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).

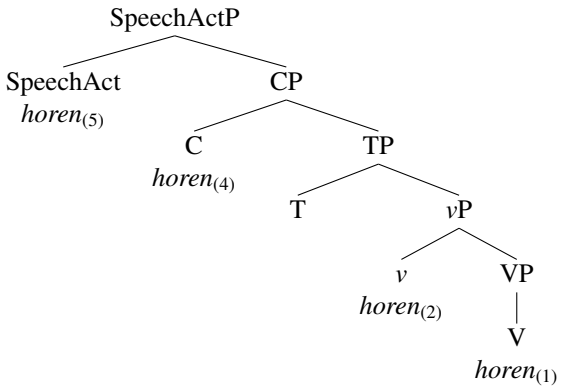
(5) Die honden blaffen, hoor.
those dogs bark hear
'Those dogs bark, you know.'

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

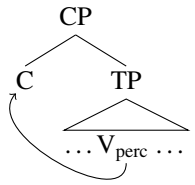
This concludes our comparison of three imperative or imperative-like constructions involving perception verbs: regular imperatives, inflected imperatives, and imperative verbs used as discourse markers. The table in (37) summarizes the data we have surveyed.

(37)

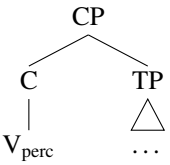
	regular imperative	**inflected imperative**	**imperative as discourse marker**
phonological reduction	–	–	+
bleached meaning	–	+/–	+
lack of argument structure	–	+/–	+
closed class	–	+	+
morphological defectiveness	–	+	+

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).

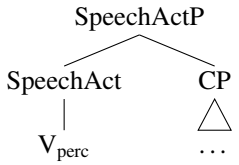
(38) **regular imperatives**



(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

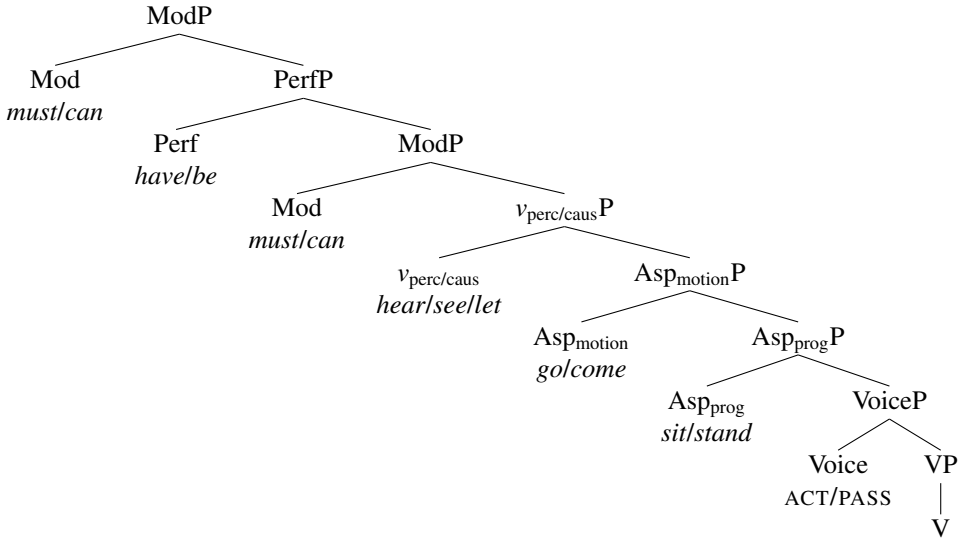
[11] The verb *laten* 'let' even shows a limited form of agreement in Standard Dutch imperatives as well, see Haeseryn et al. (1997: 18.5.4.10).

[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

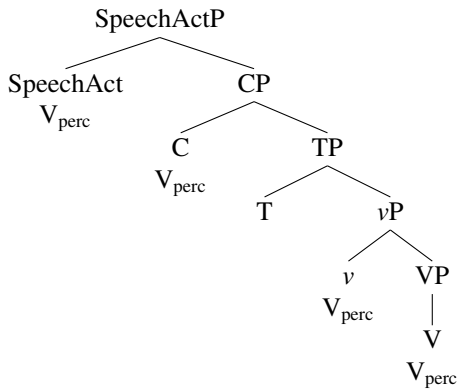
(67) Hij heeft haar gezien.
he has her seen
'He saw her.' perfective auxiliary > lexical perception verb

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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