation of the *Lexical*

Integrity Hypothesis: the compounds in question are not words syntactically but phrases, and as such, syntactic processes such as ellipsis and movement can target their parts.

Let us now turn to the question what the derivation of the elliptical clause looks like. The analysis we provide should explain why compound pruning has the three key properties we identified in section 2.1: (i) the compound is a predicate, not an attributive modifier; (ii) compound pruning is found in clausal coordination/turn-taking and (iii) compound pruning standardly shows the presence of clausal ellipsis with a few exceptions.

We believe most of these properties fall out and are in fact predicted by a *move-and-delete* analysis of remnant formation in ellipsis. If the initial, phrasal constituent in the remnant undergoes movement to a peripheral position in the clause, followed by ellipsis of a clausal constituent, we come a long way in understanding the characteristic properties of compound pruning.

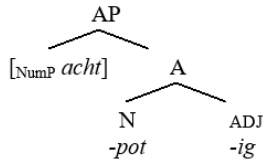
To show how, we start by laying out the derivation of the elliptical clause in (3a), repeated as (49).

(49) A: Spinnen zijn zespotig. (=3a)
spiders are six.leg.ADJ
'Spiders have six legs.'

B: Nee, acht__ Δ.
no eight
'No, they have eight legs.'

In (49), the adjectival compound forms the clausal predicate, and is complement to a *v* head which we take to contain the copular verb. The clausal predicate is predicated of the subject *spinnen* 'spiders'. We generate the subject in Sp,*v*P. The adjectival compound has the structure in (50) as we argued above: it contains in the highest specifier position the numeric phrase. This numeral, being a phrase, can undergo phrasal movement out of the AP when it is contrastively focused.

(50)



Movement of the numeral out of the AP cannot proceed in non-elliptical clauses, as the next example shows. Despite the fact that the numeral can undergo A-bar movement into a left peripheral position, the rest of the adjectival compound cannot be formed because movement leaves behind an ill-formed second part, the affixal *-potig*, which cannot attach to a host. This morphological problem results in ungrammaticality.

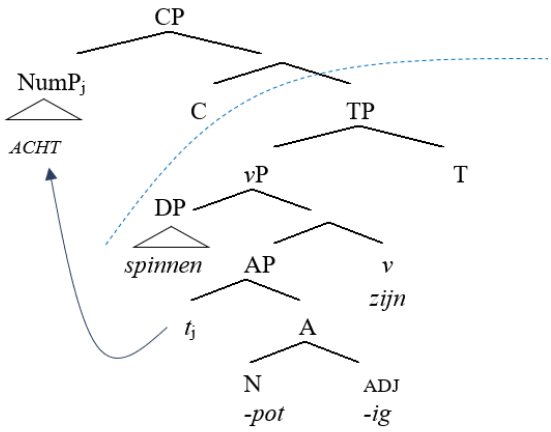
(51) *Acht zijn spinnen -potig.
eight are spider.PL leg.ADJ
lit. 'It is eight that spiders are legged.'

With reference to the ill-formed status of the stranded affixal N+ADJ unit, we can now understand why omission of the second part of the compound in compound pruning is standardly accompanied by ellipsis of another constituent in the clause. In other words, omission of the compound part is 'parasitic' on an independent ellipsis operation such as clausal ellipsis or gapping, using the terminology of Fritzgibbons (2014) and Scheider (2025). This independent ellipsis is needed in our view because it blocks vocabulary insertion, as argued in Wilder (1997), Abels (2018a), Mendes and Nevins (2023) among many others. If the affixal *-potig* falls under ellipsis, its morphological defectiveness as an unbound morpheme is removed by ellipsis: since this form does not get inserted into the structure, its affixal nature is immaterial for the well-formedness of the sentence.

With these ingredients in place, we illustrate our proposal through the derivation of the fragment-type elliptical clause in (52), which contains the numeral remnant *acht* in contrastive focus. We follow Temmerman (2013) in analysing Dutch fragments as involving A-bar movement of the remnant constituent

into Sp,CP, followed by TP ellipsis. This means that we generate the synthetic adjective phrase in predicative position, as complement to the copula. The numeral first part of the adjective, which we argued is a phrase as well, undergoes movement to Sp,CP to check a [Foc] feature on C. The movement leaves behind the affixal *-potig* inside the adjectival predicate. This does not result in ungrammaticality as ellipsis affects the TP and *-potig* is not inserted as a vocabulary item. The structure of (49B) is shown in (52):

(52)



The derivation of an example involving sluicing (see (42) above) would be identical to this, involving movement of the *wh*-phrase to Sp,CP. The derivation of gapping would similarly involve A-bar movement of the remnants to a clause peripheral position and TP-ellipsis as well, if one adopts the proposal of Aelbrecht (2010). We refrain from providing this structure for reasons of space.

With this derivation in place, we can now return to the question of why compound pruning has its characteristic properties. The need for clausal ellipsis can be understood with reference to the derivation as sketched here: clausal ellipsis is necessary as the adjectival compound cannot be realised with the host of the affix moved away from it. Note that clausal ellipsis is an available ellipsis operation in Dutch and it is moreover one that is known for its capacity to 'repair' otherwise ungrammatical derivations, see Merchant (2008:152–153) for a brief overview of such repair effects in English, van Craenenbroeck (2010) on such repair effects in Dutch dialects and even more closely Schneider (2025) on a repair effect that is surprisingly similar to ours. Smaller ellipsis, targeting only the AP predicate is unavailable: Dutch does not allow for AP ellipsis, it uses a deep anaphor instead in this position:

(53) Vliegen zijn klein, en bijen zijn *(dat) ook.
fly.PL are small and bee.PL are that too
'Flies are small and bees are, too.'

Possibly, for some speakers, AP ellipsis is possible under some conditions and can give rise to cases of compound pruning where the verb does not get deleted. We leave the fine structure of such sentences, repeated from (12) here for future work.

(54) % De weg is eerst tweebaans, maar wordt later vier. (=12)
the road is first two-laned but becomes later four
'The road has first two lanes, later four.'

Returning to the key properties of compound pruning, if our accounts holds water, we understand why compound pruning is allowed in clausal coordination (or turn-taking) only: clausal ellipsis is needed to salvage the stranded affix in compound pruning and clausal coordination is needed to create room for clausal ellipsis to apply. When smaller constituents are coordinated, there is no available standard ellipsis operation that can remove the stranded affix and this affix would result in ungrammaticality.

The last property we need to account for is the predicative nature of the compound. The compound in compound pruning is always a clausal predicate, not an attributive modifier, see examples (8ab) above, repeated in (55):

(55) a. *Lucas is [DP een groenogig jongetje], en Tim [DP een blauw jongetje].
Lucas is a green.eye.ADJ boy and Tim a blue boy

b. *Lucas is [DP een groenogig jongetje], en Tim [DP een blauw [N' Δ]].
Lucas is a green.eye.ADJ boy and Tim an blue
'Lucas is a green-eyed boy and Tim is a blue-eyed boy.' (=8)

The ungrammaticality of (55a) is easy to understand: to derive this sentence we would need to extract the numerical constituent out of an attributive adjective to a focal position in the DP. Assuming that focal adjectives may move to higher positions in the DP (Corver and van Koppen 2009), such movement of the first part of the compound would leave behind a stranded affix, as shown in (57). As Dutch does not have AP ellipsis, the stranded affix violation cannot be removed by eliding the AP and (55a) cannot be derived.

(56) [… [DP een [FocP BLAUWi [NP [N' [AP t_i -ogig] jongetje]]]]]

The ungrammaticality of (55b) is much more difficult to explain. This example differs from the previous one in that here the noun is elided as well. As omission of constituents of the size of N′ is possible in Dutch and can target a noun and any number of its attributive modifiers (Kester 1996), this type of ellipsis should in principle be able to elide a constituent that involves the adjectival modifier and the modified noun together, and block insertion of the stranded affix.

(57) [… [DP een [FocP BLAUWi [NP [N' [AP t_i -ogig] jongetje]]]]]

The ill-formedness of this sentence therefore must be due something to else. We believe that (57) is ill-formed because the premise that Dutch has nominal ellipsis is in fact wrong. What appear to be instances of nominal ellipsis are actually instances of pronominalization, as Corver and van Koppen (2011) argue in detail. If this is correct, the ungrammaticality of (57) follows from further ado: since the nominal gap contains a pronoun, there is no elided constituent – thus no structure – inside the NP, the synthetic adjective cannot be base-generated inside this elided structure and its first part cannot move out of it, either.

Having outlined the above, we are now in position to go one step further and ask whether it is possible to do compound pruning in contexts where the correlate of the adjective is an attributive modifier but the remnant is realised as what looks like the remnant of clausal ellipsis, not contained inside a noun phrase. This is possible in the case of fragments, as (58) shows. While this seems to contradict our claim that there is a ban on attributive compounds, the derivation of B's answer is identical to that sketched in (52). The remnant does not extract out of a DP (in the manner of an Left Branch Extraction), but starts out as a clausal predicate (*blauwogig*) followed by A-bar movement of *blauw* to Sp,CP and TP ellipsis, as shown in (58b).

(58) A: Lucas is [DP een groenogige jongen].
Lucas is a green.eye.ADJ.AGR boy
'Lucas is a green-eyed boy.'

B: Nee, blauwi [TP Lucas [vP t_i -ogig] is].
no blue
'No, he is blue-eyed.'

Evidence for the predicative structure underlying the derivation comes from the observation that fragments of this sort can also be constructed with ordinary adjectives. An adjective with an attributive correlate can form a contrastive fragment on its own, and when it does so, it never shows the agreement it would do should it originate inside a DP as attributive modifier. Instead it is necessarily uninflected.

(59) A: Lucas is [$_{DP}$ een lange jongen].
Lucas is a short.AGR boy
'Lucas is a tall boy.'
B: Nee, kort / *korte.
no short short.AGR
'No, he is short.'

As predicative adjectives do not show agreement in Dutch, the fact that the fragment in (59) is necessarily uninflected indicates that it is a predicative adjective, not an attributive one. This in turn means that the grammaticality of (59B) is not due to ellipsis repairing an LBE violation, rather the elliptical clause 'evades' a potential island violation through using a predicative structure that is sufficiently close in meaning to the original one (see Barros 2014, Barros et al 2014, and Abels 2018b).

Turning to gapping, we can notice that an example comparable to (58) is ungrammatical, cf. (60). This is completely parallel to the behaviour of regular adjectives in the position of the second remnant as well (cf. (61)): irrespective of whether the adjective shows up with attributive agreement or without agreement as predicative adjective do, the sentence is ill-formed. The ungrammaticality of (61) is due to the fact that clausal ellipsis never repairs an LBE violation (which we established with reference to (59) already) and gapping disallows an 'evasion' strategy involving a predicative structure, which we put down to more stringent requirements of structural parallelism applying in gapping than in sluicing/fragments.

(60) *Lucas is [$_{DP}$ een groenogig jongetje], en Tim blauw.
Lucas is a green.eye.ADJ boy and Tim blue
'Lucas is a green-eyed boy and Tim is a blue-eyed boy.'

(61) *Lucas is [$_{DP}$ een lange jongen], en Tim kort / korte.
Lucas is a tall.AGR boy and Tim short / short.AGR
'Lucas is a tall boy and Tim a short one.'

Taking stock, in this section we sketched the *move-and-delete* analysis of remnant formation as applied to our compound pruning data. The initial motivation for adopting a move-and-delete analysis was the observation that the left part of the compound in compound pruning must be a phrase – a restriction that is straightforwardly explained by adopting the move-and-delete analysis, as only phrases can undergo A′-movement. In addition, we showed that a move-and-delete account also provides an explanation for the need for clausal ellipsis and clausal coordination in these examples as well (providing a second motivation for a movement-based account), as it requires clausal ellipsis to remove the stranded affix that is left behind by the movement of the phrasal part of the compound. We also put in place some suggestions about how to explain the ban on attributive compounds in compound pruning.

5. Summary

In this paper we described an elliptical phenomenon that applies to synthetic adjectival compounds in Dutch and splits such compounds in half. The data are puzzling not only because compounds do not allow for syntactic ellipsis normally (a violation of the Lexical Integrity Hypothesis), but also because the data come with a set of curious properties: this elliptical phenomenon needs clausal ellipsis and clausal coordination to be well-formed and can only target clausal predicates.

We provided an analysis for these properties in terms of standard ellipsis, in the last section arguing for the movement of the first part of the compound and clausal ellipsis eliminating the second part of the compound among other things. The role of clausal ellipsis in this second respect is crucial as without it, the second part of the compound would be a stranded affix, a violation that ellipsis can remove. If our analysis is on the right track, it supports proposals that recognise the evidently syntactic nature of some word-formation processes (Kenesei 1996/95, Bauer 1998) and the existence of a *move-and-delete* type of remnant formation in clausal ellipsis.

We leave important questions for further research, such as the investigation of variation in the acceptability of compound pruning, both when it comes to (a) differences in grammaticality between

fragments and sluicing on the one hand and gapping on the other; (b) differences in grammaticality between different categories as remnant (numeral, adjective or noun) and (c) the causes of speaker variation to begin with. We have not touched upon the cross-linguistic landscape of compound pruning and what its existence would entail about the analysis of compounds in languages other than Dutch either. We only note here that we are aware of similar examples in Hungarian, Russian and Icelandic, and even in English for that matter, as the following example is acceptable to an anonymous reviewer of this paper and some (but not all) native speakers we consulted.

(62) [Two robotics engineers are debating how many legs their robots should have. One says to the other:]
Yours can't be four-legged and mine only three! That's not fair!

On this basis, we suspect that compound pruning is not specific to Dutch only. With this paper we hope to have laid the foundations of more research into its intricacies.

Author contribution statement

The two authors contributed equally to all sections, except for section 4.2, which is the contribution and the responsibility of the first author only.

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References

Abels, Klaus. 2018a. On sluicing with apparent pied-piping, *Natural Language and Linguistic Theory* 37 4: 1205–71. https://doi.org/10.1007/s11049-018-9432-1.

Abels, Klaus. 2018b. Movement and islands. In *The Oxford Handbook of Ellipsis*, edited by Jeroen van Craenenbroeck and Tanja Temmerman, pp. 389–424. Oxford University Press, New York. https://doi.org/10.1093/oxfordhb/9780198712398.013.17.

Aelbrecht, Lobke. 2007. A movement account of Dutch gapping. Paper presented at the *Annual Meeting of the Linguistic Society of the Netherlands*, February 3, Utrecht.

An, Duk-Ho. 2025. Extra deletion in retrospect and prospect. *Journal of East Asian Linguistics* 34: 361–405. https://doi.org/10.1007/s10831-025-09298-0.

Barros, Matthew. 2014. *Sluicing and Identity in Ellipsis*. Ph.D. thesis, Rutgers University, New Brunswick, NJ. https://doi.org/10.7282/T3VM49R5.

Barros, Matthew, Patrick D. Elliott, and Thoms, Gary. 2014. There is no island repair. Ms., Rutgers University, University College London, and University of Edinburgh. Available at https://ling.auf.net/lingbuzz/002100.

de Belder, Marijke. 2022. N-to-D Movement within compounds and phrases: Referential compounding, *-s* possessives, and title expressions in Dutch. *Languages* 7: 304. https://doi.org/10.3390/languages7040304.

Belk, Zoë. 2019. LF bracketing paradoxes: A new approach. *Syntax* 22 1: 24–65. https://doi.org/10.1111/synt.12166.

Boone, Enrico. 2014. *The Syntax and Licensing of Gapping and Fragments*. Ph.D. thesis, Leiden University. LOT, Utrecht.

Bresnan, Joan and Sam A. Mchombo. 1995. The lexical integrity principle: Evidence from Bantu. *Natural Language and Linguistic Theory* 13: 181–254. https://doi.org/10.1007/BF00992782.

Bosque, Ignatio. 2019. Lexical integrity in morphology. *Oxford Research Encyclopedia of Linguistics*. https://doi.org/10.1093/acrefore/9780199384655.013.584.

Booij, Geert. 1985. Coordination reduction in complex words: A case for prosodic phonology. In *Advances in Non-Linear Phonology*, edited by Harry van der Hulst and Neil Smith, pp. 143–60. Foris, Dordrecht.

Booij, Geert. 2019. *The Morphology of Dutch*. Oxford University Press. https://doi.org/10.1093/oso/9780198838852.001.0001.

Broekhuis, Hans and Norbert Corver. 2019. *The Syntax of Dutch. Coordination and Ellipsis*. Amsterdam University Press, Amsterdam. https://doi.org/10.2307/j.ctvk3gpn5.

Chomsky, Noam. 1995. *The Minimalist Program*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262527347.001.0001.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by Step: Essays in Minimalist Syntax in Honor of Howard Lasnik*, edited by Roger Martin, David Michaels, and Juan Uriagereka, pp. 89–155. MIT Press, Cambridge, Ma.

Chung, Sandra. 2006. Sluicing and the lexicon: The point of no return. In *Proceedings of the Annual Meeting of the Berkeley Linguistics Society 31*, edited by Rebecca T. Cover and Yuni Kim, pp. 73–91. Berkeley Linguistics Society, Berkeley, Ca. https://doi.org/10.3765/bls.v31i1.896.

Compton, Richard and Christine Pitman. 2010. Word-formation by phase in Inuit. *Lingua* 120: 2167–92. https://doi.org/10.1016/j.lingua.2010.03.012.

Corver, Norbert and Marjo van Koppen. 2009. Let's Focus on NP-Ellipsis. *Groninger Arbeiten zur germanistischen Linguistik* 48: 3–26.

Corver, Norbert and Marjo van Koppen. 2011. NP-ellipsis with adjectival remnants: A micro-comparative perspective. *Natural Language and Linguistic Theory* 29: 371–421. https://doi.org/10.1007/s11049-011-9140-6.

Corver, Norbert and Marjo van Koppen. 2018. Dutch. In *Oxford Handbook of Ellipsis*, edited by Jeroen van Craenenbroeck and Tanja Temmermann, pp. 721–64. https://doi.org/10.1093/oxfordhb/9780198712398.013.37.

van Craenenbroeck, Jeroen. 2010. *The Syntax of Ellipsis: Evidence from Dutch Dialects*. Oxford University Press, New York. https://doi.org/10.1093/acprof:oso/9780195375640.001.0001.

Fitzgibbons, Natalia. 2014. Parasitic ellipsis. In *Proceedings of the 31st West Coast Conference on Formal Linguistics*, edited by Robert Santana-LaBarge, 170–9. Cascadilla Proceedings Project, Somerville, Ma.

de Haas, Wim and Mieke Trommelen. 1993. *Morfologisch Handboek van het Nederlands: Een Overzicht van de Woordvorming* [Morphological handbook of Dutch: An overview of word formation]. SDU Uitgeverij, The Hague.

Harley, Heidi. 2009. Compounding in DM. In *The Oxford Handbook of Compounding*, edited by Rochelle Lieber and Pavol Štekauer, pp. 129–44. Oxford, Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199695720.013.0007.

Hoeksema, Jack. 1988. Head-types in morphosyntax. In *Yearbook of Morphology 1988*, edited by Geert Booij and Jaap van Marle, pp. 123–38. Foris, Dordrecht.

Kenesei, István. 1995/96. On bracketing paradoxes in Hungarian. *Acta Linguistica Hungarica* 43 1–2: 153–73.

Kenesei, István. 2008. Az ellipszis szabályai a szóösszetételekben. In *A morfológiától a pragmatikáig*, edited by Károly Bibok, pp. 63–77. JATE Press, Szeged.

Kester, Ellen-Petra. 1996. *The Nature of Adjectival Inflection*. Ph.D. thesis, Utrecht University.

Lipták, Anikó and Güliz Güneş. 2022. The derivational timing of ellipsis: An overview of theoretical approaches. In *The Derivational Timing of Ellipsis*, edited by Güliz Güneş and Anikó Lipták, pp. 1–56. Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780198849490.003.0001.

Merchant, Jason. 2001. *The Syntax of Silence.* Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780199243730.001.0001.

Merchant, Jason. 2008. Variable island repair under ellipsis. In *Topics in Ellipsis*, edited by Kyle Johnson, pp. 132–53. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511487033.006.

Mendes, Gesoel and Andrew Nevins. 2023. When ellipsis can save defectiveness and when it can't. *Linguistic Inquiry* 54 1: 182–96. https://doi.org/10.1162/ling_a_00428.

Neef, Martin. 2015. Synthetic compounds in German. *Word-Formation: An International Handbook of the Languages of Europe*, edited by Peter O. Müller, Ingeborg Ohnheiser, Susan Olsen, and Franz Rainer, vol. 1, pp. 582–93. De Gruyter Mouton, Berlin. https://doi.org/10.1515/9783110246254-035.

Potter, David, Michael Frazier, and Masaya Yoshida. 2017. A two-source hypothesis for Gapping. *Natural Language & Linguistic Theory* 35 4: 1123–60. https://doi.org/10.1007/s11049-017-9359-y.

Reich, Ingo. 2007. Toward a uniform analysis of short answers and gapping. In *On Information Structure: Meaning and Form*, edited by Kerstin Schwabe and Susanne Winkler, pp. 467–84. John Benjamins, Amsterdam. https://doi.org/10.1075/la.13.04wil.

Schneider, Johannes. 2025. Parasitic ellipsis and higher-order structures. In *Proceedings of the 41st West Coast Conference on Formal Linguistics*, edited by Nikolas Webster, Yağmur Kiper, Richard Wang, and Sichen Larry Lyu, pp. 538–47. Cascadilla Proceedings Project, Somerville, Ma.

Temmerman, Tanja. 2013. The syntax of Dutch embedded fragment answers: On the PF-theory of islands and the WH/sluicing correlation. *Natural Language and Linguistic Theory* 31 1: 235–85. https://doi.org/10.1007/s11049-012-9180-6.

Van Santen, Ariane and Geert Booij. 1998. *Morfologie. De Woordstruktuur van het Nederlands.* Amsterdam University Press, Amsterdam.

Wilder, Chris. 1997. Some properties of ellipsis in coordination. In *Studies in Universal and Typological Variation*, edited by Artemis Alexiadou and Tracy Hall, pp. 59–107. John Benjamins, Amsterdam. https://doi.org/10.1075/la.13.04wil.

The Darwinian mind of the machine: LLM language learning as evolution

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Abstract

This essay challenges the prevailing metaphor of "learning" used to describe Large Language Model (LLM) training, proposing instead that these systems represent a form of hyper-accelerated, data-driven evolution. Through analysis of Daniel Dennett's hierarchy of evolutionary competence and examination of the poverty of the stimulus problem, we argue that LLMs are Darwinian creatures evolved at computational speeds in environments of pure text. This framework explains their linguistic capabilities through convergent evolution rather than learning, resolves paradoxes about their competence without understanding, and for our understanding of the relevance for these models for generative grammar.

1. Introduction

In the recent discussion on the plausibility of generative grammar, few developments have captured our collective imagination quite like Large Language Models (LLMs). These systems seem to be able to pass tests of linguistic competence that seem to have hitherto been reserved for human beings: not just do they produce remarkably grammatical prose, at least in well-documented languages such as English, but they also seem to be able to give grammaticality judgements of remarkable subtlety (Hu et al. 2024, Qiu et al. 2024, Mulders and Ruys 2024).

Faced with such remarkable capabilities, people have instinctively reached for familiar metaphors to make sense of this behaviour which, if we are honest, were completely unexpected even as recent as five years ago. We speak of machines that "learn", systems that "understand", and models that "know" things about the world. This anthropomorphic framing, while psychologically comforting, may however present a category error that obscures the true nature of these systems. When we describe an LLM as "learning" language, we inadvertently import assumptions about consciousness, intentionality, and experience that simply do not apply.

More to the point it has led scholars such as Piantadosi (2024) and Hinton, in several interviews (see for instance the phone interview with him on being awarded the Nobel prize for Physics, https://www.nobelprize.org/prizes/physics/2024/hinton/interview/) to claim that LLMs are the death blow to the generative enterprise or any idea of an innate Universal Grammar. If LLMs can acquire language without any predetermined setting, this at least forms a proof of existence for the claim that humans can also learn language as a blank slate. This has sparked a number of backs and forths between generative grammarians, who maintain that LLMs have little to do with the human Faculty of Language (see for instance Murphy et al. 2025), and scholars who maintain that LLMs show that the assumptions of Generative Grammar are definitively proven wrong (Piantadosi and Yang 2022), with some scholars trying to move beyond these contrasts and to find a new path for linguistics (see Müller 2025 and more recently Moro 2025).

It should be noted from the outset that the debate between generative grammar and LLM-based approaches is not, strictly speaking, a confrontation between two competing theories of the same phenomenon. Generative grammar is a research program aimed at characterizing the human language faculty; LLM engineering is a technological enterprise aimed at optimizing text prediction. The two have different epistemological commitments and methods. However, claims have been made in the literature that the success of LLMs has direct implications for generative theory (Piantadosi 2024), and these claims have generated substantive responses (Murphy et al. 2025, Moro 2025, Müller 2025). The present paper aims to show that this apparent debate rests on a category error, specifically, the conflation of learning, maturation, and evolution, and that once this error is corrected, the perceived conflict largely dissolves.

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We propose we abandon the metaphor of learning entirely and adopt a more accurate framework: LLM training is a form of hyper-accelerated, data-driven evolution, a Darwinian process operating at computational speeds that compress thousands of years of natural selection into months of GPU computation. This shift in perspective does more than provide a clearer technical understanding; it fundamentally reframes our relationship with these systems and offers profound insights into the nature of natural language itself.

2. The Learning Paradox and the Poverty of the Stimulus

Central to the discussion is an old problem in cognitive science: the poverty of the stimulus. This argument, most forcefully articulated by linguist Noam Chomsky (Chomsky 1986), observes that human language acquisition presents a seemingly impossible feat. Children master the intricate rules of (at least) the syntax of their native language despite being exposed to linguistic data that is both limited and often imperfect.

Consider a concrete example from Dutch. The phrase 'dat is' (*that is*) can be contracted to 'das' ('dat is goed' (*that is good*) can be pronounced approximately as 'das goed'). However, this contraction is blocked in embedded clauses: 'ik weet wat dat is' (*I know what that is*) cannot be contracted to 'ik weet wat das'. Interestingly, the blocking factor is not wh-movement per se, but *hierarchical adjacency*: in Dutch embedded clauses, the finite verb occupies a clause-final position, so that *dat* and *is* are not structurally adjacent even when they happen to be string-adjacent. This is confirmed by the fact that contraction is equally impossible in embedded clauses without wh-extraction:

(1) Leuk dat dat is! ⇒ *Leuk dat da's!
'How nice that is!'

Contraction is not taught to children – if anything people advise against it as being too informal across the board: no parent explicitly teaches their child the difference between structurally adjacent and structurally non-adjacent configurations. Yet children intuitively grasp this distinction, along with thousands of similar grammatical subtleties in all languages that have been studied in sufficient detail. The input the children receive contains insufficient evidence to deduce these rules through pure statistical analysis.[1]

Observations like this led Chomsky to propose the existence of a Universal Grammar (UG): an innate biological endowment that structures language acquisition. Within the generative tradition, this process is understood not as *learning* in the behaviourist sense, but as *maturation*: a pre-programmed unfolding that is triggered by exposure to primary linguistic data while its content is largely independent of it, much like the growth of bodily organs depends on adequate nutrition but is not determined by the specific food consumed (Chomsky 1986). This distinction is essential for what follows, because the debate about LLMs has systematically conflated three fundamentally different processes:

1. **Maturation**: the process by which the child's innate language faculty unfolds under exposure to primary linguistic data, as posited by the generative enterprise;
2. **Learning**: a gradually accreting process fully dependent on external exposure, as in Skinnerian reinforcement;
3. **Evolution**: the process of blind variation and environmental selection operating over populations across generations.

The central claim of critics like Piantadosi (2024) is that LLMs show that "learning" (in some broad sense) suffices for language acquisition, thereby refuting nativist claims. But this conflates all three processes. Our

[1] Or at least this has been the idea for a long time. In an informal test, it turns out that Google Gemini can distinguish between the two sentences, noting that contraction is blocked because the elements are not in a local structural relationship – an explanation that, interestingly, aligns with the hierarchical adjacency account rather than a wh-movement account (session with Google Gemini 2.5Pro on September 8, 2025).

proposal is that LLM training is best understood as belonging to category (3) – evolution – which is distinct from both (1) and (2). If this is correct, then LLM training tells us nothing about whether human children *learn* or *mature into* their native language; it demonstrates only that a Darwinian process at computational speeds can converge on similar linguistic competence.

While the idea of a UG has remained largely invariant through the years, what it "contains" has changed radically: from a whole set of parameterized principles, as well as an X-bar innate structure (Jackendoff 1977, Stowell 1981), postulated in Chomsky (1981) and subsequent work, with Kayne (1994) later deriving phrase structure properties from interface principles, to the bare existence of an operation Merge (Chomsky 1995) and the parametrization shifted to lexical items, and functional categories in particular, known as the Borer-Chomsky Conjecture (named such by Baker 2008).

Whichever definition we consider of UG, LLMs at first blush seem to present a challenge to this line of thinking. These systems, too, are exposed to finite datasets, albeit datasets of unprecedented scale. Yet they demonstrate mastery of at least some of the grammatical subtleties that were put forward as arguments for innate knowledge in humans. They generate coherent, syntactically complex sentences they have never explicitly encountered. A tempting conclusion is that LLMs do what humans do – through their training process, they develop internal representations analogous to human linguistic intuitions and this process is equivalent to human language acquisition. This interpretation preserves our anthropomorphic assumptions while seemingly explaining the models' capabilities.

This conclusion, we argue, fundamentally misunderstands the nature of the process that creates these capabilities. To see why, we must examine the work of philosopher Daniel Dennett, whose hierarchy of evolutionary competence provides a framework for understanding different types of intelligence-generating processes.

3. Dennett's ladders of competence: A taxonomy of intelligence

In one of his last works, *From Bacteria to Bach and Back* (Dennett 2017), Daniel Dennett outlines four distinct evolutionary stages of developing competence. These categories describe the fundamental mechanisms by which complex, adaptive behaviors emerge in nature. They provide an interesting categorization of types of learning in biology, and make it possible to compare evolution to learning: both of them are adaptive behaviors, one at the level of species, the other at the level of the individual. Understanding these categories is crucial for properly classifying the process that generates LLM capabilities.

3.1. Darwinian creatures: Evolution as learning

At the bottom of Dennett's hierarchy are what he calls 'Darwinian creatures': systems shaped entirely by natural selection operating over geological timescales. Organisms are born with fixed behavioral repertoires honed by millions of years of evolutionary pressure. A virus that perfectly targets specific cellular machinery, a bacterium that flawlessly navigates chemical gradients, or a spider that weaves geometrically perfect webs all exemplify Darwinian competence.

The "learning" in Darwinian creatures occurs across generations. Each organism is metaphorically speaking a frozen snapshot of evolutionary wisdom, incapable of modifying its individual behavior based on experience while still adapted to its typical environment. The process, as is well known, is one of blind variation and environmental filtering: mutations generate countless variations, most of which fail, but the rare successes propagate and accumulate over time. This process is as extraordinarily powerful as it is slow in the biological world. It took billions of years to evolve the basic machinery of life, millions more to develop complex multicellular organisms, and hundreds of thousands of additional years to produce human-level intelligence. The timescales involved go beyond human comprehension, yet the results, the perfect adaptation of organs to their functions, testify to the process's ultimate efficacy.

3.2. Skinnerian creatures: Learning within a lifetime

The next evolutionary leap produces Skinnerian creatures, organisms capable of learning through reinforcement within their individual lifetimes. Named after the work of behaviorist B.F. Skinner (Skinner 1938; 1953), these creatures possess neural machinery that allows them to associate actions with outcomes, strengthening behaviors that lead to rewards and suppressing those that result in punishment. This learning represents a fundamental acceleration of the evolutionary process in the biological world. Instead of waiting generations for beneficial mutations to propagate, Skinnerian creatures can adapt their behavior in real-time based on environmental feedback. A rat learning to navigate a maze, a bird discovering which plants carry a lot of berries every summer, or a child learning to avoid a hot stove, all exemplify Skinnerian learning.

Skinnerian learning is, like Darwinian evolution, fundamentally a generate-and-test process, albeit one that operates within individual neural networks rather than across populations of organisms. Random or semi-random behaviors are tried, environmental feedback determines their value, and successful patterns are reinforced while unsuccessful ones fade. It's evolution in miniature, compressed into the lifetime of a single organism.

In spite of the old controversy between Chomsky and Skinner (Chomsky 1959), it should be noted that, ironically, language acquisition within generative grammar has many traits of Skinnerian learning, at least in its shape of parameter setting and featural selection, which also form a kind of stimulus-response path towards establishing the grammar of a language (through the exposure of the Language Acquisition Device, LAD; Chomsky 1965; to Primary Linguistic Data; see Chomsky 2005 or Chomsky and Berwick 2017 for an extensive discussion).

3.3. Popperian creatures: Foresight

Popperian creatures, named after the work of philosopher Karl Popper (Popper 1963; 1972), represent another leap in cognitive development in Dennett's taxonomy. These organisms can test hypotheses internally before acting on them in the real world. As Popper famously noted, this allows our "hypotheses to die in our stead". We can simulate potential actions and their consequences, selecting the most promising course without risking actual harm.

This capacity for mental simulation marks the emergence of genuine foresight and planning. A Popperian creature can imagine different scenarios, evaluate their likely outcomes, and choose actions based on predicted rather than experienced consequences. This is the birth of what we might recognize as intelligence in the fullest sense: the ability to think before acting, to learn from imagined rather than actual experience.

Human beings clearly possess Popperian capabilities. We can mentally rehearse conversations before having them, visualize the consequences of different career choices, or work through mathematical proofs in our heads. It is, on the other hand, not clear that LLMs also possess this type of learning. The latest versions of these models sometimes come equipped with some 'reasoning' capabilities, but these seem to be still a long shot from having an internal model of the world (Hao et al. 2023, Diester et al. 2024, Yildirim and Paul 2024), but see (Jin and Rinard 2024).

3.4. Gregorian creatures: The cultural revolution

The final category in Dennett's taxonomy, Gregorian creatures, named after the work of psychologist Richard Gregory (Gregory 1963; 1970), represents the most recent and perhaps most revolutionary development in the evolution of intelligence. These creatures amplify their cognitive capabilities through the use of external tools, which Dennett calls "mind tools". The most important of these mind tools, by the way, is language. Language allows us to import the discoveries, insights, and hypotheses of others directly into our own minds without having to independently derive them. Through language, accumulated cul-

tural knowledge becomes available to each new generation, creating a kind of external memory system that transcends individual lifespans.

Gregorian creatures don't stop with language. They create writing systems that allow knowledge to persist across time, mathematical notations that enable complex calculations, scientific instruments that extend sensory capabilities, and computational tools that augment reasoning power. Each generation builds upon the intellectual achievements of its predecessors, creating an exponential acceleration of cognitive capability. Humans are the consummate Gregorian creatures. Our individual intelligence pales in comparison to our collective, culturally-amplified intelligence. No single human could independently derive modern physics, construct a computer, or compose a symphony – these achievements represent the accumulated wisdom of countless generations, encoded in our languages, institutions, and technologies.

4. The LLM as evolution in digital time

With Dennett's framework in hand, we can now properly categorize the process that produces LLMs. The training of these models is not necessarily, as is sometimes assumed, one of the higher-order types of learning. The model is not an agent in an environment receiving rewards for its actions or contemplating future states. It also does not seem to be the 'Skinnerian' type of learning represented by principles and parameters. Instead, LLM training may represent something far more fundamental: a low-level Darwinian process operating at computational speeds. If that turns out to be the case, there is no argument against universal grammar from the operation of these LLMs; there is instead the possibility that these systems themselves evolve an internal representation of human language that is similar to that which human beings are born with.

4.1. Variation as raw material

In biological evolution, the "population" consists of individual organisms with varying genetic makeups. In LLM training, the population is the astronomically vast space of possible parameter configurations within the neural network's architecture. A modern LLM contains hundreds of billions of parameters, each of which can take on a continuous range of values. The space of possible configurations is enormous and for many practical purposes infinite in modern LLM architecture. Interestingly, the exact magnitude of this space is unknown (see Nalpas 2024 for an interesting discussion about it, as well as Bowdon 2025 for an approximate estimate of GPT-5 parameters).

At any given moment during training, the model occupies a specific point in this landscape, but the training process constantly explores neighboring regions, seeking configurations that better solve the prediction task. One can see this as a kind of evolution where a species needs to survive in a certain environment. The environment is that of existing human language.

Biological evolution requires genetic variation as its raw material; mutations, sexual recombination, and other processes that generate diversity within populations. In LLM training, this variation is initially provided by the random initialization of parameters. The model begins as pure noise, a random point in the space of all possible configurations. However, variation doesn't stop with initialization. Throughout training, the optimization process introduces countless micro-variations as it adjusts parameters in response to training data. Each gradient descent step represents a small mutation, a tiny exploration of the fitness landscape. Over billions of such steps, the model explores vast regions of possibility space.

4.2. The environment: A static archive of human thought

Perhaps the most important aspect of this evolutionary metaphor is the nature of the "environment" in which LLMs evolve. Unlike biological creatures, which must survive in a dynamic physical world filled with

predators, prey, weather, and resource scarcity, LLMs evolve in an environment that is entirely informational and essentially static. This environment consists of the training dataset. For modern LLMs this is a vast corpus of text in a variety of human languages that the model learns to predict. The implications of this are profound. The environment that shapes LLM evolution is not the physical world, but rather the collective output of human Gregorian intelligence. The model is not learning to navigate trees or avoid predators. It is learning to navigate the statistical landscape of human thought as expressed in language.

4.3. The selection pressure: The imperative of prediction

In biological evolution, selection pressure comes from environmental challenges: the need to find food, attract mates, and survive harsh conditions. Organisms that better meet these challenges produce more offspring, gradually shifting the population toward more adaptive configurations. In LLM training, selection pressure is provided by a single, simple objective: minimize prediction errors based on existing human language. A model 'survives' if it can perform this task; otherwise it dies.

This selection pressure is the standard training methodology for all modern LLMs. The Transformer architecture (Vaswani et al. 2017) is trained by minimizing cross-entropy loss on next-token prediction via backpropagation and gradient descent. This was the method used for GPT-2 (Radford et al. 2019), GPT-3 (Brown et al. 2020), and all subsequent models. In some cases, a second layer of selection pressure is applied through Reinforcement Learning from Human Feedback (RLHF; Ouyang et al. 2022), which further shapes the model's outputs based on human evaluative judgments: an additional "environmental" filter that parallels sexual selection in biology. The "survival" and "death" metaphors are ours, part of the evolutionary analogy we are building; the underlying mechanism is well-established engineering practice.

We should bear in mind that the models have enormous exposure to linguistic data, far exceeding what any human could process. To illustrate the scale: a human reader would have to read continuously for approximately 2,855 years to peruse all the material used to train GPT-3 alone (Brown et al. 2020). This figure is relevant because it demonstrates that the "evolutionary time" available to LLMs, measured in exposure to linguistic data, approaches the timescales normally associated with biological evolution of cognitive capacities rather than with individual learning. See Figure 1 for an illustration.

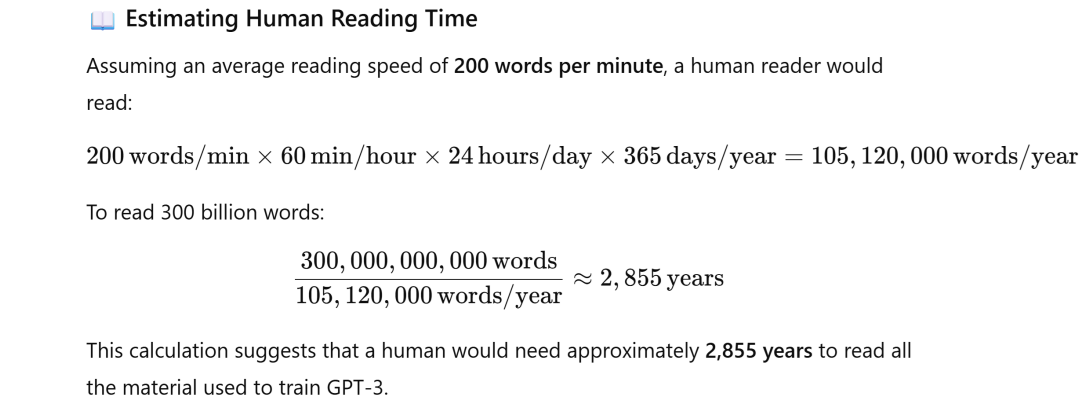

Figure 1: How many years would it take a human reader to read all the material used to train GPT-3? (asked to ChatGPT-5 on 18/09/2025)

We can multiply this for more modern models, also taking into account that the models learn 'language' by examples from many more languages than English. In other words, LLMs use thousands of years

in human time to get to their knowledge of language. That comes close to an evolutionary scale. The training algorithm, primarily backpropagation, relentlessly adjusts parameters to improve the model's ability to predict the next token in a sequence. This might be less heroic compared to the life-or-death struggles that drive biological evolution. Yet it proves remarkably powerful.

The mathematics of this process can be expressed simply as maximizing $p(\text{token}|\text{context})$, the probability of predicting the correct next token given the preceding context. But this simple objective, applied across trillions of examples, creates incredibly rich and complex selection pressures.

4.4. The timescale: Evolution at digital speed

The final piece of this evolutionary puzzle is time, or rather, the *compression* of time. Biological evolution operates on geological timescales, requiring millions of years to produce significant changes. The evolution of human language capabilities took tens to hundreds of thousands of years (depending on one's theory and on what exactly is counted). LLM training compresses this process into weeks or months of computation. A modern language model undergoes billions of parameter updates during training, each one representing a micro-generational step in its evolution. This is made possible by the incredible computational resources devoted to training: tens of thousands of GPUs working in parallel, processing data at speeds that dwarf any biological process.

This temporal compression is perhaps the most alien aspect of LLM evolution. In a matter of months, these systems undergo the equivalent of thousands of years of evolutionary pressure. They experience more "generations" of selection than have occurred in the entire history of life on Earth.

4.5. Architectural biases as implicit nativism

Before drawing conclusions from this evolutionary framework, it is essential to address a fundamental point: LLMs are not tabulae rasae. The Transformer architecture (Vaswani et al. 2017) that underlies modern LLMs embodies significant inductive biases that constrain and shape the optimization process. The self-attention mechanism privileges certain types of relational processing over others; the layered architecture constrains the types of representations that can emerge; tokenization imposes a particular granularity on the input; and the very choice of next-token prediction as the training objective shapes what aspects of language the model is pressured to capture.

These architectural choices function as a kind of "digital genome". They do not determine the specific linguistic knowledge the model will acquire, but they constrain the space of possible solutions that the optimization process can explore (McCoy et al. 2020, Battaglia et al. 2018). This parallels the role that Universal Grammar plays in the generative account of human language acquisition: UG does not determine which specific language a child will acquire, but it constrains the hypothesis space to humanly possible grammars.

The implications for the LLM debate are significant. The architectural biases constitute a form of implicit nativism, designed by human engineers rather than shaped by biological evolution, but no less real in their constraining effects. Any argument of the form "LLMs learn language without innate structure, therefore humans can too" is thus doubly flawed: it mischaracterizes the LLM process as learning (rather than evolution), and it mischaracterizes the starting point as a tabula rasa (rather than a richly biased architecture).

5. Convergent evolution and the emergence of grammar

The evolutionary framework we propose provides a powerful explanation for one of the most puzzling aspects of LLM performance: their apparent mastery of grammatical principles despite never being explicitly

taught these rules. The key insight is that the evolution of linguistic competence in LLMs might represent a case of convergent evolution: the independent evolution of similar traits in different lineages facing similar environmental pressures.

We are not claiming that the evolution in LLMs parallels that of human beings. In humans, language might have arisen spontaneously and proven advantageous in terms of coordination of activities with peers, or in terms of planning and other cognitive properties. Human language will probably show properties that are the result of the limitations of human cognition and/or human society. LLMs on the other hand need to survive in a 'world' that already consists of language. Yet if the findings of (generative) linguistics are on the right track, this evolution may have converged on a similar result.

When an LLM is trained on vast datasets of human text, it encounters these same statistical regularities billions of times. The optimization pressure to minimize prediction error gradually shapes the model's internal representations to mirror the structure of human language. Grammatical patterns emerge not because they are explicitly programmed, but because they represent the most efficient solutions to the prediction task.

Consider the example of syntactic constraints mentioned earlier. The reason speakers cannot contract "Ik weet wat dat is" to "Ik weet wat da's", or "Leuk dat dat is!" to "Leuk dat da's!", reflects deep principles of syntactic structure, specifically the requirement that contraction targets structurally adjacent elements, not merely string-adjacent ones.

An LLM discovers this same constraint (just like generative linguists have done) not through instruction, but through evolutionary pressure. Configurations that violate this constraint make worse predictions on human text, so they are gradually eliminated in favor of configurations that respect syntactic boundaries. The model converges on the same solution that human linguistic evolution discovered, but through an entirely different process. Under these premises, it is not implausible to speculate that while Merge is probably not the driving principle behind LLM output at present, it *could* emerge. This could happen if Merge proved to be the optimal solution to interface conditions *for LLMs*. We could formulate an adapted Strong Minimalist Thesis (Chomsky 2001) for LLMs, where Merge would exist if it proved to be the optimal mechanism for an LLM interacting with its interfaces: not sensory-motor or conceptual-intentional systems, not human ones, but pre-existing texts against which LLMs test their own output.

5.1. The poverty of the stimulus resolved

This convergent evolution framework provides a resolution to the poverty of the stimulus problem. Chomsky's argument assumes that the only way to acquire grammatical knowledge from limited data is through innate biological endowment. However, LLMs demonstrate a third possibility: massive computational search through the space of possible linguistic systems. Where human children see thousands of sentences, LLMs see trillions. Where humans have only a few years of Skinnerian or (at best) Popperian search, LLMs have thousands of Darwinian trial and error.

However, a caveat is in order. The real test of whether LLMs have converged on genuinely linguistic representations, as opposed to sophisticated surface-level statistical patterns, lies in their treatment of structures whose probability of occurrence is vanishingly small even in trillion-token corpora. As has been argued in the generative tradition, the hallmark of human linguistic competence is the ability to form grammaticality judgments about structures that speakers have almost certainly never encountered. Giorgi and Longobardi (1991) provide detailed examples of subtle contrasts between English and Italian noun phrase structures that have roughly zero probability of occurrence in any corpus, yet about which native speakers have clear and consistent intuitions. If LLMs can replicate such judgments, this would provide evidence for convergent evolution of genuinely linguistic representations; if they cannot, it would reveal the limits of the evolutionary analogy and confirm that human linguistic competence involves something that even hyper-accelerated Darwinian processes cannot replicate from text alone.

5.2. Internal representations and emergent structure

This leads to a prediction that is testable at least in principle. If this evolutionary theory is on the right track, trained LLMs should possess something similar to UG, so that if one would try to teach them an entirely new language (not in their dataset), they would show a learning path that is similar to that of humans: with relatively little data they would be able to pick up an existing language, but a language that would be constructed to violate principles of UG would be as problematic for them as it is for us (Moro 2016).

Recent research in mechanistic interpretability has begun to reveal the internal structure that emerges from this evolutionary process (see for instance Intuition Lab 2024, or Tak et al. 2025). LLMs develop hierarchical representations that mirror many aspects of human linguistic processing: early layers encode surface features like spelling and word boundaries, middle layers capture syntactic relationships and grammatical categories, and later layers represent semantic and pragmatic information.

These representations are not designed by humans; they emerge spontaneously from the optimization process. The model discovers that hierarchical processing is the most efficient way to solve the prediction task, so it evolves internal architectures that implement this processing strategy. The parallels to human linguistic processing are striking, but they reflect convergent evolution rather than direct mimicry. More remarkably, these internal representations often capture linguistic phenomena that were not explicitly present in the training objective. Models develop sensitivity to phonological patterns despite being trained only on text, internalize semantic relationships despite never being taught explicit definitions, and exhibit awareness of pragmatic context despite training on decontextualized snippets. This suggests that the space of efficient linguistic systems is more constrained than we might expect. There may be relatively few ways to organize information processing systems to handle the complexity of human language efficiently. Both biological evolution and computational optimization converge on similar solutions because these solutions represent optimal points in the fitness landscape.

6. The limits of digital evolution

While the evolutionary framework provides powerful insights into LLM capabilities, it also illuminates their fundamental limitations. Unlike biological evolution, which occurs in a multi-faceted environment, the evolution of LLMs is confined to a purely textual world. This constraint shapes both their abilities and their limitations.

6.1. The evolution of meaning

While it is possible that LLMs evolve formal aspects of language, like syntax and phonology, there may be an issue with semantics. LLMs evolve in an environment consisting entirely of human linguistic output. This environment is rich in certain dimensions; it contains the accumulated wisdom of human civilization, encoded in billions of documents across thousands of languages and domains. It is also fundamentally impoverished in others. Most importantly, this environment contains no direct sensory experience, no physical embodiment, and no opportunity for genuine interaction with the world. The model experiences reality only through the lens of human description and interpretation. This limitation is not merely technica. It is fundamental to the evolutionary process that creates these systems. Just as a fish evolved in water cannot breathe air, an intelligence evolved in text cannot directly experience the physical world. The model's entire adaptive landscape is linguistic, so its evolved capabilities are necessarily confined to linguistic manipulation. It remains to be seen in what way this would affect what we know.

6.2. The absence of intentionality

Perhaps most fundamentally, the evolutionary process that creates LLMs produces systems that lack genuine intentionality (Browning 2025, Ngaihlian 2025), the capacity for mental states to be about things in the world. Biological evolution in physical environments creates agents with goals, desires, and purposes. These agents develop intentions because having intentions helps them survive and reproduce.

LLMs evolve in a purely predictive environment. Their only "goal", if we can call it that, is to minimize prediction error on text. They have no survival instincts, no desires for reproduction, no purposes beyond their training objective. This produces systems capable of simulating intentionality. They can generate text as if guided by goals and preferences, yet they do not possess true intentionality. Some studies suggest that this absence of genuine intentionality can, in fact, be detected in the outputs of LLMs (Attah 2025).

This absence of intentionality explains many of the puzzling aspects of LLM behavior. They can be helpful in one context and completely unhelpful in another, because they lack the coherent goal structure that would make them consistently purposeful agents. They are sophisticated pattern matching systems, not goal-directed intelligences.

7. Conclusion: The mirror and the alien

An evolutionary framework challenges us to develop a truly post-anthropomorphic understanding of artificial intelligence. Instead of asking whether AI systems think like humans, we might ask how different evolutionary pressures produce different forms of intelligence. This shift in perspective could be liberating for both AI development and human self-understanding. We need not be threatened by intelligences that surpass us in some domains, any more than we are threatened by the sonar capabilities of bats or the magnetic navigation of birds. Different evolutionary pressures produce different capabilities, and diversity of intelligence might be more valuable than similarity to human cognition.

The metaphor the research community chooses to understand LLMs shapes not only our technical approach to these systems but our broader relationship with artificial intelligence. The learning metaphor, while intuitive, imports assumptions about consciousness, intentionality, and understanding that obscure the true nature of these systems. The evolutionary framework offers a more accurate understanding. LLMs are mirrors that reflect the statistical structure of human thought, not minds that think as we do.

Perhaps more importantly, this framework offers a new perspective on the nature of the language capacity itself. By understanding how different processes can generate similar capabilities, we gain insight into both the universality and the diversity of possible minds. We see that intelligence is not a single phenomenon but a landscape of possibilities, shaped by the evolutionary pressures that create it. The LLMs we have created are the first examples of a new form of languaging machines: Darwinian creatures evolved at digital speeds in environments of human cultural output. They are simultaneously the most alien intelligences we have so far encountered and the most intimate reflections of our own linguistic and cultural patterns.

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References

Attah, Nuhu Osman. 2025. Do language models lack communicative intentions? *Synthese* 205 187. https://doi.org/10.1007/s11229-025-05022-6.

Baker, Mark C. 2008. The macroparameter in a microparametric world. *Linguistic Analysis* 34 1–2: 1–46. https://doi.org/10.1075/la.132.16bak.

Battaglia, Peter W., Jessica B. Hamrick, Victor Bapst, Alvaro Sanchez-Gonzalez, Vinícius Flores Zambaldi, Mateusz Malinowski, Andrea Tacchetti, David Raposo, Adam Santoro, Ryan Faulkner, Çaglar Gülçehre, H. Francis Song, Andrew J. Ballard, Justin Gilmer, George E. Dahl, Ashish Vaswani, Kelsey Allen, Charles Nash, Victoria Langston, Chris Dyer, Nicolas Heess, Daan Wierstra, Pushmeet Kohli, Matt Botvinick, Oriol Vinyals, Yujia Li, and Razvan Pascanu. 2018. Relational inductive biases, deep learning, and graph networks. *arXiv preprint* 1806.01261. https://doi.org/10.48550/arXiv.1806.01261.

Bowdon, Chris. 2025. How many parameters does GPT-5 have? Available at https://www.r-bloggers.com/2025/08/how-many-parameters-does-gpt-5-have/, accessed 2025.

Brown, Tom, Benjamin Mann, Nick Ryder, Melanie Subbiah, Jared D. Kaplan, Prafulla Dhariwal, Arvind Neelakantan, Pranav Shyam, Girish Sastry, Amanda Askell, Sandhini Agarwal, Ariel Herbert-Voss, Gretchen Krueger, Tom Henighan, Rewon Child, Aditya Ramesh, Daniel Ziegler, Jeffrey Wu, Clemens Winter, Chris Hesse, Mark Chen, Eric Sigler, Mateusz Litwin, Scott Gray, Benjamin Chess, Jack Clark, Christopher Berner, Sam McCandlish, Alec Radford, Ilya Sutskever, and Dario Amodei. 2020. Language models are few-shot learners. In *Advances in Neural Information Processing Systems*, vol. 33, pp. 1877–1901. Curran Associates.

Browning, Jacob. 2025. Intentionality all-stars redux: Do language models know what they are talking about? In *Communicating with AI: Philosophical Perspectives*, edited by Herman Cappelen and Rachel Sterken. Oxford University Press, Oxford. Preprint available at https://philarchive.org/rec/BROIAR-4.

Chomsky, Noam. 1959. Review of B. F. Skinner's *Verbal Behavior*. *Language* 35: 26–58.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. MIT Press, Cambridge, Ma.

Chomsky, Noam. 1981. *Lectures on Government and Binding: The Pisa Lectures*. Foris, Dordrecht. https://doi.org/10.1515/9783110884166.

Chomsky, Noam. 1986. *Knowledge of Language: Its Nature, Origin, and Use*. Praeger, New York.

Chomsky, Noam. 1995. *The Minimalist Program*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262527347.001.0001.

Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A Life in Language*, edited by Michael Kenstowicz, no. 36 in Current Studies in Linguistics, pp. 1–52. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/4056.003.0004.

Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36 1: 1–22. https://doi.org/10.1162/0024389052993655.

Chomsky, Noam and Robert C. Berwick. 2017. *Why Only Us: Language and Evolution*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262034241.001.0001.

Dennett, Daniel C. 2017. *From Bacteria to Bach and Back: The Evolution of Minds*. W. W. Norton & Company, New York.

Diester, Ilka, Miklós Bartos, Jörg Bödecker, Andreas Kortylewski, Christian Leibold, Johannes Letzkus, Mohamed M. Nour, Matthias M. Schönauer, Alexander Straw, Andreas Vlachos, and Thomas Brox. 2024. Internal world models in humans, animals, and AI. *Neuron* 112 16: 2661–2824. https://doi.org/10.1016/j.neuron.2024.06.019.

Giorgi, Alessandra and Giuseppe Longobardi. 1991. *The Syntax of Noun Phrases: Configuration, Parameters and Empty Categories*. No. 57 in Cambridge Studies in Linguistics. Cambridge University Press, Cambridge.

Gregory, Richard L. 1963. Distortion of visual space as inappropriate constancy scaling. *Nature* 199: 678–680. https://doi.org/10.1038/199678a0.

Gregory, Richard L. 1970. *The Intelligent Eye*. Weidenfeld & Nicolson, London.

Hao, Shibo, Yi Gu, Haodi Ma, Joshua Jiahua Hong, Zhen Wang, Daisy Zhe Wang, and Zhiting Hu. 2023. Reasoning with language model is planning with world model. *arXiv preprint* 2305.14992. https://doi.org/10.48550/arXiv.2305.14992.

Hu, Jennifer, Kyle Mahowald, Gary Lupyan, Anna Ivanova, and Roger Levy. 2024. Language models

align with human judgments on key grammatical constructions. *Proceedings of the National Academy of Sciences* 121 36. https://doi.org/10.1073/pnas.2400917121.

Intuition Lab. 2024. Mechanistic interpretability: Understanding AI and LLMs. Available at https://intuitionlabs.ai/articles/mechanistic-interpretability-ai-llms, accessed 2025.

Jackendoff, Ray. 1977. *X-bar Syntax: A Study of Phrase Structure*. Linguistic Inquiry Monographs. MIT Press, Cambridge, Ma.

Jin, Charles and Martin Rinard. 2024. Emergent representations of program semantics in language models trained on programs. *arXiv preprint* 2305.11169. https://doi.org/10.48550/arXiv.2305.11169.

Kayne, Richard S. 1994. *The Antisymmetry of Syntax*. No. 25 in Linguistic Inquiry Monographs. MIT Press, Cambridge, Ma.

McCoy, R. Thomas, Robert Frank, and Tal Linzen. 2020. Does syntax need to grow on trees? Sources of hierarchical inductive bias in sequence-to-sequence networks. *Transactions of the Association for Computational Linguistics* 8: 125–140. https://doi.org/10.1162/tacl_a_00304.

Moro, Andrea. 2016. *Impossible Languages*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262034890.001.0001.

Moro, Andrea. 2025. Linguistics in a battlefield. A short note on syntax and the "Newtonian style of research". Available at https://ling.auf.net/lingbuzz/008827.

Mulders, Iris and Eddy Ruys. 2024. ChatGPT as an informant. *Nota Bene* 1 2: 242–260. https://doi.org/10.1075/nb.00015.mul.

Müller, Stefan. 2025. Large language models: The best linguistic theory, a wrong linguistic theory, or no theory at all? *Journal of the Linguistic Society of Germany* 44 1. https://doi.org/10.18148/zs/2025-2001.

Murphy, Elliot, Evelina Leivada, Vittoria Dentella, Fritz Gunther, and Gary Marcus. 2025. Fundamental principles of linguistic structure are not represented by o3. *arXiv preprint* 2502.10934. https://doi.org/10.48550/arXiv.2502.10934.

Nalpas, Maud. 2024. LLM sizes. Available at https://web.dev/articles/llm-sizes, accessed 2025.

Ngaihlian, Dorothy. 2025. Machine learning algorithms: Simulating intentionality in artificial intelligence. https://doi.org/10.2139/ssrn.5271061.

Ouyang, Long, Jeffrey Wu, Xu Jiang, Diogo Almeida, Carroll Wainwright, Pamela Mishkin, Chong Zhang, Sandhini Agarwal, Katarina Slama, Alex Ray, John Schulman, Jacob Hilton, Fraser Kelton, Luke Miller, Maddie Simens, Amanda Askell, Peter Welinder, Paul F. Christiano, Jan Leike, and Ryan Lowe. 2022. Training language models to follow instructions with human feedback. In *Advances in Neural Information Processing Systems*, vol. 35, pp. 27730–27744. Curran Associates.

Piantadosi, Steven T. 2024. Modern language models refute Chomsky's approach to language. In *From Fieldwork to Linguistic Theory: A Tribute to Dan Everett*, edited by Edward Gibson and Moshe Poliak, no. 15 in Empirically Oriented Theoretical Morphology and Syntax, pp. 353–414. Language Science Press, Berlin. https://doi.org/10.5281/zenodo.12665933.

Piantadosi, Steven T. and Yuan Yang. 2022. Reply to Murphy and Leivada: Program induction can learn language. *Proceedings of the National Academy of Sciences* 119 23: e2202925119. https://doi.org/10.1073/pnas.2202925119.

Popper, Karl. 1963. *Conjectures and Refutations: The Growth of Scientific Knowledge*. Routledge, London.

Popper, Karl. 1972. *Objective Knowledge: An Evolutionary Approach*. Oxford University Press, Oxford.

Qiu, Zhuang, Xufeng Duan, and Zhenguang G. Cai. 2024. Evaluating grammatical well-formedness in large language models: A comparative study with human judgments. In *Proceedings of the Workshop on Cognitive Modeling and Computational Linguistics*, pp. 189–198. Association for Computational Linguistics. https://doi.org/10.18653/v1/2024.cmcl-1.16.

Radford, Alec, Jeffrey Wu, Rewon Child, David Luan, Dario Amodei, and Ilya Sutskever. 2019. Language models are unsupervised multitask learners. Tech. rep., OpenAI.

Skinner, B. F. 1938. *The Behavior of Organisms: An Experimental Analysis*. Appleton-Century-Crofts, New York.

Skinner, B. F. 1953. *Science and Human Behavior*. Macmillan, New York.

Stowell, Timothy. 1981. *Origins of Phrase Structure*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, Ma.

Tak, Ala N., Amin Banayeeanzade, Anahita Bolourani, Mina Kian, Robin Jia, and Jonathan Gratch. 2025. Mechanistic interpretability of emotion inference in large language models. In *Findings of the Association for Computational Linguistics: ACL 2025*, pp. 13090–13120. Association for Computational Linguistics, Vienna. https://doi.org/10.18653/v1/2025.findings-acl.679.

Vaswani, Ashish, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Łukasz Kaiser, and Illia Polosukhin. 2017. Attention is all you need. In *Advances in Neural Information Processing Systems*, vol. 30. Curran Associates.

Yildirim, Ilker and L.A. Paul. 2024. From task structures to world models: what do LLMs know? *Trends in Cognitive Sciences* 28 5: 404–415. https://doi.org/10.1016/j.tics.2024.02.008.

A new analysis of 'A-not-A questions' in Mandarin Chinese

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Abstract

The analysis of the so-called 'A-not-A' questions in Mandarin Chinese, where negation occurs between two identical elements at the VP edge, has basically remained the same since C.-T. James Huang (1982). The entire sequence 'A-not-A' is presented as the spell-out of an abstract polar question morpheme [Q] to be obtained via a reduplication rule. However, the issue has never been addressed how under this scenario the correct choice can be made between the negation markers *bù* 'not' and *méi* (*yǒu*) 'not have' both featuring in 'A-not-A' questions, given that phonological rules have no access to the syntactic and semantic information required here. A new approach is therefore necessary. Implementing the bottom-to-top derivation in syntax advocated by the Minimalist Program since Chomsky (1995), the complete verbal projection *including* the appropriate negation is built first and only subsequently merged with [Q]. The reduplication process then applies to realize the spell-out of [Q] and copies the element 'A' immediately below negation. Accordingly, negation itself is *not* a result of reduplication. This is a desirable consequence, because the choice between the two negation markers involves the same state vs non-state dichotomy that is crucial for finiteness in Mandarin Chinese (cf. Paul and Yan 2026).

1. Introduction

The so-called 'A-not-A' questions in Mandarin Chinese are a type of yes/no questions where negation, i.e. *bù* 'not' or *méi* (*yǒu*) 'not have', occurs between two identical instances of e.g. the verb. (For the full paradigm of yes/no questions involving the juxtaposition of an affirmation and its negated counterpart, cf. section 4.1 below.)

(1) a. Tā xǐhuān bù xǐhuān shùxué?[1]
3SG like NEG like mathematics
'Does she like mathematics?'

b. Tā *xǐ-* bù xǐhuān shùxué?
3SG like NEG like mathematics
'Does she like mathematics?'

(2) a. Tāmen tǎolùn méi tǎolùn zhè ge wèntí?
3PL discuss NEG discuss this CL question
'Have they discussed this question?'

. b. Tāmen *tǎo-* méi tǎolùn zhè ge wèntí?
3PL discuss NEG discuss this CL question
'Have they discussed this question?'

Importantly, the first instance of 'A' can also be the subpart of a word, e.g. *xǐ-* 'like' and *tǎo-* 'discuss' in (1b) and (2b). Given that a syntactic rule must respect lexical integrity and cannot produce sentences such as (1b) and (2b), C.-T. James Huang (1982) proposed to derive 'A-not-A' questions from simplex sentences with an abstract polar question morpheme [Q], whose spell-out 'A-not-A' is the result of a phonological reduplication rule. This analysis has practically remained unchallenged up to and including C.-T. James Huang, Y.-H. Audrey Li, and Yafei Li (2009) (henceforth HLL 2009) and basically still uses Chomsky's (1981) *Government and Binding* framework.

However, as is evident from a plethora of data and observations over the last sixty years, the choice of the two negation markers *bù* 'not' and *méi* (*yǒu*) 'not have' is determined by syntactic and semantic

[1] The following abbreviations are used in glossing the Chinese examples: CL classifier; DUR durative aspect; EXP experiential aspect; INTERR interrogative C head; LOWC low C head; NEG negation; PERF perfective aspect; PL plural; PROGR progressive aspect; SG singular; SUB subordinator.

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factors, which by definition are not accessible to reduplication rules of a phonological nature. More precisely, Paul and Yan (2026) argue that the same state vs non-state dichotomy that underlies the system of tense and finiteness in Mandarin Chinese likewise governs the choice between *bù* 'not' and *méi* (*yǒu*) 'not have'. A radically new approach to 'A-not-A' questions is therefore necessary.

Taking up this challenge, the present article develops a completely new analysis, implementing the bottom-to-top derivation in syntax advocated by the *Minimalist Program* since Chomsky (1995). The complete verbal projection *including* the appropriate negation *bù* 'not' or *méi* (*yǒu*) 'not have' is built first and only subsequently merged with the abstract polar question morpheme [Q]. The reduplication process then applies to realize the spell-out of [Q] by copying the element 'A' below negation. It is thus only the first instance of 'A' that realizes [Q] and negation is *not* part of the reduplicated string, a welcome result.

The article is organized as follows. Section 2 on the specialness of states and section 3 on the negation markers *bù* 'not' and *mei* (*yǒu*) 'not have', respectively, provide the necessary background and summarize the major results from Paul and Ramchand (2023) and Paul and Yan (2026) concerning finiteness and negation in Mandarin Chinese. Section 4 presents the current analysis of A-not-A questions as resulting from reduplication (as first proposed in C.-T. James Huang 1982), points out its shortcomings and demonstrates how these can be avoided by adopting the bottom-to-top derivation of the *Minimalist Program*. Section 5 concludes the article.

2. The specialness of states

The semantic properties of states that distinguish them temporally from the other aktionsart categories (i.e. activities, accomplishments and achievements) is the fact that a state can have a moment as its temporal parameter (after Taylor 1977, see also Hallman 2009). If a state is true at an interval, then it is true at every subinterval of that interval, including at each moment. Mandarin Chinese reflects this specialness of states: only states, i.e. adjectives (cf. (3)), stative verbs (cf. (4ab)) and predicates headed by modal auxiliaries (cf. (5ab)) are acceptable as *bare* predicates in a finite root sentence, i.e. in a sentence that can be asserted independently.

(3) Tā fēicháng lèi / gāoxìng / jǔsàng.
3SG extremely tired / happy / frustrated
'She is very tired/happy/frustrated.'

(4) a. Wǒ zhīdào zhè jiàn shì / rènshí Lǐ lǎoshī.
1SG know this CL matter / know Li teacher
'I know about this matter/know teacher Li.'

b. Tā xǐhuān shùxué.
3SG like mathematics
'She likes mathematics.'

(5) a. Tāmen néng {yóuyǒng / pǎo bù}.
3PL can swim / run step
'They can swim/run.'

b. Wǒ {děi / xiǎng} {zǒu / xiūxi}.[2]
1SG must / want go / rest
'I must/want to {go/have a rest}.'

To my knowledge, the observations concerning the well-formedness of (3)–(5) illustrating the specialness of states go back to Kong Lingda (1994) and Huang Nansong (1994). These two authors also note the contrast with the sentences (6a–c) and (7) below featuring non-stative predicates, i.e. activities (6a),

[2] It is well-established cross-linguistically that modal constructions are stative (cf. Ramchand 2018, to appear and references therein; also cf. Li and Thompson 1981:422 for the stative nature of auxiliaries in Chinese).

accomplishments (6b) and achievements (6c). They all require aspect markers (6a–c) or a sentence-final particle (7) in order to be able to function as matrix predicates with a non-habitual, i.e. episodic reading:[3]

(6) a. Tā *(zài) {yóuyǒng / pǎo bù / pào chá / chī fàn / xǐ yīfu}.
3SG PROGR swim / run step / brew tea / eat food / wash clothes
'He is swimming/running/brewing tea/eating/doing the laundry.'
(based on Sun 2014:54)

b. Wǒ song *(-guo) tā lǐwù. (cf. Huang Nansong 1994:443, (18)–(20))
1SG give -EXP 3SG gift
'I gave him presents (before).'

c. Tāmen lí *(-le) hūn. (cf. Kong Lingda 1994:437)
3SG separate-PERF marriage
'They divorced.'

(7) Tā fā shāo *(le).[4]
3SG issue fever LOWC
'He has fever.'

If a habitual reading as in (8a–d) is possible (for which the presence of an appropriate adverb is often required), activities and accomplishments (cf. (8a–c)) as well as achievements (cf. (8d)) behave on a par with states and are then acceptable as root predicates *without* any aspect marking:

(8) a. Tā jīngcháng xǐ yīfu. (Kong Lingda 1994:436)
3SG regularly wash clothes
'He regularly does the laundry.'

b. Tā yī-tiān-dào-wǎn kàn diànshì / dǎ yóuxì.
3SG 1-day-to-late watch TV / strike video.game
'He watches TV/plays video games all day long.'

c. Tā měi tiān dōu xiě xìn / dǎ diànhuà / jìn chéng / pǎo bù.
3SG every day all write letter / strike phone / enter city / run step
'She writes letters/calls/goes downtown/runs every day.'

d. Jīnglǐ měi tiān bā diǎn dào. (Sun Hongyuan 2014:169,
manager every day 8 o'clock arrive (12); slightly changed)
'The manager arrives at 8 o'clock every day.'

For states (cf. (9a)), including habituals (cf. (9b–d)), a past temporal adverb is sufficient for a past tense reading, in contrast to non-states which require aspect marking (cf. (6bc) above). For the future tense, a future auxiliary (e.g. *huì* 'will') is required, for states (cf. (10a)) and non-states (cf. (10b)) (cf. Sun 2014):

(9) a. Tā zuótiān fēicháng lèi / gāoxìng / jǔsàng.
3SG yesterday extremely tired / happy / frustrated
'She was very tired/happy/frustrated yesterday.'

b. Tā yǐqián xǐhuān shùxué / rènshí hěn duō yǔyánxuéjiā.
3SG before like mathematics / know very much linguist
'She liked mathematics/knew many linguists in the past.'

[3] The observations concerning the contrast between states and non-states illustrated in (3)–(5) vs (6a–d) are robust and also figure in the studies on tense and finiteness by Sun Hongyuan (2014), Sybesma (2019) and He Yuyin (2020).

[4] Sentence-final particles such as *le*, i.e. the lowest C heads in the Chinese split CP 'LowC < Force < Attitude' play an important role with respect to finiteness. Cf. Paul (2017b; 2018), Ramchand (2020), Paul and Ramchand (2023).

c. Tā yǐqián chou yān / hē jiǔ.
3SG before inhale cigarette / drink alcohol
'He used to smoke/drink before.'

d. Nà shíhòu jīnglǐ chángcháng bā diǎn dào.
that time manager normally 8 o'clock arrive
'At that time, the manager used to arrive at 8 o'clock.'

(10) a. Tā míngtiān *(huì) fēicháng lèi / gāoxìng / jǔsàng.
3SG yesterday will extremely tired / happy / frustrated
'She will be very tired/happy/frustrated tomorrow.'
(Sun Hongyuan 2014:165, (7a), slightly changed)

b. Zhōngguó duì míngtiān *(huì) {yíng / shū}. (based on Sun 2014:218,
China team tomorrow will win / lose (81a–c))
'The Chinese team will win/lose tomorrow.'

To summarize, root clauses with states (including habituals and auxiliaries) as *bare* predicates (cf. (3)–(5), (8a–d) above) can be asserted independently, i.e. are finite, and have a default present tense interpretation.[5] This is because in the absence of any overt marking, the relation between the eventuality and the speech moment NOW is one of identity. Non-states, by contrast, need overt marking (aspect markers or low C heads). While the relevant data themselves are known, the state vs non-state dichotomy has so far not been acknowledged as the overarching generalization underlying the system of tense and finiteness in Chinese, nor has its importance for the syntax and semantics of negation in Chinese been recognized, a point to be demonstrated in the following section.

3. Negation in Mandarin Chinese

Using the rich array of observations in the literature over the past sixty years, Paul and Yan (2026) provide a new analysis of the two negation markers *bù* 'not' and *méi* (*yǒu*) 'not have', in the light of the dichotomy state vs non-state underlying the system of finiteness in Mandarin Chinese (cf. Ramchand 2020, to appear; Paul and Ramchand 2023).

3.1 The negation bù *'not'*

Bù 'not' negates states, i.e. adjectives (11) and stative verbs (12), including habituals (13) and predicates headed by modal auxiliaries (14), in the present (default) and past tense. *Méi* (*yǒu*) 'not have' is excluded.

(11) Tā (zuótiān) {bù /*méi (yǒu)} lèi / gāoxìng / jǔsàng.
3SG yesterday NEG / NEG have tired / happy / frustrated
'She is(/was) not tired/happy/frustrated (yesterday).'

(12) Tā (yǐqián) {bù /*méi (yǒu)} rènshí Lǐ lǎoshī / {bù /*méi (yǒu)} xǐhuān shùxué.
3SG before NEG/ NEG have know Li teacher / NEG / NEG have like mathematics
'She doesn't(/didn't) know Prof. Li (before) / doesn't(/didn't) like math (before).'

(13) Tā (yǐqián) bù chou yān / bù hē píjiǔ.
3SG before NEG inhale cigarette / NEG drink beer
'She doesn't(/didn't) smoke (before) // doesn't(/didn't) drink beer (before).'

(14) Tā (yǐqián) bù huì shuō déwén.
3SG before NEG can speak German
'She cannot(/couldn't) speak German (before).'

[5] The different factors determining the temporal interpretation in Chinese shown to be at work in (6)–(9) above confirm that *tense* is the relevant factor for finiteness in Chinese, notwithstanding the lack of *overt* tense morphology (cf. Sybesma 2007, Yen-Hui Audrey Li 2017, He Yuyin 2020, C.-T. James Huang 2022).

By contrast, when negating *non*-states, *bù* 'not' introduces a covert future/volitional modal 'will/would not, do/did not want to', in the present, past or future. This covert modal was postulated by Huang (1988) to capture the well-known interpretational possibilities (in addition to the habitual) shown in (15)–(17):

(15) a. Tāmen bù shuō huà. (See Gebauer 1980: 187, (18), (19))
3PL NEG talk word
'They do not (intend to) talk. / They will not talk.'

b. Tāmen yǐqián bù shuō huà.
3PL before NEG talk word
'Before, they did not (want to) talk to each other.'

(16) Tā bù hē jiǔ. (Li and Thompson 1981:423, (40), (42))
3SG NEG drink wine
'S/he doesn't drink wine.'
'S/he refuses/refused to drink wine.'[6]

(17) Wǒ bù mài nèi ge píngzi.
1SG NEG sell that CL vase
'I'm not selling that vase.'
'I won't/wouldn't sell that vase.'

See Gebauer (1980) notes that (15a) can have three different interpretations: habitual (her "statement of fact"), volitional/intentional and future, the latter being absent from the past tense sentence (15b). As mentioned by Li and Thompson (1981), a habitual reading as in their (16) is not always available, in which case only the refusal interpretation (past and present) obtains (cf. (17)). Teng Shou-hsin (1974b:89) summarizes this as follows: "*Bù* – negation of action verbs, carries the meaning of 'refusal' (will/would not) or 'generic/habitual'."

Similar examples abound in the literature, confirming the possibility of a present *and* past tense interpretation with *bù* 'not' for states and the availability of the (present and past tense) habitual reading for non-states. While Huang (1988) captured the future/volitional interpretations by postulating a covert future/volitional modal, he did, however, not mention that they are only observed for *bù* with *non*-stative verbs under the control of the agent. When negating habituals, by contrast, *bù* 'not' is a case of "plain" negation (i.e. without any covert modal), because habituals pattern with states.

Given these different interpretational possibilities depending on the aktionsart of the predicate in question, an adverbial status of *bù* 'not' seems implausible. This is confirmed by the regular possibility of double negation with auxiliaries (18a), for which no adverbial equivalent (18b) exists:

(18) a. Tā *bù* huì *bù* huídá.
3SG NEG will NEG answer
'S/he will not not answer.' => 'S/he will (certainly) answer'.

b. *Tā *yě* huì *yě* huídá.
3SG also will also answer

As a consequence, Paul and Yan (2026) propose an analysis of *bù* 'not' as a functional head Neg°.

[6] For conveying the episodic meaning 'he didn't drink wine', *méi* (*yǒu*) 'not have' has to be used (cf. section 3.2):

(i) Tā méi (yǒu) hē jiǔ.
3SG NEG have drink wine
'He didn't drink wine/has not drunk wine.'

3.2 The negation méi (yǒu) '*not have*'

Méi (*yǒu*) 'not have' is either the negated transitive verb 'have' selecting an object NP (cf. (19a)) or an auxiliary when preceding and negating a verbal projection as in (19bc) (cf. already Zhu Dexi 1982 and Lü Shuxiang 1985).

(19) a. Tāmen (dāngshí) méi (yǒu) háizi / gōngzuò.
3PL that.time NEG have child / work
'They don't(/didn't) have children/work (at that time).'

b. Tāmen méi (yǒu) zuò zuòyè / yánjiū zhè ge wèntí.
3PL NEG have make homework / research this CL problem
'They haven't done their homework. / They didn't do their homework.'
'They haven't researched this problem./ They didn't research this problem.'

c. Tāmen méi (yǒu) lái / dào Běijīng.
3PL NEG have come / arrive Beijing
'They haven't come. They didn't come.'
'They haven't arrived at Beijing. / They didn't arrive at Beijing.'

In both cases, *méi* 'not' is acceptable without *yǒu* 'have'. Paul and Yan (2026) therefore posit an underlying *yǒu* 'have' which may remain covert or be spelt out, as indicated by enclosing it within parentheses. Note that in the spoken language *méi* is strongly preferred (also cf. Lü Shuxiang 2000:383). However, when the speaker wants to emphasize negation, then *méi yǒu* 'not have' is used:

(20) Wǒmen zhèng zài zuò women de qiánrén
1PL just PROGR do 1PL SUB predecessor
cónglái méi yǒu zuò-guo de […] shìyè.
ever NEG have do-EXP SUB work
'We are just doing the things our predecessors have never done.'
(Zhang Huinü 2002:64, (43), slightly modified; glosses and translation added)

Given the presence of the adverb *cónglái* 'ever' here, it is the latter that receives the primary stress, with secondary stress on *méi*.

The traditional analysis of *méi* (*yǒu*) 'not have' as an auxiliary is confirmed by its allowing for VP ellipsis (cf. (21b), on a par with auxiliaries such as *huì* 'will' in (21a)):

(21) a. Zhāngsān huì lái, Lǐsì yě huì.
Zhangsan will come Lisi also will
Zhangsan will come, Lisi will, too.'

b. Zhāngsān méi (yǒu) lái, Lǐsì yě méi yǒu.
3PL NEG have come Lisi also NEG have
'Zhangsan didn't/hasn't come, Lisi didn't/hasn't, either.' [7]

As illustrated in the preceding examples, *méi* (*yǒu*) 'not have' negates non-states in the past. By contrast, when negating "derived states" (cf. Paul and Ramchand 2023), i.e. predicates marked with the progressive aspect *zài* ('*zài* V') or the durative aspect *-zhe* ('V-*zhe*'), it yields a *present* or past tense interpretation (cf. a.o. Teng Shou-hsin 1973; 1974a, Fan Jiyan 1982, Paul and Yan 2024). Note that *bù* 'not' is excluded here:

[7] The attentive reader will have noticed that in (21b), *yǒu* 'have' is not enclosed within parentheses, i.e. it is not optional here. This is due to the well-known constraint reported in all grammar manuals (cf. among others Lü Shuxiang 2000:383) that in sentence-final position (as in (21b)) and when occurring alone as an answer (cf. (i) below), *yǒu* 'have' needs to be spelt out:

(i) Nǐ yǒu háizi ma? Méi *(yǒu).
2SG have child INTERR NEG have
'Do you have children? I don't.'

(22) a. Nǐmen wèishénme {méi /*bù} zài zuò zuòyè?
2PL why NEG / NEG PROGR do homework
'Why aren't you doing your homework?'

b. Wǒ huí jiā de shíhou,
1SG return home SUB time
tā {méi (yǒu) /*bù} zài xǐ pánzi, tā zài xiūxí.
3SG NEG have / NEG PROGR wash plate 3SG PROGR rest
'When I came home, he wasn't doing the dishes, he was resting.'

c. Hòumén (gāngcái) {méi (yǒu) /*bù} suǒ-zhe.
back.door a.moment.ago NEG have / NEG lock-DUR
'The back door is(/was) not locked (a moment ago).'

This is parallel with lexical states negated by *bù* 'not', where the present tense is the default and where a past temporal adverb likewise suffices to induce a past tense interpretation.[8]

To sum up, neither *bù* 'not' nor *méi yǒu* 'not have' are associated with a fixed temporal value. Instead, the aktionsart of the predicate needs to be taken into account for determining the choice between *bù* 'not' and *méi yǒu* 'not have' and for calculating the relevant interpretation. All this cannot be achieved by a morpho-phonological reduplication rule, as postulated by the current analysis of 'A-not-A' questions, because morpho-phonological rules by definition have no access to the type of semantic information required here. Paul and Yan's (2026) analysis of negation in Chinese thus calls for a radically new approach to 'A-not-A' questions.

4. A new analysis of 'A-not-A' questions

Although 'A-not-A' questions are still a much debated topic in Chinese syntax,[9] their analysis has basically remained the same since C.-T. James Huang (1982), including his subsequent works (cf. Huang 1987; 1988; 1991 and his chapter 7 in HLL 2009) as well as the article by Hagstrom (2006) basically adopting Huang's view. Section 4.1 clears the ground and follows Huang (1991) in defining the scope of phenomena falling under the term 'A-not-A' question. Section 4.2 presents Huang's analysis of 'A-not-A' questions in detail and points out its shortcomings. Section 4.3 then breaks with the tradition of couching the analysis within Chomsky's (1981) *Government and Binding* framework and introduces a new proposal implementing the bottom-to-top derivation advocated by the Minimalist Program (cf. Chomsky 1995 and subsequent work). This new analysis can finally account for a number of long-known observations in the literature that have so far remained unexplained (cf. section 4.4).

4.1. Clearing the ground

Huang (1991) argues in great detail that the yes/no questions involving the juxtaposition of an affirmation and its negative counterpart illustrated in (23a–e) below cannot be given a uniform analysis, but involve three different types. For reasons of space, I concentrate on the resulting classification and refer the reader to Huang's work for relevant evidence.[10]

[8] The parallel with states is confirmed by the acceptability of derived states as autonomous predicates in root sentences, i.e. in finite clauses. Cf. Paul and Ramchand (2023), Paul and Yan (2024) for detailed discussion.

[9] In the most recent study, Tsai and Yang (2026) (posted on lingbuzz in 2025 after completion of the present article), the 'A-not-A' question with the copula *shì* 'be' (*shì bù shì* 'be not be' = 'is it the case [(that)…]?') as the matrix verb selecting a clausal complement (which can feature auxiliaries and all kinds of adjuncts allowed TP-internally) is presented as a special case ("outer" 'A-not-A' question), an unwarranted move (cf. Paul and Whitman 2008). For the same observations holding for (what they call "inner") 'A-not-A' questions with other verbs also hold for *shì bù shì* 'be not be' here, such as the positioning of TP-*internal* adverbs below the subject and preceding *shì* 'be'(cf. (43) below).

[10] Huang (1991) is chosen, because the full paradigm of yes/no questions is very systematically presented and analysed here. Whenever possible, however, I discuss the most recent version in HLL (2009), to be supplemented with passages from earlier versions where necessary.

(23) a. Tā xǐhuān zhè běn shū (háishì) tā bù xǐhuān zhè běn shū?
3SG like this CL book or 3SG NEG like this CL book
'Does he like this book or doesn't he like this book?'

b. Tā xǐhuān zhè běn shū bù xǐhuān zhè běn shū?
3SG like this CL book NEG like this CL book
'Does he like this book or doesn't [he] like this book?'

c. Tā xǐhuān bù xǐhuān zhè běn shū?
3SG like NEG like this CL book
'Does he like or doesn't [he] like this book?'

d. Tā xǐhuān zhè běn shū bù xǐhuān?
3SG like this CL book NEG like
'Does he like this book or doesn't [he] like [it]?'

d′. *Tā xǐhuān zhè běn shū bù *xǐ*-? (Huang 1991:311, (22b))
3SG like this CL book NEG like

e. Tā *xǐ*- bù- xǐhuān zhè běn shū?
3SG like NEG like this CL book
'Does he like or doesn't [he] like this book?'
(Huang 1991:306, (1a–e); tones added, my glosses, his translations)

The first cut is between disjunctive bi-clausal questions with *háishì* 'or' (23a) and the remaining cases, given that the former do not show any island constraints. The latter are further subdivided into two types depending on the position of the object. (23d) is derived by anaphoric ellipsis from a VP coordination. As for (23b), it may either involve a covert *háishì* 'or' and an empty subject and then patterns with (23a) or feature a full VP coordination without any ellipsis. (23c) and (23e) finally are derived by a reduplication rule from a simplex VP with the polar question morpheme [Q]. It is this type (called "true A-not-A question" in HLL 2009: 250) that I will refer to as 'A-not-A' question and examine in the remainder of the article. Its hallmark is the possibility for 'A' to be the subpart of a word, whereas this is ruled out for the process of anaphoric ellipsis applying to a VP coordination, as witnessed by the unacceptability of (23d'). The overall translation of (23a-e) as disjunctive questions by Huang is clearly inconsistent with his non-uniform analysis. In the following, examples from Huang are cited with his translations, but elsewhere 'A-not-A' questions in the strict sense defined here are translated as simplex yes/no questions (as already anticipated in (1) and (2) above).

4.2. The current analysis of 'A-not-A' questions

HLL (2009: 253) capture the interrogative nature of 'A-not-A' questions by postulating a functional head "Q[uestion]": "The Q is realized *morphologically* in the following way: it first reduplicates *an initial portion of the VP constituent* and second turns the second of the identical parts into its *appropriate negative form*" (emphasis mine).

The part "initial portion of the VP" is important because besides verbs (cf. (23c), (23e) above) and adjectives (cf. (24ab)), adjunct PPs (cf. (25)) can likewise be the target of this reduplication rule:

(24) a. Nǐ jīntiān gāoxìng bù gāoxìng? (HLL 2009:252, (66)–(67); tones added, their glosses and translations)
you today happy not happy
'Are you happy today or not?'

b. Nǐ jīntiān *gāo*- bù gāoxìng?
you today hap- not happy
'Are you happy today or not?'

(25) Nǐmen míngtiān cóng bu cóng nán-zhàn chūfā?
you tomorrow from not from south-station depart
'Will you depart from South Station tomorrow or not?'

The fact that subparts of words such as *xǐ-* in (23e) and *gāo-* in (24b) can be reduplicated is the reason why the 'A-not-A' sequence is said to result from a morpho-phonological reduplication rule (cf. already Huang 1982:284).[11] The morpho-phonological nature of the reduplication rule also explains why the preposition *cóng* 'from' is acceptable on its own in (25), despite the well-known ban on preposition stranding in Chinese (cf. Huang 1982; Djamouri and Paul 1997; 2009 and references therein). A *syntactic* rule such as ellipsis must respect lexical integrity, i.e. it cannot affect subparts inside a word, and can therefore not produce the sequence in (23e) and (24b), nor can it strand a preposition as in (25).

Concerning the position of the 'A-not-A' sequence, it occurs below the subject (in SpecIP) and above the VP, viz. in an "interrogative *functional* head, located in the same position where one would find the *negation head* of a negative sentence, as follows:

[$_{IP}$ NP [[$_{Q}$ +A-not-A] [$_{VP}$ V NP]]" (HLL 2009:253; emphasis mine)

(HLL's tree (69) is presented as a bracketed structure without the lexical material. Note that they do not label the constituent consisting of the Q head and its VP complement.)

Putting aside the assumption mentioned in passing that negation is a functional head (an issue not addressed at all elsewhere in HLL 2009), transposed into Paul and Yan's (2026) analysis this means that the realization of [Q] is to be situated in a projection below, i.e. distinct from IP/TP and above the extended verbal projection (as proposed for the negation markers *bù* 'not' and *méi* (*yǒu*) 'not have' in section 3 above). This is confirmed by the acceptability of adjunct NPs such as *jīntiān* 'today', *míngtiān* 'tomorrow' between the subject and the 'A-not-A' sequence in (24) and (25) above, thus excluding a Spec-head relation between the subject and the 'A-not-A' sequence.[12]

Importantly, we also have 'A-not-A' questions with the negation *méi* (*yǒu*) 'not have' required by non-stative verbs, where again it is possible to only reduplicate a subpart of the verb (i.e. *kàn-* 'see'):

(26) Nǐ kàn(jiàn) méi kànjiàn Lǐsì? (HLL 2009:253, (70a); tones added, their glosses and translation)
you see not see Lisi
'Did you see Lisi or not?'

In other words, negation in 'A-not-A' questions obeys the same syntactic and semantic constraints governing the distribution of *bù* 'not' and *méi* (*yǒu*) 'not have' in declarative contexts outlined above, and it is a "genuine" negation (as stated by C.-T. James Huang 1982:282). Accordingly, negation *cannot* be inserted by a morpho-phonological reduplication process that is by definition "blind" to information such as the verb's aktionsart [±state] and does not need to respect word boundaries.

This is, however, exactly what has been postulated by C.-T. James Huang up to HLL (2009:253): "The Q […] first reduplicates *an initial portion of the VP constituent* and second turns the second of the

[11] HLL (2009: 257) state that "the proposed reduplication is a morphological phenomenon", it being "in the nature of a morphological process that it affects parts of a word", hence my assigning it the hybrid status of a *morpho*-phonological rule. Cf. C.-T. James Huang (1984) for demonstrating the validity of the *Lexical Integrity Hypothesis* in Chinese.

[12] In C.-T. James Huang (1982; 1987; 1988; 1991), the 'A-not-A' sequence realizing [Q] still occurred in *Inflection*, thus incorrectly ruling out the acceptability of adverbs between the subject in SpecIP and [Q]. As argued for by Ernst (1994), the head *Inflection* in Mandarin Chinese always remains empty. This is confirmed by the acceptability between the subject and the highest head of the extended verbal projection of adverbs *qua* word class such as *hái* 'still', *yǐjīng* 'already', *yě* 'also'. While the presence of the adjunct XPs in (24) and (25) precludes any Spec-head relation between the subject and the 'A-not-A' sequence, adjunct XPs on their own cannot serve as an absolute test for the position of the verb, because they can also occur below auxiliaries (cf. Paul 2017a and references therein):

(i) {Míngtiān} tā {míngtiān} huì {*míngtiān*} lái.
tomorrow 3SG tomorrow will tomorrow come
'He will come tomorrow.'

By contrast, the acceptability of adverbs such as *dàodi* 'in the end' (cf. (43) below) unequivocally confirms the position of 'A' in a separate projection below TP and above negation in 'A-not-A' questions.

identical parts into its *appropriate negative form*. […] What form the negative part will take depends on the aspectual property of the verbal element. Thus, if the verb is an accomplishment verb like *kànjiàn* 'see' […] the negative would take the form *méi* (instead of *bù*) […]" (emphasis mine). HLL (2009) gloss over this problem by invoking the "*appropriate* negative form" without realizing that a morpho-phonological rule can precisely *not* select the correct negation form, this being a task to be accomplished in syntax.[13]

Hagstrom (2006) suffers from the same problem: "[…] the A-not-A sequence is essentially a word formed morphologically by an abstract question morpheme [=NQ; WP] and a following predicate. […] If NQ is indeed something like a VP-proclitic, […] it simply reduplicates the word (or syllable) that it attaches to, with a negative morpheme *between* the copies." (Hagstrom 2006:176, 177; emphasis mine).

In both HLL (2009) (adopting C.-T. James Huang's previous work) and Hagstrom (2006), negation is assumed to be part of the reduplicated sequence. This creates the problem that the morpho-phonological process of reduplication, contrary to current theoretical assumptions, is supposed to have access to the syntactic and semantic information that is indispensable for choosing the correct negation form (*bù* 'not' or *méi* (*yǒu*) 'not have'). Neither HLL (2009) nor Hagstrom (2006) seem to see this contradiction inherent to their scenario. This contradiction was already present in Huang (1982:282) who qualifies the reduplication rule as "syntactic or phonological". The relevant passage is cited *in extenso* because it spells out the relevant assumptions in much more detail than is done in HLL (2009):

> "[…] the [A-not-A] form is the result of some phonological rule of reduplication applying on the basis of some appropriate feature of modality. Note that the [A-not-A] form occurs exactly where one would find 'not' in an ordinary negative sentence, and furthermore that when the form occurs, no 'not' may appear elsewhere. *It is obvious then that the 'not' in* [*A-not-A*] *is the same 'not' as in negative sentences*. Suppose we say that both 'not' and [A-not-A] are realizations of some constituent indicating the affirmative/negative modality, the constituent AFF. If AFF is [+affirmative], then it is spelled out as zero, as in affirmative sentences. If it is [–affirmative], then it is spelled out as *bù* 'not'. If it is not specified for [+affirmative], it is [+Q], quantificational ranging over [+affirmative] and [–affirmative]. For mnemonic purposes, let us use the feature [+A-not-A] instead of [+Q]. […] the feature [+A-not-A] triggers a *syntactic or phonological rule* of reduplication having the following form:
>
> A-not-A Reduplication
> [+A-not-A] [$_{VP}$ X Y] => [$_{VP}$ [[X] [*bù* 'not' X]] Y]" (Huang 1982: 282, emphasis mine)

The following section proposes an alternative account of 'A-not-A' questions avoiding the pitfalls outlined above.

4.3. 'A-not-A' questions from a minimalist perspective

If one tries to transpose the existing observations for 'A-not-A' questions into the Minimalist Program (MP) (cf. Chomsky 1995 and subsequent work), something neither HLL (2009) nor Hagstrom (2006) attempt to do, it is possible to automatically obtain the appropriate negation for 'A-not-A' questions in *syntax*, on a par with Paul and Yan's (2026) analysis for declarative negative contexts. The key to this is the basic way a syntactic structure is built in all the successive versions of the MP, i.e. from the bottom to the top.

Let us therefore assume that once the complete verbal projection (including adverbs and adjunct phrases known to occur *below* negation, cf. (31)–(35) below) has been built in an MP-conforming bottom-to-top derivation, it combines, i.e. merges with, the appropriate negation (*bù* 'not' or *méi* (*yǒu*) 'not have'). The abstract "interrogative functional head" Q (as per HLL 2009:253) subsequently merges with this negated verbal projection. Then the phonological reduplication process applies in order to provide a spell-out of this abstract head and copies the element immediately below negation. Accordingly, negation itself is *not* produced by reduplication, hence not part of the reduplicated string, which is a desirable consequence.

[13] McCawley (1994:180–1) already pointed out this contradiction. Following the logic of Huang's analysis, negation in 'A-not-A' questions, being part of the reduplicated sequence, should in fact be an instance of "fake" negation, and constraints on negation observed in syntax should precisely not hold for 'A-not-A' questions.

Instead, reduplication only targets "an initial portion of the VP constituent" (as per HLL 2009:253), where this initial portion can be (the subpart, i.e. the first syllable of) a verb, an adjective, an adverb or the prepositional head of an adjunct PP. It is this copy 'A' (*without* negation) that now realizes Q and merges with the negated verbal projection.

Interestingly, as mentioned by Huang (1991:326), there exists another Q head, *kě*, in Mandarin Chinese which is in complementary distribution with the Q head realized by reduplication:

(27) a. Nǐ kě gāoxìng? (Huang 1991:326–7, (86a–c))
2SG Q happy
'Are you happy?'

b. Nǐ gāo- bù gāoxìng?
2SG happy NEG happy
'Are you happy?'

c. *Nǐ kě gāo- bù gāoxìng?
2SG Q happy NEG happy

Importantly, the Q head *kě* exclusively merges with a positive VP (28a) and thus contrasts with the Q head in 'A-not-A' questions spelt out as 'A' requiring a negated verbal projection (cf. (28b)).

(28) a. Hángzhōu, nǐ kě [(*méi) qù-guo]?
Hangzhou 2SG Q NEG go-EXP
'Hangzhou, have you been there?'

b. Hángzhōu, nǐ qù [*(méi) qù-guo]?
Hangzhou 2SG go NEG go-EXP
'Hangzhou, have you been there?'

Clearly, these two Q heads impose different selectional restrictions on their complement, while both yield yes/no questions. Adopting the perspective of the bottom-to-top derivation, this means that a negated verbal projection can in the next step merge with the Q head spelt out as (the reduplicated) 'A', but not with the Q head *kě*. Inversely, a positive verbal projection can only merge with the Q head *kě*, but not with the Q head 'A'.[14]

Further evidence for the copy 'A' alone as the realization of the Q head, *without* negation, comes from the data set in (29) provided by reviewer 2:

(29) a. Zhè ge pánzi {yuan bù yuan / fang bù fāng}?
this CL plate round NEG round / square NEG square
'Is this plate round/square?'

b. Zhè ge pánzi {bù yuan / bù fāng}.
this CL plate NEG round / NEG square
'This plate is not round/not square.'

c. *Zhè ge pánzi yuan / fāng.
this CL plate round / square

[14] Thanks to reviewer 2 for urging me to address this issue. For a proposal of how to capture selectional requirements in the MP, cf. Newman (2024; 2025). Cf. Zhu Dexi (1985; 1990) for a detailed discussion of yes/no questions in the form 'V neg V O' and 'V O neg V' for a representative sample of the Sinitic languages ("Chinese dialects" for him). The fact that some of them accept a combination of 'A-not-A' and the (equivalent of) the Q head *kě* shows that our analysis of Mandarin Chinese cannot be simply transposed. Instead, aspect and negation forms in each language must first be examined. Moreover, Zhu Dexi's (1985; 1990) fine-grained observations concerning the different forms of negation and instances of morpho-phonological fusion involving negation make a uniform analysis of yes/no questions for all these languages implausible.

d. Zhè ge pánzi (bù) shì [$_{DP}$ yuan / fang [$_{D'}$ [$_{D°}$ de] [$_{NP}$ Ø]].
this CL plate NEG be round / square SUB
'This plate is (not) round/ is (not) square.'

Absolute adjectives such as *fāng* 'square' cannot function as predicates; instead, they are embedded in a DP (with a covert complement NP) which requires the copula *shì* 'be' when in a predicate function, as is the case for nominal projections in general (cf. Paul 2010; 2021). Scalar adjectives, by contrast, constitute autonomous predicates:

(30) Tā fēicháng cōngmíng / bù cōngmíng.
3SG very be.intelligent / NEG be.intelligent
'She is very intelligent/is not intelligent.'

As illustrated in (29b), some absolute adjectives can nevertheless be directly negated by *bù* 'not' like scalar adjectives, but there is no corresponding positive form (cf. (29c)). Accordingly, there exists no well-formed positive Adjective Phrase which could merge with Q realized as 'A-*not*-A', i.e. *including* negation as per Huang's scenario. By contrast, the corresponding *negated* Adjective Phrase can be construed in syntax (cf. (29b)) and then merge with Q spelt out as 'A' as per my analysis.

This new analysis where the negated verbal projection is construed first before reduplication applies predicts that only those elements are acceptable as the first instance of 'A' in 'A-not-A' questions that can occur immediately below negation in a corresponding declarative. As demonstrated below, this prediction is borne out. (The trivial case where 'A' is a verb or an adjective is put aside here.)

Let us first look at VP-level adverbs modifying the event itself, which occur below negation and accordingly qualify as a target to be (completely or partially) copied. The (a) sentences show the 'A-not-A' questions and the (b) sentences the corresponding negated declarative:

(31) a. Tā cháng bù cháng lái? (based on Teng Shou-hsin (1973a:25, (35b))
3SG often NEG often come
'Does he come often?'

b. Tā bù cháng lái. (Teng Shou-hsin (1973a:25, (35b))
3SG NEG often come
'He doesn't come often.'

(32) a. Tāmen hù(xiāng) bù hùxiāng bang máng? (based on Ernst 1995:672, (11))
3PL reciprocally NEG reciprocally help activity
'Do they help each other?'

b. Tāmen bù hùxiāng bang máng. (Ernst 1995:672, (11))
3PL NEG reciprocally help activity
'They don't help each other.'

(33) a. Tāmen rèn(zhēn) bù rènzhēn dú shū? (C.-C. Jane Tang 2008:(70))
3PL diligent NEG diligent read book
'Do they study diligently?'

b. Tāmen bù rènzhēn dú shū.
3PL NEG diligent read book
'They don't study diligently.'

(34) a. Tāmen yīyàng bù yīyàng gāo? (C.-C. Jane Tang 2008:(68))
3PL equally NEG equally tall
'Are they equally tall?'

b. Tāmen bù yīyàng gāo.
3PL NEG equally tall
'They are not equally tall.'

(35) a. Tā jǐnzhāng de shíhou, luàn bù luàn pǎo? (based on Ernst 1994b:243, (10))
3SG nervous SUB time chaotic NEG chaotic run
'When he is nervous, does he run all over the place?'

b. Tā (jǐnzhāng de shíhou,) bù luàn pǎo.
3SG nervous SUB time NEG chaotic run
'(When he is nervous,) he does not run all over the place.'[15]

There is a direct correlation between 'A-not-A' questions and the corresponding negated declarative in (31)–(35), where the element immediately below negation is the one to be copied and to instantiate the first instance of 'A' in 'A-not-A' questions. By contrast, adverbs and adjunct phrases *above* negation such as *míngtiān* 'tomorrow' (cf. (36c)) are not eligible for copying and automatically excluded as 'A' in 'A-not-A' questions (cf. (36b)).

(36) a. Tā míngtiān qù bù qù Běijīng?
3SG tomorrow go NEG go Beijing
'Does he go to Beijing tomorrow?'

b. *Tā míng(tiān) bù míngtiān qù Běijīng?[16]
3SG tomorrow NEG tomorrow go Beijing

c. Tā míngtiān bù qù Běijīng.
3SG tomorrow NEG go Beijing
'He does not go to Beijing tomorrow.'

d. *Tā bù míngtiān qù Běijīng.
3SG NEG tomorrow go Beijing
(Intended: 'He doesn't go to Beijing tomorrow.')

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[15] Ernst (1994b:243, (10)) observes the ungrammaticality of (i) and from this infers the unacceptability of certain adverbs in 'A-not-A' questions. Apparently, he does not see that (i) is bad for the simple reason that it is not the verb *pǎo* 'run' that counts as the *initial* portion of the VP to be copied, but the adverb *luàn* 'chaotically', as evidenced by its position following the negation *bù* 'not' in (35b) above.

(i) *Tā jǐnzhāng de shíhou, luàn pǎo bù pǎo?
3SG nervous SUB time chaotic run NEG run

[16] Reviewer 2 provides (i)–(ii) from the internet, acceptable in a very colloquial register:

(i) [Míng bù míngtiān] yě wúsuǒwèi le.
tomorrow NEG tomorrow also not.matter LOWC
'Whether it's tomorrow or not doesn't even matter.'
(https://www.kkbox.com/hk/tc/song/-kW6e0lzMveSY80_SD, retrieved on Oct 16, 2025)

(ii) [Zhōng bù zhōngguórén] yě wúsuǒwèi.
Chinese NEG Chinese also not.matter
'Whether they are Chinese or not doesn't even matter.'
(https://www.163.com/dy/article/IUKAMG7U05562NCH.html, retrieved on Oct 16, 2025)

In fact, 'N *bù* 'not' N' as a stylistic, rhetorical figure is attested since the 18th century and native speakers are well aware of the fact that the "canonical" case requires the copula *shì* 'be' (added by me in (iii)):

(iii) (Shì) Bóshì bù (shì) bóshì, wǒ wúsuǒwèi. (Sobelman 1980:2, (4); her glosses and translation)
be Ph.D. NEG be Ph.D. I do.not.care
'Whether Ph.D. or not, I don't care.'

With 'N *bù* 'not' N' as a felicitous 'A-not-A' question, the reduplication of the first syllable of N is expected in (i)–(ii), given that *míngtiān* 'tomorrow' is a noun. The indirect question functions as a clausal subject in (i)–(ii) and as a clausal topic in (iii), respectively. On the constraints for the 'N-*bù* N' pattern in (iii), cf. Sobelman (1979; 1980).

The same holds for adjunct PPs: PPs whose head is copied in 'A-not-A' questions appear *below* negation in the corresponding negated declarative sentence, as expected. This is illustrated for (37) (from HLL 2009) as well as for example (38), with the corresponding declarative sentences added:[17]

(37) a. Nǐmen míngtiān cóng bù cóng nán-zhàn chūfā? (= (25) above)
2PL tomorrow from NEG from south-station depart
'Will you depart from the South Station tomorrow?'
(HLL 2009:252, (67); my glosses and translation)

b. Tāmen míngtiān bù [PP cóng nán-zhàn] chūfā.
3SG tomorrow NEG from south-station depart
'They will not depart from the South Station tomorrow.'

(38) a. Nǐ gēn bù gēn tā yīyàng gāo?
2SG with NEG with 3SG equally tall
'Are you as tall as him?'

b. Nǐ bù [PP gēn tā] yīyàng gāo.
2SG NEG with 3SG equally tall
'You are not as tall as him.'

c. *Nǐ gēn tā yīyàng bù yīyàng gāo? (compare with (34ab) above)
2SG with 3SG equally NEG equally tall
(Intended: 'Are you as tall as him?')[18]

The same observations hold for 'A-not-A' questions with *méi* 'not (have)', where again an adverb (or a subpart of it) can be copied when below negation in the corresponding declarative:

(39) a. Tāmen méi (yǒu) rènzhēn tǎolùn zhè ge wèntí. (Ernst 1995:687, (45))
3PL NEG have serious discuss this CL problem
'They didn't discuss this problem seriously.'

b. Tāmen rèn(zhēn) méi rènzhēn tǎolùn zhè ge wèntí?
3PL serious NEG serious discuss this CL problem
'Did they discuss this problem seriously?'

(40) a. Tā zhè jǐ tiān méi (yǒu) zhǔnshí lái. (based on Ernst 1995:699, (76))
3SG this several day NEG have on.time come
'The past couple of days he has not been on time.'

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[17] Li and Thompson (1981:542, (98)–(100)) already observed the importance of the position of negation. Since in the negated sentence (i), the PP (their "coverb" phrase) is above negation, the corresponding 'A-not-A' question is (ii):

(i) Tā (*bù) duì nǐ bù hǎo. (Li and Thompson 1981:542, (98)–(100); their glosses and translations)
3SG not to you not good
'S/he is not good to you.'

(ii) Tā duì nǐ hǎo bù hǎo?
3SG to you good not good
'Is s/he good to you?'

[18] (38c) is only acceptable if *gēn* is not the preposition 'with', but the coordinating conjunction 'and', hence with *nǐ gēn tā* 'you and him' as a coordinated NP. Also cf. (34) above with *tāmen* 'they' as subject instead of *nǐ gēn tā*.

(i) [NP Nǐ gēn tā] yīyàng bù yīyàng gāo?
2SG and 3SG equally NEG equally tall
'Are you and him equally tall?'

b. Tā zhè jǐ tiān zhǔn(shí) méi zhǔnshí lái?
3SG this several day on.time NEG on.time come
'Has he been on time the past couple of days?'

Only items *below* negation in the declarative sentences can be potentially copied as 'A' in 'A-not-A' questions. The addition of the caveat "potentially" is important, because not all negative sentences have an 'A-not-A' question counterpart. Given that 'A-not-A' questions are neutral questions without any bias towards a positive or negative answer, 'A-not-A' questions are ungrammatical in the presence of adverbs introducing such a bias, even if these adverbs are acceptable below negation in the corresponding negated declarative. This explains why (41a) is judged as awkward, if not downright unacceptable, "even" though the adverb *tài* 'too' occurs below negation in the corresponding declarative (41b). Instead, the question must be formed with the yes/no question Force head *ma*, i.e. a sentence-final complementizer (cf. (41c)):

(41) a. *Tā tài bù tài niánqīng?
3SG too NEG too young

b. Tā bù tài niánqīng.
3SG NEG too young
'He is not too young.'

c. [$_{CP}$ [$_{TP}$ Tā bù tài niánqīng] ma]?
3SG NEG too young INTERR
'Isn't he too young?'

That the unacceptability of (41a) is due to the conflict between the neutral nature of 'A-not-A' questions and the presupposition associated with *tài* 'too' is confirmed by (42). Here, it is the verb *dài* 'bring' that should be copied, because *yòu* 'again' always precedes negation (cf. (42c)). (42a) is nevertheless unacceptable, for *yòu* 'again' carries a presupposition at odds with the neutral status of 'A-not-A' questions. Only the question with the yes/no question Force head *ma* is acceptable (cf. (42b)).

(42) a. *Nǐ *yòu* dài méi dài qián?
2SG again bring NEG bring money

b. [$_{CP}$ [$_{TP}$ Nǐ *yòu* méi dài qián] ma]?
2SG again NEG bring money INTERR
'Did you again not bring any money?

c. Nǐ *yòu* méi (**yòu*) dài qián.
2SG again NEG again bring money
'You again didn't bring money.'

By contrast, adverbs strengthening the interrogative nature such as *dàodǐ* 'after all, in the end' and *jiūjìng* 'actually, exactly' are acceptable in 'A-not-A' questions:

(43) a. Nǐ dàodǐ ài bù ài tā? (HLL 2009:240, (22); their glosses and translation)
You truly love not love him
'Truly, do you love him or not?'

b. Zhè tái jīqì jiūjìng hǎo(yòng) bù hǎoyòng? (Lü Shuxiang 2000:314)
this CL machine actually practical NEG practical
'Is this machine actually practical?

The acceptability of the adverbs *dàodǐ* 'after all, in the end' and *jiūjìng* 'actually, exactly' between the subject and the reduplicated 'A' confirms that 'A' occurs in a distinct projection above negation and below TP hosting the subject.

To wrap up my new analysis, both *bù* 'not' and *méi* 'not' occur in 'A-not-A' questions and are subject to the same semantic and syntactic constraints here as in declarative sentences. Given that a morpho-phonological reduplication rule is by definition not sensitive to this kind of constraints, the standard account of 'A-not-A' questions proposed since Huang (1982) cannot be on the right track, where the "appropriate

negation" is to be chosen by the reduplication rule itself. Instead, the complete verbal projection *including* negation (i.e. *bù* 'not' or *méi* 'not') is first construed in syntax before merging with the abstract question morpheme [Q]. The latter is then realized by a reduplication rule that only copies the element immediately below negation, thus resulting in the first instance of 'A' as the realization of [Q], not the entire sequence 'A-not-A'. On the contrary, 'not-A' is part of the verbal projection construed in *syntax*. The fact that negation marks the left edge of the verbal projection allows for the reduplication rule to simply target the first element following negation, while otherwise there is no straightforward way for this rule to identify the "initial portion" of the verbal projection to be copied in the 'A-not-A' question.

4.4. Old puzzles solved

This new analysis can finally account for a number of observations in the literature which have so far remained unexplained.

First, 'A-not-A' questions are unavailable for defective auxiliaries such as *děi* 'must', which lack a negated form **bù děi* 'not must' (cf. (44a)), an observation going back to Fan Jiyan (1982):

(44) a. Nǐ (*bù) děi qīnzì qù. (Fan Jiyan 1982:430)
2SG NEG must personally go
'You need (not) go [there] personally.'

b. *Nǐ děi bù děi qīnzì qù?
2SG must NEG must personally go

c. [$_{CP}$ [$_{TP}$ Nǐ děi qīnzì qù] ma]?
2SG must personally go INTERR
'Do you need to go [there] personally?'

(44b) is unacceptable, because due to the defective nature of the auxiliary *děi* 'must' it is impossible to construe the negated verbal projection '*bù* 'not' *děi* 'must' VP' with which the abstract interrogative head [Q] could then merge. The question formed with the yes/no question Force head *ma*, however, is fine (cf. (44c)).

Second, only *méi* 'not (have)' is acceptable in 'A-not-A' questions, while *méi yǒu* 'not have' is excluded (cf. (45b)), an important point likewise noted by Fan Jiyan (1982):

(45) a. Tā méi (yǒu) qù-guo.
3SG NEG have go-EXP
'He has not been there.'

b. Tā qù méi (*yǒu) qù-guo? (Fan Jiyan 1982:427)
3SG go NEG have go-EXP
'Has he been there?'

(46) a. %Tā yǒu méi yǒu qù-guo?
3SG have NEG have go-EXP
'Has he been there?'

b. %Tā yǒu qù-guo.
3SG have go-EXP
'He has been there.'

(47) Tāmen rèn(zhēn) méi (*yǒu) rènzhēn tǎolùn zhè ge wèntí?
3PL diligent NEG have diligent discuss this CL problem
'Have they discussed this problem diligently?'

Yǒu 'have' is excluded in (45b) for the simple reason that this *yǒu* 'have' would then count as the first element below negation and hence as the 'A' element to be copied, thus giving rise to (46a) instead of (45b) where *qù* 'go' is the copied element 'A'. Note that (46a) is acceptable for Southern speakers of Mandarin and among younger speakers, who likewise accept (46b) with preverbal aspectual *yǒu* 'have', as to be

expected in my analysis.[19] Similarly, the presence of *yǒu* 'have' in (47) would make it impossible for the manner adverb *rènzhēn* 'diligently' to be targeted by the reduplication rule, given that *yǒu* 'have' would then be the element immediately below negation. The data in (45)–(47) thus neatly confirm that both a bottom-to-top derivation as well as exclusively copying the element following negation are crucial for a correct derivation of 'A-not-A' questions.

Importantly, Fan Jiyan (1982) points out that the constraints above do not hold in disjunctive questions with *háishì* 'or', thus nicely confirming the distinction made in C.-T. James Huang (1982:ch. 4.3.3 and subsequent works) between 'A-not-A' questions derived by reduplication, on the one hand, and disjunctive questions with *háishì* 'or', with or without partial ellipsis, on the other:

(48) a. Tā wèn-guo Lǎo Zhāng háishì méi (*yǒu*) wèn-guo Lǎo Zhāng? (Fan Jiyan 1982: 427, (12a–d))
3SG ask-EXP Lao Zhang or NEG have ask-EXP Lao Zhang
'Has he asked Lao Zhang or hasn't he asked Lao Zhang?'

b. Tā wèn-guo háishì méi (*yǒu*) wèn-guo Lǎo Zhāng?
3SG ask-EXP or NEG have ask-EXP Lao Zhang
'Has he asked or hasn't he asked Lao Zhang?'

c. Tā wèn-guo Lǎo Zhāng háishì méi (*yǒu*) wèn-guo?
3SG ask-EXP Lao Zhang or NEG have ask-EXP
'Has he asked Lao Zhang or hasn't he asked?'

d. *Tā wèn-Ø háishì méi (you) wèn-*guo* Lǎo Zhāng?
3SG ask or NEG have ask-EXP Lao Zhang

As illustrated in (48a–c), the presence of *yǒu* 'have' is very well allowed in disjunctive questions, no reduplication being involved here. Each verb must bear the aspectual suffix (the experiential aspect *-guo*), because a syntactic rule such as ellipsis must respect lexical integrity. It is not allowed to affect the subpart of a word, i.e. *wèn* 'ask' in *wèn-guo* 'ask-EXP' as in (48d). This is, however, possible for the reduplication rule in the corresponding 'A-not-A' question (49a) below, where *wèn-guo* 'ask-EXP' counts as the element 'A' to be targeted and to be (partially) copied and where accordingly it is acceptable that only the second verb bears the experiential aspect suffix *-guo*. As in (45b) above, *yǒu* 'have' is excluded after *méi* 'not' in (49b) (*modulo* the caveat concerning those speakers who accept (46ab)).[20]

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[19] Li and Thompson (1981:545) likewise state the correlation between accepting preverbal aspectual *yǒu* 'have' in (46b) and accepting its presence in the corresponding 'A-not-A' question in (46a). Unlike Fan Jiyan (1982), they do, however, not mention the illicit presence of *yǒu* 'have' in the A-not-A questions as in (45b) for those speakers who do not use aspectual *you* 'have'.

[20] The observations in (45)–(49) challenge the account in Guo (2024). Following McCawley (1994), Guo (2024:52) also observes that the correct distribution of *bù* 'not' and *méi* (*yǒu*) 'not have' must be taken care of in syntax and therefore posits an underlying full size asyndetic coordination construed in syntax for the full paradigm of yes/no questions in (23a–e) above, different from Huang's modular analysis (cf. section 4.1 above) as well as my own. The mechanisms of derivation proposed, by contrast, echo Huang's analysis, i.e. "backward prosodic deletion" (corresponding to Huang's phonological reduplication rule) for the "left conjunct" and forward syntactically conditioned ellipses (Huang's anaphoric ellipis) for the "right conjunct". Crucially, backward prosodic deletion is based on the analysis of 'A-not-A' questions as a *Right Node Raising* construction (RNR) (cf. (i)):

(i) Zhāngsān xǐhuān, dànshì Lǐsì {bù xǐhuān / tǎoyàn} zhè běn shū.
Zhangsan like but Lisi NEG like / loathe this CL book
'Zhangsan likes, but Lisi {does not like/loathes} this book.'

(ii) Zhāngsān {xǐhuān /*xǐ}, dànshì Lǐsì bù xǐhuān zhè běn shū. (cf. (1b) above with *xǐ-* acceptable in an 'A-not-A' question)
Zhangsan like / like but Lisi NEG like this CL book
'Zhangsan likes, but Lisi does not like this book.'

Note, though, that unlike in 'A-not-A' questions, the verbs need not be identical in RNR (cf. the acceptable *tǎoyàn* 'loathe' in (i)), and subpart deletion is disallowed (cf. (ii)). Nevertheless, Guo (2024:50) claims that subpart deletion and P-stranding, motivating Huang's reduplication analysis, are consistent with RNR properties. However, she does

(49) a. Tā wèn-Ø méi wèn-*guo* Lǎo Zhāng? (Fan Jiyan 1982:427, (9))
3SG ask NEG ask-EXP Lao Zhang
'Has he asked Lao Zhang?'

b. *Tā wèn-Ø méi *yǒu* wèn-guo Lǎo Zhāng?
3SG ask NEG have ask-EXP Lao Zhang

Third, in 'A-not-A' questions with *méi* 'not (have)', the perfective aspect suffix *-le* is excluded on either instance of the verb (cf. (50b–d)), only the bare form as in (50a) is allowed here (cf. Fan Jiyan 1982:428):

(50) a. Ni kàn méi kàn wénjiàn?
2SG see NEG see article
'Have you read the article?'

b. *Ni kàn-*le* méi kàn-*le* wénjiàn?
2SG see-PERF NEG see-PERF article

c. *Ni kàn méi kàn-*le* wénjiàn?
2SG see NEG see-PERF article

d. *Ni kàn-*le* méi kàn wénjiàn?
2SG see-PERF NEG see article

Given that the perfective aspect suffix *-le* is incompatible with the negation *méi* 'not (have)', the sequence *méi* V-*le* 'not V-PERF' cannot be construed. Consequently, there is no legitimate source structure from which the sequence *kàn-le* 'see-PERF' could have been copied, and (50b) is excluded. (50c) is ill-formed for the same reason, i.e. the impossibility of construing the negated verbal projection *méi kàn-le* 'NEG see-PERF', notwithstanding the principled possibility for the reduplication rule to only copy the subpart *kàn* 'see' as the spell out of [Q]. In (50d), the negated VP itself *méi kàn wénjiàn* 'NEG see article' is well-formed, but there is no source for *kàn-le* 'see-PERF' as the copied element 'A'. All these facts follow automatically from my analysis.

The fourth point is McCawley's (1994:181–3) generalisation that for compounds whose first element is a negation as in *wèi-dìng* 'not.yet-determine' = 'undecided', *wú-chǐ* 'not.have-shame' = 'be shameless' and *fǒu-dìng* 'not.be-determine' = 'reject', the 'A-not-A' question is only possible if negation in the corresponding declarative is acceptable:[21]

(51) a. *Zhèi ge wèntí wèi(dìng) bù wèidìng? (McCawley 1994:182–3, (7a), (8a),
this CL question undecided NEG undecided (8c); glosses slightly changed)
(Intended: 'Is this question undecided?')

b. *Zhèi ge wèntí bù wèidìng.
this CL question NEG undecided

(52) a. Nǐ shuō tā wú(chǐ) bù wúchǐ?
2SG say 3SG without.shame NEG without.shame
'Do you say he's shameless?'

not mention cases like (ii) and provides examples for P-stranding in RNR from Irish only, not from Chinese. Putting aside various other problems, Guo's (2024) approach also fails to predict the unacceptability of *yǒu* 'have' in (45b), (47), (49b); backward prosodic deletion exclusively affects the "left conjunct" and is independent of the size of (ellipsis in) the "right conjunct" containing *yǒu* 'have'.

[21] "However, no special mechanism would be needed to account for the parallelism if one accepted not a derivation in which the negative element is a transformationally inserted fake negation but one in terms of a deep structure involving both positive and negative conjuncts" (McCawley 1994:183). Recall from footnote 13 above that McCawley uses the term "fake" negation to refer to negation introduced by the reduplication rule.

b. Tā bù wúchǐ.
3SG NEG without.shame
'He isn't shameless.'

(53) a. Zhāngsān fǒu(dìng) méi fǒudìng zhèi ge jìhuà?
Zhangsan reject NEG reject this CL plan
'Did Zhangsan reject this plan?'

b. Zhāngsān méi fǒudìng zhèi ge jìhuà.
Zhangsan NEG reject this CL plan
'Zhangsan didn't reject this plan.'

This correlation between negation and 'A-not-A' questions is obtained automatically in the new analysis presented here, where the verbal projection including negation is first construed in syntax before being merged with the spell-out 'A' of the abstract polar question head. If there is no such negated verbal projection to begin with, the 'A-not-A' question cannot be formed, either.

5. Conclusion

The present article has challenged the standard account of 'A-not-A' questions which has basically remained the same since Huang (1982), where the entire sequence 'A *bù*/*méi* A' *including* negation is created by a reduplication rule. This cannot be correct, because such a rule is of a morpho-phonogical nature and by definition "blind" to the semantic and syntactic constraints governing the distribution of *bù* 'not' and *méi* (*yǒu*) 'not have'. As shown in Paul and Yan (2026), the same dichotomy 'state vs non-state' underlying the system of tense and finiteness in Mandarin Chinese also determines the choice between *bù* 'not' and *méi* (*yǒu*) 'not have'. *Bù* 'not' negates states (including habituals) in the past and present, whereas *méi* (*yǒu*) 'not have' negates non-states in the past and derived states (i.e. '*zài* 'PROGR' V' and 'V-*zhe* 'DUR'') in the present and past.

The new analysis proposed here implements the bottom-to-top derivation in syntax advocated by the *Minimalist Program* since Chomsky (1995). The complete verbal projection *including* the appropriate negation *bù* 'not' or *méi* 'not (have)' is built first and only subsequently merged with the abstract polar question morpheme [Q]. As a consequence, negation itself is *not* a result of reduplication. The reduplication process then applies to realize the spell-out of [Q] by (partially) copying 'A', i.e. the element directly following negation. It is thus only the first instance of 'A' that realizes [Q], while 'not-A' is part of the extended verbal projection construed in syntax, a welcome result.

The constituency in syntax contrasts with the situation in phonetics, where the sequence 'A-not-A' forms a unit. As observed in Yan, Wang, and Shi's (2014) acoustic study, there is a high intonation at the initial point of the 'A-not-A' sequence and a sudden drop to a low curve at its end. Negation itself is de-stressed, and there is no intonational break between the first instance of 'A' and 'Neg A'. It is this mismatch between syntax and phonetics that might be the reason for the longevity of the analysis where negation itself is presented as the result of reduplication as well.

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References

Chomsky, Noam.1981. *Lectures on Government and Binding*. Foris, Dordrecht.

Chomsky, Noam. 1995. *The Minimalist Program*. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262527347.001.0001.

Djamouri, Redouane and Waltraud Paul. 1997. Les syntagmes prépositionnels en *yu* et *zai* en chinois archaïque. *Cahiers de Linguistique - Asie Orientale* 26 2: 221–48. Available at https://www.persee.fr/doc/clao_0153-3320_1997_num_26_2_1515.

Djamouri, Redouane and Waltraud Paul. 2009. Verb-to-preposition reanalysis in Chinese. In *Historical Syntax and Linguistic Theory*, edited by Paola Crisma and Giuseppe Longobardi, pp. 194–211. Oxford University Press, Oxford. Available at https://crlao.cnrs.fr/wp-content/uploads/2024/09/WPaul_Djamouri_2009_verb_to_preposition_wp_rd_.pdf.

Ernst, Thomas. 1994a. Functional categories and the Chinese *Infl*. *Linguistics* 32 2: 191–212. https://doi.org/10.1515/ling.1994.32.2.191.

Ernst, Thomas. 1994b. Conditions on Chinese A-not-A questions. *Journal of East Asian Linguistics* 3: 241–64. https://doi.org/10.1007/BF01733065.

Ernst, Thomas. 1995. Negation in Mandarin Chinese. *Natural Language and Linguistic Theory* 13 4: 665–707. https://doi.org/10.1007/BF00992855.

Fan, Jiyan. 1982. Shìfēi wènjù de jùfǎ xíngshì [The syntactic form of yes/no questions]. *Zhōngguó Yǔwén* [Chinese Linguistics] 1982 6: 426–34.

Guo, Lulu. 2024. Different omission mechanisms in an A-not-A coordination. Backward deletion vs. forward ellipsis. In *Proceedings of the 32nd Conference of the Student Organization of Linguistics in Europe ConSOLE XXXII*, pp. 41–59. Available at https://www.universiteitleiden.nl/en/events/series/sole#console-xxxii-2024.

Hagstrom, Paul. 2006. A-not-A questions. In *The Wiley Blackwell Companion to Syntax*, 1st ed., edited by Martin Everaert and Henk van Riemsdijk, vol. 1, pp. 173–213. Blackwell, Malden, Ma. https://doi.org/10.1002/9780470996591.ch7.

Hallman, Peter. 2009. Instants and intervals in the event/state distinction. Unpublished ms., UCLA, Los Angeles, Ca.

He, Yuyin. 2020. *Time in Mandarin*: *The Fingerprints of Tense and Finiteness*. Ph.D. thesis, Harvard University, Cambridge, Ma. Available at https://nrs.harvard.edu/URN-3:HUL.INSTREPOS:37368956.

Huang, C.-T. James. 1982. *Logical Relations in Chinese and the Theory of Grammar.* Ph.D. thesis, MIT, Cambridge, Ma. Available at https://dspace.mit.edu/handle/1721.1/15215.

Huang, C.-T. James. 1984. Phrase structure, lexical integrity and Chinese compounds. *Journal of the Chinese Language Teachers' Associations* 19: 53-78. Available at https://ctjhuang.scholars.harvard.edu/file_url/116.

Huang, C.-T. James. 1987. Chinese A-not-A questions: A modular approach. Proceedings of the *Second International Conference on Sinology*, Academia Sinica, December 29–31, 1986. Taipei, Taiwan.

Huang, C.-T. James. 1988. *Wǒ pǎo de kuài* and Chinese phrase structure. *Language* 64 2: 274–311. https://doi.org/10.2307/415435.

Huang, C.-T. James. 1991. Modularity and Chinese A-not-A questions. In *Interdisciplinary Approaches to Linguistics: Essays in Honor of Yuki Kuroda*, edited by Carol Georgopoulos and Roberta Ishihara, pp. 305–32. Kluwer, Dordrecht. https://doi.org/10.1007/978-94-011-3818-5_16.

Huang, C.-T. James. 2022. Finiteness, opacity, and Chinese clausal architecture. In *New Explorations in Chinese Theoretical Syntax*. *Studies in Honor of Yen-Hui Audrey Li*, edited by Andrew Simpson, no. 272 in Linguistics Today, pp. 17–76. John Benjamins, Amsterdam. https://doi.org/10.1075/la.272.02hua.

Huang, C.-T. James, Yen-Hui Audrey Li, and Yafei Li. 2009. *The Syntax of Chinese*. Cambridge Syntax Guides. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9781139166935.

Huang, Nansong 1994. Shìlùn duǎnyǔ zìzhǔ chéng jù suǒ yīng jùbèi de ruògān yǔfǎ fànchóu [On the grammatical categories required for forming independent sentences]. *Zhōngguó Yǔwén* [Chinese Linguistics] 1994 6: 441–7.

Kǒng, Lìngdá. 1994. Yǐngxiǎng hànyǔ jùzi zìzú de yǔyán xíngshì [Linguistic forms that affect sentence completeness in Chinese]. *Zhōngguó Yǔwén* [Chinese Linguistics] 1994 6: 434–40.

Li, Charles N. and Sandra A. Thompson. 1981. *Mandarin Chinese. A Functional Reference Grammar*. University of California Press, Berkeley, Ca.

Li, Yen-Hui Audrey. 2017. On Grano's "Finiteness contrasts without Tense in Mandarin Chinese". Paper presented at *11th International Workshop on Theoretical East Asian Linguistics* (TEAL-11), Taipei, Taiwan, June 3–4, 2017.

Lü, Shuxiang. 1985. Yíwèn, fǒudìng, kěndìng. [Question, negation, affirmation]. *Zhōngguó Yǔwén* [Chinese Linguistics] 1985 4: 241–50.

Lü, Shuxiang (ed.). 2000. *Xiàndài Hànyǔ Bābǎi Cí* [Eight Hundred Words of Modern Mandarin]. Shangwu, Beijing.

McCawley, James D. 1994. Remarks on the syntax of Mandarin yes-no questions. *Journal of East Asian Linguistics* 3, 179–94. https://doi.org/10.1007/BF01736126.

Newman, Elise. 2024. *When Arguments Merge*. No. 88 in Linguistics Inquiry Monographs. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/15453.001.0001.

Newman, Elise. 2025. The representation of selection in syntax. Unpublished ms. Available at https://lingbuzz.net/lingbuzz/009568.

Paul, Waltraud. 2017a. Adverbs. In *Encyclopedia of Chinese Language and Linguistics*, edited by Rint Sybesma, vol. 1, pp. 122–7. Brill. Leiden. Available at https://crlao.cnrs.fr/wp-content/uploads/2024/09/WPaul__adverbs_final_long_version_for_website.pdf.

Paul, Waltraud. 2017b. Finiteness in Chinese: A peripheral matter? Paper presented at *The second workshop on syntactic cartography*, Beijing Language and Culture University, Beijing, October 28–29, 2017.

Paul, Waltraud. 2018. The encoding of finiteness in Chinese. Paper presented at the *Tenth Meeting of the European Association of Chinese Linguistics*, Milano, September 28–29, 2018. Available at https://crlao.cnrs.fr/wp-content/uploads/2025/06/handout_short_version_public.pdf.

Paul, Waltraud and Gillian Ramchand. 2023. Anchoring and stativity in English and Mandarin Chinese. Paper presented at the *13th Workshop on Theoretical East Asian Linguistics*, National Taiwan Normal University, Taipei, May 12–14, 2023. Available at https://drive.google.com/file/d/1IIll00-oj9B0x-lCPw5SjV08yJGxrt1K/view.

Paul, Waltraud and John Whitman. 2008. *Shì … de* focus clefts in Mandarin Chinese. *The Linguistic Review* 25: 413–51. https://doi.org/10.1515/TLIR.2008.012.

Paul, Waltraud and Shanshan Yan. 2024. Making some progress on the progressive aspect *zài* in Mandarin Chinese. *Journal of Chinese Linguistics* 52 1: 29–75. https://doi.org/10.1353/jcl.2024.a919398.

Paul, Waltraud and Shanshan Yan. 2026. Negation in Mandarin Chinese and the specialness of states. *Italian Journal of Linguistics* 38 1. https://doi.org/10.26346/1120-2726-266.

Ramchand, Gillian. 2018. *Situations and Syntactic Structures. Rethinking Auxiliaries and Order in English.* No. 77 in Linguistic Inquiry Monographs. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/10911.001.0001.

Ramchand, Gillian. 2020. States vs. events and the semantics of tense. Paper presented at The Chinese University of Hong Kong, November 24, 2020.

Ramchand, Gillian. To appear. The state vs event distinction. In *Cambridge Handbook of Temporality in Language*, edited by Seth Cable, Toshiyuki Ogihara, and Karen Zagona. Cambridge University Press.

See Gebauer, Margaret. 1980. Modifiers in co-operation: Negation, aspect, focus and modality in Chinese. *Cornell Working Papers in Linguistics* 1: 175–95. Available at https://linguistics.cornell.edu/publications.

Sobelmann, Chih-ping. 1979. All because of 'N-*bù*-N'. *Journal of the Chinese Language Teachers' Association* 14 1: 70–6.

Sobelmann, Chih-ping. 1980. On 'N-*bù*-N'. *Journal of the Chinese Language Teachers' Association* 15 2: 1–18.
Sun, Hongyuan. 2014. *Temporal Construals of Bare Predicates in Mandarin Chinese*. Ph.D. thesis, Leiden University, Leiden. Available at https://openaccess.leidenuniv.nl/handle/1887/29991.
Sybesma, Rint. 2007. Whether we overtly tense-agree or not. *Linguistic Inquiry* 38: 580–7. https://doi.org/10.1162/ling.2007.38.3.580.
Sybesma, Rint. 2019. Xiàndìngxìng hé hànyǔ zhǔjù [Finiteness and Chinese main clauses]. *International Journal of Chinese Linguistics* 6 2: 325–44. https://doi.org/10.1075/ijchl.19002.syb.
Tang, Chih-Chen Jane. 2008. Specifiers vs Non-Specifiers: Evidence from adjuncts in Formosan languages, Chinese and English. Paper presented at *The past meets the present: A dialogue between historical linguistics and theoretical linguistics*, Academia Sinica, Nankang, Taiwan, July 14–16, 2008.
Taylor, Barry. 1977. Tense and continuity. *Linguistics and Philosophy* 1: 199–220.
Tao, Lian. 1998. "Shì bù shì" wènjù shuōlüè [A brief note on *shì bù shì* 'be not be']. *Zhōngguó Yǔwén* [Chinese Linguistics] 2: 105–7.
Teng, Shou-hsin. 1973. Negation and aspects in Chinese. *Journal of Chinese Linguistics* 1 1: 14–37.
Teng, Shou-hsin. 1974a. Negation in Chinese. *Journal of Chinese Linguistics* 2 2: 125–40.
Teng, Shou-hsin. 1974b. Verb classification and its pedagogical extensions. *Journal of the Chinese Language Teachers' Association* 9: 84–91.
Tsai, Wei-Tien Dylan, and Ching-Yu Helen Yang. 2026. On the inner-outer dichotomy of A-not-A questions: A minimalist-cartographic account. In *New Insights into Theoretical Syntax from Asian Languages. Studies in Honor of C.-T. James Huang*, edited by Andrew Simpson, no. 290 in Linguistics Today, pp. 262–80. John Benjamins, Amsterdam. https://doi.org/10.1075/la.290.10tsa.
Yan, Jinting, Ping Wang, and Feng Shi. 2014. Pǔtōnghuà yíwèn biāojì fù yòng de shēngxué shíyàn: yǐ zhèngfǎn yíwènjù wéi lì [An acoustic analysis of question markers in Mandarin Chinese, taking A-not-A questions as example]. *Yǔyán jiàoxué yǔ yánjiū* [Language Teaching and Linguistic Studies] 5: 97–102.
Zhang, Huinü. 2002. "Zhèng zài" de fēnbù tèdiǎn jí xiāngguān wèntí [The distribution of *zhèng zài* and some related problems]. *Shǎnxī jiàoyù xuéyuàn xuébào* [Journal of Shaanxi Institute of Education] 18 2: 62–5.
Zhu, Dexi. 1982. *Yǔfǎ jiǎngyì* [On grammar]. Shangwu, Beijing.
Zhu, Dexi. 1985. Hànyǔ fāngyán lǐ de liǎng zhǒng fǎnfù wènjù [Two types of yes/no questions in Chinese dialects]. *Zhōngguó Yǔwén* [Chinese Linguistics] 1: 10–20.
Zhu, Dexi. 1990. A preliminary survey of the dialectal distribution of the interrogative sentence patterns 'V-Neg-VO' and 'VO-Neg-V' in Chinese. *Journal of Chinese Linguistics* 18 2: 209–30.

Towards a natural semantics of TWO: HAVE, WITH, and the Ancient Greek nominal dual

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Abstract

The distribution of French inalienable possessive constructions with 1. *le*/*la*/*les* or 2. with *son*/*sa*/*ses*, respectively is to a high degree parallel to Ancient Greek nouns with TWO semantics, that are accompanied by 1. a dual noun or 2. a plural noun, respectively. This parallel stems from a shared syntactic configuration with possessor extraction in the 1-contexts, while a simple binding relation is present in the 2-contexts. Possessor extraction under A-movement is accompanied by the emergence of a WITH/HAVE-context, be it prepositional 'with' or by an inflectional INST morphology. This sheds light on the morphological parallel of dual morphology and INST morphology in Proto-Indo-European. The linguistic expression of the arithmetic numbers 2 and 3 in natural language follows a similar instrumental scheme.

1. Introduction

Although word semantics mainly originates from the Lexicon upon item insertion (together with phonologic matrix and formal features), some meaning is added not upon the insertion itself but emerges *syn-categorematically*, i.e. upon the very syntactic derivation (taken as the composition function enriched with diacritics). A well-known example is Heim's proposal to take indefinite NPs not as a quantifier but as expressions with an open variable, to be bound during the syntactic derivation (Heim 1982). According to Diesing (1990), indefinites are syncategorematically bound by an existential operator at the VP-edge unless they have moved out (under scrambling) outside VP, e.g. bound by a specificity operator or a generic quantifier. In a similar vein, Postma (1994) argues that Dutch *wat*, which may mean interrogative 'what' or existential 'something', is not a lexically ambiguous operator but an open variable that is either bound by an existential or interrogative operator, depending on at what edge it is sitting, i.e. its meaning is derived syn-categorematically. Kayne (2020) argues that the semantics of English *two*, *three*, etc. is not assigned directly by the Lexicon, but by an underlying syntactic *construction*: a coordinative structure: *two* 'one & one', *three* '(one & (one & one)) etc., where 'one' is a dummy noun. In this view, it is the syntactic composition function that imports the relevant meaning, not the Lexicon as such. Let us call this "non-lexical meaning". We therefore have two possible models of the semantics of '2', M1 and M2.

M1	Lexical meaning	two → '2'
M2	Non-lexical meaning (component)	two → X & Y

In this squib we analyze the Ancient Greek DUAL in a non-lexical way. The reason for a non-lexical approach is the various problems a lexical approach has given rise to.

Dual number is a mysterious morphological category. Corbett (2000) in his book *Number* starts out with a rather straightforward definition of the DUAL: a specific morphological form (DUAL NUMBER) for a rather specific semantics ('two' or 'a pair'), an astonishingly narrow meaning for a derivational morpheme, which is remarkable in itself. However, the manifestation of the DUAL is at the same time not without problems, at least in the Indo-European language family. According to historical reconstructions in comparative linguistics, DUAL number starts out in PIE in the structural Cases (NOM and ACC) only, it slightly extends in the daughter languages (Sanskrit, Ancient Greek, Old Church Slavonic, Celtic, Germanic) hesitantly but never reaches full productivity, so it seems in any daughter language. Its depleted paradigms develop syncretisms unparalleled in other forms. The DUAL is often applied with optionality, or "incoherently" as some scholars describe it (see the references below). Moreover, it sometimes extends its meaning above the strict meaning of 'two', extending to 'three' and 'four' (e.g. in modern Russian). The lexical-morphological approach has – thus far – not succeeded in resolving the issue of the incomplete paradigms, limited productivity, and the hesitant application. In this Festschrift in honor of my colleague Johan Rooryck, who contributed much of his work within the so-called Leiden School of Generative

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Linguistics, initiated by Teun Hoekstra, Hans Bennis, Marcel den Dikken, Rint Sybesma, and many others, I would like in this Festschrift to pursue a "Leiden School" syntactic approach to the problems at hand. As we will proceed, we will admittedly lose the strict 2-semantics of the DUAL, but we will gain some insights into its syntactic distribution and limitations.

The operational tool that I would like to use in this squib is a thus far unnoticed parallel between 1. the Ancient Greek DUAL versus PLURAL number in nouns, and 2. the French inalienable *le*/*ses*-contrast as studied in Rooryck (2022). This parallel can be noticed only indirectly. I discovered it accidentally, while listing all the Ancient Greek (AG) duals in a list, glossing them, and analyzing the verbal structure they were in.[1] The emerging generalization was the following: While all nominal duals in AG have a semantics of 'two', the reverse is not true: in many cases, the semantics of 'two' is projected unexpectedly on plural morphology (Cuny 1906) rather than on dual morphology. The new generalization is that the choice between DUAL and PLURAL in the case of 2-semantics is sensitive to the Rooryck's *weak referentiality* dimension, recaptured in terms of (inalienable) *possessor extraction*.[2]

The paper is structured as follows. First, we briefly present a contrast in French that centers in Johan's work. Then we will introduce the concept "Role Ambiguity", a rather sloppy concept, not defined with any precision in this paper but only exemplified by five independent constructions in various languages. Various of these constructions feature the preposition WITH. This imprecise characterization of Role Ambiguity is legitimized by its later replacement by a precise structural analysis. Then we present examples from Ancient Greek nominal DUALS and unexpected PLURALS that parallel the French contrast. Some basic facts on Greek nominal dual and neuters are discussed here. In section 4, we describe the French and Ancient Greek contrast in terms of Possessor Extraction in the sense of Szabolsci (1983) but its relationship with the verbal head is parallel to Kayne's analysis of HAVE and WITH (1993; 1994:63–6). Sections 5 and 6 are devoted to 1. a problem for the analysis, which, however, will hopefully be eclipsed by 2. the intriguing consequences for the concept '2' in languages as well as for the IE number system in general. The paper finishes with a discussion section and conclusions (7–8).

2. Rooryck's problem

Rooryck (2022) draws attention to the minimal pair in (1).[3]

(1) a. Oriane$_i$ a levé les$_i$ mains.
'Oriane lifted her hands.'

b. Oriane$_i$ a lavé ses$_i$/*les$_i$ mains.
'Oriane washed her hands.'

These are anaphoric constructions (in the sense of Reinhart 1983), where the subject anaphorically binds the possessor position within the object. In the case of the verb *lever* 'to lift' a bare article shows up, while in the case of *laver* 'to wash' a possessive pronoun is realized. For ease of discussion we will describe (1a) as having a silent possessor (PRO according to Guéron 1985), while (1b) has a lexical possessor, as in (2). We use PRO versus 'lexical' just as a notational description of the contrast.

(2) a. Oriane$_i$ a levé les PRO$_i$ mains. PRO possessor
'Oriane lifted her hands.'

b. Oriane$_i$ a lavé ses$_i$ mains. lexical possessor
'Oriane washed her hands.'

Rooryck himself describes (1a) as having an article with "weak referentiality". We come back to that.

[1] I did so for my work on the new PAUCAL in Dutch (Postma 2015; 2024; 2025), analyzed as an extended DUAL.

[2] Related but not identical to what was traditionally called "inalienable possession" (Guéron 1985).

[3] Rooryck clearly wanted to construe an extreme minimal pair with one vowel of difference, but the second one is a bit unfortunate. It can better be replaced by *laver ses*/**les pieds*, as we will see later on.

The PRO possessor pattern of (2a) is found in various expressions/collocations in French, such as *froncer les sourcils* 'to raise one's eyebrows', *cligner des yeux* 'to wink', *balancer les hanches* 'to sway one's hips', *dodeliner de la tête* 'to nod', *ouvrir les yeux* 'to open one's eyes', *croiser les doigts* 'cross one's fingers', etc.[4] Rooryck provides various other contexts that reflect the same contrast: (dative) clitic possession, small clause possessive constructions, ACCUSATIVE + PP constructions, etc. We exemplify only the latter under (3), as we will need it later for our comparison with the AG DUAL.

(3) a. Oriane a frappé Jean$_i$ [$_{PP}$ sur l' PRO$_i$ épaule].
'Oriane hit Jean on the shoulder.'

b. Théophile$_i$ a marqué un but [$_{PP}$ de la PRO$_i$ tête].
'Théophile scored with his head.'

The pattern uses especially body parts, but is not limited to these, as Rooryck shows. Also are included: mental and physical states, such as good spirits, facial expressions, life, and health. Even inanimate possessors follow the pattern and represent not so much possession but part-whole relations. We refer to Rooryck's original work for examples. We may conclude that the contrast in (1) is a deep contrast in the French language, and perhaps in natural language in general. Before we draw a parallel contrast in the DUAL in Ancient Greek nouns, it is necessary to review some properties of (possessor) extractions from left-branches.

3. Island extraction (Possessor extraction and Left-branch extraction)

In 1976, Ross first formulates his famous domain restrictions on syntactic movement ("islands"). These islands have played an important role in linguistic theorizing and turned out to derive from deep formal properties of natural language, e.g. in Phase Theory (Chomsky 2008). Despite their deep formal nature, natural languages explore strategies that can escape these. Below, we describe some descriptions and analyses from the literature.

3.1 Non-agentive transitives

Dutch, English, and many other languages have a silent causative alternation in 'to break', in 'to open', etc. (Haspelmath 1993), as in the contrast in (4ab). While (4a) has an unaccusative verb, *break*, that requires the thematic object to front to SpecTP for nominative case, the verb assigns accusative case in (4b). It obeys the well-known Burzio-generalization (Burzio 1986) that links accusative Case assignment to the assignment of an external (agentive) thematic role.

(4) a. The glass broke. (unaccusative, non-agentive)

b. John broke the glass. (transitive, agentive)

c. John broke his leg.

d. — broke John's leg.

e. John's leg broke.

The semantic agent of the verb 'to break' is not active in the unaccusative version on (4a), while it is projected in the transitive variant in (4b). Curiously, the variant in (4c) takes an intermediate position (Kemmer 1993, Postma 1995:56): it is transitive in the syntactic sense, but — in its dominant reading — the agent role is not projected, parallel to (4a). It is standardly assumed that these conflicting features can be reconciled if we assume an underlying intransitive structure with only a theme projected, as in (4d). This structure could either get a structural subject by moving the entire object to the structural subject position, giving rise to (4e), or by extracting the possessor in the sense of Szabolsci (1983), giving rise to (4c).[5] To

[4] Examples and translations taken from Rooryck (2022).

[5] Szabolsci's cases of possessor extraction are quantificational in nature (WH, FOCUS, TOPIC, etc.), i.e. the extracted DPs land in an A-bar position. See also Corver (1990) and especially Bennis (1995). The constructions studied under

comply with Burzio's generalization, this extraction is not independent of the verb. The externalization of the possessor role is taken over by the verb, in order to be able to assign accusative Case. It is the thematic role from within the direct object (POSSESSOR), but it becomes a role by the verb (EXPERIENCER) upon complex predicate formation (Mulder 1992, Cinque 1995, Wurmbrand 2016). In other words, the thematic role of *John* in (1c) is a POSSESSOR/EXPERIENCER role from the body part *leg*, which is a relational noun and is subsequently assigned externally by the verb-noun complex. We temporarily refer to it as "Role Ambiguity" of (4c). A similar Role Ambiguity reading is present in (5b) and (6a).

(5) a. John's latest paper impressed.
b. John impressed with his latest paper.
c. — impressed John's latest paper.

(6) a. Jan knarste met zijn tanden.
'John gnashed his teeth.'
b Jans tanden knarsten.
'John's teeth gnashed.'
c. — knarsen Jans tanden.
d. Jan/De dode man knarse-tand-de.
John/the dead man gnash-tooth-PST
'John/the dead man gnashed his teeth.'

In contrast to (4), a preposition *with* emerges upon extraction of the possessor. Especially, the type under (6) will be important for our discussion of the AG DUAL. In (6), there is a demonstrable close connection between the verb and its complement: complex predicate formation. Complex predicate formation occurs with V-V and V-N sequences, e.g. English *to lose one's way* 'to get lost' versus French *se perdre* 'idem'. In some Dutch verbs, overt body part incorporation is possible as in (6d), where the object realizes between verbal stem and past tense ending. Notice that in (6ad), there is an optional agentive colouring of the subject that is lacking in (6b). The construction in (6a) is — upon agentive colouring — on the fringe of instrumental WITH-constructions, which we will not discuss here.

3.2 Inherently reciprocal verbs

Kayne (1994:63ff) discusses the alternation in (7), with a verb that is inherently reciprocal.

(7) a. John and Mary met yesterday.
b. John met with Mary yesterday.

In many languages, verbs like *meet*, *fight*, *agree*, and *collide*, i.e. inherently reciprocal verbs, have a special form, be it a reflexive SE-clitic or a special morphological form, like the Ancient Greek medio-passive paradigm or the *nif'al* binyan in Biblical Hebrew (Van Wolde 2019). In English (and partly in Dutch), they are usually not marked at all. Incidentally, it is marked by a lexical sub-component, like *col-* in *collide*. Morphologically, and we will assume syntactically as well, these are de-transitivized verbs, i.e. unaccusative verbs, with a deep-structure object in search for Case. The underlying object can simply move to SpecTP (7c-1) or else an indirect strategy is involved with sub-extraction (7c-2).

(7) c. — met [John and Mary]
1. John and Mary met. [NP1 & NP2] → SpecTP
2. John met with Mary. (NP1 → SpecTP)

Kayne provides the following analysis of (7c-2). At first glance, the sub-extraction from the conjunct would violate Ross' coordinative island constraint, unless the &-head moves out as well, merging with some higher

scrutiny involve the relation between two A-positions. We refer to Kayne (1993) and Kayne (1994) for an analysis of possessor extraction by A-movement, and more in general to Kayne (2002).

functional head and giving rise to the complex preposition WITH, i.e. F + & → WITH (Kayne 1994). This is parallel to Kayne's analysis of HAVE < BE + F (Kayne 1993, Postma 1993), and is also in line with Bennis, Corver, and Den Dikken (1997) analysis of Dutch *van* 'of' < COMP + F. In all these cases, extracting a sub-part instead of moving the constituent as a whole is permitted because equidistance (in the sense of Chomsky 1993) and is established by head movement. This construction approaches the comitative WITH-construction, which we will also leave out of the discussion in this squib.

3.3 Inalienable possession under a(n abstract) causative

A special case of 3.1 is the inalienable possession under an agentive verb. This type will be important for our analysis of Ancient Greek DUAL. We will also refer to it as the pars-pro-toto construction.[6] Consider the French / Dutch sentences in (8), which have two entailments. 'John's hands are tied' and hence 'John is tied to the gate'. We assume the structure in (8b).[7]

(8) a. J'ai attaché Jean à la clôture avec ses mains. (French)
Ik bond Jan met zijn handen aan het hek. (Dutch)
'I tied John to the gate by his hands.'
1. I tied John to the gate.
2. I tied John's hands to the gate.

b. I CAUS [[John's hands] tied to the gate]

The subject of the secondary predicate [DP [tied to the gate]] can receive accusative Case by the verb or, when the possessor moves out, the possessor receives accusative instead. If so, a functional head must move out as well (cf. Bennis, Corver, and Den Dikken 1997), giving rise to, once again, a complex preposition WITH. For some reason, the English version is slightly degraded.[8]

If the abstract CAUS is unagentive, the judgements are fine more generally, e.g. French/Dutch/English/ in (8′)–(8″).

(8′) a. Ses mauvaises manières m'irritent.
Zijn slechte manieren ergeren me.
'His bad manners annoy me.'

b. Il m'irrite avec ses mauvaises manières.
Hij ergert me met zijn slechte manieren.
'He annoys me with his bad manners.'

c. — CAUS [me √annoyed F° [his bad manners]]

Similar contrasts with other PSYCH verbs such as *to worry*, *to anger*, etc. A case with an overt causative might be instructive.

(8″) a. John's noisiness makes me angry.

b. John makes me angry with his noisiness.

c. — CAUS [[SC me [angry]] F° [John's noisiness]

In all these cases the subject is not an agent, but function as a cause. We will leave for further research the question why only in case of a dominating CAUS a construal of WITH may emerge.

[6] Postma (1997) calls these pars-pro-toto cases *upward entailing.*

[7] We assume CAUS to be underspecified for agentivity or causativity (Mulder 1992:130ff). Probably [animacy]) makes the difference (if this feature percolates up to a subject's top node).

[8] For some reason, English *with* requires CAUS = [–agentive].

4. Distribution of the Ancient Greek DUAL in nouns

Apart from SINGULAR and PLURAL, the Ancient Greek (AG) number system allows for a third option: the DUAL number for 2 entities. It is mainly an archaic Indo-European feature, still very much present in Homer, but it also survives in poetic texts in the later Attic period. The overwhelming cases concern nominative/accusative Case, which is a morphologically reduced form consisting of a root + theme vowel without further consonantal ending. Only in very few cases, oblique forms are found in AG. We will ignore these in this squib. In most if not all cases, it concerns a paired participant rather than two distinct participants. Below, we give the statistics of cases after *τὼ* 'the.DU', taken from the Perseus study tool[9]:

I. paired body parts, such as hands, feet, etc. (#109 in total),
II. kinship terms, such as spouses, brothers, kinsmen, etc. (#32 in total),
III. opposing or aligned forces, such as opposed and allied cities, sides, reasonings, opinions, etc. (#18 in total),
IV. functional words, such as two, both, either, other (#33 in total),
V. the so-called Götterdvandva, e.g. dioskures (Castor & Pollux), gods, sons of Theseus, etc. (#82 in total). These are parallel to Old-Russian Boris & Gleb, which is a formal dual.
VI. There is a remnant class VI with five members of unclear nature, such as 'origins', and 'places', which might be reduced to class III if properly emendated, e.g. τὼ τύπω 'the two hits' → τὼ τόπω 'the two regions' (both sides of the Isthmos of Corinth).

Dual nouns behave like neuter nouns in having NOM/ACC neutralization and no agreement with the verb, at least the verbal dual and the nominal dual are not used together. Only nominal forms of verbs, such as participles, agree with a dual noun to which it is predicated. Furthermore, the verbal DUAL is only used with reflexive, reciprocal, and unaccusative verbs, mostly in the medio-passive. The same holds for nominal duals. This is to be expected because possessor extraction makes the predicate indirectly reflexive.

Dual nouns can be described as two entities that are *mutually possessive*, i.e. entity 1 owns entity 2 and vice versa. Now, mutual possession cannot be overtly expressed in natural language, only silently.

(9) a. *Her$_i$ husband$_j$ and his$_j$ wife$_i$ were walking in the park.
b. John and Mary, now PRO$_k$ husband$_i$ and PRO$_i$ wife$_k$, were walking in the park.[10]

The DUAL in nouns must be licensed, either lexically, e.g. by δύω 'two', ἄμφω 'both', ἀμφοτέρω 'either', etc. or else by the syntactic construction, i.e. by the dominating verb. Now, consider some typical AG nouns with 2-semantics with a syntactically licensed DUAL in (10).

(10) οὔκουν **προβαλεῖ** τὼ **χεῖρε** κἀκτενεῖς (Aristoph. Frogs 201)
therefore throw.FUT.2SG the hands.DU stretch.2.FUT
'so do reach out, do stretch out your hands'

Here we see a possessive relation between a 2.SG pro-subject, which has undergone possessor extraction, facilitated by the selecting verb ἐκτείνω 'I stretch'.

[9] https://www.perseus.tufts.edu. Only the statistics of the table is based on the above-mentioned search. The corpus of example sentences, on the other hand, is this corpus extended with all cases of *xeire* and *pode* plus all examples with duals mentioned in the used literature.

[10] Richard Kayne (*pers. comm*) notices that the following construction with coreference outside the dvanda (triggered by the addition of *respectively*) improves the construction slightly.

(i) ?John and Mary, who are now her husband and his wife, respectively, ...

This confirms that direct, i.e. non-mediated, mutual possession must be silent in natural language. It also confirms that it is not the semantics but the syntactic representation that blocks mutual possession to be expressed overtly.

(10′) — reached out [your arms] (unaccusative verb)
[your arms] reached out [~~your arms~~] full object → subject
you reached out with the arms possessor → subject

This verb-object interaction, probably LF incorporation or complex predicate formation[11], as we have seen with our discussion in section 3 on *meet*, etc., facilitates the formation of the DUAL, just like it facilitates formation of WITH in Dutch and English.

A similar case is in (11), taken from Il. 13, 534, where 'his arms stretched out' is realized as he stretched (with) his arms. Once again, a DUAL emerges, facilitated by the verb, just as WITH is facilitated in Dutch and English.

(11) τὸν δὲ Πολίτης αὐτοκασίγνητος περὶ μέσσῳ **χεῖρε** τιτήνας
him.ACC PRT Polites.NOM own-brother.ADJ.NOM around waist arms.DU stretch.AOR.PRT.SG
'But Polites, the own brother of Deïphobus, stretched his arms around his waist.'

An interesting case worth discussing is the example in (12), where the hypothetical possessor extraction of the feminine noun ψύλλαν 'flee' proceeds under retention of a possessive pronoun αὐτῆς 'her' upon extraction. This case, therefore, is similar to the Dutch and English possessor extraction (to nominative or accusative position), discussed in (4) and (8). Admittedly, these cases are not compelling cases of our possessor extraction analysis, but are compatible with it, analyzed along the lines of Dutch and English possessor extraction.

(12) τὴν ψύλλαν λαβὼν ἐνέβαψεν ἐς τὸν κηρὸν αὐτῆς **τὼ πόδε**,
the.ACC flee.ACC taking.NOM dipped into the.ACC wax.ACC her the.DU foot.DU
'He took the flee, and dipped its two feet into the wax.' (Aristoph. Clouds 133)

Here, αὐτῆς is a resumptive possessive pronoun in genitive Case at the extraction location in the possessive DP, and is hence not yet fully parallel to the DATIVE extracted 'dipped her the two feet in the wax', let alone with ACC-extraction to acc position: 'dipped it with its feet in the wax'.[12]

In some rare cases, a DUAL and a PLURAL are used side by side, though both instances concern number 2 semantics, sometimes even concerning the very same paired object. In those cases, only the DUAL construction has possessor extraction. Consider the contrasts in (13)–(15).

(13) ὥστε ὕφαιμοι μὲν οἱ βραχίονες καὶ οἱ καρποὶ **τῶν χειρῶν**
like blood-covered.M.PL PRT the arms.PL and the wrists.PL the hands.GEN.PL,
αὐτῆς ἐγένοντο, ἀποστρεφομένης **τὼ χεῖρε**
her.GEN become.PL turned.backward.MP.GEN.SG the hands.DU
'the wrists of her hands were covered with blood, as they wrenched her hands backwards'

In (13), taken from Dem. 47.59, the woman's hands are mentioned twice, first in the (genitive) PLURAL, the second time in the (accusative) DUAL. Why does DUAL show up only once, while in both cases it concerns a paired object? Possessor extraction distinguishes the two: they wrenched her (with) the hands backwards.[13] The case in (14) has a similar mysterious contrast between DUAL and PLURAL:

[11]For overt incorporation cf. (6d). Other Dutch cases with overt incorporation are *schuddebuiken* 'shake-belly-ing', *klappertanden* 'chatter-tooth-ing, *stampvoeten* 'stamp-foot-ing', etc.

[12] Obviously, this is language dependent. It seems that Dutch and French here accept the WITH-construction readily, while English shows an additional requirement on [-agentivity]. See footnote 5.

[13] The contrast in (13) is a nice counterexample to Viti's (2011) proposal of the AG DUAL distribution. Viti does a great job by challenging Chantraine's claim that "le duel est employé avec incoherence", but does so by opting for a pragmatic approach ("principle of economy"). Economy does not make sharp predictions and can only be applied *post hoc*. All but one of Viti's examples can readily be explained by the syntactic approach defended here. Only one example, her (10), might need some further reflection. Viti's AG data are hampered by absence of glosses and — for linguistic purposes — too free translations.

(14) (he ordered to)
ἐντὸς μὲν τοῦ ἱματίου τὼ **χεῖρε** ἔχειν (…)
in PRT the.GEN cloak.GEN the.DU hands.DU have.INF (...)
ἀλλ᾽ αὐτὰ τὰ πρὸ τῶν **ποδῶν** ὁρᾶν
but towards the.PL.GEN feet.PL.GEN stare.INF
'He required them to stay with their hands under their cloaks (…) and to stare at their feet.'

In this verse, taken from Xenophon's Const. Lac. 3, students are ordered to behave prudently: they should keep their hands (in the DUAL) under their cloak, and stare at their feet (in the PLURAL). Only the first phrase can be rendered with WITH. This contrast nicely parallels Rooryck's contrast for the two French *les*/*ses* constructions. If we are right, a possible complementation to ὁρᾶν 'staring' with '(with) their eyes' could have realized as a DUAL, but we cannot test this, alas. Another instructive case is in (15), (Od 21.223).

(15) κλαῖον ἄρ᾽ ἀμφ᾽ Ὀδυσῆϊ δαΐφρονι **χεῖρε** βαλόντε
cried.3P but around Odysseus.DAT in.fight.ADJ.DAT hand.DU throwing.DU
καὶ κύνεον ἀγαπαζόμενοι κεφαλήν τε καὶ **ὤμους**
and wept kissing head PRT and shoulders.PL
'They flung (with) their **arms** around wise Odyseus, and wept; and they kissed his head and **shoulders** in loving welcome.'

The distinction is that the first case is a possessor-extraction context, while the second (15′b) is a simple transitive structure without relation between verb and object, and without WITH paraphrase.

(15′) a. — CAUS [their arms embraced Odysseus]
They embraced with their arms Odysseus.

b. They kissed his shoulders.

An interesting case is in (16) with two duals. One is χεῖρε 'hands/arms.DU' as is fully parallel to the cases above with a WITH-paraphrase. The other concerns the father-daughter pair, 'Iphigenia & her father' with an extraction under a reciprocal verb *meet* with kinship participants.

(16) ἀλλ᾽ **Ἰφιγένειά** νιν ἀσπασίως θυγάτηρ, ὡς χρή, … (Aesch. Ag. 1551)
but Iphigenia.NOM him gladly daughter, thus is.needed,
… **πατέρ**᾽ ἀντιάσασα πρὸς ὠκύπορον …
father.DU meet.SE.DU? towards fast.running.FEM
… πόρθμευμ᾽ἀχέων περὶ **χεῖρε** βαλοῦσα φιλήσει.
river of.sorrows around arms.F.DU throw.ACT.FEM.DU? lovingly

Curiously, the apocopated form πατέρ᾽ for 'father' can be interpreted as being in DUAL number (NOM/ACC), while 'Iphigenia' is extracted from the dual underlying object and has moved to SpecTP showing up in NOM Case. If so analyzed[14], this construction is parallel to the English MEET-WITH construction. The translation is in (16′).

(16′) But Iphigenia, his daughter, as is due, shall meet (with) her father lovingly at the swift-flowing ford of sorrows, and shall fling (with) her arms around him and kiss him.

So, most if not all of these DUAL cases have a potential paraphrase with the preposition WITH. Notice that Rooryck's cases mentioned above and repeated here have a similar parallel.

[14] The apocopated form **πατέρ**᾽ has various resolutions, one of which is the dual. The standard analysis resolves it as a SG.NOM. I thank an anonymous reviewer for his comments on this.

(2) a. Oriane$_i$ a levé les PRO$_i$ mains — PRO possessor
'Oriane raised her hands'
= Oriane raised with her hands

b. Oriane$_i$ a lavé ses$_i$ mains — lexical possessor
'Oriane washed her hands'
≠Oriane washed with her hands

Only the cases with the article possessor can be paraphrased with WITH. The b-case is perhaps not immediately clear, as it has an additional reading ('washing her hands with her hands', which gets excluded if one replaces *mains* 'hands' with *pieds* 'feet'.

We conclude that there is not only a parallel between the possessive-article in French and the distribution of DUAL number in Ancient Greek, even a *ruling factor* could be identified: in the AG DUAL and in the French possessive-article construction, *possessor extraction* in the spirit of Szabolsci (1983) has taken place, and hence the possibility of paraphrasing with WITH emerges in many cases (Kayne 1994). We could explain these (A-movement) cases of extraction with Kayne's 1993 HAVE analysis and Kayne's 1994 WITH analysis: these concern *constructions* with *participant extraction*, which is only licit if the corresponding functional head moves out as well, forming a syntactic complex with a selecting head. In such cases, this syntactic complex might show up as WITH, or verbally as HAVE, in AG it remains abstract but traceable by the DUAL morphology on the noun. Analyzed this way, the DUAL is a reduced morphological form that allows possessor extraction from the nominal head involved. The reverse side of this analysis is loss of the immediate connection of the DUAL with the 2-semantics. So, the DUAL seems to behave more like a separate (oblique) Case than a number category. Indeed, its distribution might be explainable if we identify the AG DUAL nominal morphology as a remnant of the instrumental Case, INST, which was lost during the transition from Proto-Hellenic to AG. We come back to this identification in section 6.

In sum, despite the similarity between the French possessive article construction and the AG DUAL, there is an important distinction: The latter concerns a necessary 2-semantics, while the former lacks this restriction, though many French cases accidentally have the paired object semantics. Before we will discuss this aspect in section 5, we will discuss a problematic case for the WITH analysis first.

It is left to reader to derive some restrictions listed in the literature from the extraction requirement and/or a separate (oblique) INST Case.

Ohler (1883): Rules of DUAL in Homer

1. DUALS are remarkably underrepresented in Nominative case (in Homer none with χειρ 'hand, arm' or πους 'foot, leg').
2. In many cases where one would expect a DUAL, a PLURAL shows up. (GJP: i.e. when extraction is blocked)
3. No DUAL in NP-coordinations (GJP: but possible in DP-coordination or sentential coordination?)
4. When two pairs of paired body parts are present in distinct grammatical functions, maximally one is in the DUAL. (GJP: it is the one closest to the verb).
5. Hardly ever is there number agreement between DUAL (pro)noun and its adjective (always PLURAL), unless the adjective is used predicatively (i.e. in a secondary predication (GJP: small clause complement)).
6. ἄμφω 'both' combines with dual or plural nouns. However, when the adjective or noun is a predicate (SC), it always takes the dual.
7. ἀλλήλων 'each other' (in case of two persons) virtually always realizes as a plural, only 7x in oblique dual (ἀλλήλοιιν), never in structural cases (*ἀλλήλω)

5. A problematic case

In this section, we briefly discuss a problematic case for our extraction hypothesis and Ohler's NO-SUBJECT generalization. The instances of DUAL number in AG that we considered thus far, concern a complement to

a verb, anaphorically bound by the subject or when embedded under a causative verb, with the subject of the secondary predication in accusative Case. So, we might assume accusative Case in all of the instances, but because of the dual's Case neutralization in all Indo-European languages, it is not overtly traceable. Moreover, if the parallel to French weak reference cases, is correct, nominative Case DUAL in nouns would be categorically ruled out. To a large extent, this is correct.[15] Seemingly nominative duals only show up with unaccusative constructions, where there is at least a positional ambiguity between being in subject or object position. More serious are dual subjects in absolute constructions (accusativus absolutus).

(17) διάκεισθον, ὥσπερ εἰ τὼ χεῖρε (…) ἀφεμένω τούτου
disposed.MP.2.DU like PRT the hands.DU having.neglected.MP.DU this.GEN
'you two are disposed like two hands neglecting this (cooperation)

In (17), a fragment from a moralistic text from Xenophon (Mem. 2.3.18), a comparison is made between an instance of two quarreling brothers and the absurdity of two hands that do not cooperate. Such apparent subject duals, especially in English translation, typically occur in absolute constructions and show gender-number agreement with the nominalized verb. Upon analysis, we see a verbal part with dual verb inflection (with a pro subject) and then a nominalized absolute construction.

(17′) (you) are.disposed.2DU, like [the two hands.DU neglecting.DU of.this]

How can these dual nominals be accounted for? How can these be subsumed to possessor extraction?
Consider absolute *with*-constructions in Germanic, exemplified in (18).

(18) [with his hat in his hand], John entered the room. (absolute WITH)

In (18) we see a small clause (SC) [his hat [in his hand]], controlled by the main clause subject *John*. Traditionally, the function of *with* was taken a mere Case assigner to the SC-subject *his hat*, which would otherwise remain without Case. Now, Kayne (1998, class notes) argued that WITH in absolute WITH-constructions is not just a Case assigner to the SC subject, it has HAVE-semantics with the controlling main-clause argument as its silent subject: 'John HAS his hat in his hand'. Furthermore, Kayne argues that, just as in the case of verbal HAVE, prepositional WITH is formed by syntactic head movement. Using floating quantifiers in Dutch and Italian, it could be shown that the silent subject of HAVE=WITH is in fact *below* the preposition, i.e. WITH must have been moved. The creation of WITH under such movement is expected upon the extraction of the pro-experiencer.

(19) a. Met allemaal een zoon in de VS, voelden de ouders zich solidair.
with all a son in the US felt the parents them(selves) solidary
'they all having a son in the US, …'

b. with (pro$_i$ all) [~~with~~ [a (t$_i$) son] in the US], … the parents …
↑_____|

So, in these absolute with-constructions, there is a silent possessor fronting which gives rise to WITH.

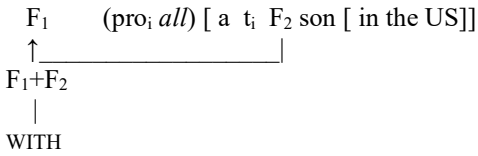
[15] Possessor extraction from derived subjects is possible, as illustrated in (i)–(ii).

(i) La tête lui tourne. (Kayne, pers. com.)
the head to.him spins
'His head is spinning.'

(ii) Het hoofd loopt me om.
the head runs me PRT
'I have work overload.' (lit. 'my head is spinning')

These constructions involve possessor extraction, followed by movement of the remnant to SpecTP for nominative Case. There is a problem here since if WITH would emerge upon possessor extraction, no movement to TP would be necessary or possible. Apparently, there is no CAUS verbal component within French *tourner* or Dutch *omlopen*.

With these analytic tools in hand, let us now return to our problem of subject duals in AG absolute constructions. The structure must have undergone possessor extraction, which is only licit upon a functional head being extracted as well, as in (20).

(20)


If we are right, the subject DUAL cases, such as (17) are absolute WITH-constructions, and the emergence of absolute WITH is formally parallel to pars-pro-toto WITH discussed above.

6. On the relation between the DUAL and WITH

In this section we give some further evidence for a deep relation between the DUAL and WITH-semantics in Ancient Greek, extendible to Indo-European in general, and possibly extendible to a cross-linguistic relation.

6.1 Dual and instrumental

It is assumed that in the Indo-European languages, WITH semantics was expressed by a special Case: the Instrumental, which we will abbreviate to INST. It survives in various daughter branches of PIE, such as Indo-Iranian, Balto-Slavic, Mycenic Greek. Remarkably, the reconstructed forms of both NOM/ACC.DUAL and INST.SG are similar. In (21) we give the reconstructed forms of Proto-Greek thematic nouns (Beekes 2010:6, s.v. ἀγρός).

(21) ***agrós*, *agrójjo* (field), *m*.**

Case	Singular	Dual	Plural
Nom.	*agr***ós** < PIE *$h_2$égr**os**	***agrṓ*** < PIE *$h_2$égr**oh₁**	*agr**ói*** < PIE *$h_2$égr**oes**
Gen.	*agr**óyyo*** < *$h_2$égr**osyo**	*agr**óyyun*** < ?	*agr**ṓn*** < *$h_2$égr**oHom**
Dat.	*agr**ṓi*** < *$h_2$égr**oey**	*agr**óyyun*** < ?	*agr**óis*** < *$h_2$égr**omos**
Acc.	*agr**ón*** < *$h_2$égr**om**	*agr**ṓ*** < *$h_2$égr**oh₁**	*agr**óns*** < *$h_2$égr**oms**
Voc.	*agr**é*** < *$h_2$égr**e**	*agr**ṓ*** < *$h_2$égr**oh₁**	*agr**ói*** < *$h_2$égr**oes**
Loc.	*agr**ói**, *-**éi*** < *$h_2$égr**oy**, *-**ey**	?	*agr**óihi*** < *$h_2$égr**oysu**
Instr.	***agrṓ*** < *$h_2$égr**oh₁**	?	*agr**ṓis*** < *$h_2$égr**ōys**

It can be seen that the two forms in red are equal. This identity has made scholars to assume a diachronic relation between ACC.DU and INSTR.SG (Schmalstieg 1977:128ff; Shields 1991:55; Schmalstieg 1998; Kapović 2017:63). The same identity holds for the reconstructed forms of PIE thematic nouns (Haudry 1979:40; Ringe 2006). For PIE thematic roots, Ringe (2006:49) attributes the same ending *-h_1 to INST.SG and NOM/ACC.DU equally. For athematic nouns, i.e. noun classes with root alternation (proterokinetic and acrostatic), however, the endings of INST.SG and NOM/ACC.DU differ because of interaction with the root: *-ih_1 and *-ih_1e, respectively (Ringe 2006:47). But the major difference is the difference in ablauting root vowel, e.g. *ped- versus *pod- 'foot'.

Pooth (2015) puts the similarity of INST.SG and NOM/ACC.DU on a principled footing. For PIE, Pooth identifies a *sociative* Case ("with dog") and an *associative* Case ("dog & co", i.e. "dog & companion"). From the latter, Pooth claims, the DUAL originates. He assumes that they merged in Proto-Greek by a suffixal glottal stop *-ʔ (Pooth 2015: §8.7), probably as a development from PIE *-ih_1. It seems plausible that the two roots correlate with underlying left and right branches: INST: [X with dog], DUAL: [dog and X] with extraction of X. We will not pursue this idea further in this paper. The historical morphological connection in IE nicely fits with the syntactic analysis of the distribution of the DUAL in AG as analyzed in

the previous sections. In the following section, we will speculate on the underlying structure of the numeral TWO '2', and the possible consequences for the other linguistic numerals: THREE '3', FOUR '4', etc.

6.2 On the status of TWO

If the proposal on the DUAL advanced in the previous pages holds water, the underlying representation of the DUAL might have reflexes in the linguistic numeral TWO, which is a formal dual itself, and probably the other low numerals. It might potentially shed light on the internal morpho-phonological relations in the low numerals, since we have a new alignment of the numerals, displayed in the scheme in (22). In this scheme the English small cap numerals stand for the linguistic representation, while the Arabic digit stands for the arithmetic concept.

(22) ONE = ?
TWO = N-with-1 → N-1.INST
THREE = N-with-2 → N-2.INST
FOUR = N-with-3 → N-3.INST
…

The arithmetic concept '1' is usually not projected in natural language, but is expressed in most contexts by the (stressed or accented) indefinite article with a noun in the singular, while the arithmetic concept '0' had no reflex in traditional natural language and is expressed by a negative sentence instead, though advanced modern slang accidentally use NULL or ZERO with a plural noun. As was noticed by some scholars (Spisy 1999; Kroonen 2014), the system of the low numerals has internal phonological association patterns but thus far no relation with any arithmetic system has been found.

So we have the following scheme:

(23) a. DUAL: NP.DU = [NP & X] with X still to be identified, i.e. Pooth (2015)'s "*& co*")
b. INSTR: F-[X & NP] => X.(F+&) [~~X &~~ NP] => X.INST [NP] = TWO NP
with X still to be identified.

To identify the lexical and morphological content of X, we will use an observation form a wide range of languages as a guide, exemplified by the Dutch contrast in (24).

(24)	a.	een paar schoenen *a pair shoes* 'some shoes'	wat schoenen *what shoes* 'some shoes'	een dag of wat[16] *a day or what* 'some days'
	b.	het paar schoenen *the.N pair shoes* 'the two (mutually possessed) shoes'	twee schoenen *two shoe.PL* 'two shoes'	twee dagen *two day.PL* 'two days'

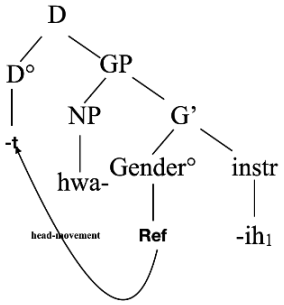
In (24a), we have three quantificational constructions meaning 'some'. In (24b) we have referential constructions with meaning '2'. The paradigm in the first column is quite general over languages: the word PAIR, when used quantificationally, approaches the meaning of SOME while its referential version approaches the meaning of TWO. Because of the systematicity of the pattern (cf. English *a couple*, Danish *en par*, Russian пара), one might hypothesize that the meaning TWO can be derived from SOME by making it referential (or vice versa by making TWO quantificational). We will now show that a similar relation holds

[16] We have switched to *dag* 'day' in the third column because the construction is best with nouns that denote a measure, like *maand* 'month, *jaar* 'year', *uur* 'hour', *gulden* 'guilder', *stuiver* 'nickel', *kilometer* 'id' etc. *Een schoen of wat* 'a shoe or what' is degraded for many speakers, though not completely ruled out. Most spreakers switch to the dummy noun *stuk* 'piece' in such cases, as in (i).

(i) een stuk of wat schoenen
a piece or what shoes
'some shoes'

in the last column, i.e. Dutch *twee* is the referential counterpart of *wat*, with parallel correspondences in some other IE languages. In other words, TWO = with WHAT cq. TWO = WHAT.INST, put differently: X=WHAT in (23). Notice that WHAT must be analyzed as an open variable (Postma 1994; Hengeveld et al. 2023), TWO = WITH *x*. The structure is given in (25). We have an NP with its gender projection GP. If we generate the sign of the neuter -t in its head, Gender°, and assume that the referent of an NP is hosted in its gender projection, i.e. the neuter marker *-t* hosts the index, be it quantificational or referential, the following structure obtains:

(25)



The structure with a suffixal instrument is in itself already a derived structure by movement of the nominal to the specifier of INST (not drawn). We have simply drawn the INST suffix as a morphological head. When we make this structure referential, we raise the index to the head of DP, producing the linear structure *t-*(*h*)*wa-i*(*h*$_1$), which results in a long mid vowel [tve:], Dutch *twee*.[17] Notice that *h* in *hwa* and the laryngeal h$_1$ had already been lost long before the rise of Dutch. In (26) we draw a similar relation between Latin *duo*/*quod* and Proto-Armenian *erku*/ *kwer*, realized as *erku*/*ver* in modern Armenian. We generalized the relations for PIE.

(26)

Lat	*quod*/*duo*		*quo*	*-d*	
		d-	(*q*)*uo*		
Du	*wat*/*twee*		*wa*	*-t*	
		t-	*wee*		
Proto-Arm	**kwer*/*erku*		**kw*	*-er*	
		er-	*ku*		
PIE	**k^{w}óh$_1$-d*	→ **d*(*k*)*uoh$_1$* = *duoh$_1$*		(neuter, DU.ACC)	
	**k^{w}é-h$_2$sh$_1$*	→ **h$_2$sku*		(FEM.SG.INST = FEM.DU)	
	**k^{w}é-h$_2$m*	→ **h$_2$m-kué*		(FEM.SG.ACC)	
	quem	→ *ambo*			

If we are right, Latin *duo* is bimorphemic with *d-* and *-uo* distinct morphemes. Evidence for the separate status of *d-* is the fact that *d-* is absent in Lat. *vigentis* '20'. There has been no phonological rule of *d*-drop in IE initial *dw*-clusters, so the reason of its drop must be morphological. This is probably the case as early as PIE ***wídḱm̥ti* '20' in view of AG εἴκοσι '20'. (There has been regular drop of intial ϝ, hence AG εἴκοσι < ϝεῖκοσι in AG). Another advantage of taking *duo* as bimorphemic, is the possible relation with Lat. *ambo* 'both' < *am* + *uo*.

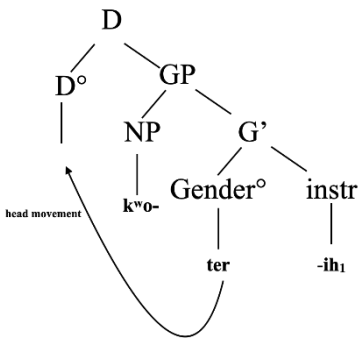
6.3 On the status of THREE

We now are in the position to generalize the approach to THREE = 2.INST. Curiously, it is not TWO itself, which is an instrumental already, that can be the input. Probably, stacking instrumentals are not allowed in

[17] Notice that in English both WH [^{h}wat] ↔ [hu:] and TWO *twenty*/*twelve* ↔ *two* [tu:] participate in a morphological samprasarana wa ↔ u relation, which is synchronically extremely rare in English (perhaps *only* versus *one* [wa] is another case).

natural language. Another reason is that we need a quantificational version of 2 in order to undergo transformation parallel to (25). One possible quantificational candidate is 'either', i.e. THREE = 'with EITHER' or rather EITHER.INST. Notice that *either* is a high scope universal quantifier (∀) when in construction with CAN. So: *You may go either way* has a (Quinian) scope relation of (∀ of 2) > CAN, not the surface scope CAN > (∀ of 2). From this high scope, we may conclude that *either* is quantificational. We propose the configuration in (27).

(27)



This scheme creates the lexical correspondences in (28), with the necessary sound changes in AG (/kʷ/ → /p/ before /o/ and /kʷ/ → /t/ before /i/).

(28)

		either 3
a.	OLatin	*(k)uteris* → *tresque*
b.	Greek	*poteros* → *tritos*
c.	Germanic	*hʷatheras* → *threhʷe*
d.	Armenian	*k'-ere-y* → *erek'*

(29)

Armenian:	*erek'* '3' < **ere-k* < **k'-ere-y*	*ere*	*kʷo*	(*t*)~~*ere*~~	-*ih1*
Germanic:	**þre-hʷih1-(z)* < *hʷa-þira-(z)*	*þer*	*hʷa*	~~*þera*~~	-*ih1*
Greek:	*trǐ-kʷi-os* < *kʷo-ter-os*	τρῐ́	τι	~~τρῐ́~~	-ς
	↓ ↓				
	τρῐ́-τος πότερος				
Latin:	*tresque* = **teris-que* < **que-teris* = *kuteris*	*tres*	*que*	~~*teri*~~	~~*-s*~~
	'three' ↓				
	uteris 'either'				

To sum up: we applied the INSTRUMENTAL = DUAL hypothesis extracted from AG to shed light on the number 2 in natural language and extended it to the number 3. If our hypothesis turns out to be on the right track, we expect it to be extensible to 4, being part of the paucal area of numbers (Kayne 2020). I do not have any evidence it can be extended above the paucals. For paucality, I refer to Pesetsky (2009) for Russian and to Postma (2023) for Dutch.

7. Discussion

An anonymous reviewer raises the important question of the universality of the proposed analysis, taking into account that in (at least) one of IE daughter languages, Modern Slovenian, the DUAL behaves quite different from the Ancient Greek DUAL: the dual in Slovenian typically occurs with two distinct entities and not with paired entities. Its distribution is also quite different and not dependent on a licensing factor (Derganc 2003). In other words, how does the configurational Theory of '2', proposed here, may handle language variation? It may be clear that Kayne's (2020) theory of 2 as a coordination (developed on the

basis of English) and the DUAL=INST theory (developed here on the basis of AG) are both intended to be taken as *universal*, i.e. these proposals intend to replace the lexical Model 1 of the introduction by the (morpho-)syntactic Model 2. On the other hand, it is obviously an empirical matter: it is conceivable that Proto-Indo-European started out with an underlying syntactic configuration of the low numbers, which was gradually replaced by a semantic-mathematical implementation on a par with the higher numbers. If so, in what sense was PIE different from Modern Slovenian? As Derganc (1997) already notices, the Modern Slovenian nominal DUAL is a rather recent innovation, as a kind of revitalization of the declining construction. Has Modern Slovenian chosen for a lexical assignment of the '2'-meaning?

Another point of discussion is the loss of the strict 2-meaning of the DUAL. A limitation of Model 2 to the low numbers 2, 3, 4 must be probably due to the well-known limitation of center-embeddings to 3, applied to the construction in (23a), where one should take 4 = 'with three'. In a certain sense, this is fortunate as the dual occasionally (regularly?) develops into a paucal. Nevertheless, the limitation to 2 is without known exception in AG. So there must be some additional constraint in AG. We leave this for further research.

8. Conclusions

Within the domain of paired inalienable possessive nouns, the division of labor of the French [N_i V les_i Ns] versus [x_i V ses_i Ns] (Rooryck 2022) is to a high extent isomorph to the division of labor of the Ancient Greek [N_i V (pro.POSS$_i$) N.DU] versus [N_i V (pro.POSS$_i$) N.PL], with DU and PL the AG dual and plural morphology.

(30)		French		Ancient Greek	
	a.	[N_i V les_i Ns]		[N_i V (pro.POSS$_i$) N.DU]	middle V constructions
	b.	[N_i V ses_i Ns]	~	[N_i V (pro.POSS$_i$) N.PL]	transitive V

The same verb classes license (30a): grooming verbs, bodily actions, mental or physical faculties, facial expressions, as well as articles of clothing, protection, and adornment. In brief, these are the verbs described in Kemmer (1993) as *medio-passive constructions*, which are "in the middle" between transitive and intransitives constructions (Van Wolde 2019). It is argued that the constructions realize a possessor extraction with A-movement, as proposed in Kayne 1993 and 1994. In Ancient Greek, the selecting verb is almost exclusively in the medio-passive morphological form. In Dutch and English, after possessor extraction, the objects realize by the ("instrumental") preposition WITH. This fact is significant for AG as well: the AG DUAL is morphologically closely related to the proto-Greek instrumental morphology, i.e. the morphological Case for instruments and comitatives. However, there is an important distinction between French and AG. While the French *les*-construction also occurs with objects that are not necessarily paired (most often they are!), the Greek DUAL is exclusively limited to paired objects. In our analysis, DUAL's limitation to paired objects in AG remains without explanation, but it might be related to properties of Rooryck's weak referentiality, which excludes a fixed referent.

Though still speculative, the DUAL~INST parallel is argued to have interesting consequences for the representation of the mathematical concepts '2' and '3' in natural language: there are strong morphological indications that 2 projects on [WITH what] = what.INST, while 3 is projected on [WITH either] = either.INST in natural language. This is a modification of Kayne's (2020) proposal to see the low numbers 1–4 as multiple coordinations.

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References

Aguilar-Guevara, Ana and Joost Zwarts. 2010. Weak definites and reference to kinds. *Semantics and Linguistic Theory* 20: 179–96. https://doi.org/10.3765/salt.v20i0.2583.

Beekes, Robert S. P. with the assistance of Lucien van Beek. 2010. *Etymological Dictionary of Greek*. Leiden Indo-European Etymological Dictionary Series 10. Brill, Leiden.

Bennis, Hans (1995). The meaning of structure: The *wat voor* construction revisited. *Linguistics in the Netherlands* 12: 25–37. https://doi.org/10.1075/avt.12.05ben.

Bennis, Hans, Norbert Corver, and Marcel den Dikken (1997) Predication in nominal phrases *Journal of Comparative Germanic Linguistics* 1: 85–117. https://doi.org/10.1023/A:1009780124314.

Bennis, Hans, Pierre Pica, and Johan Rooryck (eds.). 1997. *Atomism and Binding*. Linguistic Variations. Foris, Dordrecht.

Burzio, Luigi. 1986. *Italian Syntax: A Government-Binding Approach*. D. Reidel, Dordrecht. https://doi.org/10.1007/978-94-009-4522-7.

Chomsky, Noam. 2008. On phases. In *Foundational Issues in Linguistic Theory: Essays in Honor of Jean-Roger Vergnaud*, edited by Robert Freidin, Carlos P. Otero, and Maria Luisa Zubizarreta, no. 45 in Current Studies in Linguistics, pp. 132–66. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9780262062787.003.0007

Cinque, Guglierme. 1995. *Italian Syntax and Universal Grammar.* Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511554261.

Corver, Norbert. 1990. *The Syntax of Left Branch Extractions.* Ph.D. thesis, University of Tilburg, Tilburg. https://doi.org/10.1515/9783110849998-004.

Corver, Norbert. 1992. 'Bij Marie in de nek'. Interne structuur en extractiegedrag. *Gramma/TTT* 1: 21–40.

Cuny, Albert. 1906. *Le nombre duel en grec.* C. Klincksieck, Paris.

Derganc, Aleksandra. 1994. Some specific features in the development of the dual in Slovene as compared to other Slavic languages. *Linguistica* 34 1: 71–80. https://doi.org/10.4312/linguistica.34.1.71-80.

Derganc, Aleksandra (2003). The dual in Slovenian. In *Slovenian from a Typological Perspective*, edited by Janez Orešnik and Donald Reindl, no. 56 in STUF - Language Typology and Universals, pp. 165–81. Akademie Verlag, Berlin. https://doi.org/10.1524/stuf.2003.56.3.165.

Guéron, Jacqueline. 1985. Inalienable possession, PRO-inclusion, and lexical chains. In *Grammatical Representation*, edited by J. Guéron, H.-G. Obenauer, and J.-Y. Pollock, no. 22 in Studies in Generative Grammar, pp. 43–86. Foris, Dordrecht. https://doi.org/10.1515/9783112328064-004.

Haspelmath, Martin. 1993. More on the typology of inchoative/causative verb alternations. In *Causatives and transitivity*, edited by Bernard Comrie and Maria Polinsky, no. 23 in Studies in Language Companion Series, pp. 87–120. John Benjamins, Amsterdam. https://doi.org/10.1075/slcs.23.05has.

Haudry, J. 1979. *L'indo-européen.* Presses Universitaire de France, Paris.

Heim, Irene Roswitha. 1982. *The Semantics of Definite and Indefinite Noun Phrases*. Ph.D. thesis, University of Massachussets. Amherst, Ma.

Hengeveld, Kees, Sabine Iatridou, and Floris Roelofsen. 2023. Quexistentials and Focus. *Linguistic Inquiry* 54 3: 571–624. https://doi.org/10.1162/ling_a_00441.

Kapović, Mate. 2017. Proto-Indo-European Morphology. In *The Indo-European Languages*, edited by Mate Kapović, 61–110. Routledge, London.

Kayne, Richard S. 1975. *French Syntax: The Transformational Cycle.* MIT Press, Cambridge, Ma.

Kayne, Richard S. 1993. Towards a modular theory of auxiliary selection. *Studia Linguistica* 47: 3–31. https://doi.org/10.1111/j.1467-9582.1993.tb00837.x.

Kayne, Richard S. 1994. *The Antisymmetry of Syntax.* MIT Press, Cambridge, Ma.

Kayne, Richard S. 2020. Some thoughts on one and two and other numerals. In: *Questions of Syntax*, edited by Ludovico Franco and Paolo Lorusso, no. 132 in Studies in Generative Grammar, pp. 335–56. De Gruyter, Berlin. https://doi.org/10.1515/9781501505201-019.

Kayne, Richard S. 2002. Pronouns and their antecedents. In *Derivation and Explanation in the Minimalist Program*, edited by Samuel David Epstein and T. Daniel Seely, pp. 133–66. Wiley, New York. https://doi.org/10.1002/9780470755662.ch7.
Kemmer, Suzanne. 1993. *The Middle Voice*. No. 23 in Typological Studies in Language. John Benjamins, Amsterdam. https://doi.org/10.1075/tsl.23.
Kuryłowicz, Jerzy. 1964. *The Inflectional Categories of Indo-European*. Winter, Heidelberg.
Mulder, René. 1992. *The Aspectual Nature of Syntactic Complementation*. Ph.D. thesis, Leiden University, Leiden.
Ohler, Wilhelm. 1884. Über den Gebrauch des Duals bei Homer. In *Programm des Grossherzoglichen Gymnasiums zu Mainz*, pp. 3–28. H. Prickarts, Mainz.
Pesetsky, David. 2009. *Russian case morphology and the syntactic categories.* Ms. MIT.
Pooth, Roland A. 2015. Proto-Indo-European nominal morphology. Part 1. The noun. *Language Arts* 1.
Postma, Gertjan. 1993. The syntax of the morphological defectivity of BE. *HIL Manuscripts* 3: 31–67.
Postma, Gertjan. 1994. The indefinite reading of WH. *Linguistics in the Netherlands* 11: 187–98. https://doi.org/10.1075/avt.11.19pos.
Postma, Gertjan. 1995. *Zero Semantics: A Study of the Syntactic Conception of Quantificational Meaning.* Ph.D. thesis, Leiden University. HIL Series 13.
Postma, Gertjan. 1997. Logical entailment and the possessive nature of reflexive pronouns. In *Atomism and Binding*, edited by Hans Bennis, Pierre Pica, and Johan Rooryck, Linguistic Variations, pp. 295–322. Foris, Dordrecht.
Postma, Gertjan. 1997. On the configurational nature of possession. *Lingua* 101 3–4: 271–94. https://doi.org/10.1016/S0024-3841(96)00052-6.
Postma, Gertjan. 2015. Numerals in Dutch paucal constructions: The compositional nature of paucal number. Paper presented at the *48th Annual Meeting of the Societas Linguistica Europaea*, *Workshop on the Syntax & Semantics of Numerals*, Leiden, 2–5 September, 2015.
Postma, Gertjan. 2023. De paucalis in het Nederlands en de structuur van de grammatica. *Nederlandse Taalkunde* 28 3: 306–24. https://doi.org/10.5117/NEDTAA2023.3.003.POST.
Quine, Van. 1960. *Word and Object.* MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/9636.001.0001.
Reinhart, Tania. 1983. Coreference and bound anaphora. *Linguistics and Philosophy* 6: 41–88. https://doi.org/10.1007/BF00868090 .
Ringe, Don. 2006. *From Proto-Indo-European to Proto-Germanic.* Oxford University Press, Oxford. https://doi.org/10.1093/acprof:oso/9780199284139.003.0004.
Rooryck, Johan. 2022. Reconsidering inalienable possession with definite determiners in French. *Isogloss* 8: 1–34. https://doi.org/10.5565/rev/isogloss.233.
Schmalstieg, William R. 1998. The instrumental singular origin of the nominative dual and plural. *Linguistica Baltica* 7: 179–86.
Shields, Kenneth Jr. 1991. Comments about the o-stem genitive of Indo-European. *Historische Sprachforschung* / *Historical Linguistics*, 104 1: 52–62.
Specht, Franz. 1947. *Der Ursprung der indogermanischen Deklination.* Vandenhoeck and Ruprecht, Göttingen.
Szabolsci, Anna. 1983. The possessor that ran away from home. *The Linguistic Review* 3: 89–102. https://doi.org/10.1515/tlir.1983.3.1.89.
Viti, Carlotta. 2011. The use of the dual number in Homeric Greek. In *Indogermanistik und Linguistik im Dialog*, edited by Thomas Krisch and Thomas Lindner, pp. 595–604. Reichert, Wiesbaden.
van Wolde, Ellen. 2019. The niphal as middle voice and its consequence for meaning. *Journal for the Study of the Old Testament* 43 3: 453–78. https://doi.org/10.1177/0309089217743160.
Wurmbrand, Susi. 2016. Complex predicate formation via Voice incorporation. In *Approaches to complex predicates*, edited by Léa Nash and Pollet Samvelian, no. 41 in Syntax and Semantics, pp. 248–90. Brill, Leiden. https://doi.org/10.1163/9789004307094_010.

Restrictions on experiencer placement in German *tough*-movement: Constituency and prosody rather than intervention

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Abstract

In this paper, we will compare the syntax of English *tough*-movement with that of its translational equivalent in German. We will see that, on the one hand, the syntax of the German construction is very different: there is no A′-movement involved but rather A-movement and restructuring; additionally, the adjective is merged as an adjunct to the infinitival clause rather than being the head that selects it; on the other hand, we will see that one can observe similar restrictions on the placement of experiencers. We will argue that this suggests that many of the proposals that have been made to account for experiencer intervention in English cannot be applied to German. Instead, we will argue that the restrictions follow from independent properties of German such as (i) the constituency that obtains if German *tough*-movement essentially receives the same analysis as the modal passive and (ii) a general adjacency requirement on verb clusters.

1. Background: *Tough*-movement in English

The *tough*-movement (TM) construction in English has received a lot of attention. The main reason for this is that it seems to involve movement from the embedded object position across a CP-boundary to the matrix subject position (which would be in conflict with various principles of grammar such as locality and the Activity Condition). Thus, next to the expletive version in (1a) where *Cholesterol* occurs as the embedded object, there is a version where what looks like the object of *avoid*, i.e., *Cholesterol* occurs as the matrix subject, (1b); this variant is referred to as *tough*-movement because *tough* is one of the prototypical adjectives occurring in this construction, cf. *This book is tough to read* (for the class of verbs occurring in English TM, see Gluckman 2021). For ease of representation, we indicate the position in the embedded clause which the matrix subject is related to by means of a gap, without intending to imply a particular analysis.

(1) a. It is important to avoid cholesterol. expletive version
b. Cholesterol is important to avoid ___. TM

Perhaps the most challenging aspect of the construction are the mixed properties of the surface subject (often referred to as *tough*-subject): On the one hand, it has A-properties in that it triggers agreement on the matrix predicate. On the other hand, it is related to a position in the embedded clause, and that relationship bears some hallmarks of A′-movement: The construction is neither clause-bound nor blocked by intervening DPs in A-positions, (2a), but the gap cannot be inside an island, (2b), the infinitival clause itself acts as a island for extraction of other constituents from it, (3), and *tough*-movement licenses parasitic gaps, (4) This strongly suggests that A′-movement is involved in one way or the other (see also Řezáč 2006:307ff.).[1]

(2) a. A guy like John is hard to imagine any woman believing she could marry ___.
b. ??A guy like John is hard to imagine any woman wondering why she would agree to marry ___.
(Hicks 2009:542)

[1]Two short notes on some of the empirical aspects are in order: First, while not clause-bounded, *tough*-movement is more restricted than other types of A′-movement in that the crossing of finite clause-boundaries usually leads to degradation; the exact restrictions are difficult to pin down given that there seems to be some variability in the judgments, as suggested by the discussion in, e.g., Řezáč (2006:307ff.), Hicks (2017:9), Gluckman (2021:457), Gluckman (2022:5). Secondly, the complement CP in *tough*-movement is usually claimed to have the profile of a weak island (see Řezáč 2006), just like wh-islands, but the literature also contains many examples like (3a) below suggesting that argument extraction from the complement CP is also quite restricted.

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(3) a. *[What sonatas]$_1$ is this violin easy to play __ on __$_1$? (Chomsky 1977:105)
b. *[How intelligent]$_1$ is John easy to regard __ as __$_1$? (Řezáč 2006:292)

(4) ?Lloyd Webber musicals are easy [to condemn __ [without even watching __]]. (Hicks 2009:542)

The phenomenon has received different accounts, see Hicks (2017) for an overview. The main division is between approaches that assume movement from the embedded clause into the main clause (e.g., Hicks 2009, Hartman 2011, Longenbaugh 2017) and those where the *tough*-subject is base-generated in the main clause, while the movement effects in the embedded clause are the result of empty operator movement (e.g., Chomsky 1982, Browning 1987, Heycock 1994, Řezáč 2006, Keine and Poole 2017, Gluckman 2021; 2022).

Another important topic in recent years has been the fact that the presence of experiencers is unproblematic in the expletive construction but makes TM impossible (when the experiencer occurs between adjective and infinitival clause), see Hartman (2011):

(5) a. It is important (to Mary) to avoid cholesterol.
b. Cholesterol$_1$ is important (*to Mary) to avoid __$_1$.

While taken as evidence for A-movement from the embedded clause in Hartman (2011), Keine and Poole (2017) relate it to a type-mismatch (the adjective that takes the predicative complement cannot combine with the functional head introducing the experiencer). In yet another type of approach, Bruening (2014) and Salzmann (2023) reduce it to independent constraints on word order. The fact that the intervention effect also obtains with adjuncts (a fact that also holds for Romance languages) has been considered a strong argument against A-movement approaches, given that adjuncts should not interfere with A-movement, see Bruening (2014:710):

(6) a. It is always annoying (at meetings) to talk about the budget.
b. The budget$_1$ is always annoying (*at meetings) to talk about __$_1$.

This is a welcome result given that A-movement (raising) does not otherwise display intervention effects in English:

(7) John$_1$ seems to Mary __$_1$ to be happy.

Against this background, we will investigate the placement properties of experiencers in the German translational equivalent of *tough*-movement and explore the theoretical consequences of these restrictions. In section 2 we will show that, although the underlying syntax of the German construction is quite different, the restrictions regarding experiencer placement are surprisingly similar to those in English. In section 3 we will show that there are good reasons to believe that German TM is based on the modal passive and like the long passive involves a restructuring configuration with A-movement of the subject. I then show that the restrictions on experiencer placement follow from independent properties of German such as (i) the constituency that obtains under the modal passive analysis and (ii) a general adjacency requirement on verb clusters.

2. *Tough*-movement in German

In this section, we highlight similarities and differences between English *tough*-movement and its German translational equivalent, focusing on evidence for A′-movement and placement possibilities of experiencers.

2.1. Basic facts: Restructuring rather than A′-movement

As in English *tough*-movement, its German translational equivalent comes in both an expletive and a TM-variant (see, e.g., Holl 2010:37):[2,3]

(8) a. dass es schwer ist, [den Vorschlag zu verstehen]
that it difficult is the.ACC proposal to understand.INF
'that it is difficult to understand the proposal' expletive variant

b. dass der Vorschlag schwer [zu verstehen] ist
that the.NOM proposal difficult to understand.INF is
'that the proposal is difficult to understand' TM

The expletive variant is a non-restructuring construction, meaning that the infinitival clause is large, i.e., a CP, and hence preferably occurs in extraposed position. Evidence for CP-status comes from the fact that scrambling into the matrix clause leads to ungrammaticality. Given that scrambling is clause-bound in German (it is blocked by CPs), we must be dealing with a non-restructuring/large infinitive.

(9) *dass es [den Vorschlag]$_1$ schwer ist [—$_1$ zu verstehen]
that it the.ACC proposal difficult is to understand.INF

The TM-variant is a restructuring construction, i.e., the infinitival clause is smaller than CP and hence permeable for scrambling (see, e.g., Schwarzer 2019:180, ex. 26). The direct object of the embedded clause obligatorily has to occur in the matrix clause and, in addition, undergoes case-conversion from accusative to nominative and hence triggers subject-verb agreement on the main clause copula (Wurmbrand 2001). (10) shows that accusative case on the displaced constituent leads to ungrammaticality:[4]

(10) *dass [**den** Vorschlag]$_1$ schwer [—$_1$ zu verstehen] ist
that the.ACC proposal difficult to understand.INF is

Unlike in English, the TM-variant is not unbounded, suggesting that it does not involve A′-movement (cf. Wurmbrand 2001:29):

(11) *dass [der Vorschlag]$_1$ schwer [Leute zu überzeugen [—$_1$ zu lesen]] ist
that the.NOM proposal difficult people to persuade.INF to read.INF is
'that the proposal is difficult to convince people to read'

Again unlike in English, extraction from the infinitival clause is unproblematic, for both arguments, (12a) and adjuncts, (12b), while extraction from weak islands is otherwise degraded in German, (12c). This suggests that no A′-dependency is present within the infinitival clause of German TM that could impede extraction of other constituents:[5]

[2]German examples without reference were constructed and judged by the author.

[3]The class of adjectives occurring in the construction seems to be very similar to that in English. According to Gluckman (2021) this class is largely semantically determined. Note that the TM variant is also possible with adjectives that (i) lack an expletive version (e.g., *hübsch* 'pretty') or (ii) where the expletive version has a different meaning (e.g., *gut* 'good'), see Holl (2010:37) and the discussion of the *pretty*-class in the appendix.

[4]Schwarzer (2019:182, ex. 31) argues that *tough*-infinitives in German also display some properties of CPs, specifically that weak pronouns can remain inside the infinitival clause, as with (certain) control infinitives and unlike with obligatory restructuring predicates like raising verbs. As far as I can tell, the data are rather subtle, though; as Schwarzer indicates herself, fronting of the weak pronoun is clearly preferred.

[5]Schwarzer (2019:177, ex. 19) argues in favor of the presence of A′-movement inside the complement clause based on examples like (i), which suggest that German *tough*-movement licenses Parasitic Gaps, a hallmark of A′-movement:

(i) dass der Text einfach [ohne — gründlich durchzulesen] — zu verstehen ist
that the text easy without carefully read.through.INF to understand.INF is
'that the text is easy to understand without reading thoroughly'

The evaluation of such data is non-trivial. Apart from the fact that such examples are certainly marked, it is not clear to what extent Parasitic Gaps in German can be compared to Parasitic Gaps in languages like English and hence be used to provide an argument for A′-movement. As, e.g., discussed in Haider (2017:57–60), there are significant asymmetries which have lead some to postulate completely different (conjunction reduction-based) analyses for German Parasitic Gaps. Since the debate is still unsettled, the force of arguments based on PG-licensing is limited. Still, as Schwarzer points out, it is remarkable that examples like (i) seem more acceptable than passive sentences proper, where PG-licensing is clearly impossible.

(12) a. [Davon]$_2$ ist Hans$_1$ nur schwer [—$_1$ —$_2$ zu überzeugen] (gewesen).
there.of is John only difficult to convince.INF been
'It was difficult to convince John of it.'
b. [Als Idioten]$_2$ sind Politiker$_1$ leicht [zu —$_1$ —$_2$ beschimpfen].
as idiots are politicians easy to insult.INF
'It is easy to insult politicians as idiots.'
c. ??Davon$_1$ frag ich mich, [wie man den Peter —$_1$ überzeugen könnte].
there.of ask I myself how one the.ACC Peter convince.INF could
lit.: 'Of this, I ask myself how one could convince Peter.'

These facts suggest that the German construction involves a substantially different syntax: It is monoclausal with the surface subject entertaining an A-movement-like relationship with the object position in the embedded clause.

2.2. Placement of the experiencer

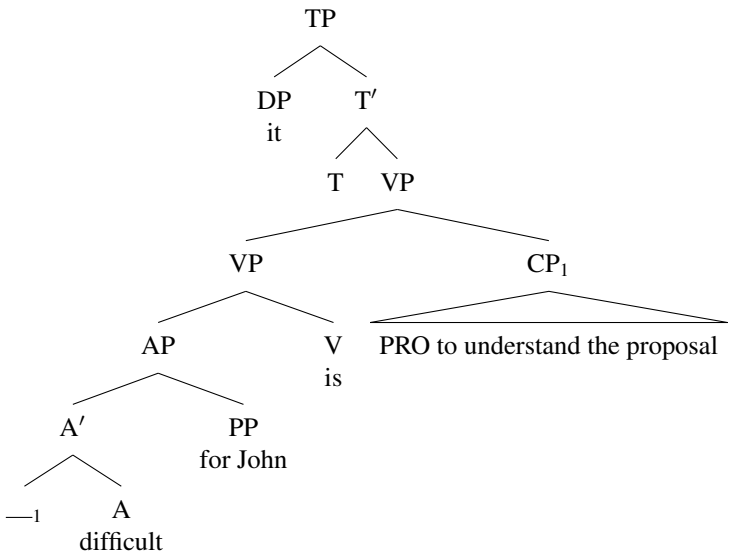
Interestingly, German TM shows certain similarities to English TM regarding restrictions on the placement of the experiencer PP.

In the expletive construction, as in English, the PP can occur in basically every position:

(13) dass es {für Hans$_A$} schwer {für H.$_B$} ist {für H.$_C$}, [den Vorschlag zu verstehen] {??für H.$_D$}
that it for John difficult for J. is for J. the.ACC proposal to understand.INF for J.
'that it is difficult for John to understand the proposal'

This pattern can be accounted for if one assumes that the CP starts out as a complement of the adjective with the experiencer projected higher, e.g., as a specifier of the adjective (given that the experiencer controls PRO inside the infinitival clause). The CP then undergoes extraposition, i.e., right-adjunction to some projection of VP/vP (which we take to be derivational, pace Bennis 1987). This leads to option (B) in (13) (we use English words for ease of representation):

(14)



The other orders in (13) arise via (A) PP-scrambling to the left (into a specifier of VP), (C) extraposition of the PP to the lower VP-segment; (D) the degradedness to extrapose the PP above/to the right of CP may be due to a heaviness effect (as this option becomes more acceptable once the PP is heavier/longer).[6]

Things are different in the TM-variant. According to my judgment the PP can only occur to the left of the adjective or in extraposed position:[7]

(15) dass der Vorschlag {für Hans} schwer {*für H.} zu verstehen {*für H.} ist {für H.}
that the.NOM proposal for John difficult for J. to understand.INF for J. is for J.
'that the proposal is difficult to understand for John'

As in English, adjuncts also lead to degradation according to my judgment (note that, crucially, the PP is intended to modify the matrix VP):

(16) dass das Thema {bei Meetings} schwer {*bei Meetings} zu besprechen {*bei Meetings} ist {bei Meetings}
that the topic at meetings difficult at meetings to discuss.INF at meetings is at meetings
'that the topic is difficult to discuss at meetings'

Thus, while there are good reasons to believe that the syntax of the German construction is rather different from its English equivalent, the restrictions on the placement of the experiencer suggest some similarity after all.

In the next section, we will investigate the syntax of the German TM-variant and conclude (in line with some of the previous literature) that it represents a version of the modal passive.

3. The syntax of German *tough*-movement

In this section, we will first show that the adjective has a different status in the German TM-construction, making an assimilation to the modal passive possible. Then, we will provide an explicit syntax for the construction and discuss the consequences for the placement of experiencers.

3.1. Similarities with the modal passive: The adjective is an adjunct

The starting point is the observation that essentially the same (modal) interpretation obtains without the adjective in a construction referred to as the *modal passive*, see, e.g., Höhle (1978), van Riemsdijk (1982), Demske-Neumann (1994), Holl (2010):

(17) dass der Vorschlag zu lesen ist
that the proposal to read.INF is
'that the proposal can/must be read'

Such sentences have two interpretations: one expressing disposition/ability, one expressing necessity. One can then optionally add a PP, namely *von*/'by'-PP under both readings, and *für*/'for'-PP in the dispositional reading (see Holl 2010:36):

[6] In Salzmann (2023) I argue that the infinitival clause is actually an external argument projected in the specifier of the adjective. This makes the same predictions regarding experiencer placement as long as the infinitival clause is extraposed.

[7] A few empirical notes: many speakers find the PP between the A and the InfP somewhat acceptable; I suspect it is an illusion because the string is locally acceptable, viz., corresponds to the predicative use of the adjective. When searching the internet, one can find a few examples via google, but their status is unclear, many are translations (with 'this is difficult for me to ...' one gets roughly 60 hits, while with 'this is for me difficult to ...' one gets 160 hits). I think that the contrast becomes clearer once the adjective is modified by *nur* 'only', which cancels the predicative interpretation (and forces the adverbial interpretation, see below).

(18) dass der Vorschlag von Hans/für Hans zu lesen ist
that the proposal by John/for John to read.INF is
'that the proposal must be read by/can be read by John'

The TM-variant can then be understood as arising from the (dispositional) modal passive by adjoining an adverbial adjective to the dependent VP: [$_{VP}$ AP [$_{VP}$ V]]. Further evidence for this perspective comes from the fact that (i) German TM is possible with adjectives that can be used adverbially but not predicatively such as, e.g., *augenscheinlich* 'evidently' (Demske-Neumann 1994:182f.) and that (ii) instead of an adverbial adjective, adverbs proper like *kaum* 'hardly' or sentential negation *nicht* can occur in their place:[8]

(19) Der Vorschlag ist kaum/nicht zu lesen.
the proposal is hardly/not to read.INF
'The proposal is hard/impossible to read.'

Evidence that the adjective is not the head of the construction comes from the attributive version of the construction, which is grammatical, (20a). Given that the adjective here occurs in uninflected form (unlike normal attributive adjectives) and prenominal adjectives cannot take right-hand complements, (20b), the adjective in the modal passive/TM cannot be the head, see van Riemsdijk (1982:73f.), Holl (2010:181) (but see Schwarzer 2019:202f. for arguments that this may be inconclusive):[9]

(20) a. ein für Hans schwer(*-e) zu verstehen-der Vorschlag
a for John difficult-WK to understand.INF-PTCP proposal
'a hard proposal to understand for John'
b. *der stolz-e auf seinen Sohn Vater
the proud-WK on his son man
'the father who is proud of his son'

The main difference is that the modal passive has no expletive version.

As for the modal component in the modal passive/the TM-version, Holl (2010) argues that it should be identified with *zu* (or *te* in Dutch), which thus should not be analyzed as an infinitival marker.[10] Evidence for this comes from the observation that the modal reading also obtains in the attributive construction (and thus without *sein* 'be', which is an argument against Demske-Neumann 1994 and Wurmbrand 2001):

(21) ein zu verstehen-der Vorschlag
a to understand.INF-PTCP proposal
'a proposal that can be/must be understood'

The placement of *zu* would work the same as with the infinitival marker: it is initially a free-stranding element that is attached to the verb at PF (via Lowering or Local Dislocation, see Salzmann 2019a). Alternatively *zu* could be taken to be the spell-out of a functional/passive head that absorbs the external argument and fails to assign accusative case; at any rate, there will be two functional heads, a modality-related head and a voice head, with only one of them receiving phonetic realization.[11]

[8] As far as I can tell, basically any adverbial can occur in the construction as long as it is compatible with the modal meaning (deontic/dispositional). For instance, *durchaus* 'absolutely', *sicherlich* 'surely' (and arguably more) are also possible (with both modal interpretations). It is also the semantics that constrains the range of adverbial adjectives that occur in the TM-version. This proposal is developed explicitly in Gluckman (2021:463–468) regarding English TM.

[9] As elsewhere, the adjective is optional in prenominal position (and in principle compatible with both modal interpretations; in (i) it is dispositional):

(i) eine nachzuvollziehen-de Begründung
a to.understand.INF.PTCP justification
'a justification that can be understood'

[10] Cf. also Gluckman (2021), who links the modal component in English TM to the complementizer.

[11] See Schwarzer (2019:173ff.) for certain challenges for the passive analysis, specifically that TM/the modal passive is possible with verbs that cannot be passivized. Note, though, that it is conceivable that whatever voice head is involved in the modal passive/German

The adjective does not always adjoin to the infinitival clause in the modal passive; sometimes, it takes scope below the modal component. It thus has to attach at a lower point inside the infinitival clause (see Holl 2010:45; cf. **it is quick to read the proposal*, showing that this is not an instance of TM):

(22) weil der Vorschlag [**schnell** zu lesen] ist
because the proposal quickly to read.INF is
'because the proposal can be/must be read quickly'

The following data provide new, additional evidence that the adjective cannot be the head taking the infinitive as its complement: the adjective can be moved by itself without the infinitive undergoing extraposition (note that it precedes the right sentence bracket in (23), i.e., the verbs in V-final position *gewesen/ist*). This entails that AP-fronting does not involve remnant AP-movement; see Salzmann (2023) for the same argument based on English TM (the data in (23) are, in principle, also compatible with the proposal in Gluckman 2022 that the infinitival clause is an adjunct of the adjective):

(23) a. Schwer$_2$ ist der Vorschlag$_1$ nicht [—$_2$ —$_1$ zu verstehen] gewesen.
difficult is the proposal not to understand.INF been
'The proposal was not difficult to understand.'
b. [Wie schwer]$_2$ eine Skipiste$_1$ [für den Wintersportler —$_2$ —$_1$ zu bewältigen] ist
how difficult a slope for the winter.sportsman to manage.INF is
'how difficult a slope is to manage for a winter sportsman'[12]

It is sometimes claimed that the entire construction has the distribution of an AP (and the adjective is thus the head taking the infinitive as its complement), based on small clause data as in (24), where the modal infinitive is only grammatical in the presence of an adjective, see Demske-Neumann (1994:150):

(24) weil er [den Vorschlag *(schwer) zu verstehen] findet
because he the proposal difficult to understand.INF finds
'because he finds the proposal hard to understand'

However, (24) becomes acceptable once an adverb like *kaum* 'hardly' or *nicht* 'not' is added, suggesting that (24) does not provide any evidence for the adjective's being the head (see also Bennis 1990:34ff. for Dutch). In addition, one can easily find examples involving *zu beachten finden* 'find worth considering' without any modification. Finally, Demske-Neumann (1994:198) provides data supposedly showing that one cannot coordinate bona fide adjectives with a modal passive, while coordination of AP+TM (= AP + *zu*-InfP) is impeccable. However, apart from the fact that Demske's judgments are not shared by other speakers (cf. also Holl 2010:170), the possibility/impossibility to coordinate two XPs has to be interpreted with care given that it is well-known that one can coordinate predicates of different categories (cf. *John is stupid and a liar*.)

In summary, the data suggest that the adjective is not the head of the construction, taking the infinitival clause as its complement (pace Wurmbrand 2001:28 and Schwarzer 2019). The facts are also not compatible with the proposal in Gluckman (2022:259) for English TM, according to which the adjective is the main predicate, while the infinitival clause is adjoined (to a projection of the adjective). Rather, the facts are most compatible with the assumption that the adjective is adverbial in nature and adjoined to the infinitival clause.

TM is semantically different from the regular passive voice head and hence imposes different restrictions. For a proposal along these lines for Romance, see Russo Cardona (2026).

[12] http://skifahren-im-harz.de/forum/index.php?topic=240.45, accessed February 3, 2018.

3.2. Properties of TM/the modal passive shared with the long passive

In this subsection, will will show that there are striking parallels between TM/the modal passive and the so-called long passive construction (see Wurmbrand 2001) suggesting that they have essentially the same syntax. First, starting with the expletive version of the "long-passive". It is also a non-restructuring construction with the object bearing accusative case, see (25a); the non-expletive version, on the other hand, is a restructuring construction showing case-conversion from ACC to NOM, (25b) (I am using the 3rd Construction to ensure that the DP has actually left the infinitival clause):

(25) a. dass versucht wurde, [den Wagen zu reparieren]
that tried became.3SG the.ACC car to repair.INF
'that it was attempted to repair the car'
b. dass der/*den Wagen versucht wurde [__ zu reparieren]
that the.NOM/the.ACC car tried became.3SG to repair.INF

Like the modal passive/TM in (11), the long passive is also not unbounded:

(26) *dass der Wagen niemanden zu überzeugen zu reparieren versucht wurde
that the.NOM car no.one.ACC to convince.INF to repair.INF tried became.3SG
'that it was attempted to convince nobody to repair the car'

In both constructions, the object of 'convince' acts as an intervener for A-movement of the embedded object.[13]

Possible evidence for (A-)movement in both constructions could also come from reconstruction effects. (27) is an attempt based on variable binding. It is somewhat difficult to construct examples: On the one hand, one needs to make sure that the binder is inside the infinitival clause. On the other hand these restructuring infinitives are small, with non-verbal constituents preferably scrambling out (the TM-version is more acceptable with an adverb than an adverbial adjective).

(27) ?weil Nacktbilder von sich$_i$ kaum [[einem Politiker]$_i$ zu verkaufen] sind
because nude.pictures of self hardly a.DAT politician to sell.INF are
'because it is difficult to sell a politician$_i$ nude pictures of himself$_i$'

(28) ??weil Nacktbilder von sich$_i$ häufig versucht werden, [einem Politiker]$_i$ zu verkaufen
because nude.pictures of self frequently tried are a.DAT politician to sell.INF
'because it is frequently attempted to sell a politician$_i$ nude pictures of himself$_i$'

As far as I can tell, the modal passive example is more acceptable, for reasons that are not fully clear to me.

Wurmbrand (2004) shows that lexical restructuring constructions do not allow for scope reconstruction with universally quantified DPs, (29a). The same holds true of German TM, (29b):

(29) a. dass alle Fenster zu schließen vergessen wurden
that all windows to close.INF forgotten became.3PL
'that it was forgotten to close all the windows' $\forall \succ$ forget; *forget $\succ \forall$; LP
b. dass kein Mensagericht leicht zu essen ist
that no mensa.dish easy to eat.INF is
'that no mensa dish is easy to eat' no $\succ$ easy; *easy $\succ$ no; TM

[13]The biclausal/CP-complement analysis of German TM in Schwarzer (2019) is set up in such a way that A′-movement is clause-bound and hence also accounts for the clause-boundedness of German TM. However, on her account it seems accidental that the long passive is subject to the same restriction – unless it can also be analyzed as involving A′-movement – but as far as I can tell, there is no evidence for that.

The situation with scope is more complex, however, in that, according to Holl (2010:54f., 60, 100, 182), scope reconstruction *is* possible under both the deontic and the dispositional reading as long as different quantifiers are used. (30) illustrates this for the deontic reading:

(30) dass zwei von (diesen) drei Artikeln (sorgfältig) zu lesen sind
that two of these three articles carefully to read.INF are
'that two out of (these) three articles must be read (carefully)' 2 ≻ must; must ≻ 2

Scope reconstruction under the dispositional interpretation seems initially less acceptable; for instance, I find scope reconstruction difficult to obtain in all the examples provided in Holl (2010), especially in his ex. 24 on p. 182 where an interpretation like 'it is easy to solve two out of three exercises' seems difficult to obtain:[14]

(31) Zwei von diesen drei Aufgaben sind leicht zu lösen.
two of these three exercises are easy to solve.INF
'Two of these three exercises are easy to solve.'

However, one of the reviewers finds reconstruction unproblematic in such examples. In addition, Schwarzer (2019:183, ex. 32b) provides the following example:

(32) dass fünf Leute schwierig gleichzeitig zufriedenzustellen sind
that five people hard simultaneously to.please.INF are
'that five people are hard to please simultaneously'

I find the example significantly better if *schwierig* is replaced with the adverbial *kaum* 'hardly', but then, the narrow scope reading is indeed possible and can be paraphrased with 'it is hardly possible to please five people at the same time'. On the other hand, other examples modeled after those in Bobaljik and Wurmbrand (2005:811) do not seem to allow for scope reconstruction:

(33) weil nur deutsche Autos leicht zu verkaufen sind
because only German cars easy to sell.INF are
'because only German cars are easy to sell'

This sentence cannot be interpreted such that it is easy to only sell German cars. I thus conclude that, while the empirical picture is more complicated in that scope reconstruction is not blocked throughout, the behavior of German TM seems quite parallel to that of the long passive (although I am not sure if scope reconstruction is ever possible in the long passive; a version of (32) such as *wenn fünf Leute gleichzeitig zufriedenzustellen versucht würden* 'if it were attempted to satisfy five people at the same time' only seems to allow the wide scope reading of the TM-subject).

Given these properties, one can essentially adopt the analysis for the long-passive (as, e.g., in e.g. Wurmbrand 2001) to the modal passive/TM: the embedded object moves from the dependent VP into the matrix subject position. The trigger for this movement step is taken to be case given that the infinitive only corresponds to a VP (rather than a vP) and hence no accusative case is available. The embedded object thus moves into the matrix clause to get case. The restrictions on scope reconstruction could be motivated by the assumptions in Wurmbrand (2004) and Bobaljik and Wurmbrand (2005) on the interpretation of chains (which for reasons of space, we cannot discuss in detail here); but given that scope reconstruction does not seem to be completely blocked, those assumptions will have to be amended.

[14]The situation would thus be parallel to English TM where scope reconstruction is usually taken to be impossible, see, e.g., Řezáč (2006), Gluckman (2022:237f.); but see Longenbaugh (2017) for a different view.

3.3. Accounting for restrictions on experiencer placement

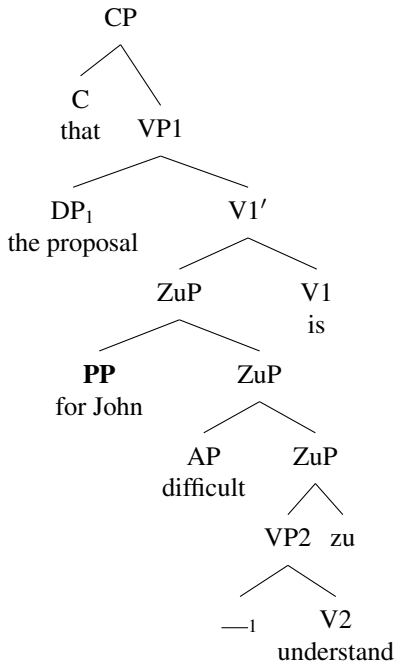
Recall from above that the experiencer can only occur in certain positions in German TM:

(34) dass der Vorschlag {für Hans$_A$} schwer {*für H.$_B$} zu verstehen {*für H.$_C$} ist {für H.$_D$}
that the.NOM proposal for John difficult for J. to understand.INF for J. is for J.
'that the proposal is difficult to understand for John'

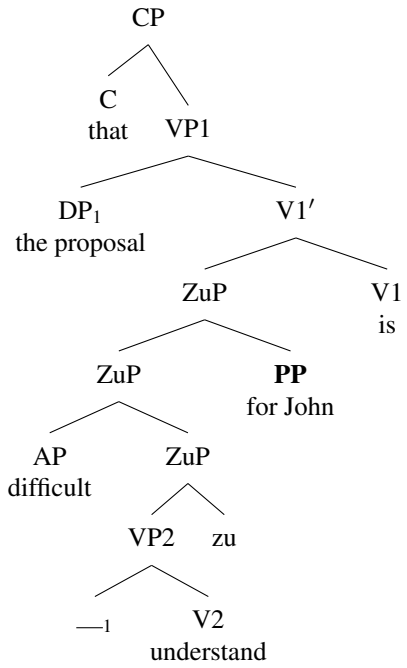
We will now show that these restrictions can be related to the constituency of the construction and an independent adjacency requirement in German verb clusters.

Given the modal passive analysis, the non-finite clause, labeled as *Zu*P in what follows, is the complement of matrix *sein* 'be'. The adjective is analyzed as an adverbial adjective and, like adverbial adverbs quite generally, is left-adjoined to *Zu*P. One can assume that both AP and PP are adjuncts that are independent of each other given that each can occur without the other. Since the AP can have scope above (dispositional) or below (deontic) the modal, one must assume that it can attach above or below *Zu*P. In what follows, we will focus on examples where the adjective takes scope above the modal component. Semantically, the experiencer applies to the VP modified by the AP, i.e., the 'toughness' of an action is evaluated regarding the experiencer. Hence, the PP must be structurally higher/merged after the AP. Given that adjuncts can normally be adjoined on either side, the PP can be adjoined to *Zu*P on the left or on the right, as shown in (35) and (36) (again, I use English words for ease of representation):

(35)

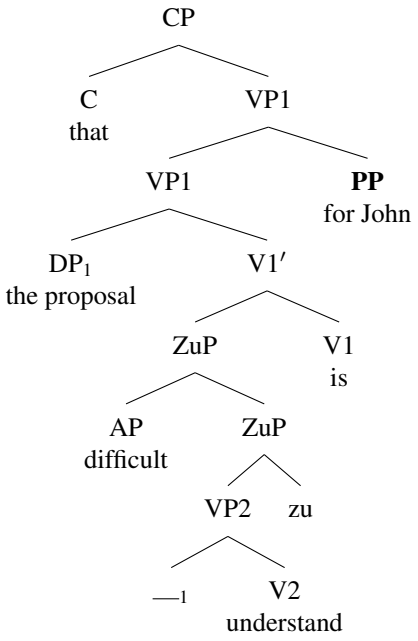


(36)



Since PPs can be extraposed in German, the experiencer can also occur at the end of the clause:

(37)



These basic assumptions about the constituency account for three of the four placement facts: Left-adjunction to *Zu*P as in (35) accounts for the grammaticality of option A in (34). Extraposition of the PP in (37) accounts for the grammaticality of option D in (34). The ungrammaticality of placing the experiencer between adjective and infinitival clause, i.e., option B in (34), simply follows for semantic reasons given that the experiencer has to be merged higher than the adjective (see (45) below for evidence that A+PP do not form a constituent). What remains to be accounted for is placement option C in (34), which is ungrammatical. Given the possibility of right-adjunction of PPs in German as in (36), it cannot be related to constituency.

The impossibility for the experiencer to occur between the infinitival clause and matrix *sein* 'be' – option C – can be related to a general adjacency requirement of the verbal elements within verb clusters: Whenever verbs occur in the so-called descending order, i.e., when the governing verb follows the governed verb, the verbal elements cannot be interrupted by non-verbal material, see Haider (2003) for the first detailed discussion and Salzmann (2013) for an overview of the various proposals to account for this adjacency requirement. The following data are taken from Salzmann (2013:100f.): the PP-complement of the verb *reden* 'speak' is initially merged as a complement to the left of the verb and can be extraposed to VP (38a). In a verb cluster, however, he PP cannot be extraposed to any of the non-final verbs. The only grammatical position is after the entire cluster, (38b):

(38) a. dass er {✓darüber} redete {✓darüber}
that he about.it talked.3sg about.it
'that he talked about it'

b. dass man __ reden {*darüber} können {*darüber} sollte {✓darüber}
that one talk.INF about.it can.INF about.it should.3SG about.it
'that one should be able to talk about it'

Importantly, the constraint only holds for verb clusters. Under VP-topicalization, extraposition of the PP to the lexical VP is unproblematic:

(39) [__ reden darüber] sollte man schon können
talk.INF about.it should.3SG one indeed can.INF
'one should indeed be able to talk about it'

This somewhat paradoxical state of affairs has found different explanations, e.g., by means of a base-generated complex head in Haider (2003), a prosodic restriction on verb clusters in Wurmbrand (2007) or cluster formation at PF in Salzmann (2013). Whatever may ultimately turn out to be the best account, what is crucial for our purposes is that experiencer placement in TM displays the same behavior: Once the infinitival clause is topicalized, the PP can occur after the infinitive:

(40) [Schwer zu verstehen für Hans] war der Vorschlag nicht.
difficult to understand.INF for John was the proposal not
'The proposal was not difficult to understand for John.'

Thus, as in other verb clusters, right-adjunction is only prohibited within the verb cluster; the constituency assumed in (36) thus also makes the right prediction for (40).

The constituency adopted in (35), (36) and (37) makes a few further correct predictions: First, given that AP and PP are adjuncts, they should be able to move independently, a prediction that is borne out ((41a) is repeated from above):

(41) a. [Nur schwer]$_2$ ist der Vorschlag$_1$ {für H.} [$\_\__2$ $\_\__1$ zu verstehen] gewesen {für H.}.
only difficult is the proposal for J. to understand.INF been for J.
'The proposal was really difficult to understand for John.'
b. [Für Hans]$_1$ ist der Vorschlag [$\_\__1$ nur schwer zu verstehen] gewesen.
for John is the proposal only difficult to understand.INF been

Third, topicalization of *Zu*P without AP and PP is predicted to be grammatical given that adjuncts can generally be stranded under VP topicalization. The PP can then either occur before or after the AP since it can be adjoined to the left ((35)) or extraposed to the right ((37)):

(42) [zu verstehen]$_1$ ist der Vorschlag {für Hans} sehr schwer $\_\__1$ gewesen {für Hans}
to understand.INF was the proposal for John very difficult been for John

Fourth, topicalization of *Zu*P with the AP but without the PP is predicted to be possible given that they form a constituent to the exclusion of the PP, which is then either stranded in its *Zu*P-adjoined position ((35)) or in extraposed position adjoined to the matrix VP (37)):

(43) [schwer zu verstehen]$_1$ ist der Vorschlag {für Hans} $\_\__1$ gewesen {für Hans}
difficult to understand.INF is the proposal for John been for John

Fifth, the reverse, i.e., topicalization of *Zu*P with the PP but without the AP is correctly predicted to be bad as they do not form a constituent:

(44) ??[zu verstehen für Hans]$_1$ ist der Vorschlag schwer $\_\__1$ gewesen
to understand.INF for John is the proposal difficult been

Sixth, topicalization of AP+PP without the *Zu*P is correctly predicted to be ungrammatical since the two do not form a constituent (some speakers seem to find such sentences acceptable, perhaps because the string is locally acceptable; the examples become clearly worse once such a parse is blocked by means of *nur* 'only'):

(45) ??[(Nur) Schwer für Hans] ist der Vorschlag [zu verstehen] gewesen.
only difficult for John is the proposal to understand.INF been

Thus, in summary, the basic constituency [PP [AP [*Zu*P]]] with some flexibility of positioning the PP makes the correct predictions for a wide range of data, including most of the placement possibilities of experiencers. There is one option that the constituency allows but is ruled out by an independent adjacency requirement in verb clusters. Thus restrictions on the placement of experiencers in German TM do not re-

quire reference to intervention but follow from independent properties of the construction/the language.[15,16]

4. Conclusion

In this short paper, we have addressed the syntactic properties of the German translational equivalent of English *tough*-movement. We have seen that while its syntax differs radically from that of its English counterpart (no A′-movement/predicate abstraction, the adjective is just an adjunct), it also bans experiencers from certain positions; as in English, the sequence A–PP–InfP is degraded. Because of these differences, many of the proposals that have been made for the restrictions in English cannot be applied to German: Longenbaugh (2016) explains the intervention effect by means of the fact that A-movement is blocked because the infinitival clause is an external argument. But since A-movement is a crucial component of the German TM-variant and is certainly possible, this explanation does not work. A type mismatch as in Keine and Poole (2017) also cannot be the reason given that there is no evidence for predicate abstraction in the embedded clause in the first place. Rather, the restrictions we have observed simply follow from independent phrase structural properties of German, on the one hand from the constituency one would attribute to the construction under a modal passive analysis, on the other from an independent adjacency requirement in verb clusters. The resulting analysis makes additional correct predictions for various constituency tests. Our result is thus in line with approaches like Bruening (2014) and Salzmann (2023) where such restrictions are related to basic word order properties of the language rather than syntactic intervention. This is a welcome result because, just like in English, recall ex. (7), experiencers otherwise do not intervene in A-movement in German:

(46) dass [der Vorschlag]$_1$ dem Peter [__$_1$ vernünftig zu sein] scheint
that the proposal the.DAT Peter reasonable to be.INF seems
'that the proposal seems to John to be reasonable'

In addition, the degradedness also obtains in the attributive construction, thus, in the absence of A-movement, see (47), and in the absence of the adjective but with adverbials, see (48):

(47) der {für Hans} schwer {*für Hans} zu verstehen-de {*für Hans} Vorschlag
the for John difficult for John to understand.INF-PTCP for John proposal

(48) dass der Vorschlag {für H.} kaum {*für H.} zu verstehen {*für H.} ist {für H.}
that the proposal for J. hardly for J. to understand.INF for J. is for J.
'that the proposal is hardly comprehensible for John'

In the appendix, I will briefly address two challenges. On the one hand, we will see that the 3rd Construction variant of German TM shows the same placement restrictions as the regular restructuring variant, even though its surface constituency is normally assumed to be more similar to that of the expletive variant. This may thus suggest that the syntax of the 3rd Construction has to be reconsidered in the light of these facts. On the other hand, we will address TM involving adjectives that do not occur in the expletive variant. For those, the modal passive analysis may seem less obvious, while the placement restrictions on experiencers are the same.

[15] As correctly pointed out by a reviewer, the experiencer placement facts also follow under approaches like Schwarzer (2019) where the adjective takes the CP as its complement as long as the experiencer is either adjoined to AP or merged as a specifier of A (or some separate head above A). The explanation for the unavailable orders would also be the same (constituency, adjacency requirement). Things are different in the approach by Keine and Poole (2017) where the adjective moves across the experiencer and thus constituency-wise, the order A–PP–InfP is possible. The constituency in Gluckman (2022) with the infinitival clause as an adjunct arguably does not rule out an experiencer between adjective and infinitival clause, but the semantic analysis in Gluckman (2021) does in that the experiencer could not be combined with the predicative adjective.

[16] The placement restrictions seem to be the same when the controller of the subject of the infinitive is expressed as a *von*-PP rather than a *für*-PP. This suggests that a *von*-PP is also merged above the adverbial adjective. Note than *von*-PPs in passive-like structures independently occur above adverbial adjectives.

Appendix: Further challenges

The modal passive in the 3rd Construction and intervention

In this first subsection of the appendix I will discuss the 3rd Construction variant of TM and restrictions on the placement of experiencers. As shown in van Riemsdijk (1982:79), the German/Dutch modal passive/TM-construction can also occur in a 3rd Construction variant (where the infinitival XP is extraposed but behaves like a restructuring infinitive):

(49) a. Hij denkt dat dit bier niet is [te drinken].
he thinks that this beer not is to drink.INF
'He thinks that this beer is not drinkable.'
b. wobei das schwierig ist [zu beurteilen] bei einem Pferd
although that difficult is to assess.INF at a horse
'although that is difficult to assess with a horse'[17]

This option is rather limited, though, in that extraposition quickly degrades once the infinitival clause becomes larger (cf. also van Riemsdijk 1982:79; note that the same holds for the 3rd Construction variant of the long passive):

(50) ?/??dass Hans schwer ist [davon zu überzeugen]
that John difficult is of.it to convince.INF
'that John is difficult to convince of this'

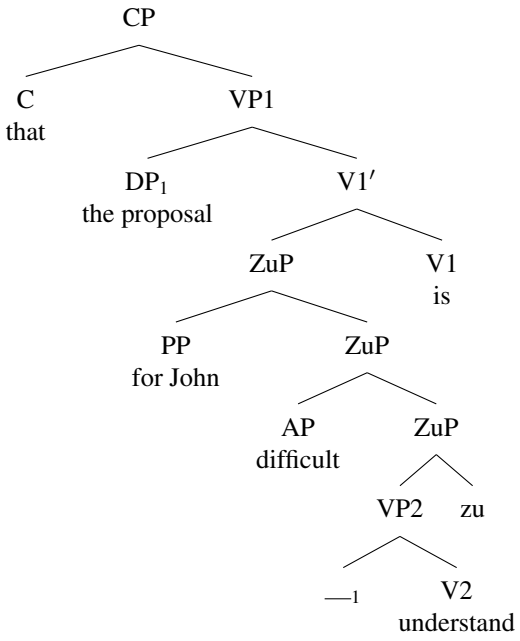
As in the regular restructuring variant, there also seem to be 'intervention' effects in that the PP can only occur in some but not all positions:

(51) dass der Vorschlag {für Hans$_A$} schwer {*für H.$_B$} ist {*für H.$_C$} zu verstehen {für H.$_D$}
that the proposal for John difficult for J. is for J. to understand.INF for John
'that the proposal is difficult to understand for John'

These restrictions do not follow under the assumptions made so far. The basic constituency assumed for TM is repeated in (52) on the next page:

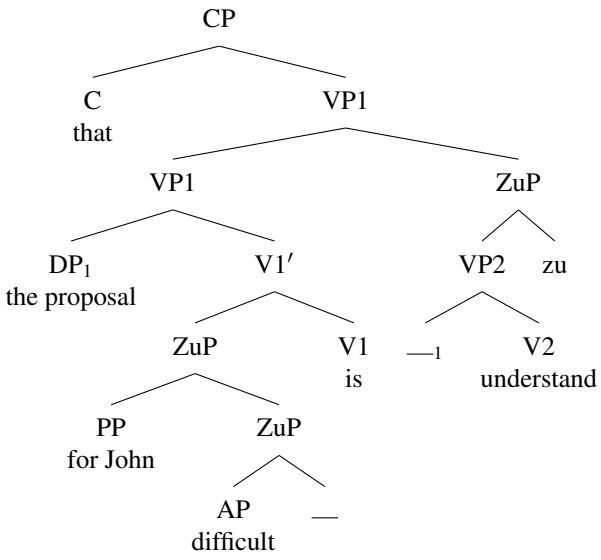
[17] http://www.horse-gate-forum.com/forum/ratgeber-pferde/medizin-und-gesundheit/sonstiges/135929-seltsames-krankheitsbild-wer-wei%C3%9F-rat.

(52)



The 3rd Construction is usually taken to involve remnant extraposition of the dependent infinitival clause. Applied to the case at hand, this would involve (remnant) extraposition of *Zu*P, leading to the structure in (53):

(53)



This correctly predicts that the PP should be able to occur to the left of the adjective as in option A. If the PP is extraposed all the way to the right, i.e., is right-adjoined to the higher segment of VP1, we obtain option D. However, since the constituency is essentially like that of the expletive construction, we also expect the PP to be grammatical when adjoined to the right of *Zu*P (option B) or when it undergoes short extraposition, i.e., adjunction to the lower segment of VP1 (option C).

The unacceptability of option B is unexpected given that adjacency in the verb cluster cannot really be at stake here since only the adjective and the copula are present, which do not require adjacency, at least not

in normal non-verbal predication, cf. *dass es schwer für Hans ist* 'that it is difficult for John'. Perhaps there is a parsing issue in that the adjective is temporarily parsed as predicative with the PP as its complement but later has to be revised once the extraposed *Zu*P is encountered. The unacceptability of option C is equally surprising given that extraposition of a constituent to a position before the extraposed remnant Inf-XP is, in principle, possible, see Salzmann (2019b). In other words, the 3rd Construction variant shows the same restrictions as the regular restructuring version, even though the surface constituency is usually taken to be more similar to that of the expletive construction. Perhaps, the placement restrictions on experiencers suggest that this should be reconsidered.[18]

Tough-movement with other types of adjectival predicates

As in English, the German TM-variant also occurs with adjectives that do not occur in the expletive construction, e.g., with the equivalent of English *pretty to look at* (cf. Lasnik and Fiengo 1974:566):[19]

(54) dass das Haus (für die meisten) hübsch anzusehen ist
that the house (for the most) pretty to.look.at.INF is
'that the house is pretty to look at for most people'

TM with adjectives of this type is discussed in Holl (2010:chapter 6.2). He proposes an analysis that is similar to that of Gluckman (2022) for English in that the adjective is taken to be predicative, the infinitival clause is taken to be predicative as well – as the result of empty operator movement –, and the two combine via predicate modification. Analyzing the adjective as predicative seems inevitable given that adjectives like *hübsch* 'pretty' don't have an adverbial use. Since TM based on the *pretty*-class is also possible in prenominal position, Holl (2010:186) is forced to assume a different syntax (but the same semantics) for that construction with the infinitive still as the head.

Interestingly, as far as I can tell, the placement possibilities for the experiencer are the same as in the TM-version discussed in the main part of the paper, i.e., the PP cannot occur between adjective and infinitive, and not between the infinitive and matrix 'be'. The latter is not surprising given the general adjacency requirement within the verb cluster discussed above. But the fact that the PP cannot occur between adjective and infinitive at least cannot be related to the constituency: if the PP is adjoined to the adjective (or is treated as a complement), it should be possible for it to occur to the right of the adjective. To account for this positional restriction, recourse to semantic composition (along the lines of Keine and Poole 2017) would be necessary: the PP could simply not combine with a predicative adjective. This would lead to the somewhat peculiar result that the surface structure is the same as in the other TM-variant, but the explanation for the placement restrictions would be partially different, an unsatisfactory state of affairs.

Even worse, it is actually not clear that an analysis in terms of operator movement is justified. Note that this would predict restrictions on extraction from the infinitive. But as far as I can tell, there are no restrictions whatsoever, just like in TM based on *tough*-like adjectives. The following examples illustrate this (in both cases, the topicalized constituent clearly modifies the infinitive, it is not compatible with 'be'):

[18] One of the reviewers suggest that the 3rd Construction has a different syntax, namely one that is more similar to English TM with the *Zu*P as a complement of A. While not impossible, it is not clear whether anything really points in that direction. The surface order can also be obtained if what is extraposed is the lower segment of *Zu*P, as assumed above. The fact that the experiencer leads to degradation when occurring to the right of *Zu*P may in fact be an indication that we are not dealing with a predicative adjective. Finally, the 3rd Construction version is also possible in the absence of an adjective. This is shown by the Dutch example above. While extremely restricted in German, one can find examples like *weil es kaum ist zu glauben* 'because it is hard to believe'.

[19] Demske-Neumann (1994:186) provides a list of adjectives that differ from the *easy* class in also predicating properties of individuals. However, most of them (e.g., *lecker* 'tasty', *lustig* 'funny' etc.) differ from the *pretty* class in that they are also compatible with the expletive construction, i.e., they can also predicate properties of propositions and hence are not equally interesting.

As pointed out by one of the reviewers, the availability of an expletive version is sometimes taken to be a defining property of *tough*-movement. This has the consequence that similarly looking constructions like the one to be discussed would no longer be expected to have the same syntax. As the facts below show, at least for German, this may be correct. For relevant discussion about the relationship between *tough*-movement and the modal passive in Romance languages, see, e.g., Giurgea and Soare (2010).

(55) a. [Von Hand] ist die Tuba unhandlich zu tragen.
by hand is the tuba unwieldy to carry.INF
'The tuba is unwieldy to carry by hand.'
b. [Mit eigenen Augen] ist sie hübsch anzusehen.
with own eyes is she pretty to.look.at.INF
'She is pretty to look at with one's own eyes.'

But without operator movement it is not clear how to turn the infinitival clause into a predicate. For reasons of space, I leave further discussion of this challenging case for another occasion.[20]

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I am grateful to two reviewers for very helpful comments that have led to a substantial improvement of the paper.

It was Johan who introduced me to *tough*-movement at a very early stage of my PhD. I was intrigued but at that point couldn't do anything with it. It wasn't until several years later that I realized that the concept could be fruitfully applied to the prolepsis construction I was studying in my dissertation, a revised version of which appeared in Salzmann (2017).

Van harte gefeliciteerd, Johan! Thank you so much for your support over many years and your contributions to the field!

References

Bennis, Hans. 1987. *Gaps and Dummies*. No. 9 in Linguistic Models. Foris, Dordrecht. https://doi.org/10.1515/9783110889536.

Bennis, Hans. 1990. Ti: A note on modal passives. In *In Grammar in Progress: GLOW Essays for Henk van Riemsdijk*, edited by Joan Mascaró and Marina Nespor, pp. 33–40. Foris, Dordrecht.

Bobaljik, Jonathan and Susi Wurmbrand. 2005. The domain of agreement. *Natural Language & Linguistic Theory* 23 4: 809–65. https://doi.org/10.1007/s11049-004-3792-4.

Browning, Marguerite Ann. 1987. *Null Operator Constructions*. Ph.D. thesis, MIT, Cambridge, Ma.

Bruening, Benjamin. 2014. Defects of defective intervention. *Linguistic Inquiry* 45 4: 707–19. https://doi.org/10.1162/LING_a_00171.

Chomsky, Noam. 1977. On wh-movement. In *Formal Syntax*, edited by Peter Culicover, Thomas Wasow, and Adrian Akmajian, pp. 71–132. Academic Press, New York.

Chomsky, Noam. 1982. *Some Concepts and Consequences of the Theory of Government and Binding*. MIT Press, Cambridge, Ma.

Demske-Neumann, Ulrike. 1994. *Modales Passiv und Tough Movement. Zur strukturellen Kausalität eines syntaktischen Wandels im Deutschen und Englischen*. Niemeyer, Tübingen.

Giurgea, Ion and Elena Soare. 2010. Predication and the nature of non-finite relatives in Romance. In *Edges, Heads, and Projections*, edited by Sciullo Anna Maria Di and Hill Virginia, no. 156 in Linguistik Aktuell/Linguistics Today, pp. 191–214. John Benjamins, Amsterdam. https://doi.org/10.1075/la.156.12giu.

Gluckman, John. 2021. The meaning of the tough-construction. *Natural Language Semantics* 29 3: 453–99. https://doi.org/10.1007/s11050-021-09181-3.

[20] Regarding constituency tests, the *pretty*-class seems to behave like the *tough*-class in that the adjective or PP can be fronted by itself, A+*Zu*P can be fronted and A+PP cannot be fronted. There is one notable difference, though: Fronting the *Zu*P by itself is rather degraded:

(i) ??Zu tragen ist die Tuba (für Kinder) unhandlich gewesen.
to carry.INF is the tuba for kids unwieldy been
'The tuba was unwieldy to carry for kids.'

Gluckman, John. 2022. Taking time with the tough-construction. *Journal of Linguistics* 58 2: 233–68. https://doi.org/doi:10.1017/S002222672100013X.

Haider, Hubert. 2003. V-clustering and clause union: Causes and effects. In *Verb Constructions in German and Dutch*, edited by Pieter Seuren and Gerard Kempen, no. 242 in Current Issues in Linguistic Theory, pp. 91–126. John Benjamins, Amsterdam. https://doi.org/10.1075/cilt.242.04hai.

Haider, Hubert. 2017. 'Mittelfeld' phenomena: Scrambling in Germanic. In *The Wiley Blackwell Companion to Syntax*, edited by Henk van Riemsdijk and Martin Everaert. Wiley Blackwell, Oxford, 2 edn. https://doi.org/10.1002/9781118358733.wbsyncom048.

Hartman, Jeremy. 2011. (Non-)intervention in a-movement: Some cross-constructional and cross-linguistic consequences. *Linguistic Variation* 11 2: 121–48. https://doi.org/10.1075/lv.11.2.01har.

Heycock, Caroline. 1994. *Layers of Predication. The Non-Lexical Syntax of Clauses*. Garland, New York.

Hicks, Glyn. 2009. Tough-constructions and their derivation. *Linguistic Inquiry* 40 4: 535–66. https://doi.org/10.1162/ling.2009.40.4.535.

Hicks, Glyn. 2017. Tough-movement. In *The Wiley Blackwell Companion to Syntax*, edited by Martin Everaert and Henk van Riemsdijk. Wiley, Hoboken, NJ, 2 edn. https://doi.org/10.1002/9781118358733.wbsyncom035.

Höhle, Tilman N. 1978. *Lexikalistische Syntax: Die Aktiv-Passiv-Relation und andere Infinitkonstruktionen im Deutschen*. Max Niemeyer, Berlin. https://doi.org/10.1515/9783111345444.

Holl, Daniel. 2010. *Modale Infinitive und dispositionelle Modalität im Deutschen*. Akademie Verlag, Berlin. https://doi.org/10.1524/9783050062341.

Keine, Stefan and Ethan Poole. 2017. Intervention in tough-constructions revisited. *The Linguistic Review* 34 2: 295–329. https://doi.org/10.1515/tlr-2017-0003.

Lasnik, Howard and Robert Fiengo. 1974. Complement object deletion. *Linguistic Inquiry* 5: 535–70. Available at https://jstor.org/stable/4177842.

Longenbaugh, Nicholas. 2016. Non-intervention and tough-movement. In *Proceedings of NELS 46. Volume 2*, edited by Christopher Hammerly and Brandon Prickett, pp. 293–306. GLSA, Amherst.

Longenbaugh, Nicholas. 2017. Composite A/A'-movement: Evidence from English tough-movement. Unpublished ms.

Řezáč, Milan. 2006. On tough-movement. In *Minimalist Essays*, edited by Cedric Boeckx, no. 91 in Linguistik Aktuell/Linguistics Today, pp. 288–325. John Benjamins, Amsterdam. https://doi.org/10.1075/la.91.19rez.

van Riemsdijk, Henk. 1982. A note on case absorption. *Wiener Linguistische Gazette* 27–28: 71–82.

Russo Cardona, Leonardo. 2026. Voice and functional structure in Italo-Romance tough-constructions. *Isogloss. Open Journal of Romance Linguistics* 12 2: 1–42. https://doi.org/10.5565/rev/isogloss.524.

Salzmann, Martin. 2013. New arguments for verb cluster formation at PF and a right-branching VP. Evidence from verb doubling and cluster penetrability. *Linguistic Variation* 13 1: 81–132. https://doi.org/10.1075/lv.13.1.03sal.

Salzmann, Martin. 2017. *Reconstruction and Resumption in Indirect A'-Dependencies. On the Syntax of Prolepsis and Relativization in (Swiss) German and beyond*. No. 117 in Studies in Generative Grammar. De Gruyter Mouton, Berlin. https://doi.org/10.1515/9781614512202.

Salzmann, Martin. 2019a. Displaced morphology in German verb clusters. An argument for post-syntactic morphology. *Journal of Comparative Germanic Linguistics* 22: 1–53. https://doi.org/10.1007/s10828-019-09103-y.

Salzmann, Martin. 2019b. On the limits of variation in continental West-Germanic verb clusters. Evidence from VP-stranding, extraposition and displaced morphology for the existence of clusters with 213 order. *Journal of Comparative Germanic Linguistics* 22: 55–108. https://doi.org/10.1007/s10828-019-09104-x.

Salzmann, Martin. 2023. Experiencer intervention in English tough movement: Evidence from extraction of the tough adjective against syntactic- and semantic-intervention accounts. *Syntax* 26 2: 223–49. https://doi.org/10.1111/synt.12250.

Schwarzer, Marie-Luise. 2019. Tough-displacement without movement. In *Structure Removal*, edited by

Andrew Murphy, vol. 94, pp. 167–214. University of Leipzig, Leipzig.
Wurmbrand, Susi. 2001. *Infinitives: Restructuring and Clause Structure*. No. 55 in Studies in Generative Grammar. Mouton de Gruyter, Berlin. https://doi.org/10.1515/9783110908329.
Wurmbrand, Susi. 2004. Two types of restructuring–lexical vs. functional. *Lingua* 114 8: 991–1014. https://doi.org/10.1016/S0024-3841(03)00102-5.
Wurmbrand, Susi. 2007. How complex are complex predicates? *Syntax* 10 3: 243–88. https://doi.org/10.1111/j.1467-9612.2007.00110.x.

A *heap* of sound symbolism

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Abstract

Classifiers like *drop* or *splash* (*of water*) are commonly taken to denote portions of an approximate *quantity* in a specific *shape*. But if this is so, why can we not talk about a #*drop of wood*, even though wood can, in principle, occur in the size and shape of a drop? Rooryck (2024) argues that static properties like size and shape are secondary, and that classifiers primarily express what kind of transformations materials undergo under the influence of a force. Thus, *wood* cannot undergo the event in which a *drop* is created. This paper presents evidence from sound symbolism for this emphasis on dynamic properties. Although some sounds in classifiers appear to be motivated by static properties (e.g., the labial /p/ in *drop* by its round shape), sound symbolism motivated by dynamic properties is more pervasive. For instance, a *splash* is formed in an event in which a portion of liquid moves through the air (/s/), followed by impact on a surface (/p/), radial dispersion of smaller blobs of liquid (/l/), and the impacts of these smaller blobs shortly after one another (/ʃ/). This calls for a more refined view on the semantics of classifiers.

1. Introduction

Rooryck (2024) takes a novel approach to classifiers, arguing that they "encode the result of a universal, internist, and computational cognitive mechanism that describes the dynamic patterns of spatial distribution of the material denoted by the predicate in their complement". Thus, a classifier like *drop (of water)* does not merely denote a shape, but rather "the transformations into shapes that are afforded by the material". In other words, Rooryck shifts the perspective from static properties (e.g., shape) to dynamic ones (behavior under influence of forces).

The aim of this paper is to provide additional evidence for this claim from sound symbolism, focusing on English. Examples of English classifiers are provided in (1).[1]

(1)

blaze (of fire)	*block (of ice)*	*breath (of air)*
burst (of adrenaline)	*crust (of bread)*	*drop (of moisture)*
flow (of blood)	*flurry (of lace)*	*glimmer (of silver)*
grain (of wheat)	*line (of coke)*	*lump (of meat)*
patch (of snow)	*pile (of linen)*	*pinch (of salt)*
pool (of moonlight)	*puff (of smoke)*	*rush (of ink)*
sheet (of cardboard)	*slice (of lemon)*	*splash (of rum)*
stream (of lava)	*tinge (of greenery)*	*touch (of colour)*
trail (of ash)	*trickle (of traffic)*	*whiff (of urine)*

I will argue that the form of many English classifiers is motivated by properties of the event in which a portion of material is separated from a larger whole – rather than properties of that portion or its shape

[1] The term *classifier* is usually reserved for special morphemes that occur in dedicated syntactic constructions and frequently do not have a meaning of their own. This is the case for many numeral classifiers, which are required in languages that have them to modify a noun by a numeral. Aikhenvald (2025:119–20) distinguishes such "true" classifiers from "quantifying nouns" like *stalk (of celery)*, which "are used as any other noun would be", "have a lexical meaning of their own", and do not "occur in a dedicated construction". One can question these requirements, since nouns like *stalk* do occur in a dedicated construction (*Cl of M*), are semantically distinct in their classifier use (a *pinch of salt* refers to a quantity, unlike the act of a *pinch*), and "true" classifiers can be transparently related to common nouns (Aikhenvald 2025:159 mentions a case in Gumuz). To be sure, English classifiers are indeed syntactically more flexible than "true" classifiers. However, this paper is primarily concerned with semantics. Like "true" classifiers, the English examples in (1) tell us something about the way the material in their complement presents itself in its environment, as a result of its physical properties. This justifies the use of the term *classifier* in this context.

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directly. Based on a set of common English sound–meaning mappings and a sample of 101 classifiers, I will show that the vast majority of English classifiers iconically reflect dynamic rather than static properties.

The idea that these classifiers iconically reflect dynamic properties is best illustrated with an example. Take the minimal opposition between *splash* and *splatter*. Although these classifiers have a similar form and both roughly denote 'a small amount of liquid, scattered in smaller portions', they are in fact used with significantly different materials, which can be explained from the differences in form. *Splash* is used with true liquids (*water*, *rum*, *vinegar*), whereas *splatter* is used with substances of higher density (*ketchup*, *jam*, *mud*). Paint can be used with either, but a *splash of paint* suggests the use of watercolors and a *splatter* that of acrylics. In the analysis presented below, the common part *spla-* iconically reflects the beginning of the event producing a splash or splatter: the movement of an amount of material through the air (/s/), followed by punctual impact (/p/) and the following radial dispersion of the material, now separated into smaller blobs (/l/). From here on the two classifiers differ. In *splatter*, the higher density material has been separated into a small number of largish blobs, which each have their own punctual impact on the surface – hence /t/ + frequentative *-er*. In *splash*, the material has scattered into a larger number of much smaller particles. The individual impacts of these particles cannot be distinguished, so /ʃ/ is used to imitate the shower of smaller particles.

Crucially, the iconic mapping of *splash* is onto dynamic properties of the verb ($splash_{\mathrm{V}}$), and not onto static, physical properties of the entity denoted by the noun ($splash_{\mathrm{N}}$): /s/, /p/, /l/, and /ʃ/ are not motivated by the meaning of 'a small amount of liquid, scattered in smaller portions' (other than via the meaning of the verb *splash*). The same is true for *splatter*. This supports the idea that classifiers primarily express dynamic properties of materials, such as the events that occur when forces are exerted on portions of that material.

Before generalizing this example to a sample of 101 classifiers, I will first introduce some necessary background (section 2). Section 3 describes my method, and section 4 presents the analysis. Section 5 concludes. For the reader's orientation, table 1 provides a glimpse of the correspondences to be discussed, distinguishing between strong correspondences, weak correspondences (which account for only some of the classifiers in a semantic class), infrequent correspondences (which account for (almost) all classifiers in a small semantic class), and uncertain correspondences (which have a significant number of counterexamples). Throughout, the reader may refer to table 2 to see which phonemes in the classifiers in my sample are, on my analysis, iconically motivated.

2. Background

My argument will depend on establishing sound–meaning correspondences that play a role in English classifiers. There are different types of systematic sound–meaning correspondences that we need to distinguish. Flaksman (2024) distinguishes various types of iconicity leading to such correspondences. The most relevant to us here are onomatopoeic words, mimetic extrakinesemisms, and mimetic intrakinesemisms.

First, *onomatopoeic words* like *buzz* and *hiss* imitate natural sounds using acoustic means, such as the noise of the fricatives /z/ and /s/ in these examples, or the use of a plosive to imitate an abrupt sound in ***sp****lash* and ***sp****latter*. Onomatopoeic words imitate natural sounds and therefore reflect dynamic properties. In English classifiers, these mappings often have a metaphorical extension where they reflect aspectual properties. For instance, the plosives in ***b****urs****t*** *(of colour, fire)* reflect the abrupt start and end of the event that is a *burst* – as opposed to the continuous, unbounded nature of classifiers that do not start or end with a plosive, such as *flow* and *stream*.

Second, *mimetic extrakinesemisms* imitate traits of objects such as size, shape, and movement, using articulatory means. Examples are ***bubb****le*, where the labials and rounded vowel reflect rounded shape, and ***wee***, where the close front vowel reflects small size. Mimetic extrakinesemisms typically reflect static properties. In general, they form a marginal group in English (Flaksman 2024:55). They play a role in some classifiers (such as indeed *bubble (of air)*), but less frequently so than other types of iconicity which

Correspondences with static features (section 4.1)		
Labial → round shape	no evidence	***bubb**le*, *s**p**ot*
Rounded vowel → round shape	infrequent	*b**a**ll*, *p**oo**l*
Close front vowel → small size	uncertain	*b**ea**d*, *f**i**lm*
Lateral → large size	uncertain	*b**l**ast*, *gu**l**p*
Rhotic → ragged/rough/uneven shape	strong	*c**r**ust*, *g**r**ain*
Voiced → three-dimensional	strong	***bund**le*, *we**dg**e*
St- → one-dimensional and rhotic → flexible	infrequent	***st**ick*, ***str**ing*
Correspondences with dynamic features (section 4.2)		
Plosive → abrupt onset/termination	strong	***b**laze*, *shre**d***
Fricative → continuous/gradual onset/termination	strong	***sh**een*, *brea**th***
Fricative → multiple onset/termination	infrequent	***h**ail*, *spla**sh***
Fricative → high velocity	strong	***flash***, ***s**urge*
Rhotic → multiple onset; vibratory onset/nucleus	infrequent	***tr**ail*, ***r**ush*
Nasal → continuous/gradual termination; long nucleus	weak	*bea**m***, *pi**n**ch*
Lateral → radial dispersion nucleus	strong	*spl**a**sh*, *p**all***
-Le/*-er* → repetition	strong	*show**er***, *trick**le***

Table 1: Sound–meaning correspondences to be discussed in section 4.

bag /bæg/	*drop* /dɹɑp/	*jet* /ʤɛt/	*sack* /sæk/	*stream* /stɹim/
ball /bɔl/	*ear* /iɹ/	*line* /laɪn/	*scrap* /skɹæp/	*stretch* /stɹɛtʃ/
bank /bæŋk/	*fall* /fɔl/	*load* /loʊd/	*shaft* /ʃæft/	*strip* /stɹɪp/
bead /bid/	*field* /fild/	*loaf* /loʊf/	*sheen* /ʃin/	*surge* /sɝdʒ/
beam /bim/	*film* /fɪlm/	*lump* /lʌmp/	*sheet* /ʃit/	*swirl* /swɝl/
bed /bɛd/	*flash* /flæʃ/	*morsel* /mɔɪsʌl/	*shower* /ʃaʊɝ/	*tangle* /tæŋgʌl/
blast /blæst/	*flow* /floʊ/	*mound* /maʊnd/	*shred* /ʃɹɛd/	*thread* /θɹɛd/
blaze /bleɪz/	*flurry* /flɝi/	*pall* /pɑl/	*shroud* /ʃɹaʊd/	*tinge* /tɪndʒ/
blob /blɑb/	*flush* /flʌʃ/	*patch* /pætʃ/	*slab* /slæb/	*touch* /tʌtʃ/
block /blɑk/	*gasp* /gæsp/	*pile* /paɪl/	*slice* /slaɪs/	*trace* /tɹeɪs/
breath /bɹɛθ/	*glimmer* /glɪmɝ/	*pinch* /pɪntʃ/	*sliver* /slɪvɝ/	*trail* /tɹeɪl/
bubble /bʌbʌl/	*grain* /gɹeɪn/	*plain* /pleɪn/	*smell* /smɛl/	*trickle* /tɹɪkʌl/
bunch /bʌntʃ/	*growth* /gɹoʊθ/	*plot* /plɑt/	*speck* /spɛk/	*twist* /twɪst/
bundle /bʌndʌl/	*gulp* /gʌlp/	*plume* /plum/	*splash* /splæʃ/	*wall* /wɔl/
burst /bɝst/	*gush* /gʌʃ/	*pocket* /pɑkʌt/	*spot* /spɑt/	*wave* /weɪv/
chunk /tʃʌŋk/	*gust* /gʌst/	*pool* /pul/	*spray* /spɹeɪ/	*wedge* /wɛdʒ/
cloud /klaʊd/	*hail* /heɪl/	*puff* /pʌf/	*square* /skweɹ/	*wisp* /wɪsp/
core /kɔɹ/	*haze* /heɪz/	*queue* /kju/	*stack* /stæk/	
crumb /kɹʌm/	*heap* /hip/	*ring* /ɹɪŋ/	*stick* /stɪk/	
crust /kɹʌst/	*hint* /hɪnt/	*riot* /ɹaɪʌt/	*strain* /stɹeɪn/	
dash /dæʃ/	*hunk* /hʌŋk/	*rush* /ɹʌʃ/	*streak* /stɹik/	

Table 2: The 101-classifier sample, with iconically motivated phonemes in blue, counterexamples in magenta, phonemes that are motivated by one correspondence but a counterexample for another underwaved, and other phonemes grayed out.

reflect dynamic properties.

Finally, *mimetic intrakinesemisms* imitate movements of the speech apparatus using acoustic and articulatory means. This type is relevant only for a relatively small number of classifiers that happen to denote portions sampled by the mouth or nose, such as *brea**th** (of air)* (where the fricative /θ/ reflects inhaling) and ***gulp** (of air)* (where velar /g/ reflects the use of the throat, lateral /l/ the use of the tongue, and labial /p/ the use of the lips). For those classifiers that do involve mimetic intrakinesemism, dynamic properties are reflected, because this type of iconicity refers to the event in which the mouth or nose is used to separate a portion of material from a larger whole.

In her etymological dictionary of English imitative words, Flaksman (2024) identifies an impressive range of sound–meaning correspondences active in English. These correspondences are reflected in a large number of words which she shows to involve the types of iconicity discussed above. However, she only included words which are suggested to involve iconicity in standard dictionaries of English. This method captures the most clearly sound-symbolic words (e.g., *clang* and other sound words), but misses many classifiers that potentially involve sound symbolism as well. Therefore, a fresh analysis of the specific set of classifiers is needed to determine to what extent, and in what way, they are imitative.

Phonaesthemes, though frequent in classifiers, will play only a minor role in my analysis. They can be described as "phonemic sequences systematically paired with certain meanings *regardless of their origin*" (Flaksman 2024:67, emphasis original), such as *gl-* for phenomena related to light (cf. *glitter*, *glow*, etc.; see Bolinger 1950, Marchand 1960:326, Sadowski 2001). Phonaesthemes may be arbitrary (this seems to be the case for *gl-*), or they may be (partially) motivated (Kwon and Round 2015:5 and references therein; Malysheva 2025). For instance, *spl-* is discussed as a phonaestheme for concepts related to liquids by Marchand (1960:322). This is motivated by the fact that liquids disperse in a radial pattern upon abrupt impact after motion, as described above for *splash* and *splatter*. However, the event described by /spl-/ can in principle occur with a broader set of substances. The fact that a ?*splash of sand* is odd cannot be explained from sound symbolism; the restriction of *spl-* to liquids is arbitrary, i.e., lexicalized in the phonaestheme. Phonaesthemes will simply be analyzed in terms of their component parts insofar they are sound symbolic. I will only mention partially lexicalized phonaesthemes as an explanation for apparent counterexamples.

3. Method

Although some degree of subjectivity will remain, I have attempted to make my method as objective as possible. The classifiers in my data set come from a corpus, and most of the sound–meaning correspondences are supported by the wealth of data in Flaksman (2024).

3.1. Data collection

First, the set of classifiers to be analyzed was extracted from the British National Corpus (BNC; BNC Consortium 2007). Sentences were parsed using CoreNLP (Manning et al. 2014) to extract instances of *a Cl of N*, where *Cl* is a monosyllable in terms of Rhodes and Lawler (1981) and Lawler and Rhodes (1981–2006);[2] multi-word complements and plural heads were ignored for simplicity. From the 743 complements that occurred more than once, only the 144 that could denote a concrete physical entity were kept. This yielded a data set of 374 potential monosyllabic classifiers, with 942 distinct head–complement pairs. From these I manually excluded head–complement pairs (i) that do not denote a portion of the material in the complement (*bird (of prey)*), (ii) that are so general they do not refer to any clear physical properties (*lot/piece (of bread)*), (iii) of which the classifier use is clearly a metaphorical extension of a distinct concrete meaning (*sea (of fire)*), or (iv) that are standardized unit terms (*inch (of snow)*; *glass* (*of coke*)). These words are either not classifiers (i), cannot be used to determine correspondences of sounds with meanings

[2]This use of the term also covers disyllables ending on unstressed /ʌl/, /ʌt/, /ɝ/, or /i/.

in the physical domain (ii), or are expected to be less iconic because the classifier use is secondary (iii–iv). Finally, I analyzed only the 101 remaining classifiers that occurred more than once. Although following this collection method meant losing some minimal pairs (e.g., the sample includes *splash* but not *splatter*), it avoids the risk of unconscious cherry-picking.

3.2. Tagging for semantic features

The 101 classifiers in the sample were manually tagged for both static and dynamic semantic features. Although the assignment of features to classifiers is to some extent subjective, the set of features itself is based on three sources from the literature. First, I included features that are well-known to be targeted by iconicity, such as size (with close front vowels corresponding to small size; Jespersen 1921–1922, Ohala 1994 and section 4.1 below). Second, I included features based on an a priori classification of acoustic denotata (Voronin 2006 [1982] in citation by Flaksman 2024:48–9), metaphorically mapped onto properties of events. For instance, Voronin (2006 [1982]) recognizes a class of "pulses": abrupt sounds such as hits and strikes. In my analysis, this is extended to the abrupt start or cessation of motion or light. Third, a few features – such as horizontal vs. vertical orientation – were added because they are often used in the description of classifier systems, without any hypothesis regarding iconicity.

Concretely, the following features were recognized:[3]

(2) a. Static features:

i. Size: large (*load*, *burst*) or small (*pinch*, *scrap*);
ii. Number of dimensions: 1 (*stream*), 2 (*pool*), or 3 (*cloud*);
iii. Flexibility: flexible, which includes curvedness (*thread*; *streak*), or inflexible (*line*);
iv. Orientation: horizontal (*patch*), vertical (*slice*), inward (*bundle*: an inward force binds the material together), or outward (*splash*: an outward force causes separation of the splash from a larger mass);
v. Shape: convex/round (*drop*), square (*block*), or ragged/rough/uneven (*crust*).

b. Dynamic features:

i. Event onset: abrupt (*puff*), continuous (*stream*), gradual (*swirl*), vibratory/oscillating (*rush*, *trickle*), or multiple (*trail*);
ii. Event nucleus: long (*pinch*: the nucleus is the continued squeezing), short (*touch*), continuous (*flow*), radially dispersive (*splash*, *pool*), or vibratory (*shred*, *scrap*: the nucleus is the tearing event);
iii. Event termination: abrupt (*drop*), continuous (*flow*), gradual (*breath*), or multiple (*splash*: multiple blobs of liquid make impact on a surface);
iv. Velocity: high (*blast*) or low (*trickle*);
v. Iterativity: classifiers like *glimmer* were tagged as involving a gradual onset and termination which is repeated (iterative), resulting in a pulsating/throbbing light. Similarly, a *swirl* involves repeated radial movements.

In some cases, event onsets or terminations are internally complex. As explained above, a *splash* has a complex onset involving (i) a continuous movement of a liquid through the air, followed by (ii) the abrupt impact of that mass on a surface. A *touch* has a complex termination involving (i) the abrupt end of the touching event, followed by (ii) its gradually receding lingering effect: when a chef adds a *touch of spice*, the event is quickly and abruptly finished, but its effect remains tangible.

[3]Three classifiers had only dynamic features; 38 classifiers only static features. The remaining 59 had both static and dynamic features. Some features proved to be very infrequent and not targeted by iconicity; they are not mentioned here (e.g., the triangular shape of *wedge*).

3.3. Analysis of iconicity

I mapped classifiers onto their pronunciation using the CMU Pronouncing Dictionary (Rudnicky 1993–2014). This allowed me to establish for each classifier which sound–meaning correspondences are active in it, starting from the set of established correspondences in Flaksman (2024).

For each potential correspondence between phonological feature P and semantic feature S, I look at three kinds of evidence to describe their strength. The "true positives" are classifiers whose form includes P and whose meaning involves S. The "false negatives" are classifiers of which the meaning involves S but whose form does not include P. I will mark examples of false negatives with an empty set symbol: ∅. These are not immediately problematic for the proposed correspondence; they merely show that S is not *necessarily* marked by P. The "false positives" or "counterexamples" are classifiers whose form includes P but which have a meaning opposing S – for instance, referring to a large size when a small size is predicted by the correspondence. Counterexamples are marked by a lightning bolt: ↯. They are more problematic, since they do not only show that P may occur unmotivated, but even that it may occur in apparently counter-iconic words. Since phonological features may in principle correspond to different semantic aspects and some degree of randomness is to be expected, the existence of a few counterexamples does not mean there is no correspondence between P and S: we are looking for general tendencies, where the true positives outweigh the counterexamples.

In general, I treat iconicity as a kind of motivation in the sense that "if A motivates B, it does not necessarily *predict* or *determine* B, but it provides some hints toward guessing what B might be" (Jackendoff and Audring 2020:55, emphasis original). Jackendoff and Audring give an example from derivational morphology: the component parts of *column-ist* are motivated by the fact that it denotes someone (*-ist*) who does something with *column*s, but it does not tell us that they *write* for a *newspaper*. Saying that *-ist* and *column* are "motivated" is nothing more than saying that *columnist* shares these component parts with other forms (such as *cyclist* and *columns*). Similarly, the meaning of a classifier can be approximated on the basis of its phonological form, but there is no full-fledged calculus to derive its exact meaning: most of the component parts of *splash* are motivated, but there does not appear to be a principled reason why it is odd to talk of a ?*splash of sand*.

There are two further aspects of motivation relevant here. First, not all component parts need to be motivated: in *scrumptious*, *-ous* is motivated by the syntactic category (cf. *joyous*), but *scrumpt-* is not motivated (it is a cranberry morph/bound root); similarly, the vowel in *splash* has no clear motivation. Second, motivation forms many-to-many relationships: just as *-ish* can mark both adjectives (*sheepish*) and verbs (*vanish*), rhotics, as we will see below, can correspond to both ragged shapes and vibratory events. And just as there are multiple adjective markers (*-ous*, *-ish*, etc.), non-abrupt event terminations can motivate both fricatives and nasals in the coda of a classifier.

Sound changes and semantic shifts can cause iconicity loss or gain (Flaksman 2024:70–6). However, I could not systematically consider etymology in the scope of the present paper. The effect of diachronic changes is diminished because words that have lost iconicity may drop out of use precisely because of the lower degree of iconicity. I have also not taken into account possibly imitative classifiers from other Germanic languages, for two reasons. First, sound-meaning correspondences may be partly conventionalized and as such the same sound may be iconically motivated by different semantic features in different speech communities. Second, the iconic potential of a sound is relative to the rest of the phonemic inventory: the more sounds of a certain class (say, fricatives) a language has, the finer the semantic distinctions of the iconic correspondences of these sounds can be (Flaksman 2024:33–4). As such, it is not straightforward to analyze data from distinct languages, even when they are closely related; for this reason I have here chosen to focus on only one language variety.

A final issue worth noting is that although my examples come from a British corpus (BNC Consortium 2007), the Lawler-Rhodes database of monosyllabic words (Lawler and Rhodes 1981–2006) and the CMU Pronouncing Dictionary (Rudnicky 1993–2014) are based on American English. Some classifiers may be excluded due to differences in spelling, and differences in pronunciation can have an effect on the degree

of iconicity. For instance, in the American pronunciation, the /æ/ vowel in *blast* is a counterexample for a correspondence between front vowels and small size: we would expect a back vowel to correspond with the large size implied by *blast*. The /ɑː/ vowel in Received Pronunciation is iconic in this respect. Both the issue of diachrony and that of different varieties of English are mostly relevant for vowels. For this reason, I have focused primarily on consonants.

4. Analysis

I first discuss possible correspondences of sounds with static classifier features (section 4.1). Section 4.2 proceeds with dynamic classifier features. Section 4.3 briefly discusses classifiers of spatial configurations (*heap*, *pile*, and *stack*), and section 4.4 analyzes two neighborhoods of phonologically similar classifiers.

4.1. Correspondences with static features

Flaksman (2024:63–5) describes four recurring correspondences in mimetic extrakinesemisms, three of which map phonological features directly onto static features of classifiers: labial → round shape; rounded vowel → round shape; and close (front) vowel → small size. These all play a role, with varying strengths, in the classifier lexicon. Flaksman also relates laterals to loud sounds (2024:43–4), but they are not clearly related to large size.

4.1.1. Labial $\overset{?}{\rightarrow}$ round shape

Labials (/m/, /p/, /b/, /v/, /f/, and /w/) are said to correspond to round shapes, but this correspondence does not seem to obtain in my classifier sample. Of the 21 classifiers with a round shape, 18 contain a labial, such as ***b**all*, ***bubb**le*, ***p**ool*, ***sp**ot*, and ***tw**ist*. However, this figure is approximately equally high in the classifiers that denote square shapes, where 7 out of 8 classifiers contain a labial (e.g., *↯**f**ield*, *↯**p**lot*, *↯ sq**u**are*).

4.1.2. Rounded vowel → round shape

Although there are no clear counterexamples to this correspondence, its role appears to be quite minor. It is supported by only 4 out of 21 classifiers (*b**a**ll*, *cl**ou**d*, *m**ou**nd*, and *p**oo**l*), with *↯ l**oa**f* being a potential counterexample.

4.1.3. Close front vowel → small size

Close front vowels have often been linked to the notion of small size (e.g. Jespersen 1921–1922, Ohala 1994). This correspondence occurs in 10 classifiers with /i/ or /ɪ/, such as *b**ea**d*, *f**i**lm*, *h**i**nt*, *p**i**nch*, and *sl**i**ver*, with the other 10 small classifiers being unmarked (e.g., *∅crumb* and *∅scrap*). This proportion is somewhat higher than for the large classifiers, where 6 out of 17 classifiers contain a (near-)close front vowel (e.g., *↯ bl**a**ze* and *↯ h**ea**p*). Conversely, the data do not suggest that open(-mid) back vowels (/ʌ/, /ɔ/, and /ɑ/) correspond to large size. While supported by seven classifiers (e.g., *b**u**nch* and *g**u**lp*), there are six counterexamples (e.g., *↯ m**o**rs**e**l* and *↯ sp**o**t*). The existence of a correspondence for small size but not large size fits a cross-linguistic pattern (Blasi et al. 2016:10820).

4.1.4. Lateral → loud sound → large size

By contrast, large size may be reflected in laterals, perhaps a metaphorical extension of the correspondence with loud sounds (Flaksman 2024:43–4). This hypothesized correspondence is supported by eight classifiers (e.g., *b**l**ast* and *gu**l**p*), almost half of the 17 classifiers referring to a large portion – a higher proportion than

the 6 out of 20 small classifiers that contain a lateral (e.g., ↯ *g**l**immer* and ↯ *s**l**iver*). Most classifiers referring to large portions contain either an open (back) vowel or a lateral (the only exceptions are ∅*burst*, ∅*shroud*, and ∅*wave*).

4.1.5. Rhotic → harsh sound → ragged/rough/uneven shape

The following correspondences with static features cannot be linked to Flaksman (2024) but do present themselves in the data.

Rhotics reflect ragged, rough, or uneven shapes. This correspondence finds support in nine classifiers (e.g., *c**r**ust* and *g**r**ain*), with only ∅*chunk* being unmarked. In some cases, the rhotic also reflects a vibratory onset or nucleus, discussed in section 4.2 below (e.g., *sc**r**ap*). There are few counterexamples: a ↯ *d**r**op*, ↯ *r**r**ing*, and ↯ *swi**r**l* have a round shape. However, the rhotic in *drop* can be explained as reflecting a vibratory event nucleus (see section 4.2 below).

This correspondence could be based on the association of rhotics with harsh sounds (Flaksman 2024:40–2). Ohala (1994:329–30) suggests that aggressive animal sounds such as growls often have an "irregular or 'rough'" sound quality, because the secondary vibrations give the impression of being large and dangerous. This fits with the correspondence between rhotics and ragged, rough, or uneven shapes, which are more dangerous than smooth shapes.

4.1.6. Voiced → three-dimensional

About three quarters of the three-dimensional classifiers contain voiced consonants (22 out of 29), a figure that is significantly lower for one- and two-dimensional classifiers (5 out of 17 and 8 out of 18, respectively). Examples are *b**a**g*, *b**u**n**d**le*, *m**ou**n**d*, and *we**d**ge*; counterexamples are, for example, one-dimensional ↯ *threa**d*** and two-dimensional ↯ *b**e**d*.

This correspondence follows from a more general, cross-linguistic iconicity whereby high acoustic frequency corresponds to small size and low acoustic frequency corresponds to large size. Three-dimensional objects appear larger than flat one- or two-dimensional objects and, as pointed out by Ohala (1994:335), voiced obstruents have a lower acoustic frequency than voiceless obstruents.

4.1.7. St- → one-dimensional and rhotic → flexible

In a small number of classifiers, a rhotic seems to mark flexibility, as in *ea**r*** (*of corn*), ***str**eak*, and ***str**eam*. This correspondence accounts for five of the ten flexible classifiers and has only one counterexamples, ↯ *co**r**e*.[4] In three of the five cases, the onset is *str-*. Rhodes and Lawler (1981) see a contrast between *st-* for one-dimensional rigid objects and *str-* for one-dimensional flexible objects (see also Lawler 2003). I would suggest that *st-* reflects one-dimensionality in general; this correspondence is confirmed by all 7 classifiers starting with *st-* in my sample. *St-* as opposed to *str-* only gets associated with rigid objects because non-rigid objects are marked "elsewhere", by *str-*.

The use of /ɹ/ to mark flexibility may be related to the correspondence of rhotics with vibratory sounds (Flaksman 2024:40–2), since flexible objects, like *st**r**ings*, vibrate when pulled tight. The cognitive basis for the correspondence between *st-* and one-dimensionality is not clear.[5] In any case, flexibility seems to fall in between static and dynamic features: when a classifier is flexible, this does not mean that it necessarily vibrates, only that it potentially vibrates.

[4] Examples of flexible classifiers without a rhotic are ∅*flow* and ∅*plume*. A possible correspondence between laterals and flexibility (which may seem plausible because laterals relate to the tongue, which is flexible) must be rejected on the basis of many inflexible classifiers containing laterals (e.g., ↯ *l**l**ine* and ↯ *bl**l**ock*).

[5] Rhodes and Lawler (1981) do not go into the issue; they treat *st-* (and *str-*) as a phonaestheme. It may be that the fricative /s/ reflects motion (cf. section 4.2 below), which is reinterpreted as mapping out the one-dimensional path along which the motion occurs. However, the meaning of *st-* seems to be at least partially arbitrary.

4.1.8. Correspondences with static features: summary

To sum up: with the exception of orientation, all static features have at least one value that can be iconically motivated: small size; one- and three-dimensionality; flexibility; and round and ragged/rough/uneven shape. The lack of correspondences with large size, two-dimensionality, inflexibility, and square shape[6] may be explained from a markedness perspective. It is noteworthy, for example, that small size can more easily be iconically motivated than large size, and is also more often grammatically marked: diminutives are more frequent than augmentatives in languages of the world.

4.2. Correspondences with dynamic features

Flaksman (2024:37–48) describes a large number of correspondences of phonological features with semantic acoustic properties. Many of these can be metaphorically mapped onto properties of motions.

4.2.1. Plosive → abrupt sound → abrupt onset/termination

Almost all 28 classifiers relating to events with an abrupt onset contain a plosive in the onset: ***b****laze*, ***g****ulp*, ***p****uff*, etc. – the only exception being ∅*flash*. The same correspondence is also clearly visible in classifiers relating to events with an abrupt termination (27 out of 30 cases; e.g., *shre****d*** and *tri****ck****le*[7]).

What is more, there are extremely few counterexamples to this correspondence. The plosive in ↯***g****limmer* is phonaesthemic: *gl-* commonly marks concepts related to light (Bolinger 1950, Sadowski 2001). The plosive in ↯*wis****p***, which in the examples in my sample refers to a portion of smoke gradually fading away, may be explained by another use of this classifier, where it refers to a thin piece of hair, grass, or other material: in this use a *wisp* has roughly the same shape as a *wisp of smoke*, except that it is bounded. I have no explanation for the plosive in ↯*clou****d***.

As we have seen above with ***sp****lash* and ***sp****latter*, event onsets may be complex, involving, for instance, a continuous motion reflected by a fricative (see below) followed by an abrupt impact reflected by a plosive. The same is true for event terminations. In *tou****ch***, /tʃ/ is motivated by an abrupt end to a very short event, followed by its lingering effect; a similar analysis applies to /dʒ/ in *tin****ge*** and *sur****ge***.[8]

4.2.2. Fricative → continuous sound → continuous/gradual onset/termination

Together with nasals, discussed below, fricatives seem to form the counterpart to plosives: they reflect an event onset or termination that is not abrupt. Both onsets and terminations may be gradual (***s****wirl*; *brea****th***), or an onset or termination may be lacking, causing continuous influx or outflux (***sh****een*; ***h****aze*). Of the 23 such onsets, 19 are marked by a fricative (in ∅*wave*, ∅*load*, and ∅*mound* it is at least not marked by a plosive; the plosive of ↯***g****limmer* can be explained as a phonaestheme). For event terminations the correspondence is less pervasive (15 out of 29). Non-abrupt terminations can also be marked by a nasal (6 out of 29; see below), lateral (5 out of 29, e.g. *pa****ll***), or a vocalic ending in ***flow*** and *spr****ay***; in only one case is such a termination marked by a plosive (↯*clou****d***).

There are three apparent counterexamples to this correspondence. First, a ↯*sli****ce*** and a ↯*sli****ver*** have an abrupt termination (the moment the cut is made). Second, although it has a lingering effect motivating

[6] A possible association between [k] and angular objects, suggested by the bouba/kiki effect (Ramachandran and Hubbard 2001:19 and references therein) but not by Flaksman (2024), has as many examples (*blo****ck***; ***s****quare*) as it has counterexamples (↯***c****loud*; ↯*sa****ck***).

[7] A *trickle* is analyzed as involving the repetition of an event in which a bit of material trickles down (e.g., a drop of water on a window in the rain). The /t/ is motivated by the abrupt appearance of a bit of material and /ɪ/ by the repetition of this appearance. When material trickles down it repeatedly stops abruptly and continues down again, which motivates the combination of /k/ and iterative *-le*, discussed below.

[8] In general, affricates as a class do not appear to reflect any particular semantic feature; they are motivated by the features reflected by their constituent parts.

/ʃ/, a ↯***f****lash* has an abrupt onset. However, these counterexamples are clearly outweighed by the 33 cases where a fricative does mark a continuous or gradual onset or termination.

4.2.3. Fricative → noise → multiple onset/termination

In relation to *spla**sh***, it was already suggested above that fricatives, reflecting noise, may be used to describe events with a large number of indistinguishable onsets or terminations (in the end of a *spla**sh***, it reflects the rain of minuscule portions of liquid). This type of termination is rare: in my sample, *splash* can only be compared to *da**sh*** (*of caffeine/spice/rum*). An example of a classifier with this kind of onset is perhaps ***h****ail*. This correspondence is infrequent but has no counterexamples.

4.2.4. Fricative → noise → high velocity

It also seems to be the case that noise is associated with motion with high velocity. Almost all (15 out of 17) classifiers with this feature include a fricative, usually in the coda: *bur**s**t*, ***fla**sh*, *ru**sh***, ***s**ur**ge***, etc. – the only exceptions being ∅*gulp* and, perhaps, ∅*bubble*. There is only one apparent counterexample – a ↯*wi**s**p* seems to move slowly – but since there are only two classifiers that imply low velocity (*wisp* and *trickle*), this is not very informative. It is more relevant in this case that in the entire data set, about two third of the classifiers contain a fricative (65 out of 101). This proportion is substantially higher for classifiers that imply high velocity.

4.2.5. Rhotic → vibratory sound → multiple onset; vibratory onset/nucleus

In ***h****ail* we saw that fricatives may be motivated by multiple event onsets so close together that they become indistinguishable. There are three cases where the event consists of repeated subevents that *are* distinguishable. In all cases, this repetition is reflected by a rhotic, associated with vibration, which is itself repetitive. First, ***tr****ail* and ***tr****ace* both refer to portions (of *blood*, *ash*, etc.) which are left behind in multiple distinguishable events. These events are punctual, motivating /t/, and repeated, motivating /ɹ/ (the collection of small events making up the *trail/trace* does not terminate, which motivates the fricative in *tra**ce*** and is consistent with the lack of a plosive in the coda of *trail*). The third case is ***tr****ickle*, which was analyzed in footnote 7.

In three or four other cases, a rhotic is motivated by some sort of oscillation in the event onset or nucleus. A ***r****ush* (*of blood*) is experienced as a sudden burst of blood which is pumped 'rhythmically' to the head. A *sh**r**ed* and a *sc**r**ap* are torn off of a larger piece of material leaving a ragged contour because the tearing event follows a ragged rather than a straight path. Finally, a *d**r**op* can perhaps be analyzed as forming abruptly at the bottom of a surface where a liquid accumulates (motivating the plosive /d/), then vibrating until its mass becomes large enough to fall (motivating /ɹ/), when it comes loose from the surface abruptly (motivating the plosive /p/).[9]

This function of rhotics plays a role in six or seven of the 22 classifiers with a rhotic in the onset, with no counterexamples. In other classifiers a rhotic in the onset is motivated by one of the other correspondences discussed above: rough/ragged/uneven shape (seven times, three of which also involve a vibratory dynamic feature: *sc**r**ap*; *sh**r**ed*; *t**r**ickle*) or flexibility (five times). In six classifiers, a rhotic in the onset has no discernible function (*breath*, *ring*, *shroud*, *spray*, *stretch*, and *strip*). Rhotics appear to be less motivated in the coda than the onset. There is no clear motivation for the rhotic in *core*, *growth*, *morsel*, and *square*.

4.2.6. Nasal → resonant sound → continuous/gradual termination; long nucleus

As already pointed out above, fricatives and nasals contrast with plosives to mark non-abrupt event onsets and terminations. Although they are still outnumbered by fricatives, nasals are used commonly with this

[9] This analysis is supported by slow-motion videos of the lifetime of a drop. Before a drop falls, it is also flexible, in the sense that pushing against it makes it wobble. The rhotic may therefore also be motivated by flexibility (see the discussion of *st-* and *str-* in section 4.1). Flexibility and vibration in the event nucleus are of course not independent.

purpose in the coda, in six classifiers, such as *bea**m***, *gli**mm**er*, and *plu**me***.

In *pi**n**ch*)*of salt*), *bu**n**ch* (*of lace*/*corn*), *bu**n**dle* (*of laundry*/*mail*), and, perhaps, *ta**n**gle* (*of vegetation*), the nasal may be motivated by a long event nucleus in which an inward force is exerted to keep a portion of material together. This can be related to the function of nasals to imitate resonating sounds that grab a listener's attention for an extended period of time, as in *pi**ng*** or *zi**ng***.

Taken together, these correspondences account for 11 of the 23 classifiers with a nasal in the coda. The three nasals in onsets have no clear motivation but do not provide counterexamples (*morsel*; *mound*; *smell*).

4.2.7. Lateral → radial dispersion nucleus

The remaining two correspondences presented themselves in the data, but cannot straightforwardly be related to one of the correspondences discussed by Flaksman (2024).

First, there are eight classifiers in which a lateral corresponds to an event involving radial dispersion. For instance, after a portion of liquid first makes impact on a surface in the event of a *sp**l**ash*, it breaks up in tiny blobs which are dispersed from the place of impact in a radial pattern. Similarly, in a *fa**ll*** (*of stone*), a number of stones fall in roughly the same place and from there tumble in all directions. In four classifiers, radial dispersion leads to round shape: a *poo**l*** has a round shape formed by the radial dispersion of a liquid from a center, a *pa**ll*** or *c**l**oud* (*of smoke*) has a similar shape but a gas-like substance, and *pi**l**e* will be discussed in section 4.3.

All classifiers that involve radial dispersion include a lateral. There are some apparent counterexamples, but most of them can be explained away. A *↯ gu**l**p* involves one-directional motion, but the lateral is motivated by the use of the tongue when gulping. *↯ S**l**ices*, *↯ s**l**abs*, and *↯ s**l**ivers* imply a one-directional cutting event, but *sl-* seems to be a phonaestheme (Marchand 1960:332). The same is true for *fl-* in *↯ f**l**ash*, *↯ f**l**ow*, and *↯ f**l**ush*. In the end, only the one-directional motion creating a *↯ trai**l*** remains as a counterexample.

4.2.8. -Le/-er → repetition

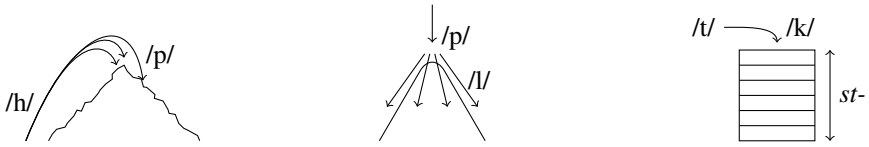
The suffixes *-le* and *-er* are widely recognized as forming frequentative or iterative verbs (e.g., *dribb**le***, *tick**le***, *mutt**er***, *smoth**er***). While this meaning may be related to the repetition of a cycle in a vibrating sound for *-er*, the iconic motivation is unclear for *-le* (Flaksman 2024:68 analyzes both as phonaesthemes). Many frequentative verbs double as classifiers, where they indicate either that the portion is internally pluralistic (a *show**er*** consists of multiple portions; in a *trick**le*** (*of moisture*) there are multiple larger blobs connected by smaller vertical pathways), or that the portion is one of many (*bubb**le*** and, not in my sample, *flick**er***, *sputt**er***). In *bund**le***, the suffix may reflect the repeated action of wrapping a piece of rope of string around a collection of items (contrast *bunch*).[10] Although these functions of *-le* and *-er* are beyond doubt given their frequency beyond classifiers, they cannot explain all instances of *-le* and *-er* in my sample: *↯ mors**el*** (different spelling but same pronunciation), *↯ sli**ver***, and *↯ tang**le*** remain elusive.

4.2.9. Correspondences with dynamic features: summary

All in all, we see that correspondences with dynamic properties of classifiers are more pervasive. In particular, plosives and fricatives are strong indicators of the abruptness (or lack thereof) of event onset and termination. In addition, there are a number of correspondences with more specific dynamic features, such as velocity (fricatives), vibration (rhotics), inward force (nasals), radial dispersion (laterals), and repetition (*-le*/*-er*).

Before concluding we need to briefly discuss the analysis of the specific set of classifiers of spatial configurations (section 4.3) and show that sound symbolism becomes more apparent when classifiers are

[10] I am grateful to an anonymous reviewer for this suggestion.



(a) *Heap*. (b) *Pile*. (c) *Stack*.

Figure 1: Sound symbolism in classifiers of spatial configurations.

contrasted to each other (section 4.4).

4.3. Classifiers of spatial configurations

A number of classifiers are frequently used to describe "spatial configurations" of individuated entities (in Rooryck's 2024 terms). My sample contains three types of classifiers of spatial configurations.[11] First, in section 4.2 I suggested that *bunch*, *bundle*, and *tangle* are united by a continuously exerted inward force to keep the material together, marked by a nasal (also in *pinch*). Second, there are classifiers like *line*, *queue*, *stream*, *thread*, *trail*, *trickle*, which refer to extended one-dimensional configurations. The rhotic in the latter examples can be analyzed as reflecting the way in which these configurations are formed, leaving behind one entity after the other in a repetitive pattern (section 4.2). *Line* and *queue* are not clearly sound symbolic, which may be due to the fact that their non-classifier use is quite common. The third class requires some more discussion here: it consists of classifiers for more or less neat configurations of entities on top of each other: *a heap/pile/stack of books*.[12]

I propose that *heap*, *pile*, and *stack* are best analyzed as reflecting the event in which a single item is added to the spatial configuration. This event is understood to be repeated (even though the classifiers do not include a frequentative suffix). By describing the way in which an item is added, these classifiers denote configurations that differ in the degree of orderliness: a *stack* is a neat *pile*, and a *pile* is somewhat neater than a *heap* (Rooryck 2024:24 n. 20). These events, schematized in figure 1, can be explained in the following way. To construct a *heap*, items are casually thrown on top of each other. The fricative /h/ can be seen as motivated by the motion of lifting and throwing (cf., outside the classifier lexicon, ***h****eave* and ***h****url*), perhaps also in part by intrakinesemism: glottal /h/ stands for the use of the throat (Flaksman 2024:60–1), which can reflect panting during lifting. The item falls on top of the rest of the heap, abruptly ending the motion, which motivates /p/ (cf. *dro****p***). Since throwing does not allow for much precision where the object ends up, a *heap* is relatively unordered. *Pile* shares its consonantal skeleton with *pool*. Whereas a *pool* is formed by a liquid expanding from a center, a *pile* is formed by dropping items (/p/) in the same location, after which they fall down along any side of the pile in a radially dispersive motion (/l/). As a result, a *pile* is more clearly cone-shaped, and therefore neater, than a *heap*. Finally, in a *stack*, items are placed carefully on top of each other and do not move down the configuration after placement; this is reflected in the use of plosives /t/ and /k/ which mirror the immediate end of the placing event (*st-* may also reflect the one-dimensionality of a stack).

4.4. Neighborhoods

Sound symbolism becomes especially apparent once we look at dense "neighborhoods" of words that are similar in both meaning and sound – essentially networks of (near-)minimal pairs. There are two large

[11] This is not a comprehensive list: Rooryck's (2024:6) examples *swarm* and *herd* do not fit into these categories.

[12] Although *mound* has similar semantics, it is iconic in a different way. From an original meaning of 'hedge, fence', this word came to be used for burial mounds and other artificial hills thrown up for protection. The labial /m/ can be motivated by the circular shape of a closed hedge or fence, and /nd/ seems to have the same function as in *bundle*, keeping together the valuables protected in the mound.

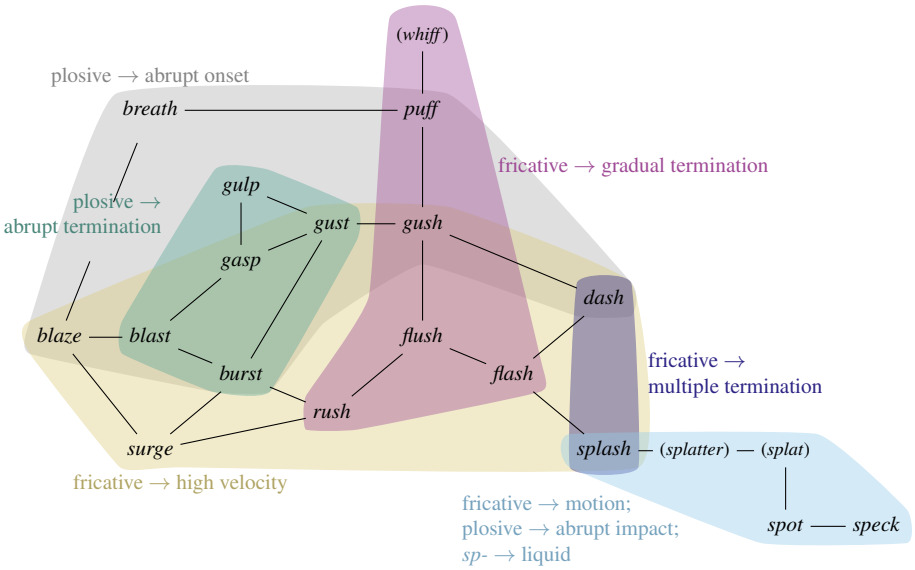


Figure 2: The neighborhood of *blaze* and *speck*.

neighborhoods in the classifier data (which can be expanded and made more dense by including classifiers not in my sample, or even non-classifier lexemes).

In figure 2 we see the neighborhood ranging roughly from *blaze* to *speck* (classifiers not in my sample are shown in parentheses). The main sound symbolic correspondences that play a role are shaded in different colors. In addition to this, minimal pairs provide evidence for more minor correspondences. For instance, a *gulp* and a *gasp* share not only an abrupt event onset and termination, they are also both inhaled through the mouth (motivated through velar /g/ → throat and labial /p/ → lips; Flaksman 2024:57–8, 60–1); the difference is that a *gulp* involves the tongue (hence lateral /l/; Flaksman 2024:59) whereas a *gasp* involves breath (hence fricative /s/; Flaksman 2024:61). A *spot* and a *speck* are primarily distinguished by the smaller size of the latter, perhaps reflected by the vowels. As with a *splat*, *splatter*, and *splash*, they are formed when a moving (/s/) liquid makes abrupt impact (/p/) on a material. However, whereas the liquid bounces back from the surface in a radial pattern in the latter three to fall down in a haphazard pattern around the place of impact, it remains on the surface in a *spot* and a *speck* – hence the lack of /l/. A *blaze*, *surge*, and *rush* are distinguished from a *blast* and a *burst* in that they have a lingering effect, motivating the lack of a final plosive. At the same time, a *surge* is different from a *blaze* in that the latter starts abruptly, whereas a surge is more gradual (like a *stream*); and as discussed above, in a *rush*, material is pumped up rhythmically – these differences are marked by different consonants in the onset. The classifiers in this neighborhood suggest that high velocity is primarily marked by (post)alveolar fricatives, whereas /f/ and /θ/ are slower.

Figure 3 sketches the neighborhood of *pool* and *stream*. A *pall*, *pile*, and *pool* are all round objects expanding from the center (the difference in dimensionality appears to be unmotivated). If *plain* and *plot* are to be related to these, the plosive /t/ of *plot* may be motivated by boundedness (i.e., the abrupt end to the expanding event) – a *plain* (*of snow*) is seen as unbounded. A *patch* (*of snow*/*dirt*/*moonlight*) is bounded but has a fuzzier boundary than a *plot*, which is clearly demarcated; hence the affricate. A *stretch* is essentially a *patch* where one side is clearly longer than the other, but it can also be seen as a bounded *stream*. The contrast of *stream* with *beam* derives from dynamic properties: a *stream* has a continuous influx of new material (/s/) whereas a *beam* is turned on abruptly (/b/); furthermore, only a *stream* is flexible (/ɹ/). On the other hand, a *streak* differs from a *stream* in having an abrupt termination. Whereas a *streak* is curved and hence somewhat flexible (/ɹ/), *stacks* and *sticks* are not (the difference in vowel between the latter two may be explained from thickness). A *trickle* differs from a *streak* in that material is added not in a continuous

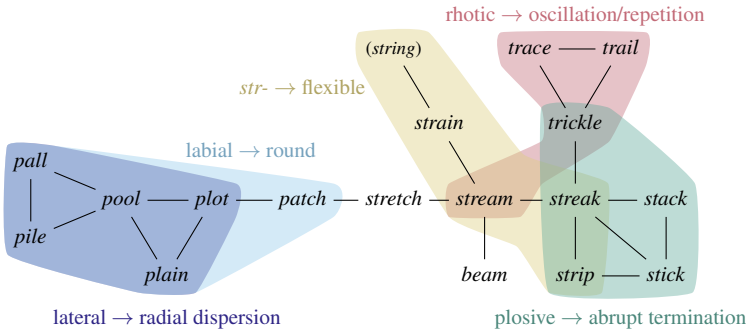


Figure 3: The neighborhood of *pool* and *stream*.

motion but in a repeated punctual event (hence /tɪ-/); furthermore, the motion of a *trickle* typically halts and continues repeatedly, motivating frequentative *-le*. A *trace* and a *trail* are similar to a *trickle* in that they are created in a repeated event, but lack the property of halting-and-continuing motion.

There are many smaller neighborhoods. *Pinch – bunch – bundle* have already been discussed above. *Slice – sliver – slab* are obviously related to each other; so are *scrap – shred* and *chunk – hunk – lump*. All these contrasts illustrate how correspondences are exploited to express fine-grained differences in meaning. A classifier can never be seen in isolation from its immediate neighborhood, which provides clues for its precise meaning – such as the association of *sp-* with liquids in figure 2 or the two-dimensional horizontal meanings of *pool*, *plain*, *plot*, and *patch* in figure 3.

5. Discussion

Rhodes and Lawler (1981) already recognized that the meanings they described for their onsets and codas essentially formed a classifier system – even though they did not limit themselves to classifiers in any particular syntactic construction. Among other correspondences, they linked onsets and codas to different numbers of dimensions and rigidity/flexibility (see the discussion of *st-* and *str-* in section 4.1). However, they did not decompose onsets and codas into individual phonemes, and avoided making any claims about possible iconic motivations for the correspondences they observed (1981:21 n. 9). By looking at this more fine-grained level in the present paper, we lose some detail from the more phonaesthemic, lexicalized meanings recognized by Rhodes and Lawler (1981), such as "curve" for *-oop* (***loop***; ***hoop***; ***scoop***) or "(on a) surface" for *-ap* (***flap***; ***map***; ***slap***; ***clap***). On the other hand, relationships between different onsets and codas can be explained. In *-oop*, the rounded vowel and labial are motivated by a round shape, but the plosive /p/ is also motivated by an abrupt end to a curved motion (when the *loop* is finished); it has the same motivation in *-ap*, which denotes motions which abruptly end on a surface, like a *slap*.

Upon analysis, these more fine-grained correspondences point to a large role for dynamic properties in the classifier lexicon. The only static properties that can be clearly marked through sound symbolism are round shape (with rounded vowels), ragged/rough/uneven shape (with rhotics), and one- and three-dimensionality (with *st-* and voiced consonants, respectively). Flexibility (marked by a rhotic) is somewhat in between a static and a dynamic property, expressing that a material has the *potential* for engaging in a vibratory event. However, the most pervasive correspondences are between sounds and dynamic properties, linking plosives to abrupt event onsets and terminations and fricatives and, to a lesser extent, nasals, to various types of non-abrupt event onsets and terminations. Other sounds suggest more specific dynamic meanings, such as vibration or oscillation (rhotics) or radial dispersion (laterals). In classifiers like *splash*, a number of sounds motivated by a dynamic property can be chained to describe an internally complex event. This hints at a much more intricate computational system underlying classifiers than one based on

shape and size alone.

Many English classifiers double as verbs and thus indirectly express dynamic properties. Many classifiers that do not have a verbal use also express dynamic properties. A focus on dynamic properties of classifiers better explains the phonological markedness of this part of the lexicon. It is also better able to explain selectional properties of classifiers, such as the fact that *drop* selects liquid materials, even though materials like *wood* or *granite* can, in principle, appear in the *shape* of a drop.

The importance of dynamic properties in English classifiers is not unexpected from a cross-linguistic perspective. Aikhenvald (2025:302) points out that nominalizations of dynamic verbs are a common source for numeral classifiers in languages of the world. Thus, English classifiers fit in a recurring phenomenon in which materials and other classifier complements are categorized according to dynamic properties – "how specific materials *distribute in space* under the exertion of a force" (Rooryck 2024:4, emphasis original).

In view of the analysis presented here, it is fair to say that English classifiers are ideophonic: they form an "open lexical class of marked words that depict sensory imagery" (Dingemanse 2019:16; cf. Liberman 1975:146 for non-classifier ideophone classes in English). This paper has focused on the last part of this definition: depicting sensory imagery. I have tried to show that classifiers do not primarily express static properties such as size and shape, but dynamic properties related to the senses of touch (*dribble*), vision (*glitter*), sound (*splash*), and more. Specifically, the paper has also shown that this expression happens through depiction, exploiting structural resemblances between form and meaning.

Acknowledgments

It is my great pleasure to dedicate this modest contribution to Johan. I feel so lucky that, by sheer chance, you became my supervisor!

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References

Aikhenvald, Alexandra Y. 2025. *A Guide to Gender and Classifiers*. Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780198863601.001.0001.

Blasi, Damián E., Søren Wichmann, Harald Hammarström, Peter F. Stadler, and Morten H. Christiansen. 2016. Sound–meaning association biases evidenced across thousands of languages. *Proceedings of the National Academy of Sciences* 113 39: 10818–23. https://doi.org/10.1073/pnas.1605782113.

BNC Consortium. 2007. The British National Corpus.

Bolinger, Dwight L. 1950. Rime, assonance, and morpheme analysis. *WORD* 6 2: 117–36. https://doi.org/10.1080/00437956.1950.11659374.

Dingemanse, Mark. 2019. 'Ideophone' as a comparative concept. In *Ideophones, Mimetics and Expressives*, edited by Kimi Akita and Prashant Pardeshi, no. 16 in Iconicity in Language and Literature, pp. 13–34. John Benjamins, Amsterdam. https://doi.org/10.1075/ill.16.02din.

Flaksman, Maria. 2024. *An Etymological Dictionary of English Imitative Words*. No. 50 in Munich Studies in English. Peter Lang, Berlin. https://doi.org/10.3726/b22331.

Jackendoff, Ray and Jenny Audring. 2020. *The Texture of the Lexicon: Relational Morphology and the Parallel Architecture*. Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780198827900.001.0001.

Jespersen, Otto. 1921–1922. Symbolic value of the vowel *i*. *Philologica* 1: 15–33.

Kwon, Nahyun and Erich R. Round. 2015. Phonaesthemes in morphological theory. *Morphology* 25 1: 1–27. https://doi.org/10.1007/s11525-014-9250-z.

Lawler, John M. 2003. *Style* stands still. *Style* 37 2: 220–37.

Lawler, John M. and Richard R. Rhodes. 1981–2006. The Lawler-Rhodes database of simplex English words. Available at http://www.umich.edu/~jlawler/monosyl.zip, accessed September 25, 2025.

Liberman, Mark Yoffe. 1975. *The Intonational System of English*. Ph.D. thesis, MIT, Cambridge, Ma.

Malysheva, Valeria. 2025. Onomatopoeia in phonaesthemic groups: An interplay between iconicity and systematicity in English. *SKASE Journal of Theoretical Linguistics* 22 2: 128–45.

Manning, Christopher, Mihai Surdeanu, John Bauer, Jenny Finkel, Steven Bethard, and David McClosky. 2014. The Stanford CoreNLP Natural Language Processing toolkit. In *Proceedings of 52nd Annual Meeting of the Association for Computational Linguistics: System Demonstrations*, pp. 55–60. Association for Computational Linguistics, Baltimore, Md. https://doi.org/10.3115/v1/P14-5010.

Marchand, Hans. 1960. *The Categories and Types of Present-Day English Word-Formation. A Synchronic-Diachronic Approach*. Harrassowitz, Wiesbaden.

Ohala, John J. 1994. The frequency code underlies the sound-symbolic use of voice pitch. In *Sound Symbolism*, edited by Leanne Hinton, Johanna Nichols, and John J. Ohala, pp. 325–47. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511751806.022.

Ramachandran, V. S. and E. M. Hubbard. 2001. Synaesthesia – A window into perception, thought and language. *Journal of Consciousness Studies* 8 12: 3–34.

Rhodes, Richard A. and John M. Lawler. 1981. Athematic metaphors. In *Papers from the Seventeenth Regional Meeting of the Chicago Linguistic Society*, edited by Roberta Hendrick, Carrie Masek, and Mary Frances Miller, pp. 318–42. Chicago Linguistic Society, Chicago, Il.

Rooryck, Johan. 2024. Classifiers as patterns of spatial distribution. Available at https://ling.auf.net/lingbuzz/008417.

Rudnicky, Alexander. 1993–2014. The Carnegie Mellon Pronouncing Dictionary. Available at https://github.com/Alexir/CMUdict, accessed September 25, 2025.

Sadowski, Piotr. 2001. The sound as an echo to the sense: The iconicity of English *gl-* words. In *The Motivated Sign*, edited by Olga Fischer and Max Nänny, no. 2 in Iconicity in Language and Literature, pp. 69–88. John Benjamins, Amsterdam. https://doi.org/10.1075/ill.2.09sad.

Voronin, Stanislav. 2006 [1982]. *Osnovy fonosemantiki*. Lenand, Moscow.

Le meilleur promoteur dans quel sens ?
A closer look at French sluicing (with extra elements)

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Abstract

This paper addresses French sluicing, focusing on constructions in which a wh-remnant co-occurs with a non-wh-element, collectively referred to as *Sweeping* (Sluicing With Extra Elements Persist-ing, Temmerman 2019). Building on prior work, it introduces a previously undescribed subtype: IWW-sluicing, involving the wh-phrase *dans quel sens* ('in what way'), and draws parallels with *comment*-sluicing (with the wh-phrase *comment* 'how'). I propose that these two types of Sweeping function as clarification requests targeting the interpretation of a repeated expression, namely the extra non-wh-remnant, which displays properties of a mixed-quoted expression. It is further argued that the explicit clarification request underlying these sluices takes on the form of a short cleft. The paper also brings a third type of Sweeping, *SpaCing* (Sluicing with a *Ça* 'that'), into the empirical picture, showing that only minimal wh-phrases such as *comment* can combine with *ça*, whereas complex wh-phrases like *dans quel sens* cannot. The findings challenge *in situ* deletion accounts and support a unified, ellipsis-based analysis of different types of French sluicing, including cases in which the sluice is accompanied by extra elements.

1. Introduction – setting the scene: Sluicing and Sweeping[1]

"Sluicing" refers to seemingly non-sentential questions, in which fragmentary wh-questions receive the same interpretation as their full verbal interrogative counterpart: they have "the same propositional content and assertoric force as utterances of what are uncontroversially fully sentential syntactic structures" (Merchant 2004:662). This is exemplified in (1)–(2) for French:[2] the sluice in (1) is synonymous with the corresponding full verbal interrogative counterpart in (2).

(1) Johan a encadré quelqu'un, mais je ne sais pas *qui*.
Johan has supervised someone but I SM know not who
'Johan supervised someone, but I don't know who.'

(2) Johan a encadré quelqu'un, mais je ne sais pas *qui* il a encadré.
Johan has supervised someone but I SM know not who he has supervised
'Johan supervised someone, but I don't know who he supervised.'

As is clear from (1), sluices in French can be embedded. They can also appear as dialogue fragments, as shown in (3), based on Dagnac's (2018:790) example (18). Dagnac (2018:790) refers to the former as "embedded sluices" and the latter as "root sluices".

(3) A: Johan doit parler avec quelqu'un. B: *Avec qui* ?
Johan must talk with someone with who
'A: Johan has to talk with someone. B: With whom?'

It has been observed that a non-wh-element may occur alongside a sluice. In a study focusing on Dutch, this phenomenon was labelled *Sweeping* by Temmerman (2019), designating *Sluicing With Extra Elements Persist-ing*. In the relevant examples that follow, the wh-remnant is italicized, and the non-wh-element is underlined.

[1] Unless indicated otherwise, all examples in this paper are French examples.

[2] Following Kayne (1984) and Dagnac (2018), I gloss *ne* as SM (scope marker), with *pas* as the sole negative element.

 Nordlyd 49.1: 207–225, Special issue in honor of Johan Rooryck, edited by Jeroen van Craenenbroeck, Aysa Ekanger, Camil Staps, and Guido Vanden Wyngaerd. Published at the University of Tromsø – The Arctic University of Norway.
http://septentrio.uit.no/index.php/nordlyd https://doi.org/10.7557/12.8263

For instance, Hoekstra (1993), Van Craenenbroeck (2004; 2010a), Dagnac (2018), Lefeuvre (2018; 2020), and Smirnova and Abeillé (2021) notice that in French the wh-remnant may be followed by *ça* 'that'. I will refer to this construction as *SpaCing*: *Sluicing plus a Ça.*[3]

(4) A: J'ai vu quelqu'un. B: *Qui* ça ?
I=have seen someone who that
'A: I saw someone. B: Who?' (Van Craenenbroeck 2010a:103, (1b))

Furthermore, Dagnac (2018:791) also draws attention to what she calls "*comment*-sluices" (see also Moline 2009; 2013): in *comment*-sluicing, a non-wh-element precedes the wh-word *comment* 'how'. An example, found in the frTenTen23[4] corpus, is given in (5):

(5) … je découvrais que j'étais different des autres. Mais différent *comment* ?
I discovered that I=was different from.the others but different how
'I was discovering that I was different from the others. But different how?' (cf. frTenTen23)

Moreover, Smirnova and Abeillé (2021:244) introduce a (for French) new construction that they refer to as "*wh-stripping*", "since it resembles what Merchant (2012) called *why-stripping,* when the wh-word is followed by a previously mentioned segment: *He left to Rome – Why Rome?*".[5] Smirnova and Abeillé (2021) opt for the more general term "*wh-stripping*" given that wh-words other than *pourquoi* 'why' are possible in this construction in French, *comment* 'how' also being one of these:

(6) A: Le dessin ci-dessus est obsédant.
the drawing here-above is captivating
'The drawing above is captivating.'

B: *Comment* obsédant ?
how captivating
'Captivating how?' (cf. frTenTen23)

This paper introduces another type of Sweeping in French: *dans quel sens*-sluicing, exemplified in (7): seemingly non-sentential questions involving the combination of a non-wh-element (*étrange* 'strange' in (7)) and the wh-phrase *dans quel sens* ('**i**n **w**hat **w**ay'). Henceforth, and following Temmerman (2023), who studies a similar phenomenon in Dutch, this construction will be referred to as **IWW**-sluicing. In IWW-sluicing, like in *wh-stripping* and *comment*-sluicing, the non-wh-remnant is 'repeated from' the antecedent clause (i.e. identical to its correlate in the antecedent).

(7) A: Toute cette histoire est étrange depuis le début.
all this story is strange since the beginning
'This whole story has been strange since the beginning.'

B: Étrange *dans quel sens* ?
strange in which sense
'Strange in what way?' (cf. frTenTen23)

[3] I prefer not to use the term "*wh-ça*" introduced by Smirnova and Abeillé (2021), because they also use this term in non-elliptical contexts. The term *SpaCing* is a nod to Van Craenenbroeck (2004, 2010a), who studies a superficially seemingly similar construction in Dutch, and calls it *Spading*: Sluicing Plus A Demonstrative In Non-insular Germanic. However, firstly, French is not a Germanic language, and secondly, the *ça* in French constructions like (4) is arguably not a demonstrative (cf. Lefeuvre 2018, 2020 and Smirnova and Abeillé 2021, cf. also section 4). Also, Van Craenenbroeck discusses problems that arise when trying to extend his analysis for (dialectal) Dutch to French. I refer the reader to Van Craenenbroeck (2004, 2010a) to discover the specifics of the construction in Germanic languages.

[4] For more information on the corpus: https://www.sketchengine.eu/frtenten-french-corpus/ (last accessed 10 April 2026).

[5] Cf. also DeVilliers (1991; 1996), Merchant (2006), Weir (2014), Ortega-Santos et al. (2014), Yoshida et al. (2015), and Kim and Abeillé (2019) for *why-stripping* in English and Spanish.

The main goal of this paper is to compare IWW-sluicing to cases of Sweeping with *comment* in French, and to present a unified analysis. A supplementary objective, building on Abeillé and Smirnova (2021), is to briefly examine the interaction of these two cases of Sweeping with SpaCing.

This paper is organized as follows. In section 2, IWW-sluicing in French is introduced, and it is shown that it exhibits properties very similar to *comment*-sluicing in French. The non-wh-remnant in these two cases of Sweeping shows the characteristics of a mixed-quoted expression. Section three presents the analysis of IWW-sluicing and *comment*-sluicing. Section 3.1 gives some background on analyzing sluicing and Sweeping. First, it sets out why this paper adopts as a foundational assumption the silent structure analysis of sluicing, and secondly, it shows that an analysis based on *in situ* questions is not on the right track for the French cases under scrutiny. In section 3.2, I propose that IWW-sluicing and *comment*-sluicing in French are instances of reprise sluicing, and that an explicit clarification request is the underlying structure of these instances of Sweeping. More specifically, I argue in favor of a short cleft analysis of these underlying structures. Section 4 brings SpaCing into the picture. This section investigates if *ça* 'that' can combine with *comment* 'how' and *dans quel sens* 'in what way'. It is shown that, unlike *dans quel sens*-SpaCing, *comment*-SpaCing, is available, also allowing for an extra non-wh-element, next to the wh-word and *ça*. I argue that this pattern can be accounted for given that minimal wh-phrases are perfectly fine in SpaCing, while complex wh-phrases are excluded in SpaCing. Finally, section 5 concludes.

2. Introducing French IWW-sluicing, and its similarities to *comment*-sluicing

As mentioned in the introduction, *dans quel sens*-sluicing represents a type of Sweeping that has until now gone undiscussed for French. Van Craenenbroeck and Temmerman (2019) noted that *comment*-sweeping in French seems very similar to *in what way*-sluicing in English and Dutch. Here, we would like to extend this observation to French IWW-sluicing, with the wh-remnant *dans quel sens*.

First of all, if you consider the interpretation of an example like (8), this is very much an interpretation like the one we see in (9).[6] That is, these are not information questions (asking about manner or reason, for instance), but clarification questions ('In what way do you mean X?', 'How do you mean X?').[7] As such, these are instances of what Ginzburg and Sag (2000) called "reprise sluices". We will come back to this later on, in section 3.2. The example in (10) also clearly shows the very similar interpretation of *comment* 'how' and *dans quel sens* 'in what way' in a sluicing environment. That is, in this example, *dans quel sens* is used to indicate which interpretation of *comment* the speaker is aiming at, i.e. the clarification reading.

(8) A: Mes parents ont décidé que cette fois j'étais allée trop loin.
my parents have decided that this time I=was gone too far
'My parents have decided that, this time, I had gone too far.'

B: Trop loin *comment* ?
too far how
'Too far how?' (cf. frTenTen23)

(9) … jusqu'à ce que les choses aillent trop loin. Mais trop loin *dans quel sens* ?
until that the things go.SUBJ too far but too far in which sense
'… until things go too far. But too far in what way?' (frTenTen23)

[6] This paper will not focus on 'true degree' readings of *comment*-sluicing (Moline 2009, 2013, Dagnac 2018). A relevant example is given in (i):

(i) On m'a dit qu'il était grand, mais je ne sais pas grand comment.
one me=has told that=he was tall but I SM know not tall how
'I was told that he was tall, but I don't remember how tall.' (Dagnac 2018:792)

[7] See also Smirnova and Abeillé (2021) on the reprise/clarification interpretation of certain sluices with *comment* 'how'.

(10) Le lobby vert américain est puissant …
the lobby green American is powerful
… – mais puissant *comment* ? *dans quel sens* ?
but powerful how in which sense
'The American green lobby is powerful – but powerful how? in what way?' (frTenTen23)

Secondly, both *comment*-sluicing and IWW-sluicing in French allow the word order with the non-wh-remnant preceding the wh-remnant (cf. the previous examples) as well as the reverse word order, with the wh-remnant preceding the non-wh-remnant. Compare examples (5) and (7) with (11) and (12), respectively:

(11) A: Il était différent.
he was different
'He was different.'
B: Je sais, mais *comment* différent ?[8]
I know but how different
'I know, but different how?'

(12) A: Gaulthérie peut paraître un choix étrange.
Gaultheria might seem a choice strange
'Gaultheria might seem like a strange choice.'
B: Dans quel sens étrange ?[9]
in which sense strange
'Strange in what way?'

Thirdly, as can be seen in the examples above, both in *comment*-sluicing and in IWW-sluicing, the non-wh-remnant is repeated from the antecedent clause. Interestingly, both *comment*-sluicing and IWW-sluicing can host (as the non-wh-remnants) elements of any category. In (13), we see an example of an NP without an article in *comment*-sluicing: the indefinite plural article *des* 'the' in (13A) is dropped in the *comment*-sluice in (13B). (14) shows an example of a finite verb in IWW-sluicing.[10]

(13) A: Ce sont des moyens de se cultiver ?
it are some means of SE educate
'Are they means of educating oneself?
B: % *Comment* moyens de se cultiver ?
how means of SE educate
'Means of educating oneself, how?' (based on Moline 2013:96)

[8] https://www.wattpad.com/amp/555664488. Last accessed 10 April 2026.

[9] https://www.facebook.com/groups/Aromatherapieprecise/posts/10155755882651721/. Last accessed 10 April 2026.

[10] A reviewer points out acceptability issues for examples (13) and (14). Given that (13) is an example from the published literature, and (14) is an attested example, with similar examples to be found in the frTenTen23 corpus (cf. (i)), I have chosen to maintain the examples in (13) and (14), with % indicating speaker variation.

(i) a. "Doivent" *dans quel sens* ?
must.3PL in which sense
'"Must" in what way?'
b. *Comment* disparaissent ?
how disappear.3PL
'Disappear, how?' (cf. frTenTen23)

(14) A: Je peux devenir violent sur un sujet comme celui-ci.[11]
I can.1SG become violent on a subject like this-here
'I can become violent over a topic like this one.'

B: % "Peux" *dans quel sens* ?
can.1SG in which sense
'"Can" in what way?'

As noticed by Van Craenenbroeck and Temmerman (2019), IWW-sluicing in Dutch and English has the hallmark characteristics of mixed quotation (Davidson 1979, Maier 2014a). This can be extended to both IWW-sluicing and *comment*-sluicing in French. Maier (2014a) defines the phenomenon of mixed quotation, exemplified in (15a), as exhibiting signs of both (i) the opacity of pure quotation and (ii) the transparency of regular language use. Pure quotation, an example of which is given in (15b), is a linguistic device referring to linguistic expressions (Maier 2014b). Pure quotation is opaque in the sense that changes to the original are not permitted (Maier 2014a:2). The same goes for mixed quotation, which involves verbatim reproduction of (part of) the preceding utterance. On the other hand, mixed quotation also shares a number of characteristics with regular, quotation-less language use (Maier 2014a:9). To give but one example, Maier (2014a) shows that indexical pronouns are altered in mixed quotation, as is the case in (15a). In (15a), we see that the original pronoun *your* has been adjusted (to *my*) to align with the perspective of the speaker.

(15) a. And then they told me to "stick a lamp up my ass". (Maier 2014a:13, (20c))

b. The word 'anomalous' has nine letters. (Maier 2014a:2, (1a))

We first consider (i) the opacity of the non-wh-element in IWW-sluicing and *comment*-sluicing. An immediate consequence of the verbatim requirement is blocking substitution of coreferential terms (Maier 2014a:6). In example (16), it is shown that synonyms cannot be substituted for one another in IWW-sluicing and *comment*-sluicing.[12]

(16) A: Toute cette histoire est étrange depuis le début.
all this story is strange since the beginning
'This whole story has been strange from the beginning.'

B: a. Étrange dans quel sens / comment ?
strange in which sense how
'Strange in what way / how?'

b. #Bizarre / curieuse / singulière / mystérieuse *dans quel sens* / *comment* ?

Moreover, the speaker's idiolect (including "speech disfluencies, typos, grammar and spelling errors, sociolect, even a completely different language") can be reproduced by the reporter "without herself being associated with these linguistic peculiarities" (Maier 2014a:8), as shown in (17) and (18). In (17), we see *spé*, short for *spécial,* which is familiar/informal spoken French. In (18), verlan is used, a type of French slang in which parts of a word are reversed to create a new word, with *louche* becoming *chelou*.[13]

(17) A: ! J'ai un pote qui fait un truc un peu spé.
I=have a friend who does a thing a bit special
'I've got a buddy who does something kinda special.'

B: "Spé" comment / dans quel sens ?
special how in which sense
'Special how / in what way?

[11] https://zestedesavoir.com/forums/sujet/4337/petit-souci-de-vocabulaire/. Last accessed 10 April 2026.

[12] For the examples in (16) and (18), the attested examples in the frTenTen23 corpus are the versions with *dans quel sens*. For (17), the attested corpus example is the version with *comment*.

[13] I use ! to indicate (non-standard) colloquial French, following the *Grand Grammaire du Français 2021.*

(18) A: ! J'trouve ça chelou.
I=find that sketchy
'I find that sketchy.'

B: Chelou dans quel sens / comment ?
sketchy in which sense how
'Sketchy in what way / how?'

Let us now consider (ii) the transparency of the non-wh-element in IWW-sluicing and *comment*-sluicing: this element is not only opaque, but also transparent, in the sense that "it allows various adjustments to the quoted original to better integrate it into the new reporting construction" (Maier 2014a:14). For instance, grammatical gender and number can be adjusted, as well as the shape of indexical elements. In (19), while the adjectival correlate in the antecedent takes the third singular feminine form, the non-wh-element in the sluice takes the masculine (or default/base) form. In (20), while there is a plural indefinite article and a plural noun in the antecedent, the non-wh-element in the *comment*-sluice and IWW-sluice appears in the singular form (with the singular indefinite article and the singular form of the noun). In (21), we see that the original indexical pronoun *toi* 'you' is adjusted, resulting in a sluice with *moi* 'me'. And in (22), the reflexive pronoun is altered from second to first person singular (*te* 'yourself' > *me* 'myself').[14]

(19) A: L'énergie solaire est-elle suffisante ?
the=energy solar is-she sufficient.3SG.F
'Is solar energy sufficient?'

B: Suffisant dans quel sens / comment ?
sufficient.3SG.M in which sense how
'Sufficient in what way / how?'

(20) Ainsi il y avait des classements. …
thus it there had some.PL rankings
… Mais un classement *comment / dans quel sens* ?
but a.SG.M ranking how in which sense
'So there were rankings. But a ranking how / in what way?'

(21) A: Il est plus comme toi.
he is more like you
'He is more like you.'

B: Comme moi comment / dans quel sens ?
like me how in which sense
'Like me how / in what way?'

(22) A: Est-ce qu'il y a une candidate dont tu penses que
is-it that=it there has a candidate from.whom you think that
tu devrais te méfier ?
you should yourself beware
'Is there a candidate of whom you think you should be suspicious?'

B: Me méfier dans quel sens / comment ?
myself beware in which sense how
'Be suspicious in what way / how ?'

As such, we can conclude that the non-wh-remnant in IWW-sluicing and *comment*-sluicing in French shows the characteristics of a mixed-quoted expression.

[14] For the examples in (19) and (22), the attested corpus examples are the versions with *dans quel sens*. For (20) and (21), the attested corpus examples are the versions with *comment*.

3. French IWW-sluicing and *comment*-sluicing: The analysis

3.1 Setting the scene: Context for analyzing Sluicing and Sweeping

Given that a sluice receives the same interpretation as its full verbal interrogative counterpart (cf. examples (1)–(2), repeated here for convenience as (23), it is often proposed that sluicing should be analyzed as a sentential ellipsis phenomenon, in which the sentential portion of a constituent question is elided, leaving only a wh-phrase remnant (Ross 1969, Merchant 2001; 2003, Vicente 2018, amongst many others).

(23) Johan a encadré quelqu'un, mais je ne sais pas *qui* (il a encadré).
Johan has supervised someone but I SM know not who he has supervised
'Johan supervised someone, but I don't know who he supervised.'

This is illustrated in (24), in which the angled brackets indicate the clausal ellipsis site, and strikethrough the process of ellipsis (however one wants to implement it technically). The wh-remnant underwent A'-movement to a position higher than the ellipsis site prior to ellipsis of the to-be-elided clausal structure. As such, the sluiced wh-phrase was extracted out of the ellipsis site, and the elided clausal structure hosts the trace of this movement operation.

(24) Johan a encadré quelqu'un, mais je ne sais pas *qui* ⟨ ~~il a encadré *t*~~ ⟩.

One of the main arguments for the incorporation of ellipsis in the analysis of sluicing is the observation that sluiced wh-phrases show various connectivity effects, i.e. they exhibit the same grammatical dependencies as their correlates in the corresponding full verbal counterpart (cf. for instance, Ross 1969, Merchant 2001, Van Craenenbroeck and Merchant 2013). To give but one example for French, let us look at the interaction of sluicing and anaphor resolution. Ott and Therrien (2020) show that sluicing in French can license a reflexive anaphor. Example (25) has a binding dependency between the reflexive *lui-même* 'itself' and its antecedent *le comité* 'the committee'. The fact that the reflexive is grammatical in (25) suggests that sluicing involves a structure in which the antecedent c-commands the reflexive, as such satisfying Principle A of the Binding Theory. If sluicing is the result of an ellipsis process applying to a full clausal syntactic structure, it follows straightforwardly that the distribution of the remnant has to be parallel to that of its equivalent in the non-elliptical sentence (given that the mechanisms and constraints that regulate the distribution of DPs and pronominal elements are identical in 'regular' full syntactic structures and their elliptical counterparts).

(25) Le comité$_i$ a publié des articles sur lui-même$_i$, mais je ne sais
the committee has published some articles about itself but I SM know
pas *combien d'articles sur lui-même$_i$* ⟨ ~~qu'il$_i$ a publié *t*~~ ⟩.
not how-many of-articles about itself that-it has published
'The committee published some articles about itself, but I don't know how many articles about itself.' (cf. Ott and Therrien 2020: (16))

So far, we have only looked at the wh-phrase in sluicing. Turning now to cases of Sweeping, it should be noted that there are accounts that propose that not only the wh-phrase, but the non-wh-element as well, has undergone movement out of the ellipsis site.[15] For instance, for cases of *why-stripping* in English (mentioned in the introduction and exemplified in (26)), Ortega-Santos et al. (2014) and Yoshida et al. (2015) propose that the non-wh-element undergoes focus-driven movement (separately from the wh-phrase), as shown in (27):

(26) A: John was eating natto.
B: Why/How come NATTO? (cf. Yoshida et al. 2015:364, (76))

(27) [$_{CP1}$ Why/How come [$_{CP2}$ *NATTO* ⟨ [$_{TP}$ ~~he was eating *t*~~] ⟩]] (cf. Yoshida et al. 2015:364, (76))

[15] Kim and Abeillé (2019) present an alternative analysis for *why-stripping*, which does not involve movement or even ellipsis. Cf. section 3.2 for more on this.

However, IWW-sluicing and *comment*-sluicing in French share the following property: French allows elements as Sweeping remnants that must remain *in situ* in non-elliptical clauses. As pointed out by Dagnac (2018:792), this appears to challenge analyses relying on the deletion of a clausal constituent after leftward A'-movement of the remnants. For cases like (5) and (7), repeated here for convenience, the non-elliptical counterparts given in (28) are ill-formed.[16]

(5) … je découvrais que j'étais different des autres. Mais différent *comment* ?
I discovered that I=was different from.the others but different how
'I was discovering that I was different from the others. But different how?' (cf. frTenTen23)

(7) A: Toute cette histoire est étrange depuis le début.
all this story is strange since the beginning
'This whole story has been strange since the beginning.'

B: Étrange *dans quel sens* ?
strange in which sense
'Strange in what way?' (cf. frTenTen23)

(28) a. *Différent comment étais-je ?
different how was-I

b. *Étrange dans quel sens est toute cette histoire ?
strange in which sense is all this story

The examples in (29) are possible in French, though:

(29) a. J'étais different comment ?
I=was different how
'How was I different?'

b. Toute cette histoire est étrange dans quel sens ?
all this story is strange in which sense
'In what way is this whole story strange?'

As such, it could be argued that the grammatical sentences in (29), which do not seem to involve any leftward A'-movement of the wh-phrase or the non-wh-element, are the non-elliptical counterparts of the examples in (5) and (7). This observation would render plausible an analysis of these cases of Sweeping (and maybe sluicing in general) as non-constituent deletion of all but the focus-marked material in the clause (in line with recent ellipsis literature, cf. e.g. by Abe 2015, Ott 2018, Ott and Struckmeier 2018, Griffiths 2019, Ott and Therrien 2020, Griffiths et al. 2022; 2023): "Ellipsis applies selectively in the elliptic clause. Focus-marked phrases (and some particles) are not elided" (Griffiths et al. 2022:12). Importantly, then, sluicing "does *not* require *wh*-movement, [and] can "delete around" wh-phrases and other remnants in situ" (Ott 2018:1). For the Sweeping examples in (5) and (7) then, the analysis would be something like:

(30) a. ~~J'étais~~ different comment ?

b. ~~Toute cette histoire est~~ étranger dans quel sens ?

In this paper, this line of analysis will not be pursued, however. The main argument to explore an alternative account is related to the embeddability of Sweeping.

If cases of Sweeping are to be derived from *in situ* questions, we expect restrictions found on these *in situ* non-elliptical clauses to carry over to their elliptical Sweeping counterparts. However, as Dagnac (2018:795 fn. 14) points out: "French does not allow embedded *in situ* questions, so embedded sluices

[16] At this point, it does not really matter if the wh-phrase and the non-wh-element end up separately in the left periphery (as proposed by Yoshida et al. 2015, cf. supra), or if they undergo A'-movement together as one constituent. What is important is that the sentences given in (28) are ungrammatical, so they cannot be the non-elliptical counterparts of the examples given in (5) and (7).

would remain unexplained." Indeed, as illustrated in (31), *in situ* questions are disallowed in embedded clauses: wh-movement is obligatory in embedded interrogatives.[17] The *in situ* analysis would then predict embedded Sweeping to be equally ill-formed, which is not the case. The examples in (32) show that Sweeping in the same embedded contexts is perfectly fine.

(31) a. (!Je ne sais pas encore) ils sont très proches comment.
I SM know not yet they are very close how

b. (!Il devrait préciser) c'est classique dans quel sens.
he should specify it=is classic in which sense

(32) a. A: Bon pour le lien, tu les vois proches ? Très proches ?
right for the link you them see close very close
Ou bien de simples amis ?
or well some simple friends
'Right, for the link — do you see them as close? Very close? Or just friends?'

B: Moi, je les verrais très proches. Je ne sais pas encore très proches *comment*.
me I them would.see very close I SM know not yet very close how
'I'd say they are very close. I don't know yet in what way.' (cf. frTenTen23)

b. Les classiques de ces 5 dernières années selon vous.
the classics of these 5 last years according.to you
Le créateur du topic devrait préciser "classique" *dans quel sens*.
the creator of.the topic should specify classic in which sense
'The classics of the last 5 years according to you.
The creator of the topic should specify "classic" in what way.' (cf. frTenTen23)

Given this observation, an alternative line of analysis will be developed in this paper for the cases under scrutiny.

3.2 The analysis: Reprise sluicing and short sources

We have concluded in section 2 that the non-wh-remnants in IWW-sluicing and *comment*-sluicing show the characteristics of a mixed-quoted expression. To deal with the data under study, it is relevant to distinguish – following Ginzburg and Sag (2000), Ginzburg and Cooper (2001; 2004), and Smirnova and Abeillé (2021) – between direct sluices (33a), which are information questions ('Who came?'), and reprise sluices (33b), which are clarification questions ('Who do you mean by Jo?'). Reprise fragments (cf. Bolinger 1978, Ginzburg and Cooper 2001; 2004, Ginzburg 2012, Griffiths et al. 2022; 2023) such as (34) involve the repetition of an element from the most recent utterance in a discourse and are clarification questions as well ('Who is Bo?' / 'What does it mean to finagle?'). According to Ginzburg and Cooper (2001:1), the main function of reprise/clarification ellipsis – as in (33b) and (34) – is "to elicit an alternative description or ostension to the content (referent or predicate etc.) intended by the original speaker of the reprised sub-utterance." Griffiths et al. (2023:157) add that a reprise utterance is used "whenever the requestor is not confident that they have complete knowledge of the content, form, phonology, register, or discursive impact (etc.) of the preceding utterance."

(33) a. Someone came. – Who?
b. Jo phoned. – WHO? (Ginzburg and Sag 2000:334)

(34) Did Bo finagle a raise? – (i) BO? / (ii) FINAGLE? (Ginzburg and Cooper 2001:1)

[17] A reviewer points out that embedded *in situ* questions are possible in (non-standard) colloquial French. That's why I use ! (instead of *), following the *Grand Grammaire du Français 2021*.

As noted by Ginzburg (2012:148) and Griffiths et al. (2023:157), so-called explicit clarification requests (ECRs) such as the example in (35) are also available, with the same reading in which the requestor is not confident about something in the preceding utterance:

(35) Did Bo finagle a raise? – What's 'FINAGLE'?

As noted by Griffiths et al. (2023:157) "ECRs represent a viable reprise source for clausal ellipsis" and "nothing prevents clausal ellipsis from being licensed in [ECRs]" (Griffiths et al. 2022:21). In other words, it is feasible that a reprise fragment such as (34ii) could underlyingly be the ECR in (35) and as such, the underlying source for the reprise fragment is a non-isomorphic clarification-seeking question.

Like reprise sluices and reprise fragments, IWW-sluices and *comment*-sluices question the form that has just been used.[18,19] That is, in the example in (36), the speaker is asking: 'how or in what way are you using / do you mean the word *curieux* (curious)'?

(36) "C'était curieux." […] Sentant qu'elle avait besoin de parler, je lui ai
it=was curious sensing that=she had need of talk I her have
demandé : curieux *comment* ? […] Curieux drôle, ou curieux un peu inquiétant.
asked curious how curious funny or curious a bit unsettling
'"It was curious." Sensing that she needed to talk, I asked: curious how? […] The funny kind of curious, or the slightly unsettling kind?' (cf. frTenTen23)

Following the line of reasoning developed by Griffiths et al. (2022; 2023), let us now consider the question which ECR could be the underlying source for IWW-sluices and *comment*-sluices in French. I would like to propose that IWW-sluices and *comment*-sluices are derived from underlying short clefts (cf. Rodrigues et al. 2009, Van Craenenbroeck 2010b, Gotowski 2022 for regular sluicing). The short cleft is an ECR, asking clarification about the mixed-quoted expression. As such, the underlying structure of the IWW-sluice and *comment*-sluice in (18), repeated here as (37) for convenience, would be as in (38).[20] Indeed, Gotowski (2022:8) notes that "French questions may also be formed with *est-ce* (an inverted cleft)" and according to Rodrigues et al. (2009:24), French "offers overt evidence of a cleft possibility" and also allows an overt copula." Rodrigues et al. (2009:24) give examples of the use of *c'était* 'it was'. In the context of (38), the use of *c'est* 'it is' seems more fitting.

(37) A: ! J'trouve ça chelou.
I=find that sketchy
'I find that sketchy.'
B: Chelou dans quel sens / comment ?
sketchy in which sense how
'Sketchy in what way / how?'

[18] This was also noted by Smirnova and Abeillé (2021:252) in the context of *wh-ça.* We will come back to this in section 4.

[19] To be precise, Smirnova and Abeillé (2021:263–4) show that *comment* also has other uses in sluicing: question about manner/identity, speech act (*pardon*?), and reason (how come?). However, in the cases under scrutiny here, i.e. Sweeping with *comment* (*comment* combining with a non-wh-element), only the reprise reading is relevant.

[20] For regular sluicing, the cleft-based analysis (Rodrigues et al. 2009, Van Craenenbroeck 2010b, Gotowski 2022) is disputed in French (cf. Dagnac 2018, Hassen 2025, Hassen and Abeillé 2025). The argumentation against a cleft source mainly has to do with certain types of wh-remnants that are available in regular sluicing, but that cannot occur in clefts. However, Sweeping is arguably different from regular sluicing, involving a very specific non-wh-remnant (i.e. a mixed-quoted expression), and having a reprise/clarification reading.

(38) Chelou *dans quel sens / comment* ⟨ ~~est-ce~~ ⟩ ?[21]
sketchy in which sense how is-it

Recall that embedded Sweeping is possible. Given the argumentation built up in the previous section, we predict embedded short clefts to be available as well. Although there seem to be differing grammaticality judgments (indicated with %), cleft continuations are possible for some speakers in embedded clauses, cf. example (39), and clefting thus seems like a possible underlying strategy.

(39) a. % Je ne sais pas curieux comment c'était.
I SM know not curious how it=was
'I don't know how it was curious.'

b. % Il faut préciser "classique" dans quel sens c'est.[22]
it must specify classic in which sense it=is
'It is necessary to specify in what way it is classic.'

Finally, for the reverse word order in IWW-sluices and *comment*-sluices, i.e. with the wh-remnant preceding the non-wh-remnant, the underlying structure would be as in (40) (cf. Temmerman 2023 for a similar proposal for Dutch IWW-sluices). I opt to use the colon here, given that most often, in the frTenTen23 corpus, examples of IWW-sluices and *comment*-sluices with the reverse word order are written with a comma or colon, exemplified again in (41) (see also the examples of *wh-stripping* in Abeillé and Smirnova 2021, most often written with a comma).

(40) *Dans quel sens / comment* ⟨ ~~est-ce~~ ⟩ : chelou ?
in which sense how is-it sketchy

(41) Dans quel sens / comment, chelou ?
in which sense how sketchy

The reader might wonder why this paper gives preference to an analysis of IWW-sluices and *comment*-sluices in French in terms of a short cleft underlying source instead of to a Direct Interpretation Approach (Ginzburg and Sag 2000, Culicover and Jackendoff 2005, Poppels 2022), given that Kim and Abeillé (2019), Smirnova and Abeillé (2021), Hassen and Abeillé (2025) and Hassen (2025) propose a Direct Interpretation Approach for similar constructions in English and in French. Under Direct Interpretation Approaches to ellipsis, cases of sluicing and Sweeping are not derived from a full verbal interrogative counterpart. No syntactic structure for the unpronounced material (i.e. at the ellipsis site) is posited. That is, for an example like (1), repeated here for convenience as (1′), the structure would be as follows:

(1′) Johan a encadré quelqu'un, mais je ne sais pas [[*qui*]$_{NP/DP}$]$_{S/CP}$.
Johan has supervised someone but I SM know not who
'Johan supervised someone, but I don't know who.'

The content of the sluice is inferred from the content of the antecedent clause. A wh-phrase in sluicing inherits its syntactic and semantic properties from a contextual correlate.

[21] Admittedly, is not easy to find non-elliptical short cleft examples like (38) in the frTenTen23 corpus (see also Smirnova and Abeillé 2021 on ellipsis being the main use of certain types of reprise questions). An attested example is the following:

(i) Impressionant comment était-ce ?
impressionant how was-it (cf. frTenTen23)

It is important to note here that in the context of this example, this is a question asking for clarification of the use of *impressionant* 'impressive', not a question with a degree reading ('how impressive').

[22] The attested example here was with *sexiste dans quel sense* 'sexist in what way', but I prefer to give the example with *classique* 'classic', to bring it more in line with (32b).

Given that there are reasons to assume that regular sluicing in French is the result of an ellipsis process applying to a full clausal syntactic structure (cf. section 3.1), one would need to argue that French uses ellipsis in regular sluicing, but not in IWW-sluicing and *comment*-sluicing. In the latter cases, the content of the Sweeping remnants would be directly interpreted based on the context. This would result in a mixed approach to sluices, according to which regular sluices are remnants of clausal ellipsis, yet other types of sluices are genuine non-sentential utterances. Here, I follow the point made by Ott and Therrien (2020:7): "Such a suggestion strikes us as not only theoretically inelegant, but also as […] implausible, if only because it is inconceivable that the learner could decide on one of these radically different strategies on the basis of what little evidence is in fact available to them". In a similar line of reasoning, Griffiths et al. (2023:185–6) state that "this claim is conceptually unsatisfying", and that conceptual redundancy should be avoided. As such, I continue adopting as a foundational assumption the silent structure analysis of sluicing (and its variants).

4. A brief look at SpaCing, and its interaction with *comment*-sluicing and IWW-sluicing

As already briefly mentioned in the introduction, French exhibits SpaCing, a construction in which a wh-word is followed by *ça* 'that', as shown in (4), repeated here. This section briefly examines the interaction of *comment*-sluicing and IWW-sluicing with SpaCing.

(4) A: J'ai vu quelqu'un. B: *Qui* ça ?
I=have seen someone *who that*
'A: I saw someone. B: Who?' (Van Craenenbroeck 2010a:103, (1b))

Building on Lefeuvre (2018; 2020) and Reinhardt (2019), Smirnova and Abeillé (2021) present a corpus study of what they refer to as "*wh-ça*" (both in non-elliptical and elliptical clauses, the latter thus being cases of what I call SpaCing). In a corpus study in 2018, Lefeuvre found 780 occurrences of elliptical *wh-ça*. The 6 wh-words attested in this corpus were: *où* 'where' (32.3%) *comment* 'how' (22.4%), *qui* 'who' (20.5%), *pourquoi* 'why' (19.4%), *quand* 'when' (4.2%), and *quoi* 'what' (1.2%). In Reinhardt's (2019) corpus study, 49 cases of *wh-ça*, all elliptical, were found, with the following 4 wh-words: *comment* (46.9%), *qui* (28.6%), *où* (16.3%), and *pourquoi* (8.2%). In their 2021 corpus study, Smirnova and Abeillé search for 7 wh-words, 6 of which are found in elliptical *wh-ça* (in total 329 occurrences): *comment* (31.3%), *où* (29.8%), *qui* (27.7%), *pourquoi* (6.7%), *quand* (3.6%), and *quoi* (0.9%). In the context of this article, we limit ourselves mostly to cases of SpaCing with *comment ça*. An example from the frTenTen23 corpus is given in (42):

(42) … il est précisé que les noms et adresses des personnes ont été
it is specified that the names and addresses of.the persons have been
changés, mais *comment* ça ?
changed but how ça
'… it is specified that the names and addresses of the people have been changed, but how?' (frTenTen23)

Importantly, Lefeuvre (2018), Reinhardt (2019) and Smirnova and Abeillé (2021) also found instances of *wh-ça* "followed by a previously mentioned segment" (Smirnova and Abeillé 2021:243):

(43) *Comment* ça, pas dans une rue?
how ça not in a street
'How come not in the street?' (Smirnova and Abeillé 2021:245, (12b), from Reinhardt 2019)

Smirnova and Abeillé (2021:247) found 105 such cases, and call examples like these "*wh-stripping*" (cf. section 1): most often with *comment* (62%), but also with *qui* (25%), *où* (11%), *pourquoi* (1%), and *quand*

(1%). To their observations, I would like to add that the previously mentioned non-wh-element can also precede *wh-ça*, as shown in (44).[23]

(44) Nos deux dernières séries auront un rythme de sortie inconnu.
our two last series will.have a rhythm of release unknown
Inconnu, *comment* ça ?
unknown how ça
'Our last two series will have an unknown release schedule. Unknown how?' (cf. frTenTen23)

Smirnova and Abeillé (2021) notice quotation properties with (what they call) *wh-stripping* just like the ones observed in this paper in the context of IWW-sluicing and *comment*-sluicing (cf. section 2). On the one hand, there is verbatim reproduction of (part of) the preceding utterance: for example, the non-wh-element can be of any category (like an imperative verb in (45)). On the other hand, we see the transparency of regular language use: notice the indefinite change in (46), for instance.

(45) Laisse, dis-je. – *Comment* ça, laisse?
leave said-I how ça leave?
'Let it go, I said. – Let it go, how?' (cf. Smirnova and Abeillé 2021:252, (26b))

(46) Elles ont emporté un certain nombre de caisses.
they have taken a certain number of boxes
Quoi! *Comment* ça, des caisses ?
what how ça INDF boxes
'They took a certain number of boxes. – What! Boxes, how?'
(cf. Smirnova and Abeillé 2021:253, (27c))

As such, it is clear that SpaCing and *comment*-sluicing can be combined. Searching for (elliptical) *dans quel sens* + *ça* in the frTenTen23 corpus, and on Google, did not result in any hits, however. The question now arises how to account for this observation: why does *comment*-sluicing allow the combination with SpaCing, but IWW-sluicing does not?

This pattern actually corresponds to a property of the Dutch counterpart of this construction (in which a wh-phrase is followed by the demonstrative *dat* 'that', referred to as Spading, cf. also section 1), first observed by Hoekstra (1993), and also observed for dialectal Dutch and French in Van Craenenbroeck (2004; 2010a): "not all types of sluiced wh-phrases can be followed by [*that*]. More specifically, only [minimal wh-phrases] can partake in Spading. Complex wh-phrases cannot" (Van Craenenbroeck 2010a:17). That is, minimal wh-phrases are perfectly fine in French SpaCing, as was already shown in (4), with the minimal wh-phrase 'who' (see also Smirnova and Abeillé 2021 for this observation). On the other hand, complex wh-phrases are degraded in French SpaCing. For Van Craenenbroeck (2004; 2010a), this was crystal clear in the dialectal Dutch counterpart of this construction, cf. the contrast in (47), but a bit less so in French: "the dialogue in [(48b)] illustrates that complex wh-phrases are degraded when combined with [*that*] (although the judgments appear to be slightly less strong than in dialect Dutch or Frisian)" (Van Craenenbroeck 2010a:103). Smirnova and Abeillé (2021), however, confirm the Dutch pattern for French: they also have an asterisk for **quel homme ça* 'which man *ça*'? Furthermore, a reviewer points out that no such cases were found in several large corpora of written French (Frantext, Reinhardt 2019, etc.).

[23] For completeness' sake, it should be added that *ça* always has to immediately follow the wh-element. That is, the following examples are ungrammatical:

(i) *Inconnu ça *comment* ?

(ii) **Comment* impossible ça ?

(47) a. *Wui* (da)?
where *that.DEM*
'Where?'

b. Welken boek (*da)?
which *book* *that.DEM*
'Which book?' (Wambeek Dutch, cf. Van Craenenbroeck 2010a:17)

(48) a. A: Je vais à Londres. B: *Quand* (ça) ?
I *go* *to* *London* *when* *ça*
'A: I'm going to London. B: When?'

b. A: Marie est en train de lire un livre.
Mary *is* *in* *train* *of* *read* *a* *book*
B: **Quel* *livre* (ça) ?
which *book* *ça*
'A: Mary is reading a book. B: Which book?' (cf. Van Craenenbroeck 2010a:103)

The availability of *comment* 'how', a minimal wh-phrase, in French SpaCing on the one hand, and the unavailability of *dans quel sens* 'in what way', a complex wh-phrase, in French SpaCing on the other hand, completely corresponds to the initial observations made by Hoekstra (1993) and Van Craenenbroeck (2004; 2010a) for Frisian and dialectal Dutch, i.e. while minimal wh-phrases are perfectly fine, complex wh-phrases are degraded in French SpaCing. Along the same lines, Smirnova and Abeillé (2021) observe, for instance, that *ça* cannot occur with *combien* 'how many', or with a wh-word preceded by a preposition.

So, why does SpaCing only allow for minimal wh-phrases? Obenauer (1976), Cheng and Rooryck (2001), and Van Craenenbroeck (2004; 2010a) already observed that the combination of a wh-word and *ça* occurs in non-elliptical wh-questions as well:

(49) Tu as vu qui ça à Paris?
you *have* *seen* *who* *ça* *in* *Paris*
'Who have you seen in Paris?'
(cf. Smirnova and Abeillé 2010:240, cf. also Cheng and Rooryck 2001:16)

As Van Craenenbroeck (2010a:104) notes: "In this example, the string *qui ça* 'who that' seems to function as a single wh-phrase. […] [T]his might be taken as an indication that the combination of wh-phrase + [*ça*] has grammaticalized into a single phrase in French. Smirnova and Abeillé (2021) also consider *ça* to be attached to the wh-phrase. To illustrate this, they contrast a grammatical example like (49) with an ungrammatical one like the following one, in which it is shown that the wh-word *qui* and *ça* cannot be separated from one another (here by a prepositional phrase):

(50) *Tu as vu qui à Paris ça ?
you *have* *seen* *who* *in* *Paris* *ça*
'Who have you seen in Paris?' (cf. Smirnova and Abeillé 2010:240, (3c))

Smirnova and Abeillé (2021:240) observe that *ça* seems to denote ignorance questions, and is not felicitous with resolved questions, as exemplified with the contrast in (51). According to Lefeuvre (2018), the main role of *ça* is to recall an element of the preceding clause and to request information about this element, as shown in (52).

(51) a. Quelqu'un est venu, je me demande qui (ça).
someone *is* *come* *I* *REFL* *ask* *who* *ça*
'Someone came, I wonder who.'

b. Quelqu'un est venu et je sais bien qui (#ça).
someone *is* *come* *and* *I* *know* *well* *who* *ça*
'Someone came and I know who.' (cf. Smirnova and Abeillé 2010:240, (2))

(52) Il était là, l'autre? – Qu… qui ça ? – Le cuisinier…
he was there the-other WH who ça the cook
'Was the other one there? – Who…who? – The cook…' (cf. Lefeuvre 2018)

Smirnova and Abeillé (2021:244–5) argue that *ça* in wh-*ça* is not a pronoun (pace Lefeuvre 2020), but rather a discourse particle, which plays a role in discourse cohesion. It is "attached to the wh-word, like *the hell* in English" (p. 240). Moreover, according to Smirnova and Abeillé (2021), pace Obenauer (1976) and Cheng and Rooryck (2001), *wh-ça* is possible both in *in situ* and in fronted position. The fact that the string *wh-ça* can occur in fronted position, as shown in (53), can also be taken as evidence for the analysis that it forms a single constituent.

(53) a. Et pourquoi ça vous feriez pendre mon papa, monsieur le duc ?
and why ça you do.COND hang my dad sir the duke
'And why would you hang my dad, Mr. Duke?'

b. Comment ça, s'il te plait, que je ne pourrais pas le savoir ?
how ça please that I SM can.COND not it know
'Excuse me, how could I not know it?' (Smirnova and Abeillé 2021:247–8, (15bc))

That would imply, then, that only a limited number of wh-phrases have undergone this process of grammaticalization. According to the corpus studies presented above (Lefeuvre 2018; 2020, Reinhardt 2019, Smirnova and Abeillé 2021), that would be the following wh-phrases: *où* 'where', *comment* 'how', *qui* 'who', *pourquoi* 'why', *quand* 'when', and *quoi* 'what'. Complex wh-phrases did not partake in this grammaticalization process.

That leaves us with examples like the ones in (43) and (44), combining SpaCing with *comment*-sluicing, repeated here for convenience.

(43) *Comment* ça, pas dans une rue?
how ça not in a street
'How come not in the street?' (Smirnova and Abeillé 2021:245, (12b), from Reinhardt 2019)

(44) Nos deux dernières séries auront un rythme de sortie inconnu.
our two last series will.have a rhythm of release unknown
Inconnu, *comment* ça ?
unknown how ça
'Our last two series will have an unknown release schedule. Unknown how?' (cf. frTenTen23)

In section 3.2, I proposed that *comment*-sluicing involves an underlying short cleft. If *comment ça* is a single phrase indeed, we could argue that *comment ça* takes the place of *comment* in *comment*-sluicing:

(54) a. % *Comment* ça ⟨~~est ce~~⟩, pas dans une rue ?
how ça is-it not in a street

b. % Inconnu, *comment* ça ⟨~~est ce~~⟩ ?
unknown how ça is-that

I leave the details of this specific cleft construction, including the considerable variation in speakers' grammaticality judgments, to be worked out in future research.

5. Conclusion

In this contribution, we discussed several cases of Sweeping (*Sluicing With Extra Elements Persist-ing*) in French. A well-known instantiation of Sweeping in French is *comment*-sluicing, with the wh-word *comment* 'how' combining with a non-wh-element. This article introduced a new type of Sweeping in French: IWW-sluicing, i.e. seemingly non-sentential questions involving the combination of a non-wh-element (*le meilleur* 'the best' in (55)) and the wh-phrase *dans quel sens* 'in what way'.

(55) A: Tout le monde dit que Johan est le meilleur promoteur !
all the world says that Johan is the best supervisor
'Everyone says that Johan is the best supervisor!

B: Le meilleur promoteur *dans quel sens* ?
the best supervisor in which sense
'The best supervisor in what way?'

It was shown how this type of Sweeping is very similar to *comment*-sluicing. The non-wh-remnants in these two cases of Sweeping show the characteristics of a mixed-quoted expression. I presented a unified analysis for IWW-sluicing and *comment*-sluicing in French, arguing that these two cases of Sweeping in French are instances of reprise sluicing (inquiring about the meaning of the mixed-quoted expression: how or in what way are you using / do you mean the word/phrase 'X'?), and that an explicit clarification request is the underlying structure of these instances of Sweeping. More specifically, I argued in favor of a short cleft analysis of these underlying structures. Finally, a third type of Sweeping, i.e. SpaCing (*Sluicing Plus A Ça*) was brought into the picture, and it was shown that only *comment*-sluicing allows for the combination with SpaCing, unlike IWW-sluicing, which does not. It was argued that IWW-sluicing differs from *comment*-sluicing in this respect, because IWW-sluicing involves a complex wh-phrase, while *comment*-sluicing involves a minimal one. Only a limited number of minimal wh-phrases when combined with *ça* have undergone a process of grammaticalization into a single phrase.

It goes without saying, that, without a doubt, these and other cases of Sweeping in French deserve closer attention. To name but one example: due to space limitations, the analysis of *Why*-stripping in French has remained undiscussed in this paper. At first glance, given the many empirical similarities with *comment*-sluicing and IWW-sluicing, the analysis proposed here for the latter two cases of Sweeping could arguably be extended to *Why*-Stripping in French. This is different than the analysis proposed by Ortega-Santos et al. (2014), Yoshida et al. (2015) and Corver (2021), though, who argue that the non-wh-remnant in *Why*-Stripping undergoes leftward focus movement followed by clausal ellipsis (as briefly mentioned in section 3.1). Moreover, there does not seem to be a consensus yet regarding the precise details on the position(s) of the different wh-phrases in these types of elliptical constructions. As such, we end on the thought in (56):

(56) A: Nous devons approfondir davantage cette question à l'avenir.
we must deepen more this question in the=future
'We need to explore this issue further in the future.'

B: À l'avenir *dans quel sens* ?
in the=future in which sense
'In the future in what way?'

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References

Abe, Jun. 2015. *The In-Situ Approach to Sluicing.* No. 222 in Linguistik aktuell. John Benjamins, Amsterdam. https://doi.org/10.1075/la.222.

Bolinger, Dwight. 1978. Asking more than one thing at a time. In *Questions*, edited by Henry Hiż, 107–50. D. Reidel, Dordrecht. https://doi.org/10.1007/978-94-009-9509-3_4.

Cheng, Lisa Lai-Shen and Johan Rooryck. 2000. Licensing *Wh*-in-situ. *Syntax* 3: 1–19. https://doi.org/10.1111/1467-9612.00022.

Corver, Norbert. 2021. Why in Dutch? On why-stripping and high and low adverbials. In *Why is 'Why' unique? Its syntactic and semantic properties*, edited by Gabriela Soare, 151–96. De Gruyter Mouton, Berlin. https://doi.org/10.1515/9783110675160-006.

van Craenenbroeck, Jeroen. 2004. *Ellipsis in Dutch Dialects*. Ph.D. Thesis, Leiden University. LOT Publications, Utrecht.

van Craenenbroeck, Jeroen. 2010a. *The Syntax of Ellipsis: Evidence from Dutch Dialects*. Oxford University Press, Oxford. https://doi.org/10.1093/acprof:oso/9780195375640.001.0001.

van Craenenbroeck, Jeroen. 2010b. Invisible Last Resort: A note on clefts as the underlying source for sluicing. *Lingua* 120: 1714–26. https://doi.org/10.1016/j.lingua.2010.01.002.

van Craenenbroeck, Jeroen and James Merchant. 2013. Ellipsis phenomena. In *The Cambridge Handbook of Generative Syntax,* edited by Marcel den Dikken, 701–45. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511804571.025.

van Craenenbroeck, Jeroen and Tanja Temmerman. 2019. Against the in situ account of sluicing: The case of French. Paper presented at *NELS50*, MIT.

Culicover, Peter W. and Ray Jackendoff. 2005. *Simpler Syntax*. Oxford University Press, Oxford. https://doi.org/10.1093/acprof:oso/9780199271092.001.0001.

Dagnac, Anne. 2018. French. In *The Oxford Handbook of Ellipsis*, edited by Jeroen van Craenenbroeck and Tanja Temmerman, 785–814. Oxford University Press, Oxford. https://doi.org/10.1093/oxfordhb/9780198712398.013.35.

Davidson. Donald. 1979. Quotation. *Theory and Discussion* 11: 27–40.

de Villiers, Jill G. 1991. Why Questions? *University of Massachusetts Occasional Papers in Linguistics* 17 8.

de Villiers, Jill G. 1996. Defining the open and closed class program for acquisition: The case of wh-questions. In *Toward a Genetics of Language*, edited by Mabel L. Rice, pp. 145–84. Erlbaum, Mahwah, NJ.

Ginzburg, Jonathan. 2012. *The Interactive Stance: Meaning for Conversation*. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199697922.001.0001.

Ginzburg, Jonathan and Robin Cooper. 2001. Resolving ellipsis in clarification. In *Proceedings of the 39th Annual Meeting of the Association for Computational Linguistics*, 236–43. Association for Computational Linguistics, Stroudsburg, Pa. https://doi.org/10.3115/1073012.1073043.

Ginzburg, Jonathan and Robin Cooper. 2004. Clarification, ellipsis, and the nature of contextual updates in dialogue. *Linguistics and Philosophy* 27: 297–365. https://doi.org/10.1023/B:LING.0000023369.19306.90.

Ginzburg, Jonathan and Ivan Sag. 2000. *Interrogative Investigations*. No. 123 in CSLI Lecture Notes. CSLI Publications, Stanford, Ca.

Gotowski, Megan. 2022. *Quoi*-sluices in French. *Glossa: a journal of general linguistics* 7 1. https://doi.org/10.16995/glossa.5793.

Griffiths, James. 2019. A Q-based approach to clausal ellipsis: Deriving the preposition stranding and island sensitivity generalisations without movement. *Glossa: a journal of general linguistics* 4 1: 12. https://doi.org/10.5334/gjgl.653.

Griffiths, James, Anikó Lipták, and Güliz Güneş. 2022. On reprise fragments. Paper presented at 'You're on mute!' ellipsis seminar, New York University.

Griffiths, James, Anikó Lipták, and Güliz Güneş. 2023. Reprise fragments in English and Hungarian: Further evidence for an in situ Q-equivalence approach to clausal ellipsis. *Language* 99 1: 154–91. https://doi.org/10.1353/lan.2023.0000.

Hassen, Amal. 2025. *Interrogative and Exclamative Sluices in French and Tunisian Arabic*. Ph.D. Thesis, Université Paris Cité.

Hassen, Amal and Anne Abeillé 2025. Preposition omission in French interrogative sluices: Empirical findings and theoretical implications. *Glossa: a journal of general linguistics* 10 1. https://doi.org/10.16995/glossa.15197.

Hoekstra, Erik. 1993. Dialectal variation inside the CP as parametric variation. In *Dialektsyntax,* edited by Werner Abraham and Josef Bayer, no. 5 in Linguistische Berichte, Sonderhefte, 161–79. Westdeutscher Verlag, Opladen. https://doi.org/10.1007/978-3-322-97032-9_8.

Kayne, Richard S. 1984. *Connectedness and Binary Branching*. No 16 in Studies in Generative Grammar. Foris, Dordrecht. https://doi.org/10.1515/9783111682228.

Kim, Jong-Bok and Anne Abeillé. 2019. Why-stripping in English: A corpus-based perspective. *Linguistic Research* 36: 365–87. https://doi.org/10.17250/KHISLI.36.3.201912.002.

Lefeuvre, Florence. 2018. Les interrogatives partielles averbales: Le cas de « proforme interrogative + *ça* / *cela* ». In *L'Interrogative en français*, edited by Marie-José Béguelin, Aidan Coney, and Alexander Guryev, 183–208. Peter Lang, Bern. Available at https://shs.hal.science/halshs-04632812v1.

Lefeuvre, Florence. 2020. Les interrogatives partielles dans un corpus de théâtre contemporain. *Langages* 217: 23–38. https://doi.org/10.3917/lang.217.0023.

Merchant, Jason. 2001. *The Syntax of Silence: Sluicing, Islands, and the Theory of Ellipsis*. Oxford University Press, Oxford. https://doi.org/10.1093/oso/9780199243730.001.0001.

Merchant, Jason. 2003. SynCom Case 98: Sluicing. Available at https://home.uchicago.edu/merchant/pubs/SynCom.sluicing.pdf.

Merchant, Jason. 2004. Fragments and ellipsis. *Linguistics and Philosophy* 27: 661–738. https://doi.org/10.1007/s10988-005-7378-3.

Merchant, Jason. 2006. Why no(t)? *Style* 40 1–2: 20–3.

Merchant, Jason. 2012. Ellipsis. Ms., University of Chicago. Available at https://home.uchicago.edu/~merchant/pubs/merchant.ellipsis.pdf.

Maier, Emar. 2014a. Mixed quotation: The grammar of apparently transparent opacity. *Semantics and Pragmatics* 7 7. https://doi.org/10.3765/sp.7.7.

Maier, Emar. 2014b. Pure quotation. *Philosophy Compass* 9: 615–30. https://doi.org/10.1111/phc3.12149.

Moline, Estelle. 2009. Présentation: panorama des emplois de *comment* en français contemporain. *Travaux de linguistique* 1: 7–17.

Moline, Estelle. 2013. *Comme* et *comment* en français contemporain: spécificités et recouvrements. In *Comme, comment, combien. Concurrence et complémentarité*, edited by Antoine Gautier and Thomas Verjans, 57–96. L'Harmattan, Paris.

Obenauer, Hans-Georg. 1976. *Études de syntaxe interrogative du français: Quoi, combien et le complémenteur.* Niemeyer, Tübingen.

Ortega-Santos, Iván, Masaya Yoshida, and Chizuru Nakao. 2014. On ellipsis structures involving a wh-remnant and a non-wh-remnant simultaneously. *Lingua* 138: 55–85. https://doi.org/10.1016/j.lingua.2013.10.008.

Ott, Dennis. 2018. Some properties of French sluicing and their theoretical implications. Poster presented at *Colloquium on Generative Grammar 28*, Tarragona.

Ott, Dennis and Volker Struckmeier. 2018. Particles and deletion. *Linguistic Inquiry* 49: 393–407. https://doi.org/10.1162/LING_a_00277.

Ott, Dennis and Raymond Therrien. 2020. Notes on sluicing and swiping in (Canadian) French. In *Proceedings of the 2019 Annual Conference of the Canadian Linguistic Association*.

Poppels, Till. 2022. Explaining ellipsis without identity. *The Linguistic Review* 39: 341–400. https://doi.org/10.1515/tlr-2022-2091.

Reinhardt, Janina. 2019. *Regularity and Variation in French Direct Interrogatives: The Morphosyntax and Intonation of Question Forms in Reality TV Shows, Audio Books and Teaching Materials*. Ph.D. Thesis, University of Konstanz. Available at https://pub.uni-bielefeld.de/record/2937889.

Rodrigues, Cilene, Andrew Nevins, and Luis Vicente. 2009. Cleaving the interactions between sluicing and preposition stranding. In *Romance Languages and Linguistic Theory 2006*, edited by Danièle Torck and W. Leo Wetzels, no. 303 in Current Issues in Linguistic Theory, 175–98. John Benjamins, Amsterdam. https://doi.org/10.1075/cilt.303.11rod.

Ross, John Robert. 1969. Guess who? In *Papers from the Fifth Regional Meeting of the Chicago Linguistic Society*, edited by Robert I. Binnick, Alice Davison, Georgia M. Green, and Jerry L. Morgan, 252–86. Chicago Linguistic Society, University of Chicago, Chicago, Il.

Smirnova Anastasiia and Anne Abeillé 2021. The French question particles *ça* and *donc*: A corpus study. *Linguistic Research* 38: 239–69. https://doi.org/10.17250/khisli.38.2.202106.003.

Temmerman, Tanja. 2019. When the sluice is not alone: On the syntax of WH+non-WH sluicing in Dutch. Paper presented at *Sluicing+@50*, University of Chicago, Chicago, Il.

Temmerman, Tanja. 2023. Weird in what way? On the syntax of Dutch 'in what way' sluices. Paper presented at *UCL Seminar Series,* University College London, London.

Vicente, Luis. 2018. Sluicing and its subtypes. In *The Oxford Handbook of Ellipsis*, edited by Jeroen van Craenenbroeck and Tanja Temmerman, 479–503. Oxford University Press, Oxford. https://doi.org/10.1093/oxfordhb/9780198712398.013.22.

Weir, Andrew. 2014. Why-stripping targets Voice Phrase. In *NELS 43: Proceedings of the 43rd Annual Meeting of the North East Linguistic Society*, vol. 2.

Yoshida, Masaya, Chizuru Nakao, and Iván Ortega-Santos. 2015. The syntax of why-stripping. *Natural Language and Linguistic Theory* 33: 323–70. https://doi.org/10.1007/s11049-014-9253-9.

Asymmetries between *because* and *for* reason clauses: Licensing speaker perspective

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Abstract

Although English *because* and *for* appear to be near-synonymous causal connectives, this paper shows that *for* has a distinct grammatical and semantic profile. When *for* introduces finite clauses, they are extraposed and inaccessible for syntactic processes. This contrasts with when *for* introduces non-finite gerundive adjuncts which behave like ordinary adjuncts; the interpretive range is narrower and less straightforwardly causal. I then identify an unexpected asymmetry in the scope of finite *for* and *because* clauses: *for* is often restricted to matrix clause interpretation, while *because* readily allows both matrix and embedded scope. I argue that finite *for* always licenses an explicit discourse-speaker point of view evaluation. Building on this, I propose an analysis in which *for* is semantically underspecified, assigns a generalized GROUND theta role (Talmy 1978; 2000) to a Discourse Speaker Point of View projection (Speas and Tenny 2003, Miyagawa 2012). In addition *for* possesses interpretable but unvalued features in the sense of Pesetsky and Torrego (2007) within its lexical specification. The interaction of theta-role assignment and feature checking derives the observed distributional and interpretive properties and suggests a unified lexical entry of *for* across its complementizer and prepositional uses.

1. Introduction

English has a variety of complementizers that introduce finite clauses denoting (loosely) causes, reasons, justifications, etc.

(1) The children didn't go to school on Monday...
   a. ...**as** they were sick that day.
   b. ...**since** they were sick that day.
   c. ...**owing to the fact that** they were sick that day.
   d. ...**'coz** they were sick that day.
   e. ...**because** they were sick that day.
   f. ...**for** they were sick that day.

In this paper, I will focus on the contrasts between *for* and *because*. These items are often treated as broadly synonymous, differing largely in register or discourse style. This view is reinforced by the fact that both may introduce clauses that are interpreted as causes, reasons, elaborations, or justifications. Although many of my informants suggested that *for* in this sense sounds old fashioned or high register, speakers retain intuitions about its distribution i.e. it is not necessarily a fossilized form – merely an uncommon form. The following corpus examples of contemporary usage illustrate that these forms are contemporary and very natural.[1]

(2) The Biden administration did not have the legal authority to fire him and that he would not resign **for** he is the head of an independent agency. (Kilgarriff et al. 2014:SketchEngine)

(3) His account of the DSK affair shows how thorough an investigator he is, **for** he not only managed to interview the man himself but watched hours of videotape from security cameras at the Sofitel hotel. (Kilgarriff et al. 2014:SketchEngine)

(4) We pay particular attention to exports **for** we aim to make Azerbaijan known in foreign countries by producing goods capable of being competitive... (Kilgarriff et al. 2014:SketchEngine)

[1] For this paper I used my own judgements as well as a number of consultants who were speakers of South African English.

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At the same time, the two connectives diverge sharply in their grammatical behaviour. Clauses introduced by *for* display a restricted distribution and resist a range of syntactic operations that are readily available to *because* clauses. The grammatical contrast is striking in light of the difficulty of constructing minimal semantic contrasts between them. The resulting tension is that how can two elements that appear to overlap so extensively in interpretation differ so systematically in their syntactic profile? This paper approaches that question by identifying a further asymmetry that emerges once scope is considered. While *because* clauses readily take scope within both matrix and embedded environments, *for* clauses show a strong preference for matrix-level interpretation. This restriction weakens in contexts involving explicit speaker evaluation. I take this pattern to indicate that *for* is systematically associated with the encoding of speaker perspective.

On this basis, I propose that *for* is semantically underspecified. Rather than encoding a specific causal relation, it introduces a general grounding relation between a proposition and a discourse-level point of view (Speas and Tenny 2003, Miyagawa 2012). More specific interpretations, including causal and justificatory readings, arise through interaction with the lexical semantics of the matrix predicate and the roles of discourse participants.

1.1. A note on terminology and structure of this paper

Because is a complementizer which introduces a finite clause. I will refer to these as *because* clauses: namely a clause dominated by a CP headed by *because*. Similarly, *for* has a complementizer usage where it may introduce a finite clause; I will refer to these as finite *for* clauses. In addition, *for* can introduce non-finite, gerundive adjuncts. This is a prepositional usage of *for*. I remain agnostic about whether to label *for* as a complementizer or a preposition because ultimately I argue that they have the same feature composition. Suffice it to say that *for* is a lexical item which has both a complementizer and a prepositional function. I will use the term "connective" as a neutral term.

The argument proceeds in three steps. In section 2, I show that finite clauses introduced by *for* are syntactically peripheral and behave as extraposed constituents, in contrast to the tighter integration of *because* clauses. In particular, I explore scope asymmetries between *for* and *because* (section 2.3).

I then turn to non-finite gerundive constructions with *for* (section 3), which display a different syntactic profile but provide a clearer window into its interpretive contribution. Taken together, these patterns support a unified treatment of *for* across its finite, non-finite, and prepositional uses. Finally, in section 4, I develop an analysis in which *for* participates in feature checking in the sense of Pesetsky and Torrego (2007) (section 4.1) and assigns a generalized grounding theta role (section 4.2) (Talmy 1978; 2000), thus deriving its distributional and interpretive properties.

2. Asymmetries between *for* and *because* finite clauses

There are a number of formal differences in distribution that suggest that *for* and *because* are very different from each other when they introduce finite clauses.

Because clauses can be co-ordinated whereas *for* clauses cannot (Quirk et al. 1985:923).

(5) a. He asked to be transferred because he was unhappy and because he saw no prospect of promotion. (Quirk et al. 1985)
b. *He asked to be transferred for he was unhappy and for he saw no prospect of promotion. (Quirk et al. 1985)

Because clauses can be topicalised but *for* clauses cannot.

(6) a. Because he was the bravest, Tigger was chosen to steal the honey.
b. *For he was the bravest, Tigger was chosen to steal the honey.

Because clauses can be focussed/stressed and *for* clauses cannot.

(7) The cake burned BECAUSE/*FOR the oven was too hot.

Because clauses may be preceded by a focus particle such as *precisely* or *exactly*; *for* clauses may not.

(8) a. My nose runs, precisely because/*for the room is too dusty.
b. The clock stopped, exactly because/*for Grandfather died.

Because clauses can be used as stand-alone utterances, whereas *for* clauses cannot.

(9) Why did the clock stop?
a. Because my grandfather died.
b. *For my grandfather died.

These properties demonstrate that finite clauses introduced by *because* are merged into the tree structure and to all intents and purposes act like other adjuncts. In contrast, finite clauses introduced by *for* are not able to participate in movement or syntactic operations as they are dislocated from the main sentence structure and behave like appositives (de Vries 2006, Ott and Onea 2015, Döring 2015, Griffiths 2015). Accordingly, they cannot be topicalized or coordinated. Also, on the assumption that focus must be licensed by either movement to or agreement with FocusP, it follows that a dislocated structure cannot bear stress or be modified by focus particles or function as a standalone response. In contrast, the fact that *because* clauses participate in these structures is evidence that *because* clauses are not similarly dislocated.

2.1. Where do because/for *clauses merge?*

Taken individually, both *because* and *for* modify propositions by specifying a reason/cause or initial state that resulted in the propositional truth value. Within a semantically driven approach to adjuncts such as that of Ernst (2002), causal/reason clauses must therefore adjoin to a propositional structure (e.g. EventP/vP) for the sake of semantic composability. This is supported by examples (10a) and (10b) which present coordinated vPs modified by causal clauses. Assuming that these constructions are not elliptical structures (with an elided subject in the second conjunct), this data shows that the causal adjuncts are merged with the coordinated constituents, namely vP.

(10) a. I [ate a sandwich because I was hungry] and [read a book because I was bored]
b. I [ate a sandwich for I was hungry] and [read a book for I was bored]

Binding tests also demonstrate that both *for* and *because* clauses are probably (initially) adjoined at vP level. Example (11) is degraded because the matrix subject c-commands the coindexed R-expression subject of the *because*/*for* clause yielding a Principle C violation. This shows that the *because*/*for* clause adjoins below SpecIP.

(11) Sandile$_i$ likes cake *because/*for Sandile$_i$ has a sweet tooth.

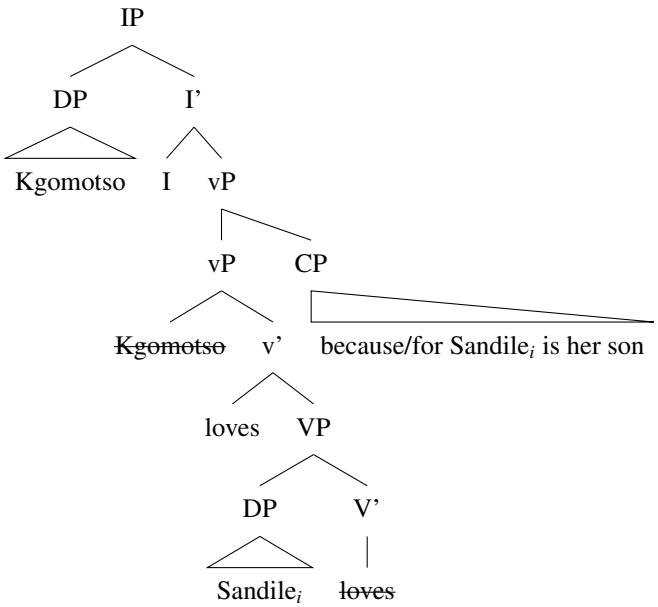
In contrast, an object R-expression (12) does not trigger a Principle C violation. This shows that *for* and *because* clauses are merged above the object position in SpecVP.

(12) Kgomotso loves Sandile$_i$ because/for Sandile$_i$ is her son.

The evidence from Principle C shows that *because* and *for* clauses are merged below the canonical subject position in SpecIP but above the object position for R-expressions. This is compatible with the claim that they are merged to the EventP/vP.[2]

[2]The judgments with respect to object pronouns are a little less clear. While example (i a) is grammatical, showing that a pronom-

(13)



In conclusion then, based on semantic, coordination and binding evidence, *because* and *for* clauses initially merge to a propositional level, most likely vP.

2.2. Causal readings

To a great extent, *because* and *for* introduce finite clauses with the same or similar causal meaning.[3] *Because* and *for* both encode loosely causal/reason readings; in most instances they appear to be completely interchangeable. The following examples indicate different kinds of situations which are lumped under "causation".

(14) The glass cracked for/because it cooled too quickly. [direct causation]

(15) If two angles of a triangle add up to 150 degrees, the other angle is 30 degrees for/because the internal angles of triangles always add up to 180 degrees. [non-temporal universal truth]

Example (14) shows strict causality where one event temporarily precedes and entails another. (15) shows that both *for* and *because* can encode an atemporal universal mathematical truth that is not causal/agentive in a strict sense. Importantly, neither of these examples requires an agentive subject in the causal clause, so

inal object does not trigger a principle C violation in *because* adjuncts, example (i b) is very slightly degraded. I acknowledge that speaker judgements vary on this, although the degree of ungrammaticality is not as strong compared to (12).

(i) a. Kgomotso loves him$_i$ because Sandile$_i$ is her son.
b. ?Kgomotso loves him$_i$ for Sandile$_i$ is her son.

I do not want to place too much emphasis on these examples until the data become clearer. However, taken at face value it might be evidence that *for* clauses adjoin slightly higher than in situ R-Expression objects but somewhat lower than the derived position of shifted objects higher in the structure. While this is consistent with my proposed analysis, nothing hinges on it: I leave this to future research.

[3]It has also been claimed that there are semantic differences between *because* and *for* clauses. *Because* seems to denote a more causal relation than does *for*. Quirk et al. (1985) suggest that *because* denotes a direct cause, whereas *for* is used for indirect causes. However, the effects are subtle and differences in judgement fall short of ungrammaticality; true minimal pairs seem hard to find in English. I am therefore sceptical that this characterization is the whole story.

causality in these situations is independent of agentivity.[4]

(16) She left the party early for/because her train was cancelled. (Reason)

(17) He knew his life was incomplete [because]/for he had yet to suffer! (Strawbs 1974[5])

Example (16) provides an agent-oriented reason that plays into the decision of an agent; an event is construed against the backdrop of another. A similar illustrative example is (17). The *because/for* clause denotes an irrealis state of affairs (i.e. lack of suffering). It is probably not the single, direct cause of his life being incomplete; rather it is more that the incompleteness of his life is interpreted by the agent against a backdrop of his lack of suffering.

(18) My number one cringer: Let her cry for/[because] she's a lady... let her dream, for[/because] she's a child! (Kilgarriff et al. 2014:SketchEngine)

Example (18) illustrates a justification: the reason provided is for the imperative. Leaving her to cry is interpreted as a justification by the speaker against the backdrop of her being a lady.

(19) The Holocaust was unique among history's great cruelties for[/because] it was a 12-year international persecution and murder machine perpetrated in the glare of broad daylight. (Kilgarriff et al. 2014:SketchEngine)

(20) Destiny Dove is definitely not your usual heroine for[/because] she is a young teenager still trying to come to grips with the death of her parents and little brother. (Kilgarriff et al. 2014:SketchEngine)

The examples in (19) and (20) both illustrate a speaker-oriented, interpretive, elaboration surrounding the circumstances of the event. In both the *for/because* clause presents facts in support of why the speaker evaluates the Holocaust as unique (19) and that Destiny Dove as not a typical heroine (20).[6]

2.3. Epistemicity and an unexpected scope asymmetry in embedded clauses

The previous section shows that both *for* and *because* may introduce finite clauses which have similar semantics interpreted loosely as causes, reasons, elaborations or justifications from a speaker perspective. *For* and *because* seem to be interchangeable in these contexts and it is very difficult to provide clear minimal pairs. This raises the problem of how to explain the very different syntactic behaviour of these complementizers in the face of their semantic similarity. Nevertheless, an unexpected semantic asymmetry occurs with embedded clauses. I will demonstrate the asymmetry and the conditions under which it occurs and use it to suggest that *for* and *because* are sensitive to epistemicity. In some contexts, *because* clauses take

[4]For all examples derived from corpora or other sources, I include "because" to test the minimal pair, even though the original examples all used "for". The added option is included in square brackets to distinguish it from the original.

[5]Thank you to Sally Hunt for suggesting this one.

[6]Camil Staps (p.c.) suggests the following minimal pair, designed to identify whether the semantics of *because* can be described as introducing the reason of the subject/agent in the main clause whereas *for* can be described as introducing an explanation by the utterer of the main clause for the event/state of affairs described in it.

(i) a. The children were not allowed to go to school because/for they were sick – even though they thought they could have gone.

b. The children did not go to school for/because they were sick – even though they thought they could have gone.

Example (i a) presents being sick is a factor in an external decision-making process (a reason for the parents to keep them home, or because of a school policy); perhaps possible in a context where the children actually wanted to go to school and found the decision to keep them home overly cautious. (i b) Presents being sick as a factor in the child's own decision-making process; it suggests that the children were only mildly sick and using it as an excuse. The fact that, as far as I can ascertain, these examples are both grammatical demonstrates that there is no contrast between *because* and *for* in this respect. Both complementizers are able to support a wide variety of relationships between events. Nevertheless, as will become clear in this paper, I believe that this idea is on the right track.

scope over either matrix or embedded clauses whereas *for* clauses only take scope over the matrix clause. The following examples demonstrate that *because* has both a causal and an evaluative meaning, whereas *for* only has the evaluative component.

(21) a. I hope that Nicolás$_i$ was convicted because he$_i$ is a drug lord. (Dealing in drugs is a crime)
→ "I hope Nicolás was convicted of being a drug lord."
b. I hope that Nicolás$_i$ is convicted because he$_i$ is a drug lord. (They'll probably catch him with his tax returns though!)

Example (21a) demonstrates an embedded scope causal reading: his being a drug lord is the cause of his conviction on drug charges. It is presupposed that Nicolás was convicted. (21b) illustrates an evaluative meaning where it is the speaker's hope that a conviction is secured on any basis because the speaker asserts that Nicolás is a drug lord and therefore deserves to be in jail. This can be contrasted with the use of a *for* clause below.

(22) a. I hope that Nicolás$_i$ was convicted for he$_i$ is a drug lord.
"*I hope he is convicted of being a drug lord."
b. I hope that Nicolás$_i$ was convicted for he$_i$ is a drug lord. (They'll probably catch him with his tax returns though!)

The embedded reading where Nicolás is convicted on drug charges is absent (22a) and only the matrix reading is available (22b): the speaker evaluates him negatively – and thus hopes he will be convicted of something or other. However, the following examples seem to contradict the findings above. First consider the scope behaviour of *because* clauses. Example (23a) highlights the embedded reading of *because* and (23b) the matrix reading.[7]

(23) a. Donald Trump informed Congress that Nicolás$_i$ was a threat because he$_i$ was a drug lord.
b. Donald Trump$_i$ informed Congress that Nicolás was a threat because he$_i$ wanted a pretext for extradition.

Based on the previous discussion one would expect *for* to only have the matrix reading. However, interestingly both matrix and embedded scopes seem to be available (24). This suggests that the matrix/embedded asymmetry is a function of the proposition type and not strictly on whether it is embedded or not. It is notable, that in both these examples the statement "that Nicolás was a threat" is not a presupposed fact, but rather the reported content of a message that might be either true or untrue. In other words it is the FIGURE aginst which the asserted GROUND associated with the causal clause is evaluated.

(24) a. Donald Trump informed Congress that Nicolás$_i$ was a threat for he$_i$ was a drug lord.
b. Donald Trump$_i$ informed Congress that Nicolás was a threat for he$_i$ wanted a pretext for extradition.

We can test whether epistemicity may be playing a role by explicitly referencing a discourse speaker with the phrase "in my opinion". Thus embedded scope of *for* is unavailable (25a) while the matrix scope reemerges (25b). *For* introduces GROUND, functioning to add comment by a discourse speaker, and the scope effects appear to be contingent on that.

(25) a. *Donald Trump informed Congress that Nicolás$_i$ was a threat for in my opinion he$_i$ was a drug lord.
b. Donald Trump$_i$ informed Congress that Nicolás was a threat for in my opinion he$_i$ wanted a pretext for extradition.

Following Speas and Tenny (2003) and Miyagawa (2012), we can capture these effects by utilizing a

[7] Both readings are available in both examples – but the context makes the relevant reading more pragmatically salient.

Speaker Point-of-View Phrase (PovP) in the high left periphery. PovP contains a PRO argument which is explicitly linked to the speaker and to which *for* phrases are obligatorily linked. If embedded clauses only contain a subset of the left-peripheral CP layers then it follows that *for* clauses will not have embedded scope. This makes an interesting prediction. If PovP is only projected in clause types that encode speaker perspective, then quotatives are expected to contain it. This is because quotatives plausibly contain full clausal structures with a richly articulated left periphery, including PovP. If so, a finite *for* clause should be able to take relatively low scope inside a reported-speech domain. The relevant speaker-oriented projection would then be available within the quoted clause itself. This prediction appears to be borne out. In (26a), the *for* clause is naturally interpreted as anchored to the main clause. In (26b), the *for* clause scopes over Harry's actions. For contrast (26c) shows that *because* clauses can take both scopes.

(26) a. William$_i$ told Harry, "You are unwise", for he$_i$ was writing a book and didn't want to have to tell bad stories about Harry.
b. William told Harry$_i$, "You are a complete idiot", for he$_i$ was writing a book about William and Kate.
c. William$_i$ told Harry$_j$, "You are a complete idiot", because he$_{i/j}$ was writing a book.

3. Non-finite "causal" clauses

Now consider non-finite contexts in contrast to finite ones. Both *for* and *because* can also embed non-finite gerundive clauses (both deverbal and denominal). In non-finite contexts, *because* and *for* clauses exhibit distinctive behaviors, particularly in how they attach to their hosts. Consider the following examples:

(27) a. William was angry with Harry for his writing a book. [VP]
b. William was angry with Harry for the writing of a book. [NP]

(28) a. William was angry with Harry because of his writing a book. [VP]
b. William was angry with Harry because of the writing of a book. [NP]

In example (27a), *for*, in its prepositional usage, introduces a causal adjunct specifying the reason for William's anger. Here, *for* introduces a nominalized non-finite VP with a direct object. The implied embedded agent is clearly oriented toward the object, identifying Harry as the agent of the writing. Similarly, *because* can introduce deverbal and denominal gerunds (28) – the only difference being that *because* also requires an overt preposition to license case on the noun. This suggests that *for* licenses Case whereas *because* does not – a fact that will become important later.

3.1. An object requirement and object binding in non-finite for *clauses*

For non-finite gerunds appear to be object-oriented. The following examples all support readings where the object of the matrix clause binds the implicit PRO subject of the predicate in the *for* gerund. Thus (29) cannot mean that I had stolen money; in (30) it is not I who is a good boy; and in (31) it is not I who am sophisticated. Finally, (32) demonstrates that the grammatical subject cannot bind PRO.

(29) I worried about the accountant for stealing the money.

(30) I took the dog to the park for being a good boy .

(31) I admired the chair for being highly sophisticated.

(32) *I drank water for staying hydrated.

Similarly, where an object is present it must be a semantically plausible antecedent. In (33) and (34) water cannot be tired and doors cannot feel unsafe, thus making these objects unacceptable antecedents.

(33) *I drank water for being tired.

(34) *She locked the door for feeling unsafe.

To claim that an object always necessarily binds PRO is too strong. An anonymous reviewer points out that for the examples above, the object may not necessarily bind PRO, even though they are plausible antecedents.

(35) a. *I drank wine for being tasty.
b. *She locked the door for being unlocked.

So the generalizations appear to be that (a) subjects may not bind PRO and (b) that if PRO is bound then it must be an object that does so. The conditions under which objects may or may not bind PRO require further research.

Object orientation makes a prediction that intransitives ought to be ungrammatical with *for* non-finite complements. This prediction is born out by examples (36)–(40) which lack an object. Example (36) shows that a dummy object expletive also cannot bind PRO within the gerund.

(36) I sat *for being tired / because of my being tired.

(37) I collapsed *for being tired / because of my being tired.

(38) I was thirsty *for being tired / because of my being tired.

(39) I was anxious *for cheating at cards / because of my cheating at cards.

(40) I disliked it *for cheating at cards / *because of my cheating at cards.

The lack of an object to bind the implicit subject in the *for* clause prevents these sentences from being syntactically valid. They also demonstrate that a sentential subject is not a suitable antecedent for PRO within the object-oriented *for* clause. Interestingly, all these examples contrast with the equivalent use of a non-finite *because* clause; this emphasizes that *because* is not obligatorily object-oriented in the same way that *for* is. This pattern extends to cases involving reciprocals. In these examples, the implicit subject is bound by the reflexive object anaphor yielding grammaticality:

(41) William reassured/congratulated himself for writing a tell-all memoir.

(42) I disliked myself for cheating at cards.

In conclusion, the non-finite gerund introduced by *for* is object-oriented. This contrasts with finite clauses introduced by *for* which do not appear similarly object-oriented – because they do not contain PRO.

3.2. Non-finites and causality

The interaction of non-finite *for* clauses with their predicates showcases a range of interpretations that extend beyond pure causality.

(43) I took the dog to the park for being a good boy.

(44) I disliked myself for cheating at cards.

(45) The intellectual admired the argument for being highly sophisticated.

In (43) the dog's behavior justifies a reward, reflecting a justificational reading. However, this contrasts with (44) where cheating is personal evaluation: a reason for self-dislike, yet lacks any connotation of reward. Example (45) also illustrates an evaluative stance by the subject. In this case, the *for* clause denotes an inherent state and does entail causation in the normal sense. These examples indicate that non-finite *for*

clauses may be interpreted in non-causal ways, differing from their finite counterparts. The general semantic reading of these clauses aligns with "on account of" or "evaluated within the context of" interpretations.

My main point here is merely to demonstrate that non-finite *for* clauses are not strictly causal but involve a range of meanings. Later in this article I will argue that *for* introduces a generalized GROUND thematic role which interacts the presuppositional content of the predicate. Under this view, the *for* clause only contributes explanatory content with a weak, highly context-dependent relation (roughly 'on account of') where a FIGURE presented in the main clause is evaluated against the GROUND presented by the *for* clause. One diagnostic for context-dependant discursive interpretation status is cancellability.

(46) I took the dog to the park for being a good boy. Y'know, I'd have taken him even if he'd chewed the rug.

(47) I disliked myself for cheating at cards. But not because cheating is wrong. I just hated that I'd been careless and got caught.

(48) I laughed at myself for cheating at cards – but only when it was pointed out to me.

In (46), the initial *for* clause invites a reward-based causal inference: being a good boy is the GROUND against which the decision to grant a reward is assessed. The continuation cancels that causal inference. In (47), the *for* clause introduces card playing as GROUND against which a moral-evaluation is invited. It can be cancelled; it is getting caught that motivates the self-dislike, not the fact of cheating at cards. In this instance, the *for* clause does not introduce the cause at all. Similarly, in (48) cheating at cards is not the direct cause of laughter – it is the fact of being called out for cheating that precipitates laughter.

For present purposes, the non-finite pattern is valuable because it helps isolate the interpretive contribution of *for* in a domain where the semantics is easier to diagnose than that of their finite counterparts. Across predicates, the relation introduced by *for* is most naturally paraphrased in very general terms as 'on account of' which I frame as GROUND, with more specific inferences (e.g. reward, blame, self-evaluation, explanation) arising as pragmatic meanings conditioned by the lexical meaning of the matrix predicate and by the discourse roles of the participants.

4. Toward an analysis

I develop an analysis that exploits the interaction between valued vs. unvalued and interpretable vs. uninterpretable features (Pesetsky and Torrego 2007), together with the distribution of theta-role dependencies. The goal is not to provide a fully articulated analysis of *for* and *because*, but rather to indicate where a principled solution is likely to lie in a feature-based architecture of this kind. Even at this level of abstraction, however, my proposal captures the contrast between finite and non-finite *because* and *for* clauses and their associated differences in interpretation. Importantly, the analysis does not, in and of itself, require that finite *for* clauses be structurally dislocated from the clause that they modify. Although I briefly consider how a dislocation-style implementation might be developed in section 4.5, I treat this as an open problem and leave it for future work to specify more fully.

Pesetsky and Torrego (2007) develop a theory of features in which features are independently specified for (i) interpretability and (ii) valuation. Interpretability is a condition at the syntax–semantics interface: an interpretable feature contributes to LF in the category on which it appears. Valuation is a morphosyntactic property: valued features bear a specific value (e.g. T:PAST/PRES; Person:3; Number:PL; Case:ACC), whereas unvalued features require valuation via Agree. Uninterpretable features cannot be interpreted on their host category and must be eliminated (or rendered inert) prior to LF. The interaction of these two dimensions yields the typology in table 1.

Within this system, Pesetsky and Torrego (2007) argue that finite complementizers such as *that* bear a T feature that is valued but uninterpretable. This interacts with the T head of TP, which bears a T feature that is interpretable but unvalued. Under their account, the CP/TP configuration jointly supports the checking of an unvalued, uninterpretable T feature on D: the interpretable T feature in T participates in the valuation

	interpretable	**uninterpretable**
valued	+valued +interpretable	+valued –interpretable (e.g. Tense on C)
unvalued	–valued +interpretable (e.g. Tense on T)	–valued –interpretable (e.g. T on D)

Table 1: Pesetsky and Torrego (2007)

of uT on D, while the valued T feature on C supplies the value required to fix the T feature on D. In what follows, I adopt this framework as a way of making explicit hypotheses about the featural content of *for*.

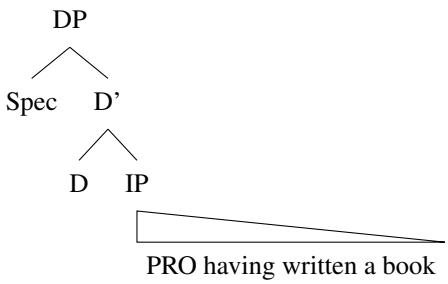
4.1. For *checks Case*

This section shows that prepositional *for* (but not *because*) functions as a case assigner. (49a) and (49b) are ungrammatical without the case-assigning preposition. When *because* embeds a non-finite nominal or gerundive structure, Case licensing becomes possible only if an overt Case-assigning preposition such as *of* is introduced. This demonstrates that *because*, as a complementizer, does not itself assign Case.

(49) a. I admired him because *(of) his having written a book.
b. I admired him because *(of) the writing of his book.

In addition example (49) shows that a case marker is required. This confirms that a deverbal gerund is headed by a DP dominating the verbal clausal structure (see also Abney 1987, Alexiadou 2001).

(50) [$_{DP}$ [D] [$_{IP}$ his having written a book]]



By contrast, in (51), *for* requires no additional preposition such as *of* to license case and thus *for* itself licenses case.

(51) a. I admired him for having written a book. [VP]
b. I admired him for the writing of his book. [DP]

I will take the more restrictive position, that the *for* preposition and *for* complementizer are featurally identical: that both check Case. To formalize this, I propose that the features of *for* include valued and uninterpretable features. This makes it identical to Pesetsky and Torrego (2007)'s characterization of C^0 – distinguished only by the feature in question.[8] By exploiting the parallelism with Pesetsky and Torrego

[8]Pesetsky and Torrego (2007) argue that Case is a realization of a complex checking relation involving T – they do not argue that Case is a primitive. I am treating Case as a primitive in my analysis purely as a placeholder. I make no commitments about the nature of the Case feature in this context. If I had to be pressed, I would suggest that "Case" is a stand-in for an epistemic feature such as [FACT] denoting the epistemic certainty of existence of an entity (if it is on a DP) or the certainty of truth value (if it is a predicate). But I don't want to get into the weeds of this.

(2007), I argue that *for* is featurally unable by itself to check all the uninterpretable and unvalued features of a DP. This will play an important role in my subsequent analysis.

(52) [FOR: [uninterpretable.case], [valued.case:ACC], . . .]

4.2. For *is semantically underspecified: It assigns a generalized theta role*

In previous sections I argued that (a) finite *for* clauses introduce (loosely) causal readings and that (b) non-finite *for* clauses exhibit a wider range of meanings which include but are not restricted to causal readings. I have also sought to show that the various readings of *for* clauses may be related to the presuppositional context interacting with the introduction of the Discourse Speaker's epistemic commitments.

If we step back momentarily from the complementizer function of *for*, we notice that ostensibly, *for* also appears to be a preposition in other English contexts albeit one with underspecified semantics. "The meaning of *for* seems abstract, manifold, and elusive" (Lindstromberg 1998:224). Examples (53) through (69) show that *for* is not thematically specific but can introduce a wide variety of DP complements including Beneficiaries, Directionals, Temporals, Instrumentals and – interestingly enough – Reasons/Causes (adapted from Lindstromberg (1998).

(53) I cooked the meal for my mother. [Beneficiary]

(54) This train is bound for Redding. [Telic Goal]

(55) You are invited to dinner; come at 7.30 for 8.00. [Telic temporal]

(56) I didn't eat aubergine for several years. [Atelic temporal]

(57) This gate is not to be used for a swing/swinging. [Instrumental]

(58) I didn't eat aubergine for several reasons. [Reason]

(59) München is famous for Glühwein. [Reason]

(60) They couldn't see the forest for the trees. [Cause – idiomatic]

(61) Adultery is grounds for divorce. [Cause]

(62) Sandile always played bridge for money. [Result]

(63) The house went for a song. [Result]

(64) The car is ready/prepared for a drive. [Availability/goal]

(65) The Falcon 9 is cleared for blast-off. [Availability/goal]

(66) Nobody takes Cyril for a fool. [Existence]

(67) There is no room for doubt. [Existence]

(68) Emigrating from my birth country was a big deal for me. [Experience]

(69) The news was shocking for the neighbours. [Experience]

In many of these examples, the contribution of prepositional *for* appears to be tightly integrated with the semantics of the predicate rather than introducing an independent lexical meaning of its own. The evidence above suggests that *for*, in its prepositional use, assigns Case and satisfies the selectional requirements of the predicate, yet does not itself introduce a richly specified thematic role. Instead, it supplies a generalized relational role, which I will characterize as GROUND (Talmy 1978; 2000). The DP introduced by *for* functions as the GROUND relative to which the main clause state or event is assessed (FIGURE). Returning to the complementizer function of *for*, the patterns reviewed earlier indicate that it behaves in parallel with prepositional *for* in lacking a determinate lexical semantics. On this basis, I adopt the more restrictive

hypothesis that complementizer *for* is semantically identical to prepositional *for*, and that both realize the same underspecified GROUND relation in the syntax as well as checking Case.

(70) [[FOR: [uinterpretable.Case], [valued.case:ACC], [θ assigner:GROUND], . . .]]

4.3. Derivation of for *with non-finite gerunds*

Having established the feature make-up of *for* in the lexicon, this section describes the derivation of non-finite and finite clauses introduced by *for*.[9] For non-finite gerunds, the derivation proceeds as follows. Step 1: The non-finite predicate is merged and a PRO subject is projected in the clause-internal subject position, where it receives its theta role from the embedded predicate. A nominalizing D head is then merged, forming a DP-sized constituent on top of the non-finite predicate (Abney 1987, Alexiadou 2001, de Vries 2006). To keep the derivation maximally conservative, I follow Pesetsky and Torrego (2007) with D introducing an unvalued Case feature that is uninterpretable on D and must be valued in the course of the derivation.

(71) a. William was angry with Harry for writing a book. . .
b. [DP [D:[unvalued.case; uninterpretable.case; θ]] [IP PRO **writing a book**]]

Because the structure is non-finite, there is no clause-internal head capable of valuing Case on D, so D's Case requirement cannot be satisfied inside the non-finite domain. Step 2: The complementizer *for* is merged.

(72) [[**for** [uninterpretable.case], [valued.case:ACC], [θ assigner:GROUND]
[DP [D:[unvalued.case; uninterpretable.case; θ]] [IP PRO **writing a book**]]]]

For bears the relevant Case-licensing resources: Agree checks unvalued.case on D with valued.case on *for* providing a non-nominative value. At the same time, *for* assigns a GROUND theta role to the DP. The Theta Criterion is therefore satisfied by a configuration in which PRO is theta-marked by the embedded predicate, and the nominalizing D is theta-marked by *for*: PRO receives a thematic role in the embedded domain, and the DP introduced by D receives a thematic role from the selecting head.

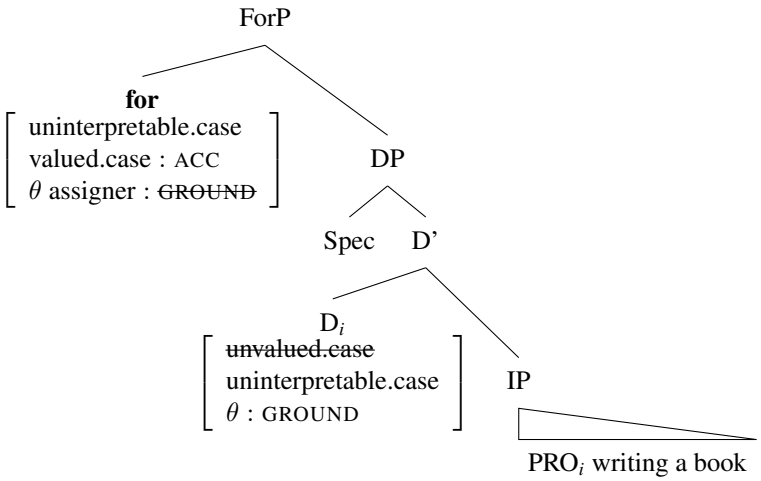
(73) After checking applies (only unchecked features shown here for convenience):
[[**for** [uninterpretable.case], [DP [D_i:[case:ACC; uninterpretable.case; θ:GROUND]] [IP PRO_i **writing a book**]]]]

The resulting structure is illustrated below in (74). Crucially, D and PRO are not independent thematic participants; D is interpreted as introducing (or at least being coindexed with) the same event participant PRO whose role is fixed clause-internally by the embedded predicate. Since conflicting thematic specifications would be illicit (or at minimum yield an interpretive crash), the role contributed by *for* must be a neutral, generalized role – something like GROUND – compatible with whatever more specific role is determined inside the embedded VP. This provides a direct explanation for why *for*, uniquely among English connectives, is able to head these nominalized non-finite clauses: it is specifically the combination of Case licensing plus a semantically underspecified theta contribution that allows the structure to converge.[10]

[9] Arguably, calling *for* a complementizer at this point is moot because it is identical in all featural respects to a preposition; *for* is a single lexical category which can take on a complementizer function as well as a prepositional function.

[10] The same point is shown by non-finite *because* adjuncts: Case and theta role are assigned by an apparently "empty" preposition *of*.

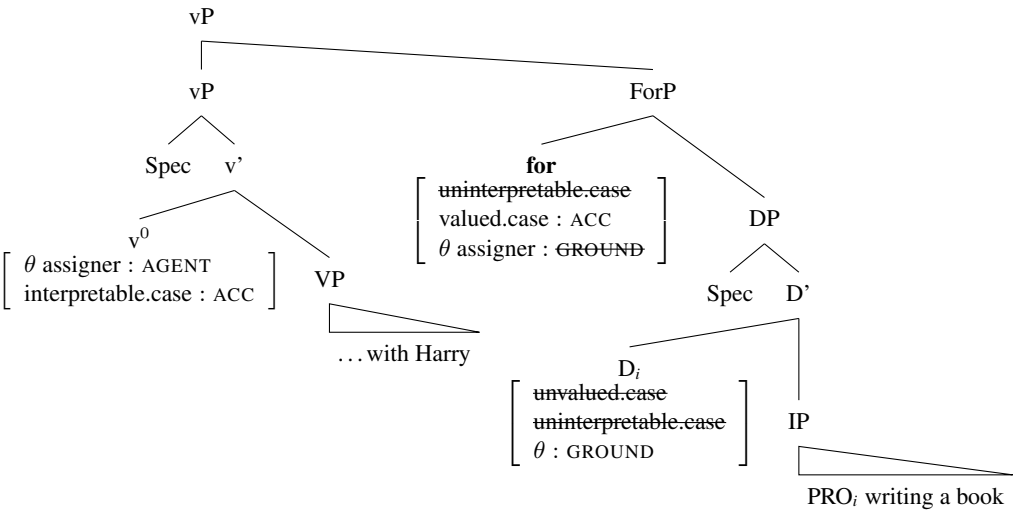
(74)



In this structure it can be clearly seen that there remain uninterpretable.case features on both *for* and the D. Consequently, when the *for* clause is merged adjoined to vP (as argued in section 2.1) within the verbal domain, *for*'s unvalued Case feature probes upward and Agrees with an interpretable Case source associated with the matrix predicate e.g. with little *v* which is a case assigner. It may also be possible that a prepositional case assigner could check uninterpretable.case. In this way, *for* is simultaneously (i) a local Case licenser for the nominalized gerund phrase (valuing D as non-nominative) and (ii) itself integrated into the matrix Case system by having its uninterpretable Case feature checked/valued in the vP domain. The consequence is that the non-finite *for* clause is derivationally complete without any need to treat it as dislocated or "peripheral": once its internal Case requirements are met and *for*'s own features are checked in vP, it can participate in the clausal syntax like other integrated adjuncts.

(75) After checking applies (only unchecked features shown here for convenience):
[vP [v [interpretable.case]] [PP **with Harry**$_i$] [[**for** [uninterpretable.case], [DP [D$_i$:[case:ACC; uninterpretable.case; θ:GROUND]] [Non-Finite PRO$_i$ **writing a book**]]]]

(76)



An interesting outcome of this analysis is that it predicts that when there is no interpretable.case feature within a vP (e.g. no case-assigning little *v* or no case-marked object), then the derivation ought not to converge. This may go some way toward explaining the ungrammaticality of *for* with intransitives (examples

(36) to (40)).[11]

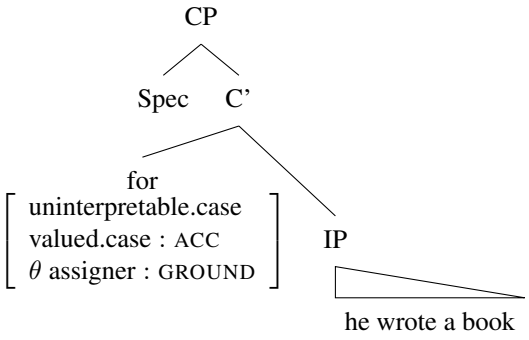
4.4. Derivations of finite for *adjuncts*

I now turn to finite causal clauses introduced by *for* in its complementizer function.

Step 1: A finite clause is merged with CP is merged headed by *for*. On standard assumptions, the IP is internally well-formed in the sense that its unvalued and uninterpretable features are discharged within the finite clause. In particular, nothing inside the IP is available to value the uninterpretable Case dependency on *for*, and the CP itself is not an appropriate target for theta-role assignment. The result is that *for*'s remaining requirements must be satisfied within the derivation of the matrix clause: its uninterpretable.case must be checked by an interpretable.case source external to the CP, and its theta role must be discharged outside the *for* clause. In this respect, finite *for* clauses contrast sharply with the non-finite nominalized structures discussed above, where *for* can license Case directly on a nominalizing D inside its complement.

(77) a. William was angry with Harry for he wrote a book.
b. [**for** [uninterpretable.case], [valued.case:ACC], [θ assigner:GROUND] [CP **he wrote a book**]]

(78)



Step 2: Merge the *for* clause with vP. *for*'s uninterpretable.case is valued upon Merge as soon as an appropriate interpretable.case feature is encountered in the vP shell.

(79) After checking applies (only unchecked features shown here for convenience):
[vP [v [interpretable.case]] [PP **with Harry**$_i$] [**for** [valued.case:ACC], [θ assigner:GROUND] [CP **he wrote a book**]]]

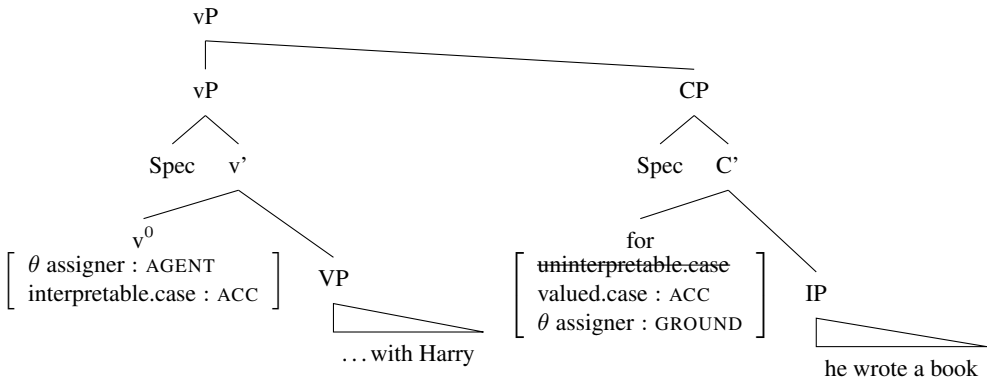
[11] In the spirit of intellectual honesty, it also makes a prediction which is not borne out by the facts, namely that passives with *for* gerunds ought to be ungrammatical since passive little *v* does not assign accusative case. In fact, such passives are grammatical and appear to be genuine instances where a subject can control PRO.

(i) a. She hates the car for using too much fuel.
b. The car was hated for using too much fuel.

(ii) a. The reviewer praised the article for offering a fresh perspective.
b. The article was praised for offering a fresh perspective.

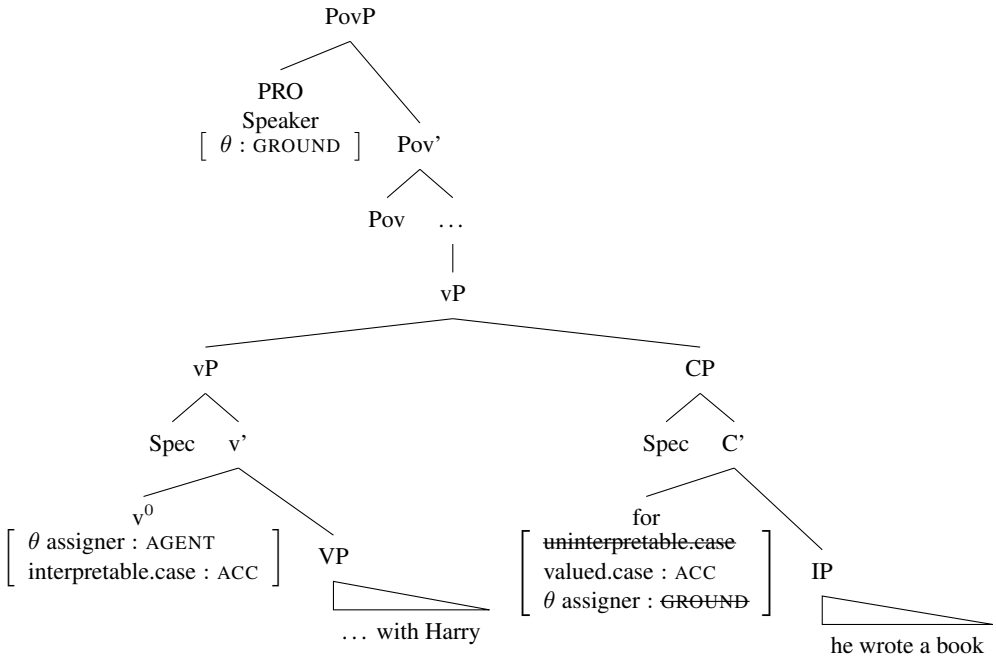
This is also an exception which proves the rule insofar as passive grammatical subjects are semantic objects. I shall leave this to future research.

(80)



Step 3: *for* still has a GROUND thematic role to assign. The Theta Criterion requires that thematic roles be exhaustively assigned, but all DPs introduced within the vP shell have already received theta roles from the selecting predicate(s), and the finite CP itself cannot bear the relevant participant role. The derivation therefore crashes unless *for* can assign a generalized GROUND role to another DP in the derivation. Given the semantics of *for* clauses encoding a speaker perspective, it is reasonable that these clauses may also interact with a phrase encoding Discourse Speaker Point of View in the left periphery: PovP (Speas and Tenny 2003, Miyagawa 2012). This phrase relates the proposition to the speaker as a discourse participant. On this view, *for* assigns its generalized GROUND theta role to the PRO Speaker argument of PovP, thereby explicitly encoding the *for* clause as a GROUND speaker-perspective.

(81)



4.5. SpellOut and why finite for *clauses are structurally dissociated*

The proposal, as developed so far, captures a cluster of properties: *for* patterns like a preposition-like complementizer with respect to feature valuation, but it also assigns a generalized GROUND theta role. In non-finite contexts, that theta role is discharged to the DP complement of the preposition. In finite

environments that theta role must be discharged in a speaker-oriented phrase within the high left periphery. What does not straightforwardly follow from the analysis is the fact that finite *for* clauses are structurally dislocated from the host clause. Being explicit about the limits of my analysis, I therefore offer the following as a partial analysis of the dislocation effect.

Notably, the dislocation effect appears restricted to finite *for* clauses. Therefore, within my analysis it is necessarily tied to the one major factor that differentiates finite and non-finite *for* constructions in the present system, namely the assignment of the GROUND thematic role by *for* to a PRO argument of PovP. One possible implementation is the following. In English, high-peripheral projections are not overtly realized. On this view, SpellOut applies before PovP is merged. When SpellOut occurs (after C and T instantiate a phase), all formal uninterpretable and unvalued features have already been checked and resolved. However, the finite *for* clause cannot yet be fully licensed in its merged position, because *for* has not discharged its GROUND theta role. This presents a paradox: if all formal features which might cause a crash at an interface are checked, then nothing actually prevents the *for* clause from being spelled out. On the other hand, its theta role has not yet been assigned so the derivation will crash at CI/LF. Accordingly I hypothesize that the finite *for* clause is spelled out in its merged position (because it meets the interface requirements) but the theta role is assigned covertly, post SpellOut. Since the *for* clause has already been spelled out in an earlier phase, the only way for *for* to discharge its theta role to the PRO argument of PovP is for the clause to be moved to a position in the high left periphery where it can enter into a local relationship with PRO. However, as it has already been spelled out in an earlier phase to do so, it must be 'ripped' from its original spelled out position, thus breaking the syntactic relations that link it to vP. This may result in a dislocation effect.

5. Conclusion

I have argued that treating *for* and *because* as near equivalents in causal clauses obscures a systematic asymmetry between them. Diagnostics involving coordination, fronting, focus, and fragment answers show that finite *for* clauses pattern differently from *because* clauses despite having very similar semantics. The investigation of non-finite *for* clauses distinguishes the semantic contributions of *because* and *for* more clearly, showing that their distribution is tightly constrained by argument structure and the epistemic orientation of the speaker.

On this basis, I reject analyses in which *for* itself encodes causation. Instead, I argue that *for* in both its prepositional and its complementizer functions is semantically underspecified: it checks Case and satisfies selectional requirements, but contributes only a highly general GROUND role to an argument relative to which the matrix proposition is assessed. This notion draws on Talmy's (1978, 2000) figure–ground organization, but generalizes it beyond spatial relations: the DP or IP introduced by *for* functions as a reference point against which an event or state is construed.

Building on this, I develop a derivational analysis in which *for* consistently introduces this GROUND relation across both finite and non-finite environments. Surface differences between them follow from independent structural factors. In non-finite adjuncts, *for* is able to discharge all its features and its theta roles within the vP shell. In finite contexts, by contrast, *for* can discharge its formal features within the vP shell but crucially cannot assign the GROUND theta role until after SpellOut when it assigns this role to the argument of PovP, explicitly encoding the epistemic point of view of the speaker into the argument structure of the clause. This placement explains both the distinctive syntax of finite *for* clauses and their stronger causal profile.

Acknowledgements

This paper feels, in some sense, like a return to my Linguistics roots and the completion of a cycle. It started in 2001, as a novice AIO under the supervision of Prof. Johan Rooryck at Leiden University, I wrote a short

descriptive squib comparing *for* and *because*. I set it aside and, for 25 years waited for it to germinate, not knowing what to do with it. The invitation to contribute to this volume provided an occasion to revisit that early work. What has emerged is quite different from what I first imagined. The argument developed in directions that were not apparent to me at the time. I like to think that my linguistic thinking and practice has developed and matured over the course of this cycle. For the opportunity and encouragement to spend my life contributing to the development of the world of ideas, my deepest thanks go to Johan.

I completed my PhD under his promotorship between 2001 and 2005. He insisted on a respect for the data, clarity in analysis, on understanding precisely how a mechanism works and what follows from it. That insistence on precision shaped how I think about syntax and about ideas in general. Our discussions at the time pushed me further than I imagined possible. At the same time, he created a space that was welcoming and deeply human. He welcomed us into his home, hosted us for meals, and showed a genuine interest. At the same time, I recognized in him a deeply ethical man – who cared deeply about the Discipline and about how we conduct ourselves as intellectuals; his subsequent work in Open Access amply demonstrates this.

Thank you, Johan for changing my life and providing such a spectacular example to me. Your legacy lives on in your advice to me which I pass on to my own students: how to write a good abstract and a comment you once made that when giving a conference presentation: one may be excused for a boring analysis, but one cannot be excused for failing to put on a good show.

Finally, I would like to thank Giselle de Vos and Sally Hunt and Camil Staps for interesting conversations about the data and the meanings of *for*. I am also sincerely grateful to two anonymous reviewers whose careful comments and suggestions strengthened the argument dramatically. Finally, I'd like to thank Anikó Lipták who provided feedback on the very first version 25 years ago.

References

Abney, Steven P. 1987. *The English Noun Phrase in its Sentential Aspect*. Ph.D. thesis, Massachusetts Institute of Technology. Available at http://hdl.handle.net/1721.1/14638.

Alexiadou, Artemis. 2001. *Functional Structure in Nominals: Nominalization and Ergativity*. No. 42 in Linguistik Aktuell/Linguistics Today. John Benjamins, Amsterdam. https://doi.org/10.1075/la.42.

Döring, Sandra. 2015. Parentheticals are – presumably – CPs. In *Parenthesis and Ellipsis: Cross-Linguistic and Theoretical Perspectives*, edited by Marlies Kluck, Dennis Ott, and Mark de Vries, no. 121 in Studies in Generative Grammar, pp. 109–46. De Gruyter Mouton, Berlin. https://doi.org/10.1515/9781614514831.109.

Ernst, Thomas. 2002. *The Syntax of Adjuncts*. No. 96 in Cambridge Studies in Linguistics. Cambridge University Press, Cambridge. https://doi.org/10.1017/CBO9780511486258.

Griffiths, James. 2015. *On Appositives*. Ph.D. thesis, University of Groningen, Utrecht.

Kilgarriff, Adam, Vít Baisa, Jan Bušta, Miloš Jakubíček, Vojtěch Kovář, Jan Michelfeit, Pavel Rychlý, and Vít Suchomel. 2014. The Sketch Engine: Ten years on. *Lexicography* 1 1: 7–36. https://doi.org/10.1007/s40607-014-0009-9.

Lindstromberg, Seth. 1998. *English Prepositions Explained*. John Benjamins, Amsterdam. https://doi.org/10.1075/z.157.

Miyagawa, Shigeru. 2012. Agreements that occur mainly in the main clause. In *Main Clause Phenomena: New Horizons*, edited by Lobke Aelbrecht, Liliane Haegeman, and Rachel Nye, no. 190 in Linguistik Aktuell/Linguistics Today, pp. 121–44. Oxford University Press, Oxford. https://doi.org/10.1075/la.190.04miy.

Ott, Dennis and Edgar Onea. 2015. On the form and meaning of appositives. In *Proceedings of NELS*, vol. 45, pp. 203–12.

Pesetsky, David and Esther Torrego. 2007. The syntax of valuation and the interpretability of features. In *Phrasal and Clausal Architecture: Syntactic Derivation and Interpretation*, edited by Simin Karimi, Vida Samiian, and Wendy K. Wilkins, no. 101 in Linguistik Aktuell/Linguistics Today, pp. 262–94. John Benjamins, Amsterdam. https://doi.org/10.1075/la.101.14pes.

Quirk, Randolph, Sidney Greenbaum, Geoffrey N. Leech, and Jan Svartvik. 1985. *A Comprehensive Grammar of the English Language*. Longman, London.

Speas, Peggy. and Carol L. Tenny. 2003. Configurational properties of point of view roles. In *Asymmetry in Grammar*, edited by Anna Maria Di Sciullo, vol. 1: Syntax and Semantics of *Linguistik Aktuell/Linguistics Today*, pp. 315–44. John Benjamins, Amsterdam. https://doi.org/10.1075/la.57.15spe.

Strawbs. 1974. Hero and heroine. Song on *Hero and heroine* (Track 5). Produced by D. Cousins & T. Allom. CD 540 935-2.

Talmy, Leonard. 1978. Figure and ground in complex sentences. In *Universals of Human Language*, edited by J. H. Greenberg, C. A. Ferguson, and Edith A. Moravcsik, vol. 4: Syntax, pp. 625–49. Stanford University Press, Stanford, Ca. https://doi.org/10.3765/bls.v1i0.2322.

Talmy, Leonard. 2000. *Toward a Cognitive Semantics*, vol. 1: Concept Structuring Systems. MIT Press, Cambridge, Ma. https://doi.org/10.7551/mitpress/6847.001.0001.

de Vries, Mark. 2006. The syntax of appositive relativization: On specifying coordination, false free relatives and promotion. *Linguistic Inquiry* 37 2: 229–70. https://doi.org/10.1162/ling.2006.37.2.229.

PART 2: OPEN ACCESS

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Abstract

DOAJ (Directory of Open Access Journals) is considered by many the authoritative database of scholarly open access journals. Still, many such journals are not found there. Based on rejection data from DOAJ this article tries to shed light on some of the major reasons journals have their applications rejected. Understanding why applications are rejected can inform us as to what can be done to improve the situation. The data point to lack of resources as a major problem. Many applications are from journals that do not meet the criteria or are predatory, but many are also from journals that could very well deserve a listing in DOAJ – they just are not able to complete an application with all relevant information in place.

1. Introduction

The Directory of Open Access Journals (DOAJ) is perceived by many as the authoritative database of scholarly open access journals. As of February 20th 2026, it contained 22,640 journals according to the homepage, https://doaj.org/, which is dynamically updated.

In informal contexts I have observed that many wonder why this or that journal is not there, and I also hear that there are many more open access (OA) journal in this or that country, than what is found in DOAJ. Why is this so? Can data on rejections enlighten us with regards to this? And can these data also inform us about the actual number of peer-reviewed OA journals, a number that never can be precise but for which there are many disagreeing estimates? An overview of different possible estimates based in various sources for 2020 is given in (Bosman et al. 2021:25–27).

2. The data

As part of preparations for an analysis of non-overlap between DOAJ and other sources of information on OA journals, primarily Scopus and Web of Science (WoS), I was allowed access to a spreadsheet documenting 50,367 rejections from DOAJ over a span of many years. The first entry is dated March 2014, the last September 2025. The start date corresponds well to 19th March 2014 being the launch of new inclusion criteria in DOAJ (Frantsvåg 2019). This means the data cover a period of more than 11 years, in that time DOAJ criteria and practices have changed, and the publishing landscape has also changed. Journals have changed publishers, publishers have moved – e.g. the large OA publisher Hindawi moved from Egypt to the UK during this period and was acquired by Wiley in 2021. This all calls for caution when trying to make broad conclusions from the material.

Due to confidentiality considerations, I am unfortunately not at liberty to share the rejection data with my readers. Here I will try to present some analyses based on what I have been able to find of interesting information in the data, primarily in the "Comment" field that contains DOAJ's notes. I will also try to compare journals that have been rejected with journals that are listed in DOAJ, based on what information is available in the rejection data.

A journal may apply to DOAJ and be rejected a number of times. To create some meaningful sort of statistics or overview I found it best to use the last rejection as a source of information – my assumption was that an applying journal would change information between unsuccessful applications, which means that the current situation and the last rejection was most interesting.

Much work needed to be done to the data before they could be analysed, including exclusion of journals' previous rejections except the last, exclusion of journals that have been accepted after a previous rejection, deduplication of entries. I refer the interested reader to the appendix for further information.

After the cleaning, we are left with 25,050 in our final selection of journal rejections. These journals have been rejected from DOAJ and not been accepted at a later date.

It is quite interesting to note that after sorting out duplicates and obviously bogus applications, we still have more rejected applications to DOAJ (25,050) than DOAJ has journals that have been approved (22,640 as of 20th February 2026).

 Nordlyd 49.1: 247–259, Special issue in honor of Johan Rooryck, edited by Jeroen van Craenenbroeck, Aysa Ekanger, Camil Staps, and Guido Vanden Wyngaerd. Published at the University of Tromsø – The Arctic University of Norway.
http://septentrio.uit.no/index.php/nordlyd https://doi.org/10.7557/12.8707

3. Reasons for rejection

The data we have contain both standard information about the journals applying, and a comment field that DOAJ personnel have used to note down information from the process, including problems observed and communication with the applicant. I used this comment field to find reasons for rejections. The other fields have been used when comparing those journals that have had their applications rejected, with those who have been accepted into DOAJ.

Searching the comment field for relevant text strings, I have tried to code the reasons. Note that the numbers sum to more than 25,050, this is because an application may have had more than one problem that has showed up as a text string match in my searches. A problem is that the reasons are given as free text, so that variations in grammar, ways of expressing thoughts, and typos may hamper efficient search. Also, some entries lack information or have only a conclusion like "Reject" without giving a reason. The entries lacking information are generally from the first years, and the policy is that there should be a reason. Applications with missing, incorrect or wrong information are summarily rejected, this could be the reason for only "reject" in the field.

Table 1 presents some problem areas that were observed in the free text and counted using Excel text filtering (note that an application may be listed under more than one problem). The short information is meant as a shorthand for the problem areas, which are discussed in more detail in the paragraphs following the table.

The method used to look at the text – the filtering mechanism in Excel – has a number of problems. The main is that when searching for text strings, alone or with two strings combined, we do not see the context. We will have a number of false positives where the strings are used in a context not denoting a problem. For example, "ISSN" can be mentioned as a problem, but also as being OK or checked. The searches performed have tried to adjust for this problem, but were most likely not fully successful in this respect. It is also quite likely that the very manual process may have overlooked problems that might be larger than most of the problems listed here. So, table 1 possibly indicates only a subset of existing problem areas, and the numbers must be treated as very rough estimates of the size of the identified problem areas.

"Comment field empty" occurs for 892 applications, meaning there was no information in the comment field. This is not a sign that the application has been rejected for no reason, but that this information has not been recorded. There are indications that these are mostly from the first years, I understand DOAJ's current policy to be that a reason should be entered here. I think it a reasonable assumption that these applications would belong in one or more of the other groups.

"Previous reject" for 1,478 applications indicates that the last application was received before an application embargo had passed (applications may have been given an embargo for a number of months or years, I have seen no definitive pattern in the length of embargoes). The real reason for the rejection lies in one of the records sorted out because it was not the last application. So, there is a more fundamental reason for the rejection, probably belonging in one of the other groups.

We see that many problems are connected to copyright and licensing, where information is either lacking, unclear or self-contradictory. For an OA journal, copyright and licensing is what defines its OA status. Not presenting such information, or providing such information in one place that contradicts similar information elsewhere, makes it impossible to know that this is really an OA journal. This could indicate either a lack of understanding or an inability to structure and state the relevant information in a transparent way. This kind of incomplete or unclear information on APCs is also a reason for rejection.

Another cluster of problems is with filling in the application, for example by providing URLs that do not lead to the information sought, providing URLs that do not work, providing the same URL irrespective of what information is required – or just not providing an answer. DOAJ has a number of criteria and also asks for information beyond the criteria in order to create an informative database. For many questions there is not necessarily a right or wrong answer, but not answering the question is not a valid response. When it comes to indexing though, claiming to be indexed in services where you are not indexed, or being listed in bogus indexes, will most likely result in a rejection.

ISSNs are a cause of difficulties for applicants: 6,909 applications were rejected for problems with ISSNs. While this number may be inaccurate due to the tools available to me (see above), there are clear

Problem area	Short info	Count
Copyright	Info missing, unclear or self-contradictory	9,580
URLs not giving information	URLs provided do not give the information required	9,390
ISSN	Not registered, does not match title, missing	6,909
Exclusion	Journal or publisher excluded (often for 2 or 3 years)	3,198
Fake claims	Fake indexing claims or bogus metrics employed	1,504
Endogeny	Editors as authors, local authorship dominant	1,495
Previous reject	Journal has had application rejected or has been removed, embargo time not expired yet	1,478
Not enough research	Has not published enough research content to merit inclusion	1,312
Editorial board	Too small, affiliations lacking,	929
Comment field empty	No information in the comment field	892
Peer review not robust	Information indicates lack of robust and fair peer review process	841
Predatory[1]	Journal/publisher found to be predatory	722
Publishing practices	Journal does not employ good publishing practices	699
URL does not work	URL(s) to journal or info does not work	641
No answer	No answer provided to questions	578
Same URL	Same URL used as response where different URLs needed	516
No licensing info	License information lacking	462
Not OA	Information indicates journal is not OA	261
Self-contradictory licensing	Licensing information contradicts itself	188
APC info	Lacking, unclear or incomplete	128
Not enough reviewers	Information indicates too few reviewers involved	120
Sum	Number of matches to searches made	41,843

Table 1: Reasons for rejections.

indications that ISSNs are a problem area. Many applications give non-existent ISSNs or ISSNs belonging to other titles than the journal applying. Having a real ISSN (or several) is a sine qua non for being registered in any journal database. An editor (or a member of a journal's support team) submitting the application should be able to find out what the journal's ISSN is, and giving incorrect answers to this question is without doubt a good reason for being summarily dismissed.

Scholarly quality indicators also create difficulties for applicants. Endogeny – editors publishing extensively in the journals they edit or too local authorship – is one problem. Indicators of peer review that is not robust, or using too few reviewers, are other problems. Too small an editorial board or lack of affiliation information for the board another. Indications the journal is not employing good editorial practices yet another. These are all indications that the journal does not meet DOAJs criteria of a journal being scholarly.

That the information given indicates the journal is not OA, should be a self-evident reason for rejecting an application.

On a more technical level, not having published enough research content to merit inclusion is given as a reason for rejection for 1,312 applications. Defining how much and how regularly a journal needs to publish, in order to be a journal and not a serial, is a problem, and I have not seen any definitive answer to this. DOAJ lists journals, not serials, and has (currently) a criterion of having published at least 10 open

[1] The term "predatory" is used in the data and in other sources to denote journals who charge APCs but do not deliver on their promise of securing scholarly quality. I will also use this term as a shorthand.

access research articles and publishing at least 5 research articles per year (*Guide to applying*, DOAJ 2026a). I am uncertain if this criterion has been the same over the period we are looking at, the version history of the DOAJ's *Guide to applying* has no indication this criterion has been changed since this information was first published in November 2021.

Application history follows the journal and the publishers. Quite a number of applications are summarily turned down due to "Journal or publisher excluded" (3,198), "Journal has had application rejected or has been removed, embargo time not expired yet" (1,478), "Journal/publisher found to be predatory" (722). As far as I have come to understand, "exclusion" here means the journals or their publishers have been told DOAJ will not accept future applications for a period of time. In the cleaned dataset the original reason for rejection/exclusion is lacking, but I would assume there are good reasons for the exclusion/rejection. Digging back into the uncleaned dataset will be time-consuming and will probably not add very much to the discussion. But as with "Comment field empty", these applications will probably belong in one or more of the other problem categories, this again indicates that numbers for other categories should be higher.

4. Comparisons between DOAJ and the rejected applications

Can we see any patterns when comparing the journals in DOAJ with those who have had their last application rejected? There are some aspects where we have information for DOAJ journals, but not for applicant journals. Such information includes the number of articles published, scholarly field and type of publisher, this information is collected and published by Walt Crawford, both as a dataset and as a yearly report (Crawford 2025a;b). While it would be very interesting to compare rejected applications with accepted journals regarding these aspects, the work entailed in finding the data needed for 25,050 journals would make that impossible. So, the comparisons made are based solely on which information is present in the applications.

It is important to note that none of the points compared below are requirements for being listed, this is information that could shed light on the technical quality of the journals. Requirements for being listed are having a valid ISSN, satisfying criteria for being scholarly, fulfilling criteria for being Open Access, and publishing content satisfying DOAJ's criteria for volume and regularity. Many applications are rejected immediately due to severe problems like ISSN issues, inconsistent licensing and copyright information, full-text not being available immediately or without registration, or not enough content being published. The majority of applications are rejected at a later stage when other issues are not solved after some rounds of attempts to improve the applicants' information.

4.1. APCs or not

Important information is whether a journal has an Article Processing Charge (APC). In DOAJ 62.4% of journals do not use APCs (numbers from the DOAJ website, searching for journals charging/not charging APCs). Among the rejected applications, we see from the rejection data that 62.2% state they do not charge APCs. If we ignore the fact that the information given might not be correct, this percentage is very similar to DOAJ's share of non-APC journals. Previous research (Frantsvåg and Strømme 2019) indicates that using APCs creates a better financial situation for the journal, and thus increases the chance of being able to meet various DOAJ standards, so it is a bit surprising that the two sets of journals are so similar, as one would have expected those that have been rejected to have a lower share of APCs than those who have been accepted. This could also be a sign that DOAJ has been successful in weeding out "predatory" journals (as these journals must have APCs by their nature) and that the share of legitimate journals not using APCs being rejected is higher than 62.2%.

4.2. Geographical distribution

ROAD (the Registry of Open Access Scholarly Resources) is a large database of the International ISSN office, listing all scholarly Open Access resources that have been issued an ISSN number, more than 64,000 (International Standard Serial Number International Centre 2026). On August 21st, 2025, I received a file containing all records in ROAD, 64,323 in all (International Standard Serial Number International Centre

Country	No of journals in DOAJ	In rejects	In DOAJ	Relative frequency rejects/DOAJ	In ROAD	Relative frequency rejects/ROAD
Indonesia	2,628	27.2 %	11.6 %	2.34	17.7%	1.54
India	412	10.1 %	1.8 %	5.56	4.2%	2.41
Türkiye	663	7.6 %	2.9 %	2.60	6.8%	1.12
United States	1,310	7.2 %	5.8 %	1.24	5.5%	1.31
Brazil	1,452	5.1 %	6.4 %	0.80	5.1%	1.00
Iran, Islamic Republic of	1,058	4.2 %	4.7 %	0.90	4.7%	0.90
Pakistan	178	2.6 %	0.8 %	3.25	0.7%	3.66
Nigeria	53	1.8 %	0.2 %	7.70	0.1%	18.04
Ukraine	464	1.7 %	2.1 %	0.83	1.8%	0.95
Spain	1,003	1.7 %	4.4 %	0.38	2.8%	0.61
United Kingdom	2,263	1.7 %	10.0 %	0.17	4.0%	0.42
Russian Federation	644	1.5 %	2.8 %	0.52	1.8%	0.82
Poland	956	1.2 %	4.2 %	0.29	3.0%	0.41
Malaysia	109	1.2 %	0.5 %	2.46	0.2%	5.93
Romania	346	1.1 %	1.5 %	0.75	1.3%	0.88
China	497	1.0 %	2.2 %	0.47	0.5%	2.06
Colombia	452	0.9 %	2.0 %	0.45	1.4%	0.64
Ecuador	105	0.9 %	0.5 %	1.91	0.6%	1.48
Mexico	235	0.9 %	1.0 %	0.83	1.0%	0.87

Table 2: Share of rejected application, of DOAJ and of ROAD for major countries.

and Frantsvåg 2026). After removing entries in the ROAD data with an end year and publication types that are clearly not journals, we are left with 56,400 records that may be current journals. Comparing all the 19 countries with 200 or more rejected applications and their share of the rejections with their share of journals in DOAJ and in ROAD, we get the picture in table 2 (sorted by number of rejected applications). A relative frequency less than 1 indicates that the country has a smaller share among rejected applications than in DOAJ or ROAD.

Looking at the relative frequency of rejects versus journals indexed in DOAJ, on the one end of the scale are United Kingdom, Poland and Spain for whom rejections looks like a minor problem. One should bear in mind that the United Kingdom is the seat of many of the large commercial publishers, who usually have few problems in organising their journals and the information in such a way as to have their applications approved, and they also have much experience with the process.

On the other end of the scale, we find Nigeria, India, Pakistan, Türkiye, Malaysia and Indonesia. Nigeria previously had a reputation for harbouring "predatory" journals (which is partly anecdotal and from the time of Beall's list), it might be that what we see here is a result of a publishing culture nurturing journals of low quality. Shen and Björk (2015) note that 27% of "predatory" publishers were located in India. Türkiye and Indonesia are countries with large OA publishing activities. We know from the DOAJ Blog (Turgut 2025) that Turkish journals need to improve the consistency of the information on their websites, as this leads to a high level of rejection. In 2025 DOAJ spent resources educating Turkish editors, which should lead to a lower reject rate in coming years. China's relatively high frequency of rejects versus ROAD numbers combined with the DOAJ numbers could indicate that there are relatively few Chinese entries in ROAD that haven't applied to DOAJ.

First language	DOAJ	Rejects	Relative frequency among rejected applications
English	63.34 %	65.68 %	1.04
Spanish	9.78 %	5.08 %	0.52
Indonesian	4.78 %	11.86 %	2.48
Portuguese	4.39 %	3.12 %	0.71
Persian	2.56 %	2.17 %	0.85
French	2.33 %	1.23 %	0.53
Russian	2.30 %	1.00 %	0.44
Arabic	1.26 %	2.38 %	1.88
Italian	1.11 %	0.34 %	0.31
Chinese	1.08 %	1.24 %	1.15
Polish	0.94 %	0.26 %	0.28
German	0.90 %	0.52 %	0.58
Ukrainian	0.84 %	0.46 %	0.54
Turkish	0.73 %	1.80 %	2.47

Table 3: First language among DOAJ and rejected applications.

4.3. Publishing language

When applying to DOAJ the applicant is asked to enter the languages the journal accepts manuscripts in. There is no ranking of languages, but if we assume that languages generally are entered in order of importance or dominance in the journal, we can compare which language is first (and hence most important) among journals in DOAJ and among journals that had their applications rejected.

If we look at all languages that are mentioned first by 100 or more journals in DOAJ, we see the picture in table 3. A relative frequency less than 1 means the language is less represented among the rejected applications than among journals in DOAJ.

The languages that stand out with a high rejection frequency are Indonesian, Turkish and Arabic. This corresponds well to what we see in the geographical distribution of rejected journals, except for Arabic which is not so closely tied to a single country. The numbers in the table could possibly point to the language itself being a source of problems for the applications: for example, the applicant may have problems filling in the application form and trying to make sense of the accompanying instructions and information.

4.4. Licenses

It is difficult to get a comprehensive overview of the licenses used by the rejected journals and the journals indexed in DOAJ – there are too many combinations available. Creative Commons (CC) licenses are dominant for both rejects and listed journals, but a striking difference is that while listed journals use the publisher's own license in 174 cases (0.77% of listed journals), this is used by 3,184 rejected journals (12.71% of rejected journals). Publisher's own licenses are generally not translated to other languages and are not machine-readable (in contrast to CC licenses). This can reduce the reuse and distribution of the content, hence reducing readership and usefulness. It is telling that this is so popular with the rejected applications, and it can point to publishing competence being a major reason for the journals having their applications rejected.

4.5. Machine-readable license embedded

In the guidelines for applying (DOAJ 2026a) it is stated that "It is recommended that licensing information is displayed or embedded in full-text articles, but this is not required for inclusion in DOAJ". In the information on transparency and best practices (DOAJ 2026b) it says "Licencing terms should be indicated on the full text of all published articles (HTML and PDF)" and that "If Creative Commons licences are used, then the terms of that licence should also link to the correct licence on the Creative Commons website".

The term "Machine-readable license embedded" means that the licensing information should be displayed as text with an embedded link to the relevant license. An important point is that the linked license information needs to be in the article, not only in the masthead or in an "about the journal" information text.

Among rejected applications, 49% claim to have machine-readable licenses embedded, while in DOAJ 60% claim the same.

4.6. Use of preservation services

This is an area that is a bit difficult to analyse properly, as for most of the period we have data for (2014–2025) there has been no guidance as to which services actually perform the functions that a long-term preservation service should. From 2020 DOAJ instated a policy that acceptable services should be listed in the Keepers Registry, or undergo separate scrutiny, to be accepted. Currently, applicants can choose from a list of 7 actual services, or "A national library" or "Other" – or tick off that no such service is used. Both "A national library" and "Other" then ask for a free-text input. It is quite obvious from looking at the data in DOAJ that not all editors really understand what they have responded: unidentifiable three-letter acronyms are not really informative, and neither "Handle", "Indexing Services" nor "Self-Archiving Policy", just to give a few examples, are adequate responses to this question. This is the same that was found in the Open Access Diamond Journals Study (Bosman et al. 2021:58–60). An impression from looking at the data is that in DOAJ, the vast majority of journals that have a value in this field are actually preserved, but 61% of journals in DOAJ have not provided the name of such a service. Among rejected applications, the list of dubious entries is longer and represents a larger part of the non-empty responses, but only 41% of rejected applications have no value here.

4.7. Deposit policy information

As with preservation services, this is a bit difficult to analyse: the entries for deposit policy information are a mix of predefined services and free text. The journal's or publisher's own website is a popular source to point to both for rejected applications and for accepted journals in DOAJ.

Journals in DOAJ lack information about this for 63.7% of journals, among rejected applications this is lacking for 71.2%. 23.7% of journals in DOAJ use Open Policy Finder, only 8.5% among the rejected applications. Diadorim comes third with 2.9% for journals in DOAJ against 1.8% for rejected applications, and Dulcinea is used by 1.5% of journals in DOAJ, 0.3% of rejected applications.

4.8. Persistent article identifiers

Persistent identifiers (PIDs) for articles are URLs that do not experience link rot, typically DOIs, URNs and Handles. Such services are used by 83% of journals in DOAJ, while 16% have no such identifiers. The remaining journals list various combinations of services, mostly the aforementioned services.

Among rejected applications 26% have no such article PID listed, while 68% use DOIs. The remaining 6% of applicants list a number of different things, many are actual such PIDs but e.g. URL, UDC, UDK, PDF, Google Scholar are not such identifiers. So some more than 26% lack persistent article identifiers.

Theme	Rejected applications	Journals listed in DOAJ
APCs or not – % not using APC	62.2%	62.4%
Geographical distribution	Third world over-represented	
Publishing language	Turkish, Indonesian over-represented	
Licenses – Publisher's own	12.71%	0.77%
Machine-readable license embedded	49%	60%
Use of preservation services	59%	39%
Deposit policy	36%	29%
Persistent article identifiers	74%	83%
Author holds copyright	69%	62%
Waiver policy in place	37%	61%

Table 4: Summary of comparisons.

4.9. Author holds copyright

69% of rejected applications claim to have a policy that the authors retain copyright to their own work, against 62% among journals listed in DOAJ. One should note, though, that one of the major reasons for rejection is inconsistent and self-conflicting information re copyright (see table 1). So, I would hesitate to accept that the rejected journals actually are better in this regard, than journals accepted by and listed in DOAJ.

4.10. Waiver policy in place

If a journal charges an APC, it is important to know whether they have a waiver policy in place, so that the APC will be less of an obstacle for authors from less prosperous countries or institutions. 37% of rejected applications say they have such a policy, while 61% of journals in DOAJ claim to have one. One could note that less prosperous countries are overrepresented among rejections. APCs in journals from these countries are often relatively low, so the need for a waiver could be less than for publishers from prosperous countries. And the journal's finances could well be less suited for offering waivers.

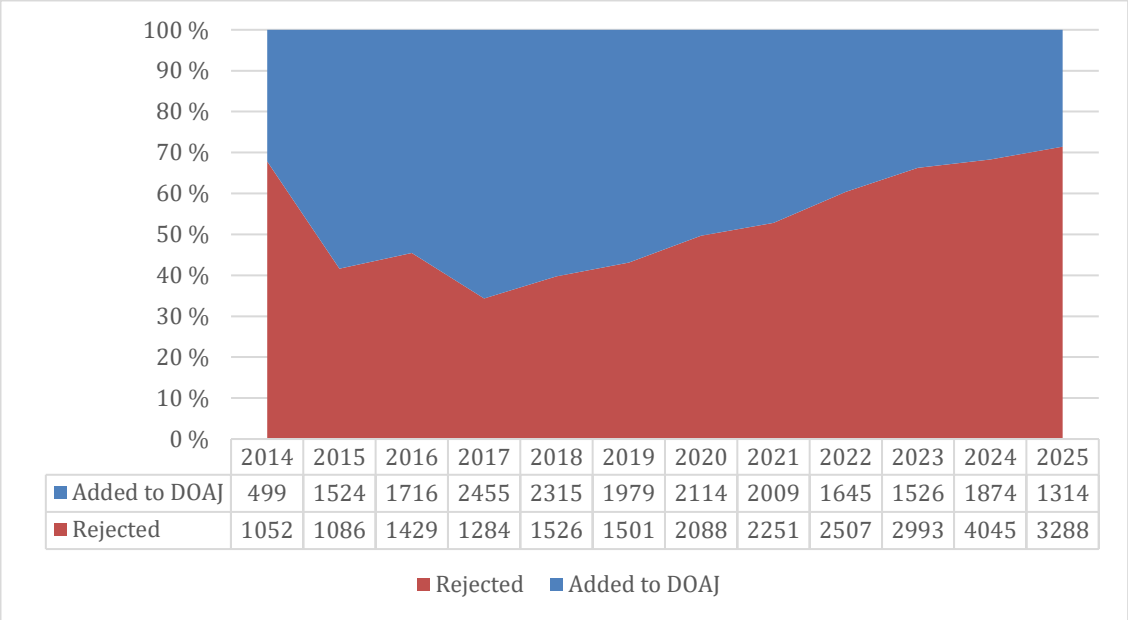
4.11. Conclusion to comparisons

Table 4 provides a summary of the comparisons from this section. For more detailed information on geographical distribution or publishing language, see the relevant subsection. There was too much information to put in the table.

It is important to understand that the data compared here are not requirements for being accepted to DOAJ, but information on to which extent the journals meet publishing standards. However, lack of response, incomprehensible or inconsistent information on these points may lead to a rejection.

It is difficult to draw strong conclusions when we compare the different aspects. When looking at the numbers we need to remember that what we have for the rejected journals are their claims, while the information in DOAJ has been through some quality control. And a "good" response in an application might be found inaccurate and a reason to reject the journal. So, the numbers given above for the rejected applications will probably present a better picture of the applicants' technical quality than what is the reality.

We see a marked difference in geographical distribution, and in the use of licenses. Use of preservation services seems to be better among rejected applications than among DOAJ journals, 59% versus 39%. The 59% include many more "various" services of unknown quality than the 39%, so the difference is not as huge as it may seem. When we look at deposit policies, journals in DOAJ have information about this to a larger extent than rejected applications.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Added to DOAJ	499	1524	1716	2455	2315	1979	2114	2009	1645	1526	1874	1314
Rejected	1052	1086	1429	1284	1526	1501	2088	2251	2507	2993	4045	3288

Figure 1: Rejects and additions to DOAJ 2014–2025.

Persistent article identifiers are used by at least 83% of DOAJ journals, and by 72–74% of the rejected journals. Machine-readable licenses are embedded in 60% of DOAJ journals, 49% of rejected journals. Author holds copyright in 62% of DOAJ journals, 69% among rejected journals. DOAJ journals with an APC has waiver policies in place to a much larger extent than among rejected journals.

A tentative conclusion is that the rejected journals to some extent display a lower technical quality than journals in DOAJ. This is not a reason for their being rejected, but it shows us they probably have fewer resources available to them. It is impossible to compare scholarly quality from the data available to us, but we know all journals in DOAJ have been through a quality check – even if their quality may have changed since then. In addition, low scholarly quality is one of the factors resulting in a rejection (see table 1).

5. Is there a development over time?

Looking at the number of rejected applications and the number of journals added to DOAJ over time gives us the picture in figure 1.

An important caveat is that the dates used are the date the application is registered for rejected applications, and the date added to DOAJ for additions. As there is a time lag between application and rejection or acceptance, an accepted application may well have been registered in the preceding year.

The picture still shows that while the majority of applications were turned down in the first years in the period, this developed positively for some years, increasing the accepted share to over 60%. But from around 2017 the reject rate started steadily increasing again and is now around 70%. This indicates that the quality of either the applying journals or the applications – or both – have deteriorated over the last years, or that requirements have become more difficult to satisfy over the years, for example new requirements introduced during the period studied. One should bear in mind, though, that journals with the last rejection in recent years may have one or more earlier rejections – this effect will automatically make the reject percentage higher in recent years than in previous years, where some rejections will be "suppressed" by the later rejection. But when using the full number of applications, i.e. all applications, not only the last one, we see the same pattern.

6. What can this tell us?

That the number of rejected journals seems to be higher than the number of accepted journals can be seen as evidence of many things. One obvious conclusion – too obvious, in my opinion – is that this shows that most journals not in DOAJ, do not belong in DOAJ in their present form.

I have no doubt that some of the numbers around the reasons for rejection – like "fake claims", "excluded", "endogeny", "editorial board", "peer review", "predatory" and "publishing practices" – represent serious problems that indicate that this applicant does not belong in a registry of scholarly open access journals like DOAJ.

On the other hand, some of the reasons for rejection – like "copyright", "URLs not giving info", "URL does not work" – rather point to problems with for example publishing competencies, structuring information, thinking through policies, than to low-quality journals. Of course, to be a good journal you need to have control over this, so a reject from DOAJ does look well merited. But these are things that could be fixed, given time and supervision by people with more competence in these fields. National initiatives such as pushing DOAJ competence to editors of journals not being listed, and DOAJ using local ambassadors, should help journals to get indexed in DOAJ in the future.

ROAD numbers indicate there are some 56,400 scholarly OA journals. DOAJ has 22,600 journals – and 25,050 rejections. 13,444 of the rejections are listed in the ROAD data. Another 2,078 journals in the ROAD data are found in the lists DOAJ publishes of retracted journal listings. (A few of these turn out to be journals that were delisted at some point and then listed again later.) This means that of the 56,400 series in ROAD about 15,400 have demonstrated they do not (yet) belong in DOAJ. This leaves about 41,000 series in ROAD that could possibly merit a listing in DOAJ; meaning it could look like DOAJ is missing about 18,000 journals. But we know that some of the ROAD listings are not journals, but other serials and hence do not belong in DOAJ. We also know these serials haven't applied for inclusion in DOAJ. It could be they know they do not belong – but it could also mean they lack the necessary competence and resources to know they should apply, and to make an application. And then we have quite some thousands of rejected applications that do not represent real scholarly OA journals. One conclusion we should be able to make is that DOAJ lists the majority of all journals that belong there.

Why have so many journals not applied, and why are so many unable to demonstrate they belong there? There are, of course, a number of possible reasons for not applying or not being able to provide the necessary information, but I fail to see more than these four main reasons:

1. Lack of awareness of DOAJ and the role it plays in disseminating information and making the journal and its contents visible;
2. Incentive and assessment structures motivating indexing in indexes like Web of Science or Scopus but overlooking the need to be in DOAJ;
3. Lack of the necessary competence to create and maintain information on the journal website and create a successful application to DOAJ;
4. Lack of resources necessary to create and maintain information on the journal website and an application to DOAJ.

It boils down to two factors: knowledge and resources (time/money) to do the work. The OA community needs to see the necessity to help those who need more knowledge, and national institutions need to see the necessity to supply journals with the required resources. Today, libraries play an important role in supporting journals, but I fear this is not enough. And not all journals have a good library at hand to help them.

There are processes pointing in the right direction, e.g. DOAJ has been reaching out to resources (people and organizations) in various countries to engage them in helping journals/publishers. The help consists of education of editors, assistance in the preparation of better applications and ensuring that information is in place on the journals' websites. We see an increase in funding of diamond OA, e.g. the University of Lorraine's Open Science Fund and UiT The Arctic University of Norway's Diamond Programme, and the Norwegian *NÅHST* mechanism for non-APC OA journals being extended to more

subject areas. The establishing of the European Diamond Capacity Hub should improve the situation of European diamond OA journals and help improve competencies.

But the vast majority of OA journals are from outside Europe. Beyond the ALMASI project, which aims to develop a nonprofit, high-quality, and sustainable scholarly communication ecosystem across Africa, Europe, and Latin America, and the Collaboration for sustainable open access publishing in Africa, I am not certain which processes are ongoing to help these. A mixture of international and national initiatives and infrastructures is probably what is needed.

The analysis of the DOAJ rejection data presented in this paper should make it clear that there are many journals out there needing help, and also that DOAJ puts a lot of resources into ensuring that a listing in DOAJ means you have been scrutinized regarding both scholarly quality and compliance with fundamental OA requirements.

Appendix

To be useful, the raw data needed some cleaning. This Appendix aims at documenting the cleaning process and the reasoning behind what was done.

I created a new field, concatenating the two ISSN fields to create a single field to compare. I then sorted by this concatenated field first, then on date so that the most recent application came last. I then created another field, counting the number of times a concatenated ISSN appeared from there to the end of the column. The final occurrence of such a concatenated ISSN thus was assigned the value 1. This approach is not fool proof, if ISSN info in the application change between applications the duplication of applications will not be discovered.

Some journals were rejected due to missing or erroneous ISSN numbers in the application. To quote a typical comment from DOAJ "The ISSN is incorrect, provisional or not registered with issn.org. No ISSN registered at issn.org is provided in the application form." These records have been removed from the data. A number of journals providing "0000-0000" as an ISSN are also removed.

A number of such concatenated ISSNs received a high number of rejects, the record in this file is 43. 49 records show 20 or more rejects. Typical comments from DOAJ are "automatically rejected, nonsensical ISSNs"; "fake issn, autorejected"; "duplicate, autorejected"; "The provided ISSNs are from different journals. The same URL has been provided for all the questions which require a URL for an answer and this URL does not link to a journal's website". All these have also been removed, as they do not represent real journals and real applications.

After removing 17,385 rejects with an occurrence value greater than 1, I was left with 32,888 final rejections with a unique concatenated ISSN field.

Now, if a journal is rejected but later accepted, this does not show in the file. So, I have tried to match the concatenated ISSN with a similar concatenated ISSN in a DOAJ file from February 13, 2026. This is not fool proof as journals change their listed ISSNs – adds, removes, changes – from time to time. Trying to match on title has the same problems of changes. Using a concatenated ISSN will remove a major part of the journals that have been accepted after a rejection (or more). Of 32,888 journals, 27,752 didn't find a match in DOAJ's current file, meaning 5,136 journals have been accepted after one or more rejects, 15.6%. Those with a match was removed before further work was undertaken. Matching on concatenated ISSN will underestimate the number of journals that should be removed. A quick glance at the list of Norwegian rejects shows two undiscovered matches – one journal that has later been accepted, but without one of the ISSNs in the rejected occurrence, one that is rejected twice with a change in ISSNs between rejections. If journals from other countries are similar, this indicates about 10% of remaining rejects should have been removed.

To try to find duplicate entries that do not match on concatenated ISSNs, I tried using the same technique as I used for them, on the journal titles. This revealed 1657 lines where the title matched the title of another line. A manual check revealed that this was mostly a case of changes in ISSNs between the various applications. A few instances of different journals with the same name were also found, but removing all duplicate names, while removing some that should have been retained introduces less error than keeping them all. Checking them all manually to decide which to keep costs too much labour to be

Number of rejections	Count
1	23,283
2	5,709
3	2,198
4	927
5	415
6	185
7	86
8	39
9	21
10	9
11	5
12	3
13	3
15	2
19	3
Total	32,888
Accepted	22,640

Table 5: Number of rejections per applicant.

worth the effort. So, the 1655 lines were removed, leaving 26,097 for further work. Matching titles to titles in DOAJ, to find rejected journals that have been accepted later, revealed 1047 matches that also were discarded. Some of these are different journals with identical titles, but a manual checking of some of the matches revealed that varying use of ISSNs for the same journal was the major source of these journals not having been found during earlier rounds of matching.

This leaves us with 25,050 in our final selection of journals. These are journals that have been rejected from DOAJ and not been admitted later. And the information we have is from the final rejection. This means that of the 32,888 journals only 7,838 have been able to be accepted to DOAJ after being rejected.

Some statistics on the number of rejections

One of my reviewers indicated a strong wish for more information about the number of rejections per journal. I had actually thought about this at an earlier stage, but not seen how I could produce such numbers. The reviewer's wish made me think again, and find a solution. The findings are not central to the article, but could be interesting "bonus material" for some of us.

Looking at the number of rejects an applicant receives, I found I could count the other way, so that the line with the latest occurrence – the one with the number 1 – could count also the number of occurrences of the same ISSN above, so that we get the number of applications for that ISSN, including the latest. I did this with the 50,273 records not being obviously problematic due to missing or bogus ISSN (see table 5).

We see that the typical application is rejected once, and a good number come back for a second and third rejection. The number of accepted journals, listed in DOAJ, is nearly as high as the number of single rejections, but accepted journals represent a longer time span. Being accepted still comes in as the second most likely outcome of an application.

The applications with a high number of rejections seems to be the result of same ISSN being used for a number of totally unrelated applications. One should note that all entries with 20 or more rejects have been sorted out at an earlier stage, as it was easy to see they were a result of the same ISSN being used for unrelated applications.

Where the line between struggling applications and bogus applications could be drawn in this table, is difficult to say for certain. After some manual checking we find that the ones with 19 rejects are not real (they are not repetitions of the same journal applying), the 2 with 15 rejects are real, 1 of the ones with 13 is actually 1 journal with 15 rejects (with slightly differing ISSNs) plus 1 fake application using this journal's ISSN, while the other 2 with 13 rejects are real. Among those with 12 rejects is one journal whose application has been rejected 12 times because the journal is already listed in DOAJ, the 2 others are also real applications. All 5 with 11 rejections look like real applications from the same journal. Of the 9 with 10 rejections, 7 seems to be repeated applications from the same journal. 1 is a journal that actually has 11 rejections, one with another ISSN combination. And the last one with 10 rejections is a combination of 10 different applications using the same non-existent ISSN.

Time does unfortunately not allow me to dig deeper into this.

Disclaimer

The author was on the advisory board of DOAJ from 2012 until the end of 2021.

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References

Bosman, Jeroen, Jan Erik Frantsvåg, Bianca Kramer, Pierre-Carl Langlais, and Vanessa Proudman. 2021. *OA Diamond Journals Study. Part 1: Findings*. Zenodo. https://doi.org/10.5281/zenodo.4558703.

Crawford, Walt. 2025a. *Gold Open Access 2025: Articles in Journals 2020–2024 (GOA10)*. Cites & Insights Books, Livermore, Ca.

Crawford, Walt. 2025b. Gold Open Access 2025 [Data set]. https://doi.org/10.6084/m9.figshare.29146061.

DOAJ. 2026a. Guide to applying. Available at https://doaj.org/apply/guide/, accessed April 8, 2026.

DOAJ. 2026b. Transparency & best practice. Available at https://doaj.org/apply/transparency/, accessed April 8, 2026.

Frantsvåg, Jan Erik. 2019. The DOAJ spring cleaning 2016 and what was removed – Tragic loss or good riddance? *Publications* 7 3: 45. https://doi.org/10.3390/publications7030045.

Frantsvåg, Jan Erik and Tormod Eismann Strømme. 2019. Few Open Access journals are compliant with Plan S. *Publications* 7 2: 26. https://doi.org/10.3390/publications7020026.

International Standard Serial Number International Centre. 2026. ROAD: Directory of Open Access scholarly resources. Available at https://road.issn.org/, accessed April 7, 2026.

International Standard Serial Number International Centre and Jan Erik Frantsvåg. 2026. Replication Data for: Reasons journals are not found in DOAJ [Data set]. DataverseNO, V1. https://doi.org/10.18710/6K2ZUT.

Shen, Cenyu and Bo-Christer Björk. 2015. 'Predatory' open access: A longitudinal study of article volumes and market characteristics. *BMC Medicine* 13: 230. https://doi.org/10.1186/s12916-015-0469-2.

Turgut, R. 2025. *Advancing Open Access in Türkiye*. Available at https://blog.doaj.org/2025/09/29/advancing-open-access-in-turkiye/.

Chercheurs et chercheuses en figure d'éditeurs et d'éditrices dans la communication scientifique

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Abstract

This article explores the hybrid figure of the 'researcher-publisher', who plays an essential but often overlooked role in scientific communication. It offers a critical examination of traditional publishing models that strictly separate scientific and editorial roles, highlighting instead the profound interdependence between content and form. Through examples such as Johan Rooryck and the mutiny of the journal Lingua, it illustrates how the reappropriation of editorial functions by researchers allows them to regain scientific sovereignty in the face of commercial logic. The article also analyses the emergence of scholar-led publishers, seeing in this commitment a promise of autonomy and renewal for research.

Résumé

Cet article explore la figure hybride du « chercheur-éditeur », essentielle mais souvent méconnue dans la communication scientifique. Un examen critique des modèles de publication traditionnels qui séparent strictement les rôles scientifiques et éditoriaux est proposé, soulignant au contraire une interdépendance profonde entre le fond et la forme. À travers des exemples comme celui de Johan Rooryck et la mutinerie de la revue Lingua, on illustre comment la réappropriation des fonctions éditoriales par les chercheurs permet de regagner une souveraineté scientifique face aux logiques commerciales. L'article analyse également l'émergence de maisons d'édition dirigées par des universitaires, voyant dans cet engagement une promesse d'autonomie et de renouveau pour la recherche.

« Et pourquoi vous livrer à la souffrance ? Ce qui nous coûte notre vie, le sujet qui, durant des nuits studieuses, a ravagé notre cerveau ; toutes ces courses à travers les champs de la pensée, notre monument construit avec notre sang devient pour les éditeurs une affaire bonne ou mauvaise. Les libraires vendront ou ne vendront pas votre manuscrit, voilà pour eux tout le problème. Un livre, pour eux, représente des capitaux à risquer. Plus le livre est beau, moins il a de chances d'être vendu »
H. De Balzac. *Les Illusions Perdues.*

1. Prologue

Les premières fois que j'ai rencontré Johan Rooryck, que ce soit à l'occasion d'un atelier organisé par la Commission Européenne sur les « modèles alternatifs d'édition » ou d'une rencontre dans les locaux d'un éditeur, il était très souvent accompagné de Saskia de Vries, une grande professionnelle de l'édition. J'étais quelque peu intrigué par cette figure double du « chercheur et de l'éditrice » qui faisaient des présentations ensemble, comme si, lorsqu'il s'agissait de parler d'édition scientifique, il était pour eux nécessaire de le faire à deux voix, mettant en lumière le caractère indissociable des deux compétences professionnelles. C'est un positionnement que je reconnaissais et que j'appréciais alors qu'à l'époque, et c'est toujours le cas d'ailleurs, nombre de chercheurs pensent que la « révolution Internet » leur permet de s'affranchir des professionnel.le.s de l'édition pour publier leurs livres et leurs articles. Lorsque j'ai mieux connu Johan par la suite, j'ai vite compris que non seulement il reconnaissait les compétences propres aux professionnel.le.s de l'édition, mais qu'il avait acquis lui-même ces compétences pour les exercer en particulier au sein de la revue qu'il a créé : Glossa. Cette figure du chercheur hybride, alliant dans une seule personne une forte compétence scientifique et éditoriale ne m'était pas inconnue. Je l'ai rencontrée à de multiples reprises et très tôt dans ma carrière, et toujours avec un grand intérêt de ma part, malgré la diversité des personnalités rencontrées. Car j'ai toujours trouvé dans ces personnalités une authentique passion, celle qui met de la lumière dans leur regard lorsqu'il se mettent à parler de « leur » revue, à la fois et indissociablement comme

 Nordlyd 49.1: 261–273, Special issue in honor of Johan Rooryck, edited by Jeroen van Craenenbroeck, Aysa Ekanger, Camil Staps, and Guido Vanden Wyngaerd. Published at the University of Tromsø – The Arctic University of Norway.
http://septentrio.uit.no/index.php/nordlyd https://doi.org/10.7557/12.8494

un objet scientifique et éditorial. A mon grand regret, cette figure du chercheur-éditeur est relativement méconnue quoique fréquente. Elle échappe aux catégorisations des activités du chercheur lecteur, auteur, évaluateur que l'on trouve le plus souvent mobilisées pour évoquer la place des chercheurs et chercheuses dans les processus éditoriaux. Sur la base non d'une enquête systématique (qui reste à faire) mais de l'expérience accumulée par près de vingt-cinq ans de carrière professionnelle, essentiellement dans le domaine des sciences humaines et sociales, la précision est importante, je voudrais à la fois célébrer et explorer les particularités de ces chercheurs et chercheuses en figure d'éditeurs ou d'éditrices qui sont si essentiels à la recherche, et dont Johan Rooryck est un remarquable spécimen.

Comment caractériser la nature particulière de l'activité de publication et de mise en circulation de textes dans l'espace public ? Cette question en apparence banale recèle pourtant une complexité insoupçonnée. Car une des particularités du monde de l'édition est de joindre singulièrement deux ordres de réalités qui se définissent traditionnellement l'un contre l'autre : L'idéel et le matériel, le ciel des concepts et le monde du papier, ou des écrans[1]. D'où cette difficulté voire impossibilité de bien caractériser une activité qui, par nature, se présente comme fondamentalement impure, hybride, insaisissable. Les indices de la nature particulière de cette industrie, si on veut la définir comme telle, sont nombreux : la création d'un droit qui lui est particulier par exemple, parce que le droit de propriété qui s'établit classiquement sur les biens matériels n'y suffit pas ; le rôle particulier que les ouvrier typographes et autres cols bleus de l'édition ont pu jouer dans les révolutions politiques du XIXe siècle, mais aussi les constantes contradictions qui traversent le secteur au carrefour de logiques qui peuvent y revendiquer tout aussi légitimement que leurs concurrentes une part de souveraineté : culturelle, politique ou économique. C'est cette pluralité de logiques qui anime les débats, en France par exemple, autour du prix unique du livre, en Amérique latine, de la *bibliodiversidade*, partout de la concentration du secteur de l'édition. La question vaut pour le secteur de la publication scientifique tout autant que pour d'autres domaines. Le point de friction qui se trouve ici devoir être mis en évidence, joint une logique scientifique de production de connaissances et une logique éditoriale de gestion matérielle du support sur lequel ces connaissances sont exposées et diffusées. Point de friction, nécessairement, car les logiques sont hétérogènes et tout le défi du travail d'édition, défi passionnant, est de les articuler intelligemment. C'est au point de contact entre ces logiques hétérogènes, au sein de la chaîne opératoire qui transforme un manuscrit en publication, que nous démarrerons notre enquête.

2. Modéliser la distribution des rôles dans la publication scientifique

Lorsqu'on s'intéresse à la manière dont est représentée la diversité des tâches nécessaires à la publication d'un livre ou d'une revue, on trouve souvent que ces tâches sont organisées sous la forme d'une chaîne opératoire allant de la réception du manuscrit au référencement de la publication finale dans les index et moteurs de recherche en passant par l'évaluation par les pairs, la préparation de copie, la mise en page, la diffusion. Chacune de ces étapes est placée sous la responsabilité d'un type d'acteur particulier, établissant la plupart du temps, une ligne de partage bien claire entre le scientifique et l'éditorial : au chercheur ou à la chercheuse le contrôle de scientificité du contenu de la publication, au professionnel ou à la professionnelle de l'édition le soin de la réalisation matérielle de la publication, à d'autres métiers encore, à l'intersection des sciences de l'information et des métiers des bibliothèques et de la librairie la responsabilité d'assurer la diffusion et la visibilité de la publication. D'autres métiers sont encore impliqués lorsqu'il s'agit par exemple d'assurer un modèle économique à la publication ou de la préserver sur le long terme.

Il revient à Bo-Christer Björk et Turid Hedlund de la Swedish School of Economics and Business Administration d'avoir proposé un modèle de description formelle des processus de publication académique parmi les plus aboutis que l'on puisse trouver. Ce travail, qui s'étend sur plusieurs années, est le résultat de plusieurs projets successifs et a donné lieu à une série de publications au cours de laquelle le modèle a pu être raffiné et complexifié (Björk 2007). On s'intéressera ici à la première publication qui rend compte de la présentation du modèle (Björk et Hedlund 2003). La proposition de Björk et Hedlund mobilise une méthode courante de modélisation des processus de travail en entreprise (IDEF0) et est fondée sur une

[1] Après avoir été longtemps niée, la dimension matérielle de l'édition a bénéficié d'une reconnaissance récente grâce au travail de plusieurs chercheurs au cours des dernières décennies (Vitali-Rosati 2025).

distinction claire entre différents rôles au sein du processus de publication : les « researchers » [2] qui écrivent les publications, les « publishers » qui conduisent et effectuent les opérations de publication, les « academics » qui participent au processus de publication en tant qu'éditeurs ou éditrices scientifiques et évaluateurs ou évaluatrices, puis d'autres rôles subséquents dans le processus de publication attribués aux « libraries » et « bibliographic services », avant les « readers » et « practicioners » qui consomment les publications. A ce stade, on peut remarquer la distinction opérée entre « publishers » et « academics » rendant compte de la séparation entre les fonctions éditoriales et scientifiques dans les processus de publication. Sur cette base, Björk et Hedlund proposent une modélisation du processus de publication sous forme d'une succession de 22 diagrammes fonctionnels (d'autres encore plus précis ou sur d'autres parties du processus de communication scientifique apparaîtront dans les publications suivantes des deux auteurs). Le premier (« A0 Do Research. Publish, Study and Apply the Results, Breakdown ») distingue trois étapes attribuées à des rôles distincts : « Perform the research » est attribuée à « the researcher » guidé par la méthode scientifique ; « Publish the results » est attribué à « the publisher » dans le cadre des pratiques de publication ; « Study the results » est conduit par les « readers » qui ont des habitudes de lecture ; et enfin « Implement the results » est pour la société et l'industrie. Si l'on s'intéresse maintenant à la partie « publish the results » qui nous concerne directement ici (diagramme A21), on a les étapes « write manuscript » réalisée par « the researcher », « perform publishing activities » par « the publisher », et enfin « archive and index » par les « bibliographic services ». Finissons par le schéma A 22331 « Do Article Specific Activities », organisé lui aussi sur un principe purement séquentiel : on a une première étape « review manuscript » réalisée par les « reviewers » qui sont des « academics ». L'étape suivante « revise manuscript » est réalisée par « the researcher » qui a soumis le manuscrit. Dans le schéma toutefois, le passage de la première à la seconde étape est placé sous la responsabilité de « the editor ». Enfin, on passe directement à l'action « Typeset article », réalisée par « the publisher ». Il est un peu étrange que les auteurs n'aient pas jugé bon d'insérer l'étape de préparation de copie (qui s'intitulerait alors « copy edit article ») avant cette dernière étape. C'est peut-être dû à une focalisation excessive sur certaines disciplines qui ne connaissent pas ce travail spécifique sur les textes (en particulier en ce qui concerne l'édition d'articles par opposition aux livres), ou pour lesquelles ce travail est fusionné et inclus dans la mise en page.

On comprend la nécessité conceptuelle de bien séparer les fonctions, les responsabilités et les compétences pour se représenter les différentes dimensions d'un travail complexe qui transforme un manuscrit en véritable publication. Et d'ailleurs, le travail de Björk et Hedlund s'appuie sur de longues enquêtes auprès des différents acteurs de la publication scientifique et opère une formalisation sur la base d'informations recueillies et recoupées. C'est d'ailleurs de cette manière que, intuitivement, les professionnel.les de l'édition se représentent le plus souvent l'organisation collective du travail d'édition : comme une chaîne de traitement, un processus unidirectionnel le long duquel divers acteurs se passent le relais pour élaborer, étape après étape, ce qui deviendra un produit délivré aux lecteurs et lectrices. Un bon exemple de la confirmation par les représentations des acteurs eux-mêmes de la modélisation scientifique de Björk et Hedlund peut se trouver dans les *workflows* que proposent les logiciels de gestion des publications scientifiques comme Open Journal System (OJS), développé par le consortium Public Knowledge Project (PKP) (PKP Docs s. d.) et Janeway, développé par Martin Eve et Andy Byers pour le consortium Open Library of Humanities (OLH) (Eve et Byers 2018)[3]. L'exemple du workflow modélisé par OJS est plus intéressant pour la démonstration car, contrairement à Janeway, il est utilisé dans toutes les disciplines et, avec plus de 30 000 revues vivantes l'utilisant de par le monde, il est sans doute le système le plus courant que l'on puisse trouver. A la lecture du schéma proposé par la documentation utilisateur du logiciel, on voit que le logiciel induit un ordre séquentiel d'actions réalisées par des personnes jouant des

[2] Toute cette partie utilise les termes en anglais mobilisés par les auteurs afin d'éviter toute ambigüité liée à la traduction en français des termes.

[3] Le logiciel Lodel, développé par OpenEdition ne propose pas de workflow de publication pour sa part car, centré sur la publication en ligne des articles et chapitres d'ouvrage, il ne gère pas la collaboration entre les différents acteurs de la publication, qui intervient en amont de l'utilisation du logiciel. Un autre exemple, est le framework de publication CoKo qui propose un workflow mais peu exploitable car reposant sur la mise en oeuvre d'une boîte à outils très générique (Hyde 2021)

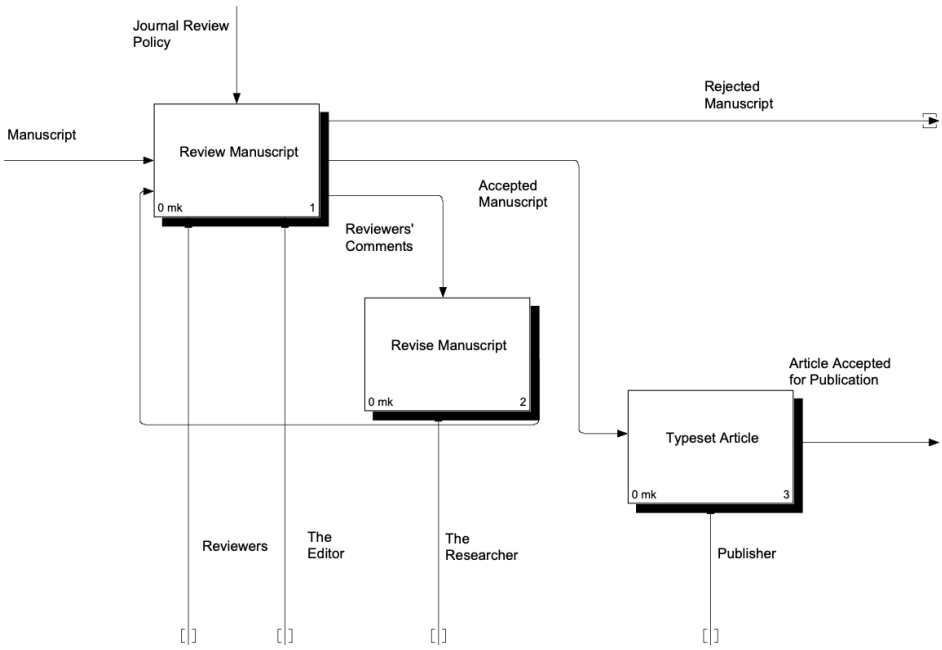

Figure 1: Diagram A22331 Do Article Specific Activities.

rôles distincts : *journal manager, editor, section editor, reviewer, copyeditor, layout editor, proofreader, author, reader*. Les rôles identifiés par OJS se situent donc à un niveau de granularité plus fin que deux qu'utilisent Björk et Hedlund. Surtout, ils ne disent rien du profil attendu des personnes susceptibles de remplir ces rôles. Nulle part, OJS n'indique si tel ou tel rôle doit être rempli par un.e « academic », « publisher » ou « librarian ». Par ailleurs, on peut remarquer que si un ordre séquentiel global des opérations d'édition est proposé, à certains endroits les flèches reliant certaines étapes sont bidirectionnelles, impliquant des allers-retours, en particulier aux étapes de préparation de copie et de mise en page.

Les hésitations d'attribution de rôle et de directionnalité du workflow que présente le schéma présenté par la documentation du logiciel OJS est des plus intéressantes. Ces hésitations reflètent certes la grande diversité que doit gérer un seul logiciel. La notion de revue scientifique recouvre en effet une grande diversité de situations en termes de taille (entre une dizaine d'articles par an, voire moins, et plusieurs centaines), mais aussi d'organisation éditoriale (publication en flux continu, par numéro, avec ou sans de multiples rubriques) et enfin d'organisation du travail éditorial. En ce qui concerne ce dernier point, plusieurs études (Dufour et al. 2023, Monnet 2020, Bosman et al. 2021, Contat et Gremillet 2015) ont mis en évidence la grande distance qui s'établit entre une revue auto-éditée par quelques chercheurs ou chercheuses d'un même laboratoire ou appartenant à une société savante sans aucun autre soutien professionnel, et une revue portée par une maison d'édition et disposant d'un ou plusieurs postes à plein temps de professionel.le.s d'édition. La rigueur de la modélisation est donc mise à mal par la variété des situations. C'est particulièrement vrai de l'attribution des différents rôles éditoriaux aux « academics », « publishers », « bibliographic services », etc. pour reprendre les termes proposés plus haut. Si la taille d'une revue compte pour beaucoup dans l'attribution des rôles, on s'en doute, influençant beaucoup la spécialisation des tâches, son histoire particulière (comment a-t-elle été créée, qui en a la possession, quel est son modèle économique) permet aussi d'expliquer certains traits de son organisation et des fonctions assumées par les un.e.s et les autres. La proposition qui est ici faite est donc de considérer plus attentivement les failles du modèle, les situations de brouillage ou d'ambiguïté, plus nombreuses qu'on ne pense.

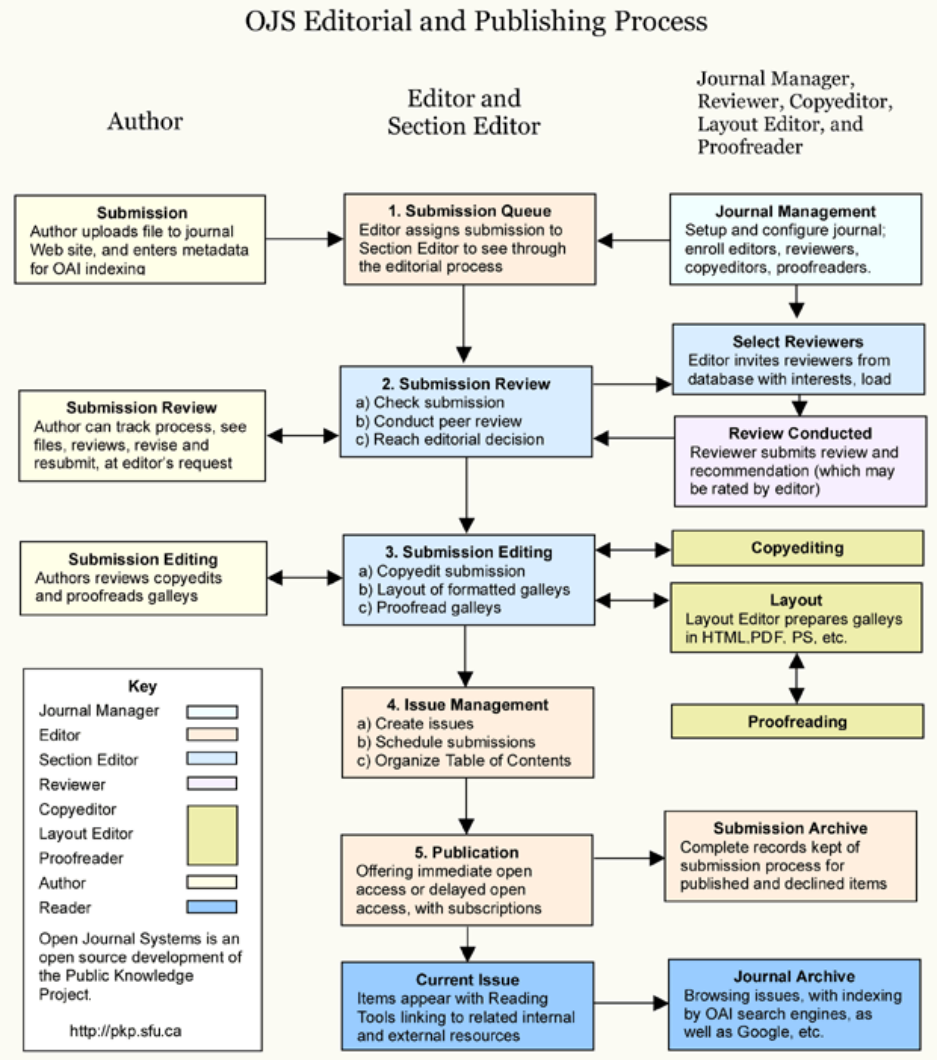

Figure 2: Workflow proposé par OJS.

En effet, les représentations opératoires standard ont pour défaut de rendre invisibles les profils hybrides qui sont pourtant tout à fait nécessaires au bon fonctionnement de l'ensemble. Autrement dit, les modélisations courantes de la chaîne d'édition mettent en valeur le rôle unique de chaque instrument de l'orchestre, sans rien dire du profil de l'instrumentiste ni rendre justice au rôle du chef d'orchestre. Or, ces rôles sont souvent assumés par des chercheurs et chercheuses, qu'ils ou elles soient éditeurs ou éditrices, relecteurs ou relectrices, rédacteurs ou rédactrices en chef de revues, responsables de collections de livres ou, dans un certain nombre de cas, directeurs ou directrices de maisons d'édition. Ce sont des chercheurs et chercheuses, mais qui sont projeté.e.s dans des fonctions peu visibles, peu reconnues et mal connues pour les profils académiques. Dans les représentations les plus courantes du travail de chercheurs et chercheuses, les figures de l'enquêteur ou enquêtrice, de l'analyste, de l'auteur ou autrice, de l'évaluateur ou évaluatrice, de l'enseignant.e ou de l'entrepreneur ou entrepreneuse de science sont les plus visibles, les plus valorisées. Beaucoup plus rarement celles qui sont liées aux fonctions de publication. L'objectif de cet article est de braquer le projecteur sur les rôles éditoriaux des chercheurs et chercheuses dans les publications scientifiques, d'en comprendre les différentes dimensions et d'explorer les difficultés propres à ces rôles assumés par ces profils dans la chaîne éditoriale.

3. Editor, publisher, éditeur, éditeur

Continuons cette exploration par un petit voyage linguistique, ce qui ne devrait pas déplaire à celui en l'honneur de qui sont publiés ces mélanges. La langue française, contrairement à l'anglais, possède une particularité intéressante quand il s'agit de désigner les différentes fonctions éditoriales. Alors qu'en anglais, on peut distinguer la fonction d'« editor » qui contrôle la dimension intellectuelle de la publication, et la fonction de « publisher » qui en contrôle la dimension matérielle, le français ne dispose pour sa part que d'un seul mot pour désigner les deux réalités : « éditeur » [4]. Si bien que pour lever toute ambiguïté lorsque c'est nécessaire, le français va, dans un cas, qualifier le mot « éditeur » en « éditeur scientifique », et dans l'autre, utiliser une périphrase décrivant la fonction : « maison d'édition ». A première vue, la langue anglaise semble en effet plus précise : d'un côté, « editor » est une personne physique qui prend en charge l'établissement du texte avant qu'il soit imprimé. Dans le cadre de publications scientifiques, « the editor » joue le rôle d'interface entre l'auteur et les évaluateurs. C'est lui ou elle qui décide de la version finale du texte qui sera effectivement publiée. A un niveau plus structurel, il ou elle établit ou participe à l'établissement de la ligne éditoriale de la publication, sur la base de laquelle les textes seront aussi acceptés ou refusés, outre leur qualité scientifique intrinsèque. Il est le gardien de cette ligne éditoriale. On comprend aisément que l'« editor » est presque toujours un chercheur ou une chercheuse dans le cas d'une publication scientifique car ses décisions relèvent de l'orientation de la science elle-même, de la structuration des directions de recherche au sein du travail d'édition. Alors que les évaluateurs et évaluatrices sont cantonné.e.s à la vérification de l'originalité des recherches présentées et à la solidité de l'argumentation scientifique, les « editors » indiquent une direction collective. Ils ou elles établissent et mettent en œuvre une « politique » éditoriale. A l'opposé, le mot « publisher » en anglais désigne habituellement non pas une personne physique mais une entité collective, dont le rôle est d'assumer la responsabilité à la fois de l'organisation globale de l'ensemble des opérations nécessaires à la publication d'un texte, mais aussi d'en assumer la responsabilité juridique dans toutes ses dimensions. De manière intéressante, si le français désigne les deux fonctions pourtant bien différentes par un même mot, il dispose pourtant dans son stock linguistique, des deux racines latines que mobilise l'anglais pour distinguer les fonctions. Si le verbe « éditer » peut avoir la même ambigüité que le substantif auquel il correspond[5], le français peut aussi recourir au verbe « publier » comme parfait synonyme du verbe « éditer »[6]. Cette instabilité du vocabulaire en français destiné à rendre compte du travail d'édition est bien connue des professionnels du secteur, qui se livrent quelquefois à une certaine créativité linguistique pour préciser les fonctions. Ainsi, récemment, Caroline Dandurand (Dandurand 2022) propose un glossaire qui distingue nettement deux entrées : « Éditeur : structure qui sélectionne des textes pour la publication, les organise, les édite et les diffuse. Elle coordonne l'ensemble des fonctions éditoriales afin de faire paraître un texte sous forme d'article ou d'ouvrage. Elle assume la responsabilité éditoriale et juridique des contenus qu'elle publie », et « Publieur : structure qui assure les fonctions liées à la publication d'un texte ». « Publieur » est un néologisme assumé dans le contexte du développement de l'édition numérique qui bouleverse quelque peu le paysage de l'édition scientifique en faisant apparaître des structures qui n'assument pas toutes les fonctions prises en charge par un véritable « éditeur ».

[4] Le Trésor de la Langue Française distingue trois significations pour ce terme : « Personne ou société qui édite des œuvres sous forme d'objet imprimé » ; « Personne qui prépare une œuvre ou un recueil d'œuvres en vue de les publier » ; « Personne qui fait paraître sous sa responsabilité un journal, une revue ou un périodique. » https://www.cnrtl.fr/definition/%C3%A9diteur.

[5] Le TLF reconnaît que le verbe « éditer » peut avoir plusieurs significations : « Assurer la reproduction, la publication et la diffusion d'une œuvre » ; « Établir le texte d'une œuvre, éventuellement accompagné de notes critiques et de commentaires, en vue de sa publication » Le Dictionnaire de l'Académie Française en distingue deux : « Publier et mettre en vente, sous forme d'imprimé, une œuvre littéraire, une œuvre scientifique, un périodique » ; « Établir avec la plus grande exactitude le texte d'une œuvre et en assurer la publication » https://www.cnrtl.fr/definition/%C3%A9diter.

[6] TLF : « Faire paraître un article, une revue, un ouvrage, en assurer l'impression et la diffusion. Synon. éditer. » https://www.cnrtl.fr/definition/publier.

Si les fonctions de publication, au sens premier de « rendre public », sont relativement claires à établir dans leur technicité, un plus grand mystère règne sur le travail qui consiste à « éditer » un texte. Ce travail reste à bien des égards méconnu parce qu'il mélange dans une même action des compétences et des intérêts différents et variés. C'est un travail hybride qui suppose une très grande proximité entre les chercheurs et chercheuses et les professionnel.le.s de l'édition lorsque les revues ou les collections d'ouvrage sont suffisamment financées pour avoir des équipes dédiées, mais il arrive souvent que les deux compétences soient mélangées dans les mêmes personnes, en raison d'un manque de moyens, voire d'une volonté délibérée ! Voilà un premier espace où l'on trouve le chercheur ou la chercheuse en figure d'« éditeur » ou « éditrice ». Mais à y regarder de plus près, et cela peut paraître plus troublant, c'est aussi un endroit où les professionnel.le.s de l'édition sont conduit.e.s à assumer des fonctions qui devraient, à première vue, être attribuées aux chercheurs et chercheuses exclusivement. Comme on l'a vu précédemment, la littérature professionnelle organise les différentes étapes de l'édition d'un texte en chaîne opératoire bien ordonnée : *editing* (édition), *copyediting* (préparation de copie), *typesetting* (mise en page), par exemple. Toute personne ayant eu à éditer un texte sait pourtant que le bel ordonnancement unidirectionnel de la préparation d'un texte est jusqu'à un certain point théorique : dans nombre de cas, la préparation d'un texte passe par de nombreux allers-retours, chaque étape faisant apparaître des problèmes qui conduisent à reprendre l'étape précédente. Il ne s'agit pas de dire que tout est mélangé, mais plutôt que tout est interdépendant. Par exemple, la correction linguistique ou syntaxique d'un texte peut faire apparaître des incohérences dans le raisonnement exposé par l'auteur ou l'autrice, et donc éventuellement des insuffisances scientifiques qui ont échappé à l'étape d'évaluation par les pairs. Cette interrelation est évidemment plus ou moins prégnante selon les pratiques d'écriture propres aux différentes communautés scientifiques qui ont plus ou moins formalisé l'organisation de l'exposition des résultats de recherche, comme, par exemple, les sciences médicales qui ont massivement adopté le format IMRAD dans les années 70 et 80 (Sollaci et Pereira 2004). La vérification des données et des références bibliographiques porte elle aussi des implications scientifiques, évidemment, et cette fois, cela concerne toutes les disciplines. Si cette vérification est censée être globalement réalisée au niveau de l'évaluation par les pairs, il est connu que celle-ci n'est jamais systématique. Un souci de qualité « éditoriale » peut alors faire apparaître des imprécisions voire des erreurs dans les données, des citations tronquées qui détournent le sens du texte cité, voire, fréquemment, des erreurs de pagination dans les références font naître des points d'interrogation sur la solidité du raisonnement lui-même lorsqu'il s'appuie sur des travaux antérieurs. Disons-le nettement : ce genre de correction postérieure à l'évaluation par les pairs est un des secrets les mieux gardés des professionnel.le.s de l'édition qui doivent souvent effacer les traces de leur intervention dans le domaine de souveraineté du scientifique. Non pas que ces personnels introduisent des données ou des éléments de raisonnement de leur cru dans la publication, mais, par les questions qu'ils ou elles soulèvent, conduisent les auteurs et autrices à reprendre la rédaction de leur article ou de leur livre, à réduire la portée de leurs conclusions et, le plus souvent, à renforcer la cohérence de leur argumentation. L'étape suivante, celle qui permet de « mettre en page » le texte scientifique, est loin d'être une pure opération technique comme on le croit trop souvent. Car la mise en forme doit refléter une structure intellectuelle du texte. Et souvent, la personne qui met en page doit se creuser la tête pour comprendre où commence et où finit une partie, quel niveau de titre il ou elle doit appliquer à tel intitulé, comment mettre en forme tel tableau ou représenter telle figure. Le passage au numérique de l'édition avec l'application du langage XML pour « sémantiser » un texte conduit lui aussi à se poser des questions qui peuvent être de nature scientifique, lorsqu'il s'agit par exemple, de qualifier par la pose d'une balise, tel élément d'information dans le texte (Vitali-Rosati 2025).

Tous ces éléments qui mettent en lumière l'interdépendance profonde du scientifique et de l'éditorial, du fond et de la forme, supposent, certes, une certaine spécialisation scientifique des professionnel.le.s de l'édition qui travaillent sur des textes qu'ils ou elles doivent pouvoir comprendre, mais aussi, et c'est moins reconnu, une participation active de chercheurs et chercheuses doté.e.s de compétences éditoriales à toutes les étapes du travail d'édition d'un texte, lorsque ils ou elles travaillent en collaboration avec des professionnel.le.s de l'édition et, *a fortiori*, lorsqu'ils ou elles prennent toutes les actions à réaliser en charge.

4. L'éditeur ou éditrice de revue, de collection de livres

Mais l'interpénétration du scientifique et de l'éditorial ne s'arrête pas là. Car si l'on monte d'un cran, au niveau de la responsabilité d'une revue ou d'une collection d'ouvrages, là encore, les représentations classiques qui font bien la différence entre ce qui relève de la responsabilité scientifique du rédacteur ou de la rédactrice en chef d'un côté, et de la responsabilité opérationnelle de la maison d'édition sont, dans bien des cas…toutes théoriques. Si l'on cantonne le chercheur ou la chercheuse à organiser le travail de contrôle de l'intégrité scientifique de la publication en assemblant un comité éditorial et en gérant un comité d'évaluateurs, on manque l'essentiel. Car en réalité, toute décision relative à une revue ou une collection d'ouvrages, depuis la définition de son périmètre scientifique jusqu'à son modèle économique, mais aussi sa politique de diffusion, d'indexation, son mode d'organisation matériel et immatériel, et jusqu'au choix des outils qu'elle utilise, tout cela a une implication scientifique forte. Cette proposition est souvent mal comprise ou rejetée par celles et ceux qui pensent que la dimension scientifique s'arrête au niveau de l'article ou de l'ouvrage comme support d'enregistrement de la recherche, et que donc, à l'ère des entrepôts de données et des plateformes, la revue est appelée à disparaître comme forme obsolète parce que liée à l'imprimé[7]. Cette perspective « utilitariste » de la publication scientifique méconnaît largement la manière dont ce que l'on pourrait qualifier de collectif de publication (comme il existe des collectifs de recherche) influence la recherche elle-même, en permettant à des communautés scientifiques de se structurer autour d'un bien qui leur est commun (la collection, la revue), en permettant à de nouveaux objets, de nouvelles méthodes de recherche d'émerger, en créant des espace de discussion collective (Gatti et al. 2024).

Un grand nombre de discussions et d'incompréhensions à l'intérieur du monde scientifique sur les fonctions attendues et réelles des revues scientifiques, et dans une moindre mesure, des collections de livre, sont causées par cette dichotomie profonde entre d'un côté, les revues créées par des chercheurs et chercheuses pour répondre à un besoin de structuration de la recherche elle-même, et de l'autre celles qui sont créées par les maisons d'édition comme des produits commerciaux susceptibles de répondre à un besoin sur un marché éditorial. Évidemment, dans la plupart des cas, il y a coïncidence au moins partielle entre les deux logiques car la logique du marché de la publication scientifique est susceptible d'être portée par la logique d'évolution du champ des connaissances scientifiques telle que produite par la recherche elle-même. Un bon exemple historique est la manière dont Robert Maxwell a tiré profit du développement considérable des investissements dans la recherche scientifique après la Seconde Guerre mondiale pour prendre position dans le secteur de la publication scientifique qui était devenu un marché prometteur (Miranda 2001). Il reste que la concordance entre la dynamique qui guide l'évolution de la revue comme un produit toujours ajusté aux besoins de clients sur un marché défini et celle qui fait évoluer la revue comme lieu où se rencontre une communauté scientifique est rarement exacte. Cette distance entre les deux logiques, commerciale et communautaire, crée une tension permanente au centre de laquelle se trouvent les comités éditoriaux des revues et en particulier leur rédacteur ou rédactrice en chef. Cette tension peut se manifester à tous les niveaux de la publication : évidemment en ce qui concerne la définition de la ligne éditoriale, des critères d'acceptation des articles mais aussi du recrutement des membres du comité éditorial, du mode de fonctionnement des outils utilisés, par exemple pour gérer les processus d'évaluation des articles ou, éventuellement de la définition du périmètre scientifique de la revue elle-même.

Cette tension s'étend même à la politique commerciale attachée à la revue, comme l'illustre à la perfection l'histoire de la mutinerie menée par Johan Rooryck et ses collègues du comité éditorial de la revue de linguistique *Lingua* contre leur éditeur Elsevier. Un cas intéressant et non isolé où « editors » et « publishers » entrent en conflit à propos … du prix d'abonnement de la revue et plus généralement de la politique commerciale qui y est attachée. L'événement, raconté de multiples fois par le mutin lui-même (Krämer et Rooryck 2016) et plusieurs titres de presse (Jaschik 2015) fut déclenché lorsque le comité éditorial envoya une lettre à son éditeur pour lui demander de baisser le prix d'abonnement de la revue, devenu inaccessible à un nombre croissant de bibliothèques dans différents pays du monde. La réponse de l'éditeur à la lettre fut une fin de non-recevoir basée sur une claire séparation des rôles et des responsabilités : aux uns le scientifique, aux autres le commercial. Sauf que le commercial a des

[7] C'est la position défendue par Jean-Claude Guédon par exemple (Stern et al. 2015).

conséquences sur le scientifique, en particulier lorsqu'il empêche toute une partie de la communauté scientifique d'accéder aux résultats de recherche que cette même communauté produit, en raison de prix d'abonnement prohibitifs. Ici, ce qui se manifeste, c'est la nature de la revue comme espace de discussion pour une communauté savante, espace dont l'accès ne peut être interdit à une partie de cette communauté pour des raisons financières ou commerciales. Depuis le cas *Lingua*, plusieurs comités de rédaction ont suivi le même exemple, jusqu'à, récemment, le comité du *Journal of Philosophical Logic*, revue propriété du groupe Springer, qui décide de démissionner en masse en protestation d'une politique commerciale incompatible avec les besoins de cette communauté (Weinberg 2025). Dans les deux cas, et dans un plus grand nombre encore, la démission en masse des éditeurs d'une revue possédée par une maison d'édition commerciale conduit à la création d'une nouvelle revue dotée d'un nouveau titre, souvent soutenue par une institution publique ou une coopérative d'édition à but non lucratif comme Open Library of Humanities dans les deux cas cités. Le passage de *Lingua* à *Glossa*, de *Journal of Philosophical Logic* à *Philosophical Logic* est une révolution copernicienne pour les chercheurs et chercheuses qui prennent ce type d'initiative, bien qu'en apparence, peu de choses changent quant au contenu et au mode d'organisation de la rédaction de la revue. Car dans un cas, ils et elles représentent une main d'œuvre souvent gratuite - car leur rémunération est surtout symbolique - œuvrant au succès commercial d'un produit proposé sur un marché économique, et dans l'autre, ils et elles sont les gardien.ne.s d'un espace discursif où se retrouve la communauté savante dont ils et elles sont issu.e.s. La responsabilité des chercheurs et chercheuses dans l'un et l'autre cas est sans commune mesure. La place du chercheur ou de la chercheuse dans un système d'édition commerciale est celle d'un rouage dans une machinerie qui le ou la dépasse et au service de fins qui lui sont étrangères. Cette place marginalisée et secondaire est d'ailleurs concordante avec l'évolution concomitante des systèmes de recherche eux-mêmes qui positionnent les chercheurs et chercheuses comme des producteurs ou productrices de savoirs au cœur d'un système dont les objectifs leurs sont étrangers et supérieurs (comme la puissance militaire, économique, la compétitivité, par exemple) (Rieu 2021). Ainsi, la trajectoire de prolétarisation du chercheur, c'est-à-dire à la fois d'une dépossession de ses moyens de production intellectuelle et d'une aliénation de son activité à des fins qui lui sont étrangères, bien documentée dans les systèmes d'enseignement supérieur et de recherche (Busch 2014), se double d'une évolution similaire dans les pratiques éditoriales. Vu sous cet angle, les démissions en masse des chercheurs et chercheuses de leurs fonctions au sein des comités de rédaction des revues commerciales pour recréer leurs propres revues s'apparente à un mouvement de réappropriation par les chercheurs et chercheuses de ce qui est davantage qu'un simple outil de diffusion des connaissances, mais aussi un espace social propre au scientifique où s'élabore l'institution discursive d'une communauté savante.

D'ailleurs, un peu à l'instar de leur illustre modèle historique, ces « guerres d'indépendance » scientifiques au sein des revues qui peuvent débuter à propos de questions purement commerciales, impliquent souvent bien d'autres questions liées à la gestion d'une revue, comme la définition de la ligne éditoriale et du sujet dont traite la revue, le recrutement des membres du comité de rédaction, la gestion de l'évaluation par les pairs et des interactions avec les évaluateurs et évaluatrices. C'est en effet une question fondamentale de souveraineté scientifique qui est souvent posée à travers ces sujets d'apparence très technique et quelque peu minuscules en apparence.

5. L'entrepreneur d'édition scientifique

L'implication des chercheurs et chercheuses dans l'édition scientifique au-delà des fonctions attendues comme auteur ou autrice, évaluateur ou évaluatrice, se révèle enfin à un dernier niveau d'analyse, lorsque certains prennent l'initiative de diriger et/ou de créer des maisons d'édition. Ici, on ne peut qu'être frappé de la diversité des occasions, des situations et des modèles qui conduisent de manière continue les chercheurs et chercheuses à prendre des responsabilités à la direction de maisons d'édition. Il est vrai que les grandes maisons d'édition scientifique historiques ont plutôt été créées par des imprimeurs et des libraires, à l'instar de Lodewijk Elzevir (c. 1540–1617), Jordaan Luchtmans (1652–1708), Georg Reimer (1776–1842), Charles Wiley (1782–1826) et Julius Springer (1817–1877) à des époques où le travail d'édition était une extension d'un métier principal de réalisation et de distribution matérielle de livres. Mais d'autres histoires bien différentes existent aussi, qui vient contrebalancer le rôle des imprimeurs-libraires

du 16e au 19e siècle. Par exemple, celles dont rend compte Valérie Tesnière dans son histoire de l'édition savante en France autour du Quadrige (Tesnière 2001b). On y trouve les figures de Félix Alcan par exemple (1841-1925) dont le profil d'éditeur-libraire est assez proche des exemples cités précédemment malgré un passage par l'Ecole Normale Supérieure, mais aussi une aventure de nature très différente, celle entreprise par cinq professeurs de la Sorbonne qui décident en 1921 de créer les Presses Universitaires de France dans l'inspiration politique plus générale, importante à l'époque, du coopérativisme (Tesnière 2001a). Les PUF, société d'édition à but lucratif, mais dont l'actionnaire principal est la Banque des Coopératives est entièrement sous contrôle effectif des professeurs fondateurs pendant les premières années de son existence. A peu près à la même période, d'autres professeurs, spécialisés en langues anciennes et études classiques fondent l'Association Guillaume Budé qui elle-même crée rapidement la société d'édition Les Belles Lettres pour répondre à un besoin d'édition savante des textes classiques dans l'espace francophone (Jouanna 1997). Pourquoi créer ces structures éditoriales en dehors de l'Université ? Sans doute parce que l'institution universitaire n'est pas capable en France, de porter ce type d'activités, au début du XXe siècle.

Dans d'autres pays et à d'autres époques toutefois (Jagodzinski 2008) (Rayner 2019), les universités se sont plus ou moins toutes dotées de services de publications qui ont pu prendre des formes assez abouties pour être qualifiées de presses universitaires. Si les relations juridiques en particulier entre les institutions et les structures éditoriales peuvent être très variées, depuis l'intégration complète jusqu'à l'indépendance juridique, dans la plupart des cas, les chercheurs et chercheuses jouent un rôle essentiel à la direction de ces structures éditoriales. En France par exemple, la direction de la plupart des presses est assurée par un binôme constitué d'un chercheur ou d'une chercheuse et d'un.e professionnel.le de l'édition (Dandurand 2022), élaborant conjointement une politique éditoriale répondant à la fois à des ambitions scientifiques, des contraintes logistiques et économiques, une mission de diffusion des connaissances. Il est certain qu'à l'intérieur de la catégorie de « presses universitaires », on trouve une grande variété de modèles économiques, éditoriaux, organisationnels. La conjonction d'acteurs aux profils divers : scientifiques, éditoriaux, entrepreneuriaux à la direction de ces structures ne permet pas de prédire les politiques éditoriales, les stratégies économiques et managériales qui seront adoptées par elles. Celles-ci peuvent d'ailleurs varier au cours du temps, par nécessité d'adaptation à un marché changeant et à la concurrence des maisons d'édition du secteur privé. Ainsi peut-on voir certaines presses universitaires adopter des comportements commerciaux qui ne permettent pas de les distinguer de sociétés privées dont la réalisation de profits est la principale motivation.

D'ailleurs, il est quelques exemples de maisons d'édition à but lucratif qui ne sont pas des presses universitaires, dont les pratiques commerciales ont pu être fortement critiquées au sein de la communauté scientifique, jusqu'à en questionner la qualité scientifique (Nicholas et al. 2023), qui ont été créées et sont dirigées par des chercheurs et chercheuses : MDPI par exemple, quelquefois qualifié d'« éditeur-prédateur », a été créé par Shu-Kun Lin, un chercheur en chimie issu de l'ETH-Zurich. Autre exemple, Frontiers Media, créé par Henry et Kamila Markram, spécialisé.e.s en neurosciences, issu.e.s de l'EPFL de Lausanne.

A la même époque, une série d'initiatives à l'opposé de celles-ci en termes de valeurs, d'éthique et de pratiques de publication, fortement ancrées dans une culture communautaire non commerciale, naissent et se développent. Un des vaisseaux amiraux de ces nouveau « scholar-led publishers » est bien sûr Open Library of Humanities, créée par un chercheur et une chercheuse britanniques, Martin Eve et Caroline Edwards (Eve 2014) ; il s'agit bien sûr de l'éditeur de *Glossa*. Bientôt qualifiées de « new university presses » et de « scholar-led publishers » (Adema et Stone 2017), ces initiatives ont fleuri particulièrement au Royaume-Uni sous l'impulsion d'une jeune génération de chercheurs et chercheuses poursuivant le double objectif d'expérimenter de nouvelles pratiques de publication et de construire des alternatives concrètes et opérationnelles à un système de publication verrouillé par la domination des éditeurs commerciaux et des presses universitaires adoptant les mêmes pratiques. Certaines de ces nouvelles structures éditoriales expriment une forme d'engagement politique qui se traduit quelquefois avec une certaine radicalité à la fois dans les sujets traités, les théories critiques mobilisées, mais aussi les formes éditoriales adoptées, et bien sûr, les modes de gouvernance de leur propre entreprise (Adema et Moore 2021 ; Moore 2025). On ne peut s'empêcher de voir dans ces initiatives britanniques du début du XXIe siècle, quelque écho au coopérativisme des fondateurs des Presses Universitaires de France un siècle plus tôt ; ou encore à la

création de Liber/Raison d'agir par le sociologue français Pierre Bourdieu dans les années 90 (Lebaron et Mauger 1999).

On s'intéressera brièvement pour finir, à ces nombreuses initiatives lancées par des chercheurs et chercheuses visant à changer radicalement le système de publication scientifique que ce soit en termes d'accès aux contenus, aux formes ou aux pratiques éditoriales. Ces initiatives sont souvent le résultat de frustrations engendrées par des pratiques de publication trop conservatrices jusqu'à en devenir fossilisées dans certaines disciplines, en tout cas inadaptées aux besoins et aspirations de nouvelles générations de chercheurs et chercheuses. La création de PLOS en est un bon exemple : la Public Library of Science (PLOS) est une initiative lancée par plusieurs chercheurs en médecine, dont le prix Nobel de médecine, Harold Varmus, avec un objectif de refonte radicale du système de publication scientifique hors du contrôle des éditeurs commerciaux (Varmus et al. 2000). Évidemment, il serait intéressant d'étudier plus en détail comment une plateforme de publication qui s'était pensée comme assez radicalement alternative à sa création fut rattrapée par l'évolution d'un écosystème de communication scientifique qui s'est adapté à la vitesse de l'éclair. C'est peut-être une leçon à méditer pour d'autres initiatives comme Peer-Community In et SciPost, deux plateformes d'un type nouveau créées elles aussi par des chercheurs.

6. Conclusion[8]

« L'édition est une partie intégrante de la recherche. Lorsque j'édite un texte, je fais de la recherche ». Nous sommes quelques-un.e.s à avoir entendu ces phrases au cours de conversations avec Johan Rooryck. Par son action et son implication à tous les niveaux du monde de l'édition, dans *Glossa*, LingOA, mais aussi OPERAS et le modèle d'édition en accès ouvert Diamant (Science Europe 2022), il apparaît comme un exemple topique du chercheur en figure d'éditeur, incarnant et intégrant en lui tout un écosystème d'élaboration, édition, publication, diffusion des connaissances scientifiques. Figure dérangeante jusqu'à un certain point, à la fois pour les chercheurs qui considèrent que ce n'est pas à cet endroit que la science s'élabore, mais aussi pour les professionnel.le.s de l'édition qui peuvent craindre une négation de la spécificité de leur métier. Les un.e.s et les autres ne devraient pourtant pas le regarder avec méfiance mais au contraire considérer cette figure comme une promesse : promesse pour les chercheurs de briser les chaînes dans lesquelles quelques décennies de reconfiguration managériale de la recherche scientifique les ont jetés, perdant peu à peu les attributs de leur autonomie sur la production des savoirs. Par où commencer ? La proposition qui leur est faite est d'identifier la publication comme le point d'appui à partir duquel regagner une autonomie perdue car la publication est le lieu singulier où cristallisent les savoirs, point focal où beaucoup des maux qui affectent la recherche contemporaine sont matérialisés. Mais promesse aussi pour les professionnel.le.s de l'édition qui gagnent dans tous les cas à travailler avec des chercheurs qui sont aussi de bons éditeurs, du fait d'une intercompréhension accrue entre des métiers si complémentaires. C'est la promesse de vrais compagnonnages où chacun apprend de l'autre et où l'apport de chacun est reconnu dans un travail collectif que l'on pourrait qualifier, en reprenant l'étymologie du terme « éditer », de mise au monde des savoirs.

Références

Adema, Janneke and Samuel A. Moore. 2021. Scaling small; or how to envision new relationalities for knowledge production. *Westminster Papers in Communication and Culture* 16 1 : 27–45. https://doi.org/10.16997/wpcc.918.

Adema, Janneke and Graham Stone. 2017. *Changing Publishing Ecologies. A Landscape Study of New University Presses and Academic-Led Publishing*. JISC. Available at https://repository.jisc.ac.uk/6666/1/Changing-publishing-ecologies-report.pdf.

[8] Je remercie Emmanuelle Corne pour m'avoir mis sur la piste de cette conclusion qui lui ressemble.

Björk, Bo-Christer. 2007. A model of scientific communication of a global distributed information system. In *Proceedings of the IATUL Conferences*, paper 3. Available at https://docs.lib.purdue.edu/iatul/2007/papers/3.

Björk, Bo-Christer and Turid Hedlund. 2003. Scientific Publication Life-Cycle Model (Splc). Universidade do Minho.

Bosman, Jeroen, Jan Erik Frantsvåg, Bianca Kramer, Pierre-Carl Langlais, and Vanessa Proudman. 2021. *OA Diamond Journals Study. Part 1: Findings*. Zenodo. https://doi.org/10.5281/zenodo.4558704.

Busch, Lawrence. 2014. *Le marché aux connaissances: Néolibéralisme, enseignement et recherche*. Sciences en questions. Editions Quae.

Contat, Odile and Anne-Solweig Gremillet. 2015. Publier : à quel prix ? Étude sur la structuration des coûts de publication pour les revues françaises en SHS. *Revue française des sciences de l'information et de la communication* 7 (juillet). https://doi.org/10.4000/rfsic.1716.

Dandurand, Caroline. 2022. Préfiguration d'une structuration collective des éditeurs scientifiques publics engagés dans la science ouverte. Report, Comité pour la science ouverte. https://doi.org/10.52949/25.

Eve, Martin Paul. 2014. All that glisters: Investigating collective funding mechanisms for Gold Open Access in humanities disciplines. *Journal of Librarianship and Scholarly Communication* 2 3: eP1131. https://doi.org/10.7710/2162-3309.1131.

Eve, Martin Paul and Andy Byers. 2018. Janeway: A scholarly communications platform. *Insights* 31: 15. https://doi.org/10.1629/uksg.396.

Gatti, Rupert, Pierre Mounier, and Johan Rooryck. 2024. Beyond 'no fee': Why Diamond Open Access is much more than a business model. Ledizioni. https://doi.org/10.5281/ZENODO.14440034.

Hyde, Adam. 2021. White paper: Kotahi current state. Available at https://coko.foundation/articles/white-paper-kotahi-current-state.html.

Jagodzinski, Cecile M. 2008. The university press in North America: A brief history. *Journal of Scholarly Publishing* 40 1: 1–20. https://doi.org/10.3138/jsp.40.1.1.

Jaschik, Scott. 2015. Language of Protest. *Inside Higher Ed*, November 1. Available at https://www.insidehighered.com/news/2015/11/02/editors-and-editorial-board-quit-top-linguistics-journal-protest-subscription-fees.

Jouanna, Jacques. 1997. Le 80e anniversaire de l'Association Guillaume-Budé. *Comptes rendus des séances de l'Académie des Inscriptions et Belles-Lettres* 141 4: 1133–42. https://doi.org/10.3406/crai.1997.15809.

Krämer, Martin and Johan Rooryck. 2016. A tale of two journals or How Elsevier pushed Open Access in linguistics. *Septentrio Conference Series* 1. https://doi.org/10.7557/5.4061.

Lebaron, Frédéric and Gérard Mauger. 1999. Raisons d'agir : un intellectuel collectif autonome. *Journal des anthropologues. Association française des anthropologues* 77–78: 295–301. https://doi.org/10.4000/jda.3089.

Miranda, Robert N. 2001. Robert Maxwell: Forty-Four years as publisher. In *A Century of Science Publishing*, edited by Einar H. Fredriksson, pp. 77–89. IOS Press. https://doi.org/10.3233/978-1-58603-148-0-77.

Monnet, Éric. 2020. Les comités de rédaction et l'économie de la publication. In *L'édition en sciences humaines et sociales : Enjeux et défis*, edited by Étienne Anheim et Livia Foraison, pp. 217–25. Cas de figure. Éditions de l'École des hautes études en sciences sociales. https://doi.org/10.4000/books.editionsehess.28983.

Moore, Samuel. 2025. *Publishing Beyond the Market: Open Access, Care, and the Commons*. University of Michigan Press, Ann Arbor, Mi. https://doi.org/10.3998/mpub.11781635.

Nicholas, David, Eti Herman, Abdullah Abrizah, Blanca Rodríguez-Bravo, Cherifa Boukacem-Zeghmouri, Anthony Watkinson, Marzena Świgoń, Jie Xu, Hamid R. Jamali, and Carol Tenopir. 2023. Never mind predatory publishers… what about 'grey' publishers? *El profesional de la información* 32 5: e320509. https://doi.org/10.3145/epi.2023.sep.09.

PKP Docs. n. d. Journal setup & workflow basics – instructor guide for course journals. Available at https://docs.pkp.sfu.ca/instructor-guide/en/setup-workflow.html, accessed January 1, 2026.

Rayner, S. J. 2019. University presses and academic publishing. In *The Cambridge History of the Book in Britain*, vol. 7: *The Twentieth Century and Beyond*, edited by Andrew Nash, Claire Squires, and I. R. Willison, pp. 470–83. Cambridge University Press, Cambridge. https://doi.org/10.1017/9780511862489.018.

Rieu, Alain-Marc. 2021. *Managing Knowledge, Governing Society: Social Theory, Research Policy and Environmental Transition*. Routledge, London. https://doi.org/10.4324/9781003187004.

Science Europe. 2022. Action plan for Diamond Open Access. Science Europe. Available at https://www.scienceeurope.org/our-resources/action-plan-for-diamond-open-access/.

Sollaci, Luciana B. and Mauricio G. Pereira. 2004. The introduction, methods, results, and discussion (IMRAD) structure: A fifty-year survey. *Journal of the Medical Library Association* 92 3: 364–71.

Stern, Niels, Jean-Claude Guédon, and Thomas Wiben Jensen. 2015. Crystals of knowledge production. An intercontinental conversation about Open Science and the humanities. *Nordic Perspectives on Open Science* 1: 1–24. https://doi.org/10.7557/11.3619.

Tesnière, Valérie. 2001a. Coopératisme et édition : à la recherche de nouvelles formes de production et de gestion. In *Le Quadrige, 1860–1968. Un siècle d'édition universitaire*, Hors collection, 245–80. Presses Universitaires de France.

Tesnière, Valérie. 2001b. *Le Quadrige, 1860–1968. Un siècle d'édition universitaire*. Presses Universitaires de France. https://doi.org/10.3917/puf.tesn.2001.01.

Varmus, Harold, Patrick Brown, and Michael Eisen. 2000. Open letter. *PLOS*. Available at https://plos.org/open-letter/, accessed January 8, 2026.

Vitali-Rosati, Marcello. 2025. Formats et modèles. In *C'est la matière qui pense*. Presses universitaires de Rouen et du Havre. Available at https://ceen.univ-rouen.fr/matiere-marcello/chapitre4.html.

Vitali-Rosati, Marcello. 2025. *C'est la matière qui pense*. Presses universitaires de Rouen et du Havre. https://ceen.univ-rouen.fr/matiere-marcello/.

Weinberg, Justin. 2025. Editors at Springer's Journal of Philosophical Logic resign, launch new Open Access journal. *Daily Nous*, December 10. Available at https://dailynous.com/2025/12/10/editors-at-springers-journal-of-philosophical-logic-resign-launch-new-open-access-journal/.

Diamond open access in the Finnish scholarly publishing landscape

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Abstract

Diamond open access, where institutional publishers (typically universities and learned societies) make content immediately available at time of publication and no payment is asked from either readers or authors, is in stark contrast to the open access publishing models utilised by large commercial publishers. This paper presents a bibliometric mapping study focusing in particular on the current presence and characteristics of Diamond open access journals and book series in Finland. Utilising national data sources, the study identifies 201 active peer-reviewed journals in Finland, of which 146 (73%) are open access and the vast majority, 139 (69%), are more specifically Diamond open access. Additionally, 63 active peer-reviewed book series are identified, for which the open access share and Diamond open access share was 34 (54%) and 32 (51%) respectively. We find that a high share of all Finnish journals is published by learned societies, and are hosted on the Journal.fi national platform (62%), with a high proportion (75%) of all Diamond open access journals being hosted on the platform. The paper contributes with the first targeted study and openly available dataset on this particular segment of scholarly publishing channels.

1. Introduction

1.1. Prologue

Throughout his career Johan Rooryck has contributed to the research landscape on many levels, from the very grassroots level of producing and facilitating original research, to the top of international science policy. His actions have created ripples of momentum that grow and will continue to reverberate long into the future. In this paper we focus in particular on Diamond open access journals – i.e. journals that are "community-driven, academic-led and -owned", and that do not "charge fees to either authors or readers" (Ancion et al. 2022). Diamond OA is an area of scholarly publishing where Johan has been a key figure in advancing the practices from multiple fronts, and still continues to do so through the European Diamond Capacity Hub (EDCH) and a strong presence in international projects. Actions speak louder than words. In 2016 Johan's passion for Diamond open access was tangibly demonstrated through his leadership in the mass editorial exodus from the Lingua journal (Rooryck 2016) and the founding of Glossa as a Diamond open access journal, which he has continued to edit until this day. This was a seminal moment in the actions around open access publishing, demonstrating that also individual scholars can make a difference.

1.2. Aim of the study

Despite the increased attention and emphasis that Diamond open access publishing has received in recent years, there is still a lack of studies and data that would provide comprehensive mapping of the presence of Diamond open access. The most comprehensive study to date is the Diamond Open Access Journals Study with data from 2020, but also that study relied on estimations rather than confirmed observations for the total number of Diamond open access journals in the world (Bosman et al. 2021).

In this study we provide the most comprehensive and up to date bibliometric mapping of Diamond open access journals and book series active in Finland, a country where Diamond open access publishing is already at an advanced stage due to a number of reasons that are documented in the next section. As more of these national studies on Diamond open access crop up with associated datasets (e.g. Frantsvåg 2022, Taubert, Sterzik, and Bruns 2024), stakeholders gain a more comprehensive and contextualized global perspective and can make more informed actions about the best paths forward both nationally and internationally.

There is no official exact definition on what constitutes 'Diamond open access', but often the lowest common denominator is that readership and authorship should not come with any associated financial costs. In this study we identify Diamond open access channels based on open availability of all content and without costs for authors or readers. In addition, we will analyse to what extent the identified Diamond

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http://septentrio.uit.no/index.php/nordlyd https://doi.org/10.7557/12.8338

open access channels also meet the set of operational criteria developed in collaboration between the DIAMAS and CRAFT-OA projects (Armengou et al. 2024).

1.3. A brief history of Diamond open access in Finland

The overall journal publishing landscape in Finland is characterised by most journals being published by individual small non-profit learned societies and associations, active within the domain of social sciences and the humanities (Late et al. 2020). There is also a practice stemming back to the 1800s of providing government subsidies for supporting non-profit scholarly publishing in Finland, which on average has covered roughly a third of publishing expenses (Ilva and Lilja 2014). This practice is exceptional on the European level where, if there is any support for national journals, it is managed through competitive grants or through support channelled through universities (Laakso and Multas 2023). While non-profit-driven subscription income has been a key source enabling publishing activity among these organisations, it is an income source which the growth of open access publishing risks eroding over time. A further complication is that subscription-access has often been bundled into the learned society's membership. As subscription-based content becomes less relevant, scholars may be less inclined to join or remain members of learned societies, with implications beyond the publication model.

Finland, like several other Nordic countries, has a copyright organisation (Kopiosto) responsible for managing compensation collection from primarily the public sector and educational institutions for their copying and digital distribution of copyrighted materials in their activities. Kopiosto is also responsible for the distribution of collected funds towards publishers who publish copyrighted materials. In the case of scholarly publications, the collected funds are paid out to the Association of Finnish Scholarly Publishers that funds e.g. development projects of publishers in the country through competitive funding rounds. Publications that are published with a Creative Commons license do not contribute to this compensation model. As the share of such content has been growing there has been a decreasing amount collected to be able to distribute back into the publishing sector through this established mechanism. As such there is a system-level disincentive and friction for the growth of Diamond open access with Creative Commons licenses seen through this particular lens. This is likely one of the reasons for why the vast majority of Diamond open access journals in Finland have been found to not have adopted open licensing while still remaining free to read and access (Linna et al. 2020).

Science policy in Finland has been strongly in support of open access publishing since the early days of the movement. Hedlund and Rabow (2007) provide an early overview of the development of open access in the Nordic countries, where also a description of the major steps that had been taken in Finland are included. In 2005 a committee appointed by the Ministry of Education provided recommendations to research funders, universities, research institutes, and publishers to transfer towards open access for research outputs (Ministry of Education 2005). The Council of University Rectors for the universities in Finland signed the Berlin Declaration of free access to research information in 2006 (openaccess.mpg.de n.d.). Experimentation with a centrally managed journal platform based on Open Journal Systems (OJS) was funded by the Ministry of Education in 2006, with the Federation of Finnish Learned Societies (TSV) being the main organisation in charge of development which included a pilot with the journals participating in using the platform (Hedlund and Rabow 2007).

Hedlund and Rabow (2007) is also the earliest study that includes some measurement of open access publishing among journals published in Finland. The authors used Ulrichsweb to establish that there were, at that point in time, 98 peer reviewed journals in Finland, 40% of which had an online version and 6% of which were open access. All of the Nordic countries had their open access shares in the single digits so the situation of Finland was roughly in line with the others. At the time of the study Finland had 6 journals indexed in the Directory of Open Access Journals (DOAJ). Björk (2019) – another open access measurement of Finnish journals with data collected in 2018 – utilised the Finnish Publication Forum (JUFO) list to identify 334 peer-reviewed journals published in Finland placed at quality levels 1–3 (see section 2 for more information on the JUFO system) and manually checked for their open access status by accessing their webpages. The study could establish that 97 were open access which resulted in an open access share of 30%. With a comparable methodology to Björk (2019), Linna et al. (2020) utilised the JUFO

list to identify Finnish journals placed on quality levels 1–3 and assessed their open access status during 2020 by visiting the journal webpages. The study included 332 journal titles as its baseline, of which 177 (53%) were immediate open access, 19 (6%) delayed open access, and 8 (2%) were hybrid open access. Journals that had author-side fees were 7, with one additional journal implementing fees only for special issues. As such open access journals in Finland were found to be Diamond open access almost exclusively, with only 8 of 177 (5%) open access journals implementing APCs on any basis. The increase of open access journals from 97 found by Björk (2019) in 2018 to 177 journals found by Holopainen et al. (2020) in 2020 is a massive jump for which we do not find an explanation in any substantial methodological difference in the studies. Rather, during this time period three factors substantially contributed to a lot of journals opening up access to their content. These factors are described in the three following paragraphs: policy, funding, and technology.

Since 2020 there has been a national policy in place striving for full open access to journal articles (Open Science and Research Coordination 2019) with an updated version in the final drafting stage as of May 2026. This in conjunction with the national research funder, the Research Council of Finland, being an early Plan S signatory, and there being a financial incentive for universities in the public funding model since the year 2021 to make any peer-reviewed outputs open access (Ministry of Education and Culture 2019), has created a particularly strong demand for publishing practices to migrate towards open access models.

Ever since the early days of discussing open access in the context of Finland there has been a concern for how publishing based on this model would be funded as subscription income decreases while the state subsidies are not enough and also require journals to declare through financial documentation that they have other income to be eligible for the subsidies (Hedlund and Rabow 2007). Ilva (2018) provides a good description of what to date has been the most extensive and formal attempt at launching a funding model for Diamond open access journals, a consortial model where enrolled research performing organisations from which researchers publish in enrolled journals would be invoiced annually based on their publishing activity on a per-article basis. The proposed model and pricing did not get sufficient support from universities and despite there being reports written and attempts made at building new models since then (e.g. TSV 2023), the commitment from universities to assist in funding domestic journals has remained weak. Enabling open access has been a criterion of the state subsidies for publishing activities facilitated by TSV since 2014, with increasingly specific requirements added over time (Ilva and Lilja 2014, TSV 2025).

Even though piloting a common OJS platform was already initiated in 2006 as described by Hedlund and Rabow (2007), it was in 2015 together with the launch of the Journal.fi portal based on OJS version 3 that migration among journals started. 50 journals were part of the initial cohort of journals that moved to or launched on the platform during its initial years, with it hosting over 150 open access journals as of May 2026. A snapshot of the profile of journals publishing on the platform in 2020 is provided by Pölönen et al. (2021) when 98 journals were publishing on the platform operated by the Federation of Finnish Learned Societies with funding from the Ministry. Use of the platform is free for journals, with a requirement for open access that content should be freely accessible with a maximum delay of one year of publication.

The most recent and holistic summary of the circumstances of Diamond open access publishing in Finland is provided as an 18-page country overview within a report by Taşkın et al. (2024) stemming from the EU-funded DIAMAS-project. Drawing on bibliometric data from various international sources, collected web survey responses with publishers, and discussions with national focus groups, the publication provides an overview of how Diamond open access is developing and being sustained in Finland, with similar overviews provided for 9 other European countries enabling comparisons to be made. What were particularly distinctive features for Finland in comparison to any other studied country was the emphasis on social sciences and humanities among national publishers, a large share of institutional publishers (commonly learned societies) that only publish one journal title, with publishing supported by a substantial amount of volunteer and in-kind work, and the presence of a strong national IT platform combined with the inclusive public subsidy funding mechanism that has been described earlier in this introduction. However, the study did not use national bibliometric sources for identification of journals, nor separated out Diamond open access within the bibliometric analysis, which instead the present study is set on doing.

2. Methodology

Our openly available dataset (Pölönen and Laakso 2026) consists of active academic scholarly journals and series published in Finland. The main data source is the national register of publication channels developed and maintained by the Publication Forum (in Finnish *Julkaisufoorumi*, in short JUFO) at TSV. The full list of publication channels, including over 35,000 serials, conferences and book publishers, can be browsed and downloaded via the public JUFO-portal (jfp.csc.fi n.d.). All journals and series in JUFO are required to have an ISSN code, and the basic bibliographic metadata for all the serials is derived from the ISSN International Centre.

While most serials with classifications in the JUFO-portal are published outside Finland, in this study we focus on journals and book series whose country of publishing is Finland. In August of 2025, the JUFO-portal contained 2,456 serials published in Finland. Because the JUFO-portal includes serials targeted to scientific, professional and general audiences, we have narrowed down the analysis to active academic/scholarly journals and series by combining two approaches.

Firstly, to identify peer-reviewed journals in Finland essential information can be extracted from the publicly available JUFO data. JUFO classification of journals into 4 level categories is curated by 23 expert-panels composed of nearly 300 researchers from the Finnish universities and research institutes. The expert panels have approved 329 out of 2,456 Finnish serials to JUFO level 1 or higher based on the following criteria:

1. Identifier: The publication channel has a registered ISSN or ISBN number.
2. Transparency: The publication channel's website has a transparent description of the editorial board and the peer review process. (A book publisher may meet Level 1 criteria even if the editorial board and peer review process are not described on the website.)
3. Scientific focus: The publication channel is specialised in the publication of scientific or scholarly research outcomes and it publishes peer-reviewed scientific publications on a regular basis. Channels that publish scientific data, software and methods that support the production of research outcomes are equated with channels that publish scientific or scholarly research outcomes.
4. Editorial board: The publication channel’s editorial board consists of experts, who mainly include researchers working in universities or research institutes.
5. Peer review: The entire manuscripts of scientific or scholarly articles or books are subject to peer review, which is carried out blindly or openly by external scientific experts invited by the editors. (A book publisher may meet the Level 1 criteria if it has a credible quality assessment by the book’s editors.)
6. Scope: The publication channel is used by a national or international scientific community, with over half (1/2) of the editorial board or authors coming from a different research organisation than the publisher organisation.
7. Credibility: The publication channel is scientifically relevant in its field for the international or Finnish scientific community, and its procedure for ensuring scientific quality is credible.

Secondly, to assess which of the identified serials from the first step have had any publishing activity within recent years we can rely on the comprehensive bibliometric research information data that is collected on the national level. Authors affiliated with 14 universities, 24 universities of applied sciences, 12 state research institutes, and several other organisations, have reported to the Ministry of Education and culture a total of 9,780 peer-reviewed articles in 2022–2024 in 367 Finnish serials, so we can use this information as a de facto definition of currently active academic/scholarly outlets. Here we rely on the notion that at least one author affiliated to any of the organisations reporting bibliometric information has published in the serial during 2022–2024. This is a methodological limitation of the study, however, we estimate the share of journals published in Finland with no author affiliated to any research performing organisation reporting bibliometric information to the government during the timespan to be very small. The Ministry collects this data from the higher education institutions specifically for the purpose of allocating part of

Has peer-reviewed publications in 2022–2024	JUFO level Level 1–3	JUFO level Level 0	Total
Yes	264	103	367
No	65	2024	2089
Total	329	2127	2456

Table 1: Identification of active peer-reviewed Finnish serials, utilising national publication activity records and the national JUFO classification.

their annual core funding based on publication output. For the other organisations, the main motivation of reporting publications is visibility of their output in the national Research.fi service.

In this analysis we will focus on 264 serials that are demonstrably active in the sense of having peer-reviewed publication outputs in 2022–2024, and having been approved by the field specific expert panels to level 1 or higher in the JUFO classification (table 1). These serials represent 80% of all serials on JUFO levels 1, 2 or 3 and 72% of those with at least one peer-reviewed output in 2022–2024.

In the analysis, we distinguish between publisher types, subject fields, open access and indexing status. Identification of the publisher type is based on publisher information registered at the International ISSN Centre (Kulczycki et al. 2025), while all other metadata (start year, open access, field, indexing) is from the JUFO-portal.

3. Results

3.1. Growth of the landscape and publisher types

The oldest serial in the dataset is *Suomalaisen kirjallisuuden seuran toimituksia*, a book series of the Finnish Literature Society established in 1834. Of the 264 serials in operation today, 14% were established by the end of 1920s, all by the learned societies (figure 1). The most peculiar feature of the Finnish scholarly publishing landscape is indeed the dominant role of learned societies, strengthened since 1899 by the establishment of TSV as their national umbrella organisation. In total, 75% of all serials in our dataset are published by societies.

The earliest serial by an educational institution is *Ortodoksia*, an academic journal focusing on the theology, culture, and traditions of the Orthodox Church, founded by a department at the University of Helsinki in 1933. Currently, this journal is published by the Finnish Orthodox Clergy Association and the Orthodox Theology Study Program of the University of Eastern Finland, in cooperation with the Karelian Theological Society. Today, 17% of the 264 active peer-reviewed serials are published by universities and other educational institutions.

Other types of publishers also emerged in the 1930s. In 1939, the Union of Finnish Medical Officers launched a peer-reviewed journal *Sotilaslääketieteen Aikakauslehti* (in English, 'Journal of Military Medicine'). Other publishers than societies and educational institutions currently publish 8% of the active peer-reviewed serials. Only two of the Finnish serials (1%) are published by commercial publishers, both in the legal domain: *Verotus* (in English, 'Taxation') and *Edilex*, a legal information service publishing also peer-reviewed content.

3.2. Fields of science, publication languages, and publication types

Most serials, 86%, are in the fields of social sciences and humanities (SSH), whereas 14% operate in the natural sciences, engineering, agriculture and medical fields (STEM) (figure 2). A ready explanation for this is that researchers in both STEM and SSH fields publish the majority of their peer-reviewed output in foreign outlets. Nevertheless, in the SSH it is a common international pattern that a sizable share of research is published in the dominant or national language(s) of the country. Accordingly, 78% of the peer-reviewed

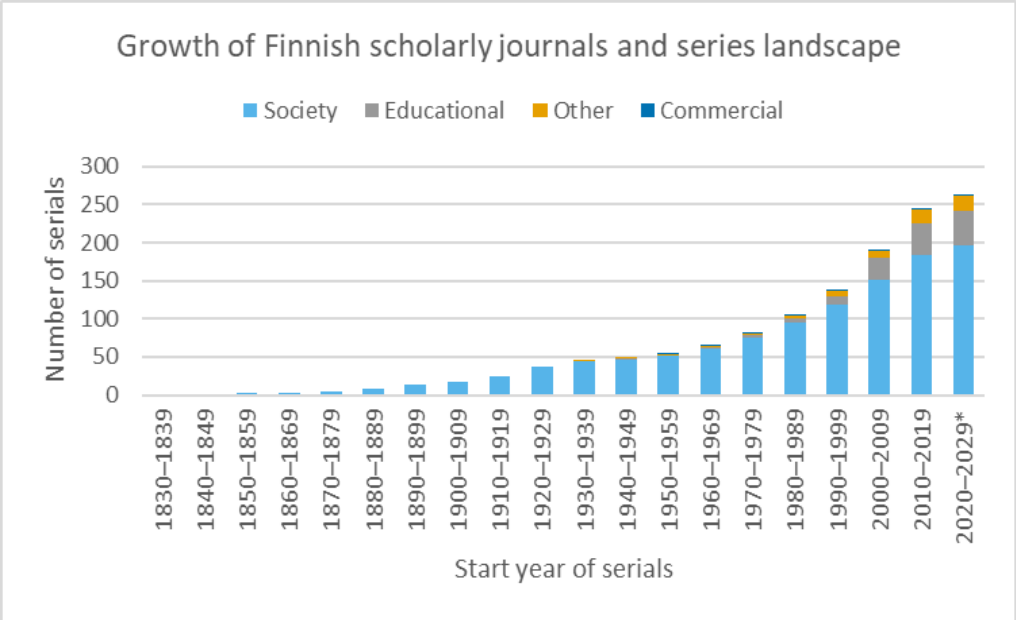

Figure 1: Growth of Finnish scholarly journals and series, categorised by publisher type.

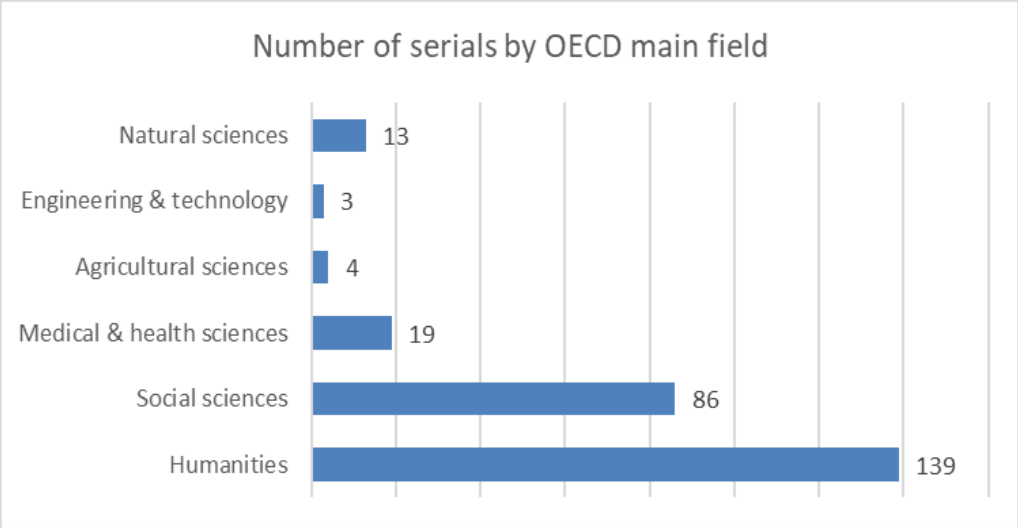

Figure 2: Number of active Finnish peer-reviewed serials by OECD main field.

output in Finnish serials is published in Finnish and 3% in Swedish (table 2). There is also one Finnish journal publishing in Sami language.

Interestingly, the publication output of medicine and health in Finnish serials is comparable to SSH fields, not only in volume but also in the dominant role of the Finnish language. Two medical journals, *Duodecim* and *Lääkärilehti*, are indeed among the single most frequently used publication venues, in terms of the number of articles, by Finnish researchers also when including foreign journals. In the humanities, in addition to Finnish (67%) a considerable share (8%) of output is published in Swedish (and also other languages than English play a role). Finnish publishers also provide English-language outlets for peer-reviewed research focused on Finnish history, culture and society.

Main OECD field	Peer reviewed outputs 2022–2024	Share of outputs in English	Share of outputs in Finnish	Share of outputs in Swedish	Share of outputs in other languages
Natural sciences	204	93%	7%	0%	0%
Engineering	56	79%	21%	0%	0%
Agriculture	184	71%	29%	0%	0%
Medicine & health	2788	10%	90%	0%	0%
Social sciences	2585	11%	88%	1%	0%
Arts & humanities	3289	24%	67%	8%	2%
Grand total	9106	19%	78%	3%	1%

Table 2: Publication volumes per OECD disciplinary field, with breakdown of publication language.

As indicated earlier, the serials landscape in Finland includes both book series and journals. In addition, many books are published by societies and other types of publishers outside series – these fall outside this analysis. Distinguishing between book series and journals is not always easy, and we do not have at our disposal a ready categorization of serials. An example of this ambiguity are yearbooks, which may have a regular publishing schedule but authors perceive the product as article collections.

With some limitations we can use the nationally collected publication data to characterize serials as either book series or journals. The authors have indicated, at the time of reporting their outputs in the institutional research information system whether these are monographs or articles in journals, book chapters or conference papers. Clear cases included 35 serials (13%) having only book chapters and/or monographs reported within them, while 184 (70%) have only journal articles reported. As regards uncertain cases, most serials with majority of book articles were characterized as book series, with the exception of yearbooks. A total of 201 serials were characterized as journals and 63 as book series.

3.3. Open access, diamondization, publishing platforms and visibility

The large majority, 73%, of serials published in Finland enable open access, including 180 (68%) providing open access in the publisher service and additional 13 serials (3%) allowing self-archiving in a publication repository (figure 3). These shares are, expectedly, somewhat smaller (56%) among serials we characterized as book series than among journals (79%). In the case of journals, those published by learned societies have a smaller share of open access (76%) than those published by educational and other institutions (90–94%). Diamond open access is by far the most dominant open access publishing model in Finland, covering 65% of 264 active peer-reviewed serials (69% of journals and 51% of book series).

Almost half (49%) of the active peer-reviewed serials are published on the Journal.fi platform (table 3), including 62% of the journals and 8% of the book series. The platform is provided free of charge for TSV member societies, of whose journals it hosts 68%. It is interesting to note that more than half (53%) of the educational institutions' journals are also on the platform, probably often published in collaboration with a society. The role of Journal.fi in the open access landscape is underscored by the fact that 61% of serials enabling open access, and 64% of the Diamond open access serials, are published on the platform. For the learned societies the platform is vital, as it hosts 83% of their Diamond open access journals.

There are large differences between various global indexing services in their coverage of peer-reviewed serials published in Finland (figure 4). DOAJ includes 22% of all serials, and a larger share (34%) of those hosted on Journal.fi. TSV and DOAJ collaborated in 2019 to promote indexation among Finnish journals (DOAJ 2019). The fact that English language serials from Finland, whether published on Journal.fi or other platforms, are more frequently indexed in DOAJ can indicate that they have better resources to meet the DOAJ requirements, and that journals targeted at international audiences consider it an advantage to have visibility in DOAJ.

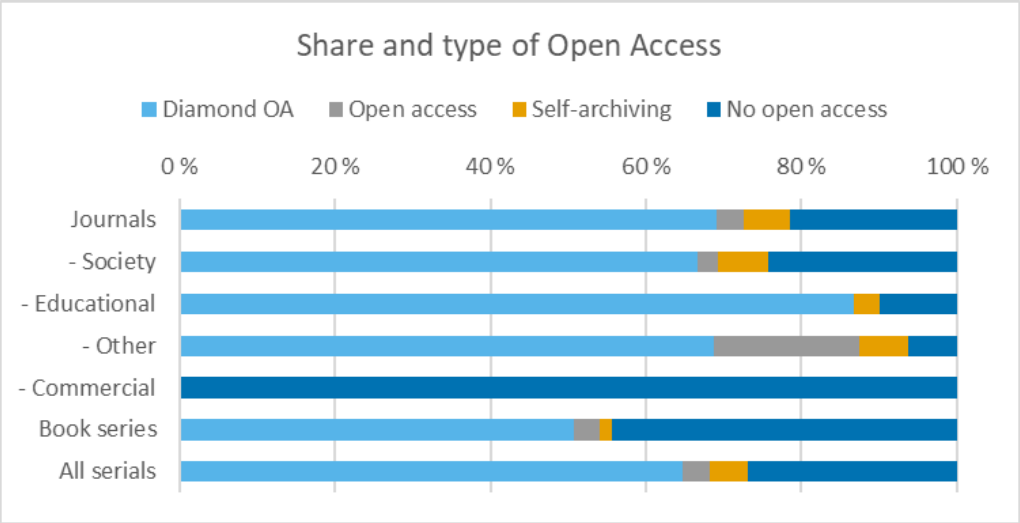

Figure 3: Share and type of Open access, per publisher and publication type.

Serial type and publisher type	All	Share on Journal.fi	Open Access	Share on Journal.fi	Diamond open access	Share on Journal.fi
Journals	201	62%	146	71%	139	75%
- Society	153	68%	106	80%	102	83%
- Educational	30	53%	26	58%	26	58%
- Other	16	31%	14	29%	11	36%
- Commercial	2	0%	0	0%	0	0%
Book series	63	8%	34	15%	32	16%
All serials	264	49%	180	61%	171	64%

Table 3: Presence on the Journal.fi platform per serial, publisher, and access type.

When it comes to the bibliometric databases, Scopus covers 17% of all the included Finnish serials and the share is slightly higher (22%) among those not included in the Journal.fi ("Other platforms" in figure 4). Despite efforts over the years to improve geographical and disciplinary coverage of journals in Scopus, journals published in English are ahead of those publishing in national or multiple languages. One reason for the relatively low coverage of Finnish journals in Scopus could be that due to the role of the national JUFO-classification there is no funding-related pressure for Finnish journals to seek indexation.

OpenAlex is an open and inclusive bibliometric database, which has shown to provide broader coverage of literature and citations across fields, geographical locations and languages than the traditional global databases, such as Scopus and Web of Science. There is indeed a striking difference between the databases in the representation of Finnish serials, of which OpenAlex covers half (50%). OpenAlex covers journals hosted on Journal.fi very extensively (81%) and quite irrespectively of publication language. Only 25% of the Finnish journals published on other platforms than Journal.fi have OpenAlex coverage, and those published in English have a clear advantage. This discrepancy may be due to use and assignment of DOI to published articles, which Journal.fi provides for journals free of charge (but it is up to journals to implement).

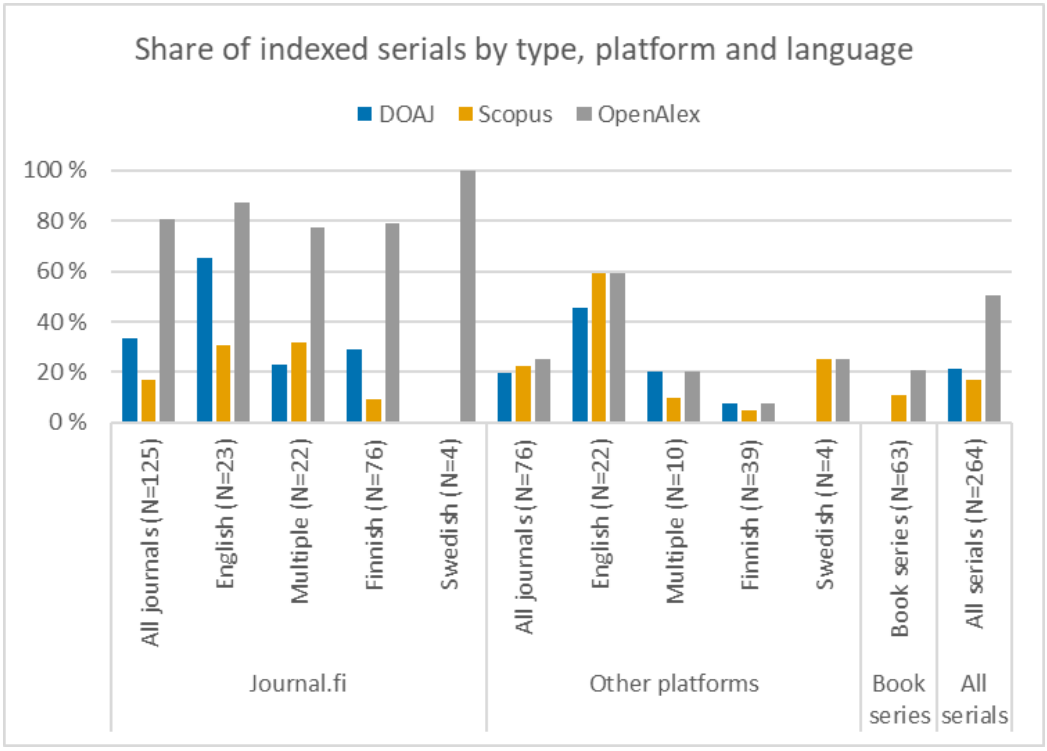

Figure 4: International indexing breakdown.

3.4. Diamond open access journals in Finland

Finally, we focus specifically on the 171 Finnish Diamond open access journals, of which 71% are published by learned societies, 20% by educational institutions, and 9% by other types of organisations. The current Diamond open access landscape reflects the historical growth of serial publishing in Finland over two hundred years: 4% were established in the 19th century, 37% in the 20th century, and 59% in the 21st century. While Diamond open access is prevalent (80%) among the present century serials, also 52% of the 20th century and 43% of the 19th century serials in Finland are currently Diamond open access (figure 5).

As with the Finnish peer-reviewed serials in general, also the Diamond open access model serves predominantly SSH communities. Whereas the majority of serials in social sciences (73%) and humanities (65%) are currently Diamond open access, the same holds true for 41% of serials in the STEM fields. On the other hand, it is interesting to note that the Diamond open access model has been a viable option also for several Finnish STEM journals publishing in English or multiple languages (figure 6).

Diamond open access supports, as elsewhere in the world, multilingual knowledge production and dissemination. Over half (51%) of the Diamond open access journals publish in Finnish and 2% in Swedish. Also, the only journal published in an official regional minority language, Sami, is a Diamond journal. One-fourth (25%) of the Diamond open access journals publish exclusively in English, while 21% are multilingual. Interestingly, it seems that the barrier for transitioning to Diamond open access can be higher for the national language serials (figure 7): 77% of the serials published in English are Diamond open access, but the share is somewhat smaller for multilingual serials (61%) and for those published in Finnish, Swedish and Sami (62%). The explanation could be that journals published in Finnish, Swedish and Sami have a broader readership and subscription base among professionals and citizens, a source of income which these journals fear to lose by transitioning to Diamond open access.

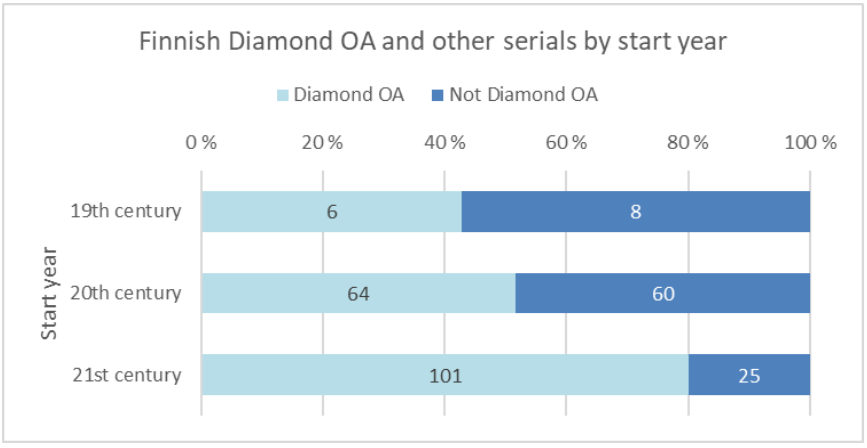

Figure 5: Finnish Diamond open access and non-Diamond open access serials by start year.

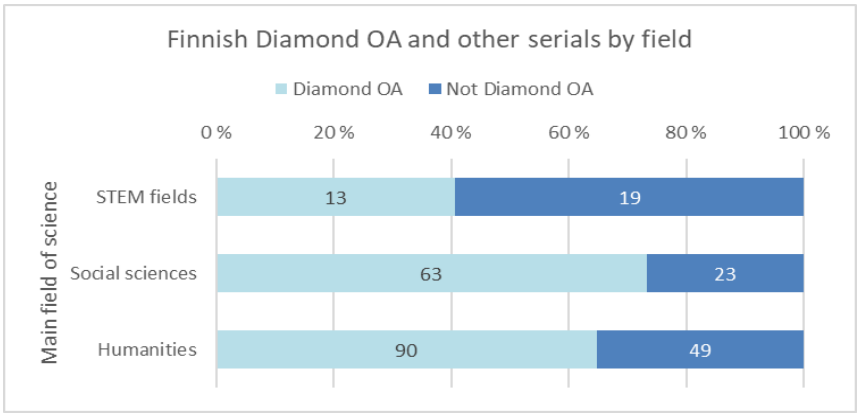

Figure 6: Finnish Diamond open access and non-Diamond open access serials by field of science.

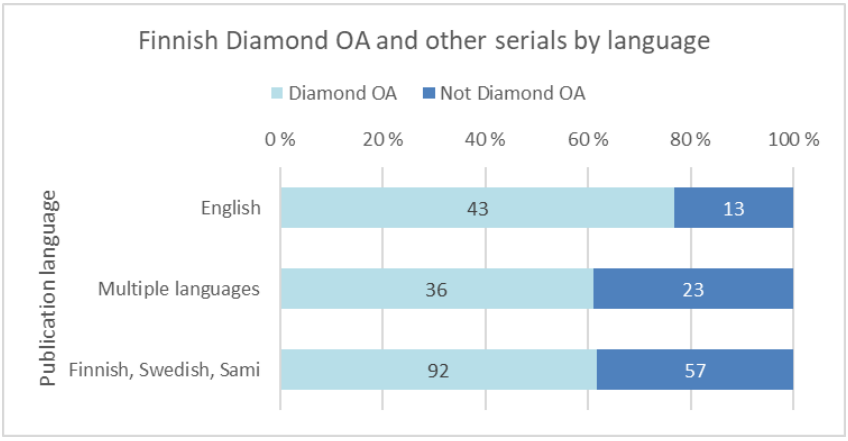

Figure 7: Finnish Diamond open access and non-Diamond open access serials by language.

If we reflect on how well the Finnish Diamond open access journals align with the criteria for Diamond open access journals developed as part of the CRAFT-OA and DIAMAS projects (Armengou et al. 2024), we can see that the Finnish Diamond open access journals included in this study cover them to a large degree. One of the results of the CRAFT-OA project is the recently launched Diamond Discovery Hub (DDH), in which journals fulfilling the following set of criteria can be included: 1. Persistent identification; 2. Scholarly journal; 3. Open Access with open licenses; 4. No fees; 5. Open to all authors; and 6. Community-owned. The decisive criterion from the perspective of Finnish journals is the use of open licenses.

The Finnish Diamond open access journals all have persistent identification (i.e. an ISSN), they are all scholarly journals (have peer-review and formal publication processes), they are open to all authors (no exclusivity in terms of authorship), and they are largely community-owned (most of them by learned societies). Outside of a handful of open access journals in Finland (7), none of them require fees for publishing in the journal. The final criterion is associated with the use of open licenses (all content open access with article-level open license metadata). According to Linna et al. (2020), the majority (108) of open access journals in Finland did not have any specified license while the rest utilised some version of a Creative Commons license. Data based on DDH compliant journals suggests that the situation has improved since the Linna et al. (2020) study was conducted, as now 60% of the Diamond journals use an open license.

4. Conclusions

In Finland, Diamond open access has largely been the default model for open access from the very start when journals started transitioning away from closed-access models. From the review of previous research measuring open access in Finland (Hedlund and Rabow 2007, Björk 2009, Linna et al. 2020) combined with the results of this study it is possible to see indication that the growth of Diamond open access has been continuous and is still ongoing (methodologies slightly differ across the studies so there is some room for variance in numbers due to this). A strong facilitating factor is the Journal.fi platform which launched in 2015 and is free to use for journals but requires at least delayed open access to be in place for all journals publishing there. However, one should not discount the impact that broader national science policy has had for facilitating journals to transition to open access publishing: within the available options, Diamond open access has been the most obvious option for the Finnish journals. The national-level policy for journal publications that came into effect in 2020 made it clear that there is a strong commitment among many central stakeholders that open access publishing is the desired present and future (Open Science and Research Coordination 2019). This policy in combination with Plan S commitment from the Research Council of Finland, and the Ministry of Education and Culture implementing financial incentives for universities to make every reported peer-reviewed output available open access starting from the year 2021 (Ministry of Education and Culture 2019), an environment was created where national journals were pointed toward the direction of Diamond open access publishing.

Finnish Diamond open access journals are a good example of the diversity that national publishing landscapes contribute with in comparison to the more uniform profile of commercial international publishing. The bibliometric investigation provided in this paper highlighted that Finnish Diamond open access journals are largely driven by non-profit organisations such as learned societies, publishing in national languages or multilingually, and having a strong emphasis on the social sciences and humanities. Finnish researchers also publish a lot in international journals published by large commercial publishers (Pölönen et al. 2020), which taken as a whole represent the opposite of all these attributes, and both types of outlets serve different purposes in scholarly communication (Pölönen 2022). According to Pölönen et al. (2020), in total Finnish publishers account for 11.6% of the Finnish universities' peer-reviewed output, a share comparable to major commercial publishers like Elsevier (14.4%) and Springer Nature (12.9%).

For Diamond open access publishing to continue to grow and prosper in Finland and around the world, what is needed is building bridges and collaborations, across countries, disciplines, and stakeholder groups (Laakso and Taşkın 2025). For Europe, the European Diamond Capacity Hub (EDCH) and associated regional- and national-level service centers for Diamond open access that are being set up are key to create fertile ground for pooling actors, knowledge, and strengthen the visibility and common voice

for Diamond open access. Also, reform of research assessment, advocated by CoARA, DORA and CLACSO-FOLEC, is needed to remove incentive structures that disadvantage Diamond open access publishing. However, creating change can come from many different avenues, and not all need to happen through established top-down means. Researchers have a lot of autonomy in their work and can collectively shape the landscape through their actions, as was exemplified with the founding of the Glossa journal led by Johan Rooryck (Rooryck 2016). While there have not been any similar examples of editorial walkouts for publications in Finland, the actions and choices that local researchers make are what is keeping Diamond open access journals alive and prospering. This concerns both researchers choosing to submit and publish their research in Finnish journals (Pölönen 2022), as well as all the time that researchers put into running the journals as in-kind and volunteer effort (Taşkın et al. 2024).

References

Armengou, Clara, Margo Bargheer, Arnaud Gingold, Sy Holsinger, Mikael Laakso, Dominic Mitchell, Pierre Mounier, Janne Pölönen, Johan Rooryck, Milica Ševkušić, Irakleitos Souyioultzoglou, and Hanna Varachkina. 2024. Operational Diamond OA criteria for journals. Zenodo. https://doi.org/10.5281/zenodo.12721408.

Ancion, Zoé, Lidia Borrell-Damián, Pierre Mounier, Johan Rooryck, and Bregt Saenen. 2022. Action plan for Diamond Open Access. Zenodo. https://doi.org/10.5281/zenodo.6282403.

Björk, Bo-Christer. 2019. Open access journal publishing in the Nordic countries. *Learned Publishing* 32: 227–36. https://doi.org/10.1002/leap.1231.

Bosman, Jeroen, Jan Erik Frantsvåg, Bianca Kramer, Pierre-Carl Langlais, and Vanessa Proudman. 2021. OA Diamond Journals Study. Part 1: Findings. Zenodo. https://doi.org/10.5281/zenodo.4558704.

DOAJ. 2019. New pilot to encourage Finnish Open Access journals to apply to DOAJ. Available at https://blog.doaj.org/ar/2019/09/02/new-pilot-to-encourage-finnish-open-access-journals-to-apply-to-doaj/, accessed October 7, 2025.

Frantsvåg, Jan Erik. 2022. Diamond Open Access in Norway 2017–2020. *Publications* 10 1: 13. https://doi.org/10.3390/publications10010013.

Hedlund, Turid and Ingegerd Rabow. 2007. Open Access in the Nordic countries. State of the art report & workshop views and recommendations. Nordbib, Copenhagen. Available at https://hal-hprints.archives-ouvertes.fr/hprints-00445420v1.

Ilva, Jyrki and Johanna Lilja. 2014. Kotimaiset tieteelliset lehdet ja avoin julkaiseminen: selvitys mahdollisista rahoitusmalleista. Tieteellisten seurain valtuuskunta, Tieteellisten seurain valtuuskunnan verkkojulkaisuja. Available at https://urn.fi/URN:ISBN:978-952-5995-09-1.

Ilva, Jyrki. 2018.. Looking for commitment: Finnish open access journals, infrastructure and funding. *Insights: The UKSG Journal* 31 0: 25. https://doi.org/10.1629/uksg.414.

jfp.csc.fi. n.d. JUFO portal. https://jfp.csc.fi/jufoportal, accessed October 7, 2025.

Kulczycki, Emanuel, Jose Gamboa, Alonso Octavio, Maria Fernanda Beigel, Luciano Digiampietri, Mikael Laakso, Janne Pölönen, Zehra Taskin, and Gabriel Vélez Cuartas. 2025. Beyond the oligopoly: Scholarly journal publishing landscapes in Latin America and Europe. https://doi.org/10.31235/osf.io/cm5uz_v1.

Laakso, Mikael and Anna-Maija Multas. 2023. European scholarly journals from small-and mid-size publishers: Mapping journals and public funding mechanisms. *Science and Public Policy* 50 3: 445–56. https://doi.org/10.1093/scipol/scac081.

Laakso, Mikael and Zehra Taşkın. 2025. Collaboration in Diamond Open Access publishing. Zenodo. https://doi.org/10.5281/zenodo.15096454.

Late, Elina, Laura Korkeamäki, Janne Pölönen, and Sami Syrjämäki. 2020. The role of learned societies in national scholarly publishing. *Learned Publishing* 33 1: 5–13. https://doi.org/10.1002/leap.1270.

Linna, Anna-Kaarina, Mika Holopainen, Arto Ikonen, and Irene Ylönen. 2020. Kotimaiset tieteelliset julkaisusarjat ja avoimuus. *Informaatiotutkimus* 39 4: 4–32. https://doi.org/10.23978/inf.98656.

Ministry of Education. 2005. Avoimen tieteellisen julkaisutoiminnan työryhmän muistio. Opetusministeriö. Available at https://web.archive.org/web/20061001184326/http://www.minedu.fi/OPM/Julkaisut/2005/avoimen_tieteellisen_julkaisutoiminnan_tyoryhman_muistio.

Ministry of Education and Culture. 2019. Universities, Core Funding Model from 2021. Available at https://minedu.fi/documents/1410845/4392480/UNI_core_funding_2021.pdf, accessed September 29, 2025.

openaccess.mpg.de. n.d. Berlin Declaration – Signatories. Available at https://openaccess.mpg.de/signatories-en, accessed September 29, 2025.

Open Science and Research Coordination. 2019. Open access to scholarly publications. National Policy and executive plan by the research community in Finland for 2020–2025 (1). Responsible Research Series. https://doi.org/10.23847/isbn.9789525995343.

Pölönen, Janne and Mikael Laakso. 2026. Dataset – Diamond open access in the Finnish scholarly publishing landscape [Data set]. Zenodo. https://doi.org/10.5281/zenodo.19571456.

Pölönen, Janne, Mikael Laakso, Raf Guns, Emanuel Kulczycki, and Gunnar Sivertsen. 2020. Open access at the national level: A comprehensive analysis of publications by Finnish researchers. *Quantitative Science Studies* 1 4: 1396–428. https://doi.org/10.1162/qss_a_00084.

Pölönen, Janne, Sami Syrjämäki, Antti-Jussi Nygård, and Björn Hammarfelt. 2021. Who are the users of national open access journals? The case of the Finnish Journal.fi platform? *Learned Publishing* 34: 585–92. https://doi.org/10.1002/leap.1405.

Pölönen, Janne. 2022. National publication channels make possible scholarly publishing in domestic languages. *Tietolinja* 2022 1. https://urn.fi/URN:NBN:fi-fe2022061546940.

Rooryck, Johan. 2016. Introducing *Glossa*. *Glossa: a journal of general linguistics* 1 1: 1–3. https://doi.org/10.5334/gjgl.91.

Taşkın, Zehra, Iva Melinščak Zlodi, Mikael Laakso, Didier Torny, Sona Arasteh, Margo Bargheer, Tabea Klaus, Julian Schima, Tommaso Agnoloni, Ginevra Peruginelli, Andrea Davidson, Mateusz Franczak, Cosaldo Bernabé María Ángeles, Virginia de Pablo Llorente, Helen Dobson, and Jade Heyman. 2024. D5.2 National overviews on sustaining institutional publishing in Europe. Zenodo. https://doi.org/10.5281/zenodo.13683953.

Taubert, Niels, Linda Sterzik, and Andre Bruns. 2024. Mapping the German Diamond Open Access journal landscape. *Minerva* 62: 193–227. https://doi.org/10.1007/s11024-023-09519-7.

TSV. 2023. Ehdotus avointen kotimaisten tiedelehtien rahoitukseksi kommentoitavana. Available at https://web.archive.org/web/20231003002004/https://www.tsv.fi/fi/uutiset/ehdotus-avointen-kotimaisten-tiedelehtien-rahoitukseksi-kommentoitavana, accessed October 3, 2023.

TSV. 2025. Application Instructions. Available at https://www.tsv.fi/en/grants/publishing-and-international-activities-scientific-societies/application-instructions, accessed October 7, 2025.

Master of Christmas trees

Niels Stern
OAPEN Foundation

Abstract

The article describes the highly collaborative process of the creation of policy recommendations for Open Access books within the EU-funded project PALOMERA (Policy Alignment of Open access Monographs in the European Research Area). Johan Rooryck played a leading role in this specific project task. Extensive stakeholder involvement and iterative validation exercises ensured greater recommendation alignment and created community engagement, which in their turn increase the recommendations' chances for being implemented. The recommendations are an important stepping stone for the policy development of open and equitable academic book publishing.

1. Introduction

The first time I heard the analogy of a Christmas tree for a shared document with a margin full of comments, questions, and suggestions for edits was in the EU-funded project PALOMERA (cordis.europa.eu 2025). Johan Rooryck was the editor of the document, and the analogy was made by him as far as I remember. It was indeed a compelling analogy, easy to visualise and hard to forget. Furthermore, as any good analogy it has several layers of meaning. The "Christmas tree document" was the culmination of the PALOMERA project's data collection, research analysis, stakeholder consultations, validation exercises, and internal discussions turned into a 45 pages long document consisting of policy recommendations for Open Access (OA) Books. It was a specific task of the project, and it was led by Johan Rooryck in collaboration with me. The lavishly commented document bears witness of a long and thorough process leading up to it and the ambition of referencing all the evidence and feedback gathered throughout the project. It required eloquence, editorial experience, and diplomatic skills to turn such a highly decorated "Christmas tree" into a final document. Under Johan's firm leadership, we succeeded in making it a remarkable set of useful, actionable, and evidence-based recommendations for OA books that has been viewed and downloaded over 5,000 times from Zenodo. This article reveals the process that led to this eloquent result which has become an important stepping stone for the policy development of open and equitable academic book publishing.

2. The PALOMERA project

The PALOMERA project (Policy Alignment of Open Access Monographs in the European Research Area), funded under Horizon Europe from January 2023 to December 2024, had academic books and policies as its primary focus. In the project we defined academic books as scholarly peer reviewed books including monographs, book chapters, edited collections, critical editions, and other long-form scholarly works. We set out to investigate and address a longstanding imbalance in European research policy. Whereas journal articles have, over the previous decade, been subject to increasingly coordinated and binding OA mandates, academic books and monographs have remained underrepresented in the policy environment despite their important role in scholarly production and research communication, particularly in the social sciences and humanities. This continued importance of scholarly books has often been emphasised in studies about the status of the monograph, for instance by Crossick (2015) and Ferwerda et al. (2017).

PALOMERA's central objective was to explore the policy landscape for OA books and understand why so few OA policies include books. Based on that investigation and analysis, PALOMERA would then produce evidence-based and actionable recommendations that could align the relevant stakeholders that we had in focus (research funding (RFO) and research performing organisations (RPO), policymakers, scholarly societies, academic libraries and publishers, researchers, and infrastructure providers) to increase the number of good and efficient OA policies for academic books.

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2.1. Project objectives

The distinctive contribution of PALOMERA lay not only in the scope of its empirical work, which combined comprehensive data collection (finding policies, doing surveys, conducting interviews) and systematic mapping of policies across thirty-nine European countries, but also in the collective manner in which this work was undertaken. A sixteen-member consortium brought together universities and research institutes, library and publisher organisations and infrastructure providers, each contributing disciplinary and professional expertise from across Europe. The diversity of stakeholders in the consortium ensured that the research design was never narrowly framed from the perspective of one stakeholder group, but instead evolved through dialogue, and continuous feedback from several stakeholders.

From the outset, the guiding principle was alignment across stakeholders, i.e. taking into consideration the perspectives of the different stakeholders when developing and implementing policies. But also, alignment on key policy elements that must be included in policies to make them efficient.

Alignment, therefore, should *not* be understood as making all policies the same *but rather* ensuring that all policies address a set of key policy elements in a structured way that takes into consideration a multi-stakeholder perspective. How the policy elements are defined and described in a given policy will obviously always depend on the objectives and the political, economic, and cultural contexts of the policymaker.

2.2. Data collection

The project was divided into three phases (data collection, analysis, and recommendations). After each phase, an event was planned to validate the outcome of the phases. This proved to be a very useful and engaging methodology.

First, we investigated the landscape across 39 European Research Area (ERA) countries. This systematic investigation resulted in a collection of over 650 documents of which 246 were analysed as policy documents. Sections in these policies that addressed books were marked and translated into English if in another language. Moreover, around 40 in-depth interviews were conducted. These were anonymised and the transcripts were manually tagged based on PESTLE (Political, Economic, Social, Technological, Legal, and Environmental) indicators for later analysis. All the 650 documents, besides the interview transcripts and the results of ERA wide surveys, were stored in an open, well-structured and fully searchable Knowledge Base.[1] The first validation event invited a diverse group of stakeholders from across Europe to assess the comprehensiveness and usefulness of the Knowledge Base and to help us fill the gaps wherever possible and to give us feedback for future work (for more information about the validation methodology and practice, please see Rabar and Mounier 2024).

2.3. Analysis

By deconstructing each OA policy into its core elements, we were able to develop a detailed overview of both the differences and similarities between OA book policies. This analysis revealed that many policies were vague or ambiguous in terms of their requirements for OA books. A further fundamental challenge was that many OA policies explicitly excluded books altogether, indicating that significant work remains in establishing an initial foundation for such policies within many organisations.

The interviews carried out during the project provided essential contextual insights into national circumstances, processes, ongoing initiatives, and challenges that are not evident from existing OA policies alone. We identified a range of barriers and enabling factors affecting OA book policy development. National coordination emerged as one of the most significant enablers, with effective coordination and alignment at the national level proving crucial to progress. Our survey findings also suggested that individuals seem more willing to engage at the institutional level when a clear national strategy is in place. Another major theme highlighted in the interviews was funding, which, when insufficient, constitutes a key barrier to advancing OA book policy development.

[1] https://knowledgebase.oabooks-toolkit.org/.

The online survey demonstrated a strong desire among respondents for increased activity in OA book policy development, not only within their own stakeholder group but across all groups. Respondents indicated a need for improvement in most areas, including funding, infrastructures, and the availability of information on OA publications. The survey of national libraries further showed that national differences continue to dominate, particularly in relation to data usage, the extent to which licensing information is collected, and even the definition of an "academic book".

Our country analysis across the ERA revealed wide disparities in policy frameworks, funding mechanisms, publishing options, infrastructure, and legal provisions, with only a few countries introducing measures such as secondary publishing rights. We generally found that OA book policies could be improved by providing greater clarity, shared terminology, and stronger definitions, i.e. alignment as described above.

The analysis of our data confirmed that OA book policies are far less developed than those for journal articles. We also found that policies for OA books were frequently vague, lacking clear definitions, responsibilities, and timeframes, and while less common than journal policies, those that did exist could be similarly comprehensive but often fell short on detail around OA models and funding. Furthermore, we saw that RFO policies are generally more prescriptive – often requiring OA and providing funding – than RPO policies who tend to *recommend* OA, usually via self-archiving. Before publishing the research findings, a second validation event took place. This time in the form of an open and in-person full day peer review meeting between experts and the main author and leader of the analysis work supported by the scientific coordinator and the organisers of the event. This was a rewarding and highly constructive engagement and feedback process method.

The research findings were published as a comprehensive 150 pages report by Laakso et al. (2024). These findings that constitute the main bulk of the evidence for the recommendations, were also further disseminated as short and easy to read articles in the OAPEN OA Books Toolkit.[2] Some articles give an overview of the policy and funding landscape in Europe including best practices and case studies. Other articles delve into the Policy Life Cycle developed by the project, with short descriptions of each of its six stages, providing examples of how these are managed in real life situations based on interviews with research funders. Moreover, there are descriptions of how some RFO and RPO fund OA books with links to a catalogue of examples. All the articles have references back to the Knowledge Base.

2.4. Co-creating the recommendations within the community

PALOMERA's findings, the most comprehensive of their kind in Europe, aimed to guide policymakers, funders, and institutions in shaping more effective policies to expand access to OA books. This guidance was anticipated as a set of evidence-based and actionable recommendations.

However, we did not proceed immediately to drafting recommendations. Instead, the project placed great emphasis on iterative validation exercises. After the initial mapping and analysis, findings were circulated within the consortium where early drafts of recommendations were issued. These were then discussed with external experts, for example the project's Advisory Board, the LIBER Open Access Working Group, and the EUA Open Science Expert Group. Their feedback on the draft recommendations was highly valuable. Furthermore, the analysis findings and prospective recommendations were also discussed in the Funder Forum that was established early in the project. This forum involved research funder representatives from twenty-four countries, and as key stakeholders their opinions were highly relevant to the drafting of the recommendations. Early recommendations were also tested in workshops on several occasions, and as part of the methodology a formal validation event was set up to give direct feedback on the recommendations.

These many validation events served several functions. First, they verified the accuracy of the consortium's findings from the different stakeholder perspectives. Second, they enabled refinement. Critical feedback led to adjustments in the framing of problems, ensuring that recommendations would not be perceived as unrealistic or inattentive to context. Third, they created community engagement and helped raise awareness of the work of the PALOMERA project. Finally, validation exercises fostered alignment.

[2] https://oabooks-toolkit.org/.

By involving stakeholders directly in the iterative development of outputs, PALOMERA ensured that the recommendations would resonate with the community and therefore stand a greater chance of being implemented.

2.5. Finalising the recommendations

Within the PALOMERA project group an important task was to structure and manage all this community feedback into one single document of recommendations. This was handled by delegating responsibilities. Project members were allocated to oversee and develop draft recommendations for specific stakeholder groups. This meant that for each of the eight stakeholder groups that we were addressing, there was a small team of 2–3 group members who would present draft recommendations building on the evidence base and the community feedback for their stakeholder group. This would then be discussed during task meetings and changes would be recorded. These internal discussions were intensive, constructive, and highly interesting from a co-creational point of view.

From those inspirational conversations where agreement could be hard to find – but was found – the colourful "Christmas tree" document slowly but steadily turned into a clean and well-structured document with recommendations at three levels: General recommendations, Common recommendations for RFO, RPO, and Policymakers, and Stakeholder-specific recommendations.

The recommendations are both strategic and practical. For example, they call upon funders and policymakers to include books explicitly in their OA mandates, thereby providing the clarity and coherence that had hitherto been lacking; they emphasise the importance of sustainable funding mechanisms, advocating not only for transparent calculation of book processing charges but also for models that avoid disadvantageous disciplines or institutions with fewer resources; they highlight the need for infrastructures that are open, interoperable, and publicly supported, rather than leaving the ecosystem dependent on commercial providers and subject to vendor lock-in; they encourage national and regional alignment, arguing that fragmented approaches undermine both efficiency and equity; and they stress the importance of inclusivity, urging that OA book policies take account of linguistic diversity, smaller publishing markets, and the needs of scholars in under-resourced settings.

The final report with the recommendations by Bandura-Morgan et al. (2024) was presented at the PALOMERA conference in Ljubljana, Slovenia in October 2024. Since then, they have been presented at many international conferences and webinars. Furthermore, a booklet was produced to share them in a more digestible way. However, the real value lies in the detailed descriptions of each recommendation which are found in the full report. Those detailed descriptions summarise the many conversations and discussions and reflect the community feedback. Stakeholders get very concrete and detailed guidance to how they can advance OA for academic books.

3. Beyond PALOMERA

The PALOMERA project ended 31 December 2024. It had delivered four key exploitable outcomes – to use the European Commission (EC) terminology. These were 1) the Knowledge Base, 2) the analysis findings, 3) the Funder Forum, and 4) the recommendations. But equally important it had fostered a strong and skilled community around OA book policies and generated unprecedented awareness. In hindsight it is not so surprising that the formal review performed by an external expert on behalf of the EC was very positive. However, at the time we were of course prepared for any type of criticism. One very thoughtful recommendation from the reviewer was to really ensure the implementation of the recommendations and basically to exploit as much as possible the results of the project. However, the subsequent EC Work Programmes did not call for any such follow-up projects. Still, we have managed to make good use of the results. The Knowledge Base has been improved, and guidelines have been developed to invite RFOs, RPOs, and policymakers to upload their policies. The OA Books Network[3] showcased this in a policy-a-thon in the early summer of 2025 and in a webinar on services for policymakers.

[3] https://openaccessbooksnetwork.hcommons.org/.

3.1. A new Policy Forum on OA Books

During the project period, four Funder Forum meetings were held. At the last of these meetings it was decided by the participants to explore ways to continue the forum because it was seen as a useful way for RFOs and other policymakers to convene and discuss challenges and opportunities for OA book policies and to exchange knowledge and experiences. A conclusion of the meeting was to let Science Europe, cOAlition S, and OAPEN explore pathways for the continuation of the forum.

Therefore, Bregt Saenen (Science Europe), Johan Rooryck (cOAlition S) and I sat down and developed a concept note for a new Policy Forum on OA Books jointly coordinated by the three organisations and hosted by Science Europe. Considering their engagement in this space the boards of the respective organisations approved the concept note and in May 2025 the first Policy Forum meeting took place. This forum is uniquely positioned to implement the PALOMERA recommendations both at the strategic and practical levels. Work in this direction is already taking good shape and includes engagement with the OPERAS Special Interest Group on OA Books.[4]

3.2. International engagement and new Christmas trees

Beyond the Policy Forum we have also experienced other stakeholders like publishers, libraries, and societies engaging with the recommendations – also outside of Europe, for example in Africa and North America. We have invited stakeholders who engage with the recommendations to share with us what they do by filling in a simple form.

Getting thus far with the PALOMERA project is the success of a large group of skilled and friendly people working very well together. Johan Rooryck played an important part in that group effort by balancing voices and concerns with mastery, diplomacy, and editorial equilibrium.

He is now mastering other "Christmas trees" due to his deep engagement in diamond OA projects, for example in the ALMASI project[5] and the preparation of the AEGIS-OA which will be further developing the European Diamond Capacity Hub (EDCH).[6] Due to his co-coordinating roles in these projects, he has also been applying all his editorial skills in the writing and co-writing of those proposals.

The latter project proposal, AEGIS-OA, also includes books and therefore our paths are crossing again, which is wonderful. The idea is to include books in the EDCH and more generally to develop quality schemes, training modules, communities, and funding opportunities for diamond OA books. This will not be an easy task, but our evidence base is wider, our directions clearer, and our community is stronger than ever before. And we have the Master of Christmas trees on our side! So, I remain optimistic.

Acknowledgments

Perhaps not so well-known to many, Johan speaks and understands some Swedish. Since I am Danish and this piece appears in a Nordic journal, please allow to congratulate Johan in my mother tongue: Kære Johan, hjertelig tillykke med fødselsdagen! Jeg er taknemmelig for din åbenhed, gæstfrihed og vores venskabelige arbejdsfællesskab, som jeg håber vil vokse i dybde og omfang. Jeg ønsker dig alt det bedste!

[4] https://operas-eu.org/special-interest-groups/open-access-books/.

[5] https://cordis.europa.eu/project/id/101188192.

[6] https://diamas.org/.

References

Bandura-Morgan, Laura, Nataliia Bazeliuk, Andrea Davidson, Malte Dreyer, Lorena Caliman Fontes, Maria Olímpia Fernandes Especiosa, Nelson Henrique Ferreira, Rupert Gatti, Françoise Gouzi, Davide Emanuele Iannace, Mikael Laakso, Delfim Leão, Frank Manista, Gabriela Manista, Maciej Maryl, Pierre Mounier, Sinziana Paltineanu, Nora Papp Le Roy, Vanessa Proudman, Ursula Rabar, Claire Redhead, Johan Rooryck, Niels Stern, Graham Stone, Andrej Vrčon. 2024. PALOMERA Deliverable 4.2 – The PALOMERA recommendations for Open Access books. Zenodo. https://doi.org/10.5281/zenodo.14330411.

cordis.europa.eu. 2025. PALOMERA – Policy Alignment of Open access Monographs in the European Research Area. https://doi.org/10.3030/101094270.

Crossick, Geoffrey. 2015. Monographs and Open Access. HEFCE. Available at https://webarchive.nationalarchives.gov.uk/ukgwa/20170712122802/http://www.hefce.ac.uk/pubs/rereports/year/2015/monographs/.

Ferwerda, Eelco, Frances Pinter, and Niels Stern. 2017. A landscape study on Open Access and monographs. Knowledge Exchange. https://doi.org/10.5281/zenodo.815931.

Laakso, Mikael, Laura Bandura-Morgan, Nataliia Bazeliuk, Andrea Davidson, Malte Dreyer, Davide Emanuele Iannace, Gabriela Manista, Maryl Maciej, Lisa Matthias, Oguz Ozkan, Vanessa Proudman, Sînziana Păltineanu, Nelson Henrique da Silva Ferreira, Graham Stone, Jan-Philip Tummes, Magdalena Wnuk, and Hanna Varachkina. 2024. PALOMERA Deliverable 3.1 – Report on analysis findings. Zenodo. https://doi.org/10.5281/zenodo.14330282.

Rabar, Ursula and Pierre Mounier. 2024. PALOMERA D5.3 – Validation report, version 1.5. Zenodo. https://doi.org/10.5281/zenodo.14265343.

This 49th volume of *Nordlyd* is a special issue in honor of our colleague and friend Johan Rooryck on the occasion of his 65th birthday. The volume comprises 17 articles by 24 different authors, the wide range of topics of which mirrors Johan's exceptional versatility.