

Towards a natural semantics of TWO: HAVE, WITH, and the Ancient Greek nominal dual

Gertjan Postma
Leiden University

Abstract

The distribution of French inalienable possessive constructions with 1. *le/lal/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

© 2026 Gertjan Postma. *Nordlyd* 49.1: 153–169, 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/10.7557/12.8335>

This work is licensed under a [Creative Commons “Attribution-NonCommercial 4.0 International”](https://creativecommons.org/licenses/by-nc/4.0/) license.

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. $F + \& \rightarrow WITH$ (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 τὸ ‘the.DU’, taken from the Perseus study tool⁹:

- 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. dioskuros (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. τὸ δύο ‘the two hits’ → τὸ 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 δύο ‘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) οὐκουν **προβαλεῖ** τὸ χεῖρε κάκτενεῖς (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 formation¹¹, 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 μέσσω **χεῖρε** **πιτήνας**
him.ACC PRT Polites.NOM own-brother.ADJ.NOM around waist arms.DUAL 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 ἐνέβαγεν ἐς τὸν κηρὸν αὐτῆς τὸ πόδε,
the.ACC flee.ACC taking.NOM dipped into the.ACC wax.ACC her the.DUAL foot.DUAL
 ‘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, **ἄποστρεφομένης** τὸ **χεῖρε**
her.GEN become.PL turned.backward.MP.GEN.SG the hands.DUAL
 ‘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:

¹¹For overt incorporation cf. (6d). Other Dutch cases with overt incorporation are *schuddebuiken* ‘shake-belly-ing’, *klappertanden* ‘chatter-tooth-ing’, *stampvoeten* ‘stamp-foot-ing’, etc.

¹²Obviously, 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.

¹³The 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 incohérence”, 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 τὸ χεῖρε ἔχειν (...)
in PRT the.GEN cloak.GEN the.DU hands.DU have.INF (...)
 ἀλλ' αὐτὰ τὰ πρὸ τῶν ποδῶν ὄραν
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 ὄραν '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 δ᾿αἴφρονι χεῖρε βάλοντε
cried.3P but around Odysseus.DAT in.fight.ADJ.DAT hand.DU throwing.DU
 καὶ κύνεον ἀγαπαζόμενοι κεφαλὴν τε καὶ ὄμους
and wept kissing head PRT and shoulders.PL
 'They flung (with) their **arms** around wise Odysseus, 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 analyzed¹⁴, 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-semantic. 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-semantic, 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 χεῖρ ‘hand, arm’ or πούς ‘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 (ἀλλήλοισιν), 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 τὸ 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 ...
 ↑ _____ |

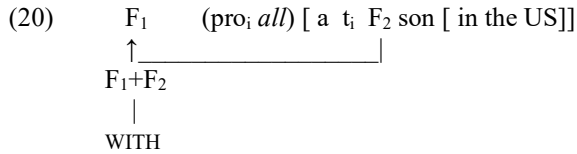
So, in these absolute *with*-constructions, there is a silent possessor fronting which gives rise to WITH.

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).



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, Mycenaic 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.	*agrós < PIE *h ₂ éǵros	*agrǒ < PIE *h ₂ éǵroh ₁	*agrói < PIE *h ₂ éǵroes
Gen.	*agróyyo < *h ₂ éǵrosyo	*agróyyun < ?	*agrón < *h ₂ éǵroHom
Dat.	*agrǒi < *h ₂ éǵroey	*agróyyun < ?	*agróis < *h ₂ éǵromos
Acc.	*agrón < *h ₂ éǵrom	*agrǒ < *h ₂ éǵroh ₁	*agróns < *h ₂ éǵroms
Voc.	*agré < *h ₂ éǵre	*agrǒ < *h ₂ éǵroh ₁	*agrói < *h ₂ éǵroes
Loc.	*agrói, -éi < *h ₂ éǵroy, -ey	?	*agróihi < *h ₂ éǵroysu
Instr.	*agrǒ < *h ₂ éǵroh ₁	?	*agrǒis < *h ₂ éǵrōys

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 *-h₁ 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: *-ih₁ and *-ih₁e, 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 *-ih₁. 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 from a wide range of languages as a guide, exemplified by the Dutch contrast in (24).

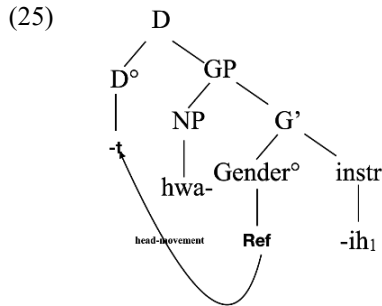
- (24) a. **een paar** schoenen **wat** schoenen een dag of **wat**¹⁶
a pair shoes *what shoes* *a day or what*
 ‘some shoes’ ‘some shoes’ ‘some days’
 b. **het paar** schoenen **twee** schoenen **twee** dagen
the.N pair shoes *two shoe.PL* *two day.PL*
 ‘the two (mutually possessed) shoes’ ‘two shoes’ ‘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 speakers 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^o, 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:



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(h₁)*, which results in a long mid vowel [tve:], Dutch *twee*.¹⁷ Notice that *h* in *hwa* and the laryngeal *h₁* 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	<i>quod/duo</i>		<i>quo</i>	<i>-d</i>
			<i>d-</i>	<i>(q)uo</i>	
	Du	<i>wat/twee</i>		<i>wa</i>	<i>-t</i>
			<i>t-</i>	<i>wee</i>	
	Proto-Arm	<i>*kwer/erku</i>		<i>*kw</i>	<i>-er</i>
			<i>er-</i>	<i>ku</i>	
	PIE	<i>*k^wóh₁-d</i>	→	<i>*d(k)uoh₁ = duoh₁</i>	(neuter, DU.ACC)
		<i>*k^wé-h₂sh₁</i>	→	<i>*h₂sku</i>	(FEM.SG.INST = FEM.DU)
		<i>*k^wé-h₂m</i>	→	<i>*h₂m-kué</i>	(FEM.SG.ACC)
		<i>quem</i>	→	<i>ambo</i>	

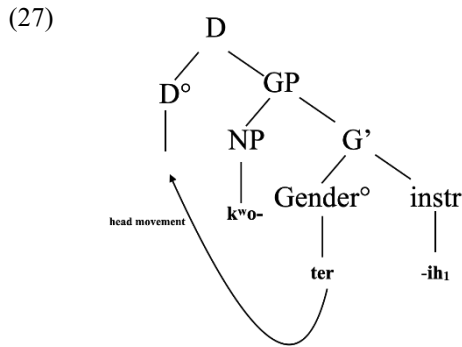
If we are right, Latin *duo* is bimorphemic with *d-* and *-uo* distinct morphemes. Evidence for the separate status of *d-* is the fact that *d-* is absent in Lat. *vigēntis* ‘20’. There has been no phonological rule of *d*-drop in IE initial *dw*-clusters, so the reason of its drop must be morphological. This is probably the case as early as PIE **widk₂nti* ‘20’ in view of AG εἴκοσι ‘20’. (There has been regular drop of initial *ʃ*, hence AG εἴκοσι < ʃεἴκοσι 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 [ˈwʌt] ↔ [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 (\forall) when in construction with CAN. So: *You may go either way* has a (Quinian) scope relation of (\forall of 2) > CAN, not the surface scope CAN > (\forall of 2). From this high scope, we may conclude that *either* is quantificational. We propose the configuration in (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)

		<u>either</u>	<u>3</u>
a.	OLatin	(k)uteris	→ tresque
b.	Greek	poteros	→ tritos
c.	Germanic	h ^w atheras	→ threh ^w e
d.	Armenian	k'-ere-y	→ erek'

(29)

Armenian:	erek' '3' < *ere-k < *k'-ere-y	ere	k ^w o	(t)ere	-ih ₁
Germanic:	*pre-h ^w ih ₁ -(z) < h ^w a-pira-(z)	þer	h ^w a	þera	-ih ₁
Greek:	trí-k ^w i-os < k ^w o-ter-os	τρί	τι	τερí	-ς
	↓ ↓				
	τρί-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 $[N_i V \text{les}_i N_s]$ versus $[x_i V \text{ses}_i N_s]$ (Rooryck 2022) is to a high extent isomorph to the division of labor of the Ancient Greek $[N_i V (\text{pro.POSS}_i) N.DU]$ versus $[N_i V (\text{pro.POSS}_i) N.PL]$, with DU and PL the AG dual and plural morphology.

(30)	French	Ancient Greek	
a.	$[N_i V \text{les}_i N_s]$	$[N_i V (\text{pro.POSS}_i) N.DU]$	middle V constructions
b.	$[N_i V \text{ses}_i N_s]$	~ $[N_i V (\text{pro.POSS}_i) N.PL]$	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.

Acknowledgments

I thank Johan Rooryck and Pierre Pica who in the early nineties organized a series of lectures at Leiden University on the linguistic encoding of Identity and Inalienable Possession as a proxy of Identity. The intense and sometimes emotional discussions gave rise to the bundle *Atomism and Binding* (Bennis et al. 1997). This squib would not have been written without this inspiring input and after decades of silent maturation. I thank Richard Kayne and Camil Staps for valuable comments. All errors are mine.

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, Guglielmo. 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 Massachusetts. 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](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 niphala 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.