

Dutch *must* more structure*

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1. Introduction

In Dutch, just like in English, the same modal words can express different flavors, depending on the context.

- (1) Mijn grootouders moeten een hek hebben.
my grandparents must-PL a fence have
'My grandparents must have a fence.'
- (i) 'Based on my knowledge, it is necessarily the case that my grandparents
have a fence.' epistemic
- (ii) 'My grandparents are obliged to have a fence.' deontic
- (iii) 'In order to reach a certain goal, it's necessary for my grandparents to have
a fence.' teleological

This variability in flavors is captured in the standard Kratzerian (1977, 1981, 1991) analysis where a modal like *moeten* 'must' comes in a single lexical entry, and where its flavor is determined by a contextually-provided modal base and ordering source, which together determine the set of worlds that the modal quantifies over.

Some researchers have argued that the kind of flavor a modal can receive is further constrained by syntactic factors, e.g., its position relative to Tense and Aspect (Groenendijk and Stokhof 1975, Iatridou 1990, Abusch 1997, Cinque 1999, Condoravdi 2002, Stowell 2004, Hacquard 2006, 2010). Hence, certain flavors may be restricted to certain types of complements (e.g., different modal bases are available in different syntactic positions). In this paper, I will present novel data with Dutch *moeten* in support of the view that modal flavor is conditioned on the size of the modal complement. Specifically, I will argue that:

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- 1) Deontic flavors are only available when the modal's complement is (at least) as big as a vP (Rubinstein 2012).
- 2) Epistemic flavors are only available when the modal's complement is a TP (Jackendoff 1972, Bresnan 1993, Cinque 1999, Hacquard 2006, 2010, but see von Stechow & Gillies 2007, Rullmann & Matthewson 2012 for a contrasting view).

I will focus on examples like (2), in which the complement of *moeten* 'must' does not contain an overt verb¹: Unlike (1), these *moeten NP* sentences can no longer express an epistemic necessity, but can still express a deontic or teleological one.

- (2) Mijn grootouders moeten een hek. *epistemic, ✓deontic, ✓teleological
my grandparents must a fence
 'My grandparents need to/must have a fence.'

In the two following subsections I will elaborate on the two claims stated above.

1.1 Claim 1: Deontic modals & vP complements

The fact that (2) can express either deontic or teleological necessity may seem to contradict Rubinstein's generalization (2012), which states that only modals with a verbal complement can have a deontic interpretation. Support for this generalization can be found in English, Hindi-Urdu, Czech, and Hebrew (3): The context in (3) forces a deontic interpretation and in this context, the Hebrew modal *çayav* 'must' with a vP complement is felicitous (3a). The same modal with an NP complement is infelicitous in this context, which shows that it cannot have a deontic interpretation (3b) (Rubinstein 2012:163).

- (3) City regulations mandate that home owners put up fences between their properties. You and your neighbor get along very well without a fence. In fact, both of you object to a fence because it would have to go right on top of the beautiful flower beds that have been flourishing between your two properties. You say to your neighbor:
- a. *çayav-im livnot kan gader.* ✓epistemic, ✓deontic, ✓teleological
must-M.PL build.INF here fence
 'A fence needs to be built here.'
- b. *çayav-im kan gader.* *epistemic, *deontic, ✓teleological
must-M.PL here fence
 'We need a fence here.'

¹ Note that besides *moeten*, other modals like *mogen* 'may', *kunnen* 'can', and *hoeven* 'need' can combine with an NP in Dutch (i). Furthermore, Dutch (as well as many other Germanic languages) also has *moeten PP* (ii) and *moeten AP* (iii) sentences (Barbiers 1995, 2002, Van Riemsdijk 2002, 2009, van Dooren 2014). In sections 2 and 4 I will return to the sentences in (ii) and (iii).

(i)	<i>Ze mogen een hek.</i> <i>they may-PL a fence</i> 'They can have a fence.'	(ii)	<i>Jan moet naar huis.</i> <i>Jan must to house</i> 'John must go home.'	(iii)	<i>De deur moet blauw.</i> <i>the door must blue</i> 'De door must become blue.'
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The Dutch data in (2) seem to go against Rubinstein's generalization, as *moeten* combined with an NP can have a deontic interpretation. Based on evidence involving manner adverbs, I will argue in section 2 that Dutch *moeten NP* sentences contain more structure than meets the eye and are underlyingly *moeten vP* sentences ((4), Van Riemsdijk 2002, 2009). As such, Dutch fits into Rubinstein's generalization.

- (4) $[_{\text{ModP}} \text{We}_t \text{ moeten } [_{\text{vP}} t \text{ } [_{\text{VP}} \text{ een hek } \text{ V}]]]$
we must a fence V

The explanatory question of *why* deontics seem to need a verbal complement will be left for future research. In the discussion, I will explore the idea that the restriction might hold for predicates beyond modals.

1.2 Claim 2: Epistemic modals & TP complements

Dutch *moeten* cannot express epistemic necessity when the modal combines with an NP ((2), Barbiers 1995). The contrast between (1) and (2) raises two questions: Why is the full range of flavors not available when there is no overt verb in the complement? And why does it only affect the availability of the epistemic flavor?

One possibility is that modals with epistemic flavors take bigger complements than modals with root (i.e., non-epistemic) flavors (Brennan 1993, Cinque 1999, Hacquard 2006, 2010, Veselinović 2017). According to Cinque's hierarchy, modals are part of the functional projection, and scope in different positions based on flavor: Epistemics are restricted to positions above Tense, roots to positions below Aspect:

- (5) $\text{Mod}_{\text{epistemic}} > \text{TP} > \text{AspP} > \text{Mod}_{\text{root}} > \text{VP}$

The unavailability of epistemic flavors for *moeten NP* in (2) suggests that its underlying structure is one where the complement of the modal is smaller than a TP (4).²

1.3 Main claims and outline

In the next three sections, I will argue that cross-linguistically, modal flavor is conditioned on the size of the modal complement in the following way:

- (6) *Cross-linguistic generalization on size/modal flavor*

Flavor \ complement	TP	vP	NP
epistemic	✓	X	X
deontic	✓	✓	X
teleological	✓	✓	✓

² In this paper, I assume that Dutch *moeten* is a Cinquean functional element in a monoclausal configuration. However, there may be reasons to think that Dutch *moeten* is a full verb. If so, we lose the direct Cinquean explanation for the connection between modal height and modal flavor, and the lack of epistemic flavors with a smaller structure. But see Veselinović 2017 for evidence that even in bi-clausal structures, epistemic modal verbs may have to select for a TP, while deontics select for something smaller.

Based on data involving manner adverbs, I will claim in section 2 that Dutch *moeten NP* is underlyingly minimally *moeten vP* with silent verbal structure, and as such fits the generalizations stated above. In section 3, I will argue that this verbal structure has to be smaller than a TP, as an epistemic interpretation is unavailable. Further details on the silent verb proposed in (4) will be given in section 4, and the explanatory questions will be addressed in section 5: Why does the size of the modal complement influence the modal flavor? I will suggest that we might be able to generalize the claims on epistemics and deontics beyond Dutch *moeten*.

2. Deontics & vPs

In this section, I will provide further support in favor of Rubinstein's (2012) generalization: Deontic flavors are only available with complements that are verbal. While Dutch *moeten NP* (2b) seems to be a counterexample to this generalization, I will argue that Dutch, in fact, supports it. Crucially, I will show that there is more structure than meets the eye in *moeten NP* sentences. The diagnostic of manner adverbs will show that the modal's complement is at least as big as a vP.

2.1 Manner adverbs as a diagnostic for verbal structure

Manner adverbs like *carefully*, *quickly* and *gradually* tell us *how* something happened. These adverbs need to be licensed by verbal structure (if only very little).³

Manner adverbs are felicitous in Dutch *moeten NP* sentences (7), in which they modify the complement and not the modal: Sentence (7a), for instance, does not mean that the *need* is careful; instead, it is the *washing* that needs to be *done carefully*. As such, the sentences in (7) indicate that the complement of the modal underlyingly contains more structure than just an NP.

- (7) a. De auto moet (voorzichtig) een wasbeurt. Dutch
the car must carefully a washing
'The car needs to be washed carefully.'
- b. De patiënt moet (geleidelijk) vast voedsel.
the patient must gradually solid food
'The patient must gradually get solid food.'

In order for the manner adverbs to have an attachment site in (7), covert verbal structure needs to be present in the complement. I posit a silent verb in the complement of Dutch *moeten NP* sentences (8), which makes the minimal size of the complement a vP.⁴

³ A further condition that needs to be satisfied for the felicitous attachment of manner adverbs is that the verbal structure is eventive as opposed to stative (Katz 2000, Maienborn 2005).

(iv) #John quickly/carefully resembles Mary.

⁴ Alternative analyses in which there is no silent verb have been proposed, with the modal directly taking an NP (Barbiers 1995, 2002) or a small clause (for *moeten AP* and *moeten PP* sentences, Barbiers 1995, 2002, Constantinescu et al. 2012). The diagnostic in (7) tells us that for these analyses as well, there has to be enough verbal structure to allow for the attachment of manner adverbs. Furthermore, in a small clause

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(8) [ModP *moeten* [vP [vP NP V]]]

The structure in (8) is similar to Van Riemsdijk's (2002) analysis of modals with PP complements in languages like Dutch and German. Van Riemsdijk proposes that sentences like (9a) underlyingly contain a silent verb *GO* (9b). Note that eventive adverbs are also allowed in these structures, thereby diagnosing verbal structure (9c).

- (9) a. Jan moet naar huis. Dutch
Jan must to house
'John must go home.'
*epistemic, ✓deontic, ✓teleological
- b. Jan moet naar huis GAAN. c. Jan moet snel naar huis.
Jan must to house GO *Jan must quickly to home*
'John must go home.'
'John must go home quickly.'

The present analysis of *moeten NP* sentences is compatible with Van Riemsdijk's analysis of *moeten PP* sentences, and seems to be able to be extended to *moeten AP* sentences as well (see fn. 1). The three types of sentences differ in their interpretation, however: In section 4, I will claim that the silent verb in *moeten NP* sentences has a general possessive interpretation, but that interpretation does not seem to fit in with *moeten PP* and *moeten AP* sentences. Further research is necessary in order to find out whether we need to postulate three different silent verbs for the three types of sentences.

In this section I proposed that the availability of both eventive adverbs and a deontic interpretation for *moeten* in *moeten NP* and *moeten PP* sentences are not a mere coincidence: Providing more support for Rubinstein's generalization, *moeten* takes in both cases a verbal complement, and consequently, a deontic interpretation of the modal is available.

2.2 Back to Hebrew

The diagnostic of manner adverbs provides further support for the connection between vP complements and deontic flavor, as Hebrew *χayav* combined with an NP cannot have a deontic flavor, and at the same time, *χayav NP* sentences do not allow for manner adverbs.

Manner adverbs in Hebrew are licensed by verbal structure (10a). Crucially, these adverbs are not allowed in the complement of *χayav NP* sentences (10b). This shows that the complement of Hebrew *χayav NP* does not contain verbal structure. Correspondingly, Hebrew *χayav NP* sentences can have a teleological, but not a deontic interpretation (3b).

- (10) a. *χayav-im lishtof et ha-mexonit be-zehirut.*
must-M.PL to.wash ACC the-car in-care
'We must wash the car carefully.'

analysis for *moeten NP* sentences (v), the small clause has to be of a special type as it requires a possessive, rather than predicative interpretation (see section 4).

- (v) [ModP *We_i moeten* [SC *t een hek*]]
we must a fence

- b.* ha-mexonit *χayev-et* shtifa be-zehirut.
the-car must-F.SG wash in-care
 (intended: ‘The car needs carefully a cleaning.’)

To summarize, on the surface, Hebrew *χayav* and Dutch *moeten* seem to show a difference in how modal flavor is constrained by the size of the modal complement. Hebrew *χayav NP* sentences can only be interpreted teleologically, while Dutch *moeten NP* sentences can also be interpreted deontically. This difference is merely superficial, however, as Dutch *moeten* takes a complement that underlyingly contains verbal structure. Both languages thus fall within Rubinstein's generalization, as a deontic interpretation for the modal is available only in the language in which the modal complement can be shown to be bigger than an NP.

3. Epistemics & TPs

In the previous section I argued that Dutch *moeten NP* sentences are underlyingly minimally *moeten vP* sentences. Having established the minimal size leaves room for the maximal size. On the crucial assumption that Dutch *moeten* is in a monoclausal configuration, I will suggest that the complement is smaller than a TP, as this accounts for the absence of epistemic interpretations in *moeten NP* sentences (2).

The starting point for my argument is that an epistemic reading for *moeten NP* sentences is absent ((2), repeated as (11), Barbiers 1995). The same holds for *moeten PP* sentences (9a). Why would the epistemic flavor be sensitive to the presence of an overt verb?

- (11) Mijn grootouders moeten een hek.
my grand-parents must-PL a fence
 i. # 'Given the evidence, it is necessary that my grandparents have a fence.' *epis
 ii. 'My grandparents are obliged to have/need a fence.' deontic, teleological

Previous accounts of this property do not hypothesize the presence of a silent verb in the complement of the modal (see fn. 4). For Barbiers (1995, 2002), modals get an epistemic interpretation only if there is a particular verbal feature in the complement. With a non-verbal complement, this feature is absent so the modal cannot get an epistemic interpretation. Constantinescu et al. (2012), who follow a small clause analysis, claim that there is a meaning incompatibility between small clause complements and epistemic flavors.

What I want to propose is that *moeten* in (11) cannot have an epistemic interpretation because it combines with a phrase smaller than a TP. Previous research argues that sentences with modal auxiliaries are monoclausal. According to Cinque (1999), modals appear in different functional projections depending on the flavor: Epistemics above Tense, and non-epistemics below Aspect ((5), see also Groenendijk and Stokhof 1975, Iatridou 1990, Abusch 1997, Cinque 1999, Condoravdi 2002, Stowell 2004, Hacquard 2006, 2010, but see von Stechow & Gillies 2007 and Matthewson & Rullmann 2012 for a contrasting view). If this is true for Dutch *moeten*, then we expect epistemic interpretations to only be available when the modal combines with a TP.

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Evidence in favor of the claim that epistemic *moeten* scopes above tense comes from the felicity of sentence (13) given the scenario in (12) (adapted from Hacquard & Cournane 2016, see also Hacquard 2006, 2010):

- (12) “Imagine a scenario, where Al has been a prime suspect for a crime that occurred last night in Montreal. Up to now, all of the evidence pointed to him being in Montreal last night. But just now, we receive fresh evidence that proves that Al was in fact in DC last night.”
- (13) Al moest gisteren wel in DC zijn.
Al must-PST yesterday AFFIRMATIVE in DC be
'Al had to be in DC last night.'

Despite past morphology on *moeten*, (13) can felicitously report an epistemic necessity given *current* evidence. This suggests that epistemic *moeten* outscopes tense.

4. More on the silent V

Having established the structure in (8), I will now go into further detail of the semantics of the silent verbal element. I will propose that it establishes a general possessive relation between its internal and its external argument.

4.1 A possessive interpretation

Most *moeten NP* sentences can be interpreted as underlyingly containing the overt verb *hebben* 'have'. The meaning of the silent verb needs to be more flexible than overt *hebben*, however, as it also needs cover interpretations like *get* and *take* (14).

- (14) Jan moet een rode trui/ een contract/een douche.
Jan must a red sweater/ a contract/a shower
'John needs to HAVE a red sweater, GET a contract, TAKE a shower.'

The interpretation has to be flexible, but crucially, within limits, as not all interpretations are available: Sentence (15a), for instance, cannot have a predicative interpretation. Even given a plausible context, this sentence cannot mean 'John needs to *become* a doctor'. Likewise, a movement interpretation (cf. *moeten PP* sentences, (9)) is unavailable. Sentence (15b) cannot mean 'John needs to *go* to the swimming pool'.

- (15) a. Jan moet een dokter. b. Jan moet een zwembad.
Jan must a doctor *Jan must a swimming-pool*
'John needs to have a doctor.' 'John needs to have a swimming pool.'

I thus want to propose that the silent verb has a general possessive interpretation, which covers all cases in (14), and at the same time excludes the unavailable readings in (15). I leave for future research whether such a possessive interpretation can cover all possible cases (see Schwarz 2007 for similar concerns with English *need NP* sentences).

4.2 *Moeten NP compared to moeten PP and moeten AP*

The basic facts described in the previous sections for *moeten NP* sentences carry over to *moeten PP* and *moeten AP* sentences: The modals in these sentences can have both a deontic and a teleological flavor, but not an epistemic flavor ((9a), (16)), and eventive adverbs are available ((9c), (16)). I thus propose that the complements are also vPs.

- (16) De kamer moet (voorzichtig) leeg. Dutch
the room must carefully empty
 'The room must be emptied carefully.' *epistemic, ✓deontic, ✓teleological

What is different for *moeten NP*, *moeten PP* and *moeten AP* sentences, is their interpretation. While *moeten NP* sentences are close to an interpretation with *have*, *moeten PP* sentences get an interpretation close to *go* (Van Riemsdijk 2002, 2009), and *moeten AP* sentences get an interpretation close to *become*. Crucially, the interpretations are not a mix and match situation: As we saw above, a predicative interpretation like *become* is excluded for *moeten NP* sentences, and similarly, a possessive interpretation like *have* is not available for *moeten PP* and *moeten AP* sentences. The question that needs to be further explored, is whether this means that there are three semantically different covert verbs in the lexicon, or whether the meaning arises from an underspecified silent verbal element that combines with an NP, PP, or AP complement?

5. Discussion

The case study on Dutch and Hebrew necessity modals presented in this paper provides further support for the view that modal flavor is conditioned on the size of the modal complement. First, it supports Rubinstein's generalization (2012), which states that deontic modals need (at least) a vP complement. A deontic interpretation for the modal is available only for Dutch *moeten NP* sentences, for which the modal complement can be shown to be bigger than an NP, i.e., a vP. Second, it is in line with the claim that epistemic interpretations are tied to an even bigger complement, such as a TP: The absence of epistemic flavors with Dutch *moeten NP* would stem from the fact that the complement is smaller than a TP, i.e., a vP.

It has been claimed that the complement of English *need* in sentences like (17) also contains covert structure (Larson, Den Dikken and Ludlow 1997, Harley 2004, Schwarz 2007). I will leave a detailed comparison between Dutch *moeten* and English *need* for future research, but what is crucial for the current proposal to hold is that if *need NP* sentences indeed have more structure, it is not the right kind to license a deontic interpretation: Indeed, in contrast to Dutch *moeten*, Rubinstein (2012) shows that English *need* combined with an NP can only have a teleological interpretation.

- (17) My grandparents need a fence. *deontic, ✓teleological

The explanatory questions of *why* epistemic and deontic modals are conditioned by their complement, also need further research. Interestingly, these constraints might hold more generally: Dutch *hebben* 'have' and *zien* 'see', for instance, can only have a deontic flavor

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