

“I MUST OUT – OUT!”*

– *Synchronic and Diachronic Perspectives on
Modal Verbs and their Complements* –

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* "What devilish den is this? I must out - out!" (1892; Henley & Stevenson; *Admiral Guinea*)

CONTENTS	PAGE
ACKNOWLEDGEMENTS	
ABSTRACT	
1. CHAPTER 1: Introduction	
1.1. Two phenomena, two hypotheses, two studies	8
1.2. Non-verbal complements of modal verbs: two phenomena	11
1.3. Structure and expected results	12
2. CHAPTER 2: Theoretical Framework	
2.1. Introduction	13
2.2. Modal verbs and their complements	13
2.2.1. The semantics of modality	13
2.2.2. The syntax of modality	16
2.2.3. Modal verbs	18
2.2.4. Intermediate summary – setting up the requirements	19
2.2.5. Modal verbs – further subdivisions	19
2.2.6. Non-verbal complements of modal verbs	24
2.2.7. Comparison: one label, two phenomena	29
2.2.8. Silent infinitives and Small Clauses	31
2.2.9. Intermediate summary	42
2.3. Synchronic overview	42
2.4. Diachronic change	44
2.4.1. English modals	45
2.4.2. Non-verbal complements: A case study	46
2.4.3. Set-up	49
2.5. Review and a quick look ahead	50
3. CHAPTER 3: Case study 1 – the Modern European Languages	
3.1. Introduction	51
3.2. Method	52
3.3. Modal verbs in the European Languages	55
3.3.1. The selection of the modal verbs	55
3.3.2. Interpretation of the modal verbs	59
3.4. Modals and their complements	62
3.4.1. Hypothesis (1a): Directional versus nominal and sentential complements	62
3.4.2. Hypothesis (1c): Epistemics and deontics	65
3.4.3. Hypothesis (1b): Dynamics	68
3.5. Conclusion	77

4. CHAPTER 4: Case study 2 – Historical English	
4.1.Introduction	80
4.2.Preterite-presents and their complements	81
4.3.The collection	84
4.4.One label, two phenomena: The Constant Rate Hypothesis	94
4.4.1. Rate per complement type	95
4.4.2. Rate per individual lexical item	98
4.5.Time of decrease	101
4.5.1. Decrease per complement type	101
4.5.2. Decrease per individual lexical item	102
4.6.Sentential complements	104
4.7.Review and consequences	104
5. CHAPTER 5: Theoretical Analysis	
5.1.Introduction	107
5.2.Part 1: Variationist Approach	108
5.3.Part 2: Structural Approach	110
5.4.Conclusion	118
6. CHAPTER 6: Conclusion and Suggestions for Further Research	119
7. BIBLIOGRAPHY	122
APPENDICES	
1. Questionnaire Modern European Languages	
2. Synchronic Data	
3. Semantic parallels in the Germanic, Romance, and Celtic language families	
4. Modal Verbs and their Complements in the Slavic Languages	
5. Bias for Genre and Dialect in the Historical Corpora	
6. Absolute Frequencies in the Historical Corpora	
7. Statistics: Linear Regression	

LIST OF TABLES

1. Dynamic modality in Dutch
2. Modals and auxiliaries
3. Modal verbs included from the Germanic languages
4. Modal verbs in the Romance languages
5. Dynamic modalities identified in the European languages
6. Modal verbs classified by interpretation in the European languages
7. Interpretations of *can* and *must* in the Germanic languages
8. Interpretations of *should* and *will* in the Germanic languages
9. Overview of modal verbs and their complements in 16 Modern European languages (to be revised)
10. Overview of modal verbs and their complements in 16 Modern European languages (final version)
11. Ordering of particle verbs and modal verbs with non-verbal complements in Old and Middle English
12. Information Penn Historical Corpora
13. Information ARCHER
14. Information CLMET
15. Overall results YCOE, PPCME2, PPCEME and PPCMBE
16. Overall results ARCHER
17. Overall results CLMET
18. Comparison Penn, CLMET, and ARCHER
19. Absolute frequencies of preterite-presents
20. Slope differences per complement type – relative frequency
21. Slope differences per complement type – ratio
22. Slopes and significance per modal verb with direct object
23. Number of subcorpora and average ratio per modal verb with direct object
24. Absolute frequencies of *munan* and *þurfan*
25. Slopes and significance per modal verb with prepositional and particle predicates
26. Comparison *sculan* and *motan* with directional complements
27. The decrease of nominal complements
28. The decrease of particle complements
29. The decrease of prepositional complements
30. The decrease of nominal complements per verb
31. The decrease of directional complements per verb
32. *Willan* in the history of English
33. Overview of synchronic and diachronic data
34. Summary of synchronic and diachronic data

LIST OF FIGURES

1. Categorization of modality and the English classification
2. Five interpretations of modality
3. Check for Norwegian modals and their complements
4. Distribution per genre in the YCOE (-1150)
5. Distribution per genre in the PPCME2 (1150-1500)
6. Distribution per dialect in the YCOE (-1150)
7. Distribution per dialect in the PPCME2 (1150-1500)
8. Distribution per genre ARCHER (1600-1999)
9. Distribution per genre CLMET (1710-1920)
10. Relative decrease per complement type
11. Decrease of the ratio per complement type
12. Genres Old English 3 (950-1050)
13. Genres Old English 4 (1050-1150)
14. Fictional decrease and its logistic transformation
15. Logistic transformation of the relative frequency and fitted line
16. Logistic transformation of the ratio and fitted line
17. Absolute decrease per complement type in the Penn Corpora

ABSTRACT

Modal verbs can combine with complements that do not contain a verbal element: They can combine with direct objects, embedded sentences, and adjectival, particle, and prepositional predicates. The hypothesis is that the distribution of these types of complements is a diagnostic for the presence of argument structure in different types of modal verbs. Modal verbs in a dynamic interpretation resemble main verbs in the sense that they have argument structure (Ross 1969, Klooster 1986, Brennan 1993, Barbiers 1995, Wurmbrand 1999, 2001, Eide 2005, among others); as such they can select for different types of complements (Chomsky 1965, Grimshaw 1979). Modal verbs in a deontic interpretation are functional elements in the sense that they do not have argument structure (Brennan 1993, Barbiers 1995, Bhatt 1998, Wurmbrand 1999, 2001, Eide 2005); they can only combine with complements that satisfy the EPP without needing to assign a thematic role to the subject; these are Verbal complements and Small Clauses. As adjectival, particle, and prepositional predicates are either structured as full Verbal Phrase with a silent infinitive GO (Van Riemsdijk 2002) or as Small Clause complements (Barbiers 1995), these are the only possible non-verbal complements with which deontics can combine.

The main claims are supported by the results of a study on 16 Modern European languages: In the Modern European languages, dynamic modal verbs frequently combine with Nominal and Sentential Phrases, while deontic modal verbs only combine with Adjectival, Particle, and Prepositional Phrases. The loss of preterite-present verbs with non-verbal complements in the history of English further supports the main claims as both the time of the loss and the rate of the change (Kroch 1989) are different for preterite-presents with direct objects and for preterite-presents with prepositional and particle predicates.

1.1. Two phenomena, two hypotheses, two studies

Modal verbs in English can combine with verbal and non-verbal complements. In English, *will* can be complemented by a Verbal Phrase (1), for instance, while in Italian *voglio* ‘to want’, and in Icelandic, *vilja* ‘to want’, can combine both with Nominal Phrases (2) and with Sentential Phrases (3).

- | | | |
|-----|--|-----------|
| (1) | I need to go home. | English |
| (2) | a. Voglio una auto.
<i>want-1.SG a car</i> | Italian |
| | b. Ég vil þennan bíl.
<i>I want this-ACC car</i>
‘I want this car.’ | Icelandic |
| (3) | a. Voglio che tu mi dica la verità.
<i>want-1.SG that you me say-INF the truth</i>
‘I want you to tell me the truth’ | Italian |
| | b. Ég vil að hann komi hingað.
<i>I want that he comes-CONJ here</i>
‘I want him to come here.’ | Icelandic |

Modal verbs in Dutch, moreover, can also combine with Prepositional (4), Particle (5), and Adjectival Phrases (6).

- | | | |
|-----|---|-------|
| (4) | Ik moet naar huis.
<i>I must to house</i>
‘I must go home.’ | Dutch |
| (5) | Het licht moet uit.
<i>the light must off</i>
‘The light must be switched off.’ | |
| (6) | De muur mag rood.
<i>The wall may red</i>
‘The wall may become red.’ | |

Based on these examples there seems to be a link between the interpretation of the modal verb, and the possible complements: While modal verbs expressing so-called *dynamic* modality, that is, modality expressing a force internal to the subject like volitionality (2)-(3), can combine with direct objects and embedded sentences, modal verbs expressing *deontic* modality, that is, modality expressing an obligation (4) or a permission (6), can combine with prepositional, particle, and adjectival predicates.

The observation about dynamic modal verbs fits in with the idea proposed by, among others, Ross (1969), Palmer (1979, 1986), Hoekstra (1984), Klooster (1984, 1986), Roberts (1985, 1993), Brennan (1993), and Eide (2005)¹ that dynamic modal verbs resemble main

¹ The terminology in each of these proposals differs: The distinction between main verbs and functional elements corresponds to the difference between transitive and intransitive verbs (Ross 1969,

verbs in the sense that they have argument structure. Like main verbs, they assign the semantic role of an agent to their subject; a first diagnostic is that they cannot occur with expletive subjects (7).

- (7) *Det vil komme en mann hit i morgen. Norwegian
there will come a man here in morning Eide 2005:177
 ‘There wants to come a man here tomorrow.’

Main verbs furthermore select for both the syntactic category and the semantics of their complements: Chomsky (1965), and Grimshaw (1979), among others, have shown that verbs carrying argument structure select for both the type and the semantics of their complements. As such, it is expected that dynamic modal verbs show cross-linguistic differences with respect to the selection of the type and the semantics of the complement².

The observation about deontic modal verbs fits in with the idea proposed by, among others, Klooster (1984, 1986), Brennan (1993), Barbiers (1995), Bhatt (1999) and Wurmbrand (1999, 2001), that deontic modal verbs are functional elements in the sense that they do not have argument structure. Correspondingly, these verbs do not assign the semantic role of an agent to their subject; they can therefore, for instance, occur with expletive subjects (8).

- (8) There may be singing but no dancing on my premises. Wurmbrand 1999

Functional elements do not impose categorical or semantic restrictions on their complements; the single restriction is that the subject must have received the semantic role of an agent from a lexical element. Following the theta-criterion, which states that every argument should have a theta role (Chomsky 1981), and deontic modal verbs cannot assign any theta role, the surface subject must have raised from a position in which it was assigned the semantic role of an agent. Only this will satisfy the syntactic criterion that every clause should have a subject (the Extended Projection Principle (EPP), Chomsky 1981). Drawing the parallel with raising verbs (9), the only complements that are expected to be cross-linguistically available are Verbal Phrases (10)a and Small Clauses (10)b (Stowell 1981, 1983).

- (9) a. John seems [TP ~~John~~ to leave] raising
 b. John seems [SC ~~John~~ nice]
 c. *John seems [CP that he has left]
 d. *John seems [NP Mary]³

Klooster 1984, 1986), between modal main verbs and modal auxiliaries (Palmer 1979, 1986, Eide 2005), between functional and semi-functional elements (Wurmbrand 2001), and between raising and control verbs (Brennan 1993, Bhatt 1998, Wurmbrand 1999).

² Within the framework of Government and Binding (Chomsky 1981), main verbs assign thematic roles to their complements as well. Although this would explain why dynamic modal verbs can license nominal and sentential complements, it remains unclear why they can also license verbal complements, which do not bear a thematic role.

³ Nominals used as predicates are perfectly fine (Safir 1987):

- (i) John seems a fool.

- (10) a. John must [VP ~~John~~ leave]⁴ deontic
 b. John must [SC ~~John~~ away]
 c. *John must [CP that he has left]
 d. *John must [NP Mary]

The first main thesis, which is further elaborated on in the following section, is that the distribution in (2)-(6) is theoretically driven: the availability of the different types of complements functions as a diagnostic for being a main verb or a functional element. What is new is that these notions are directly labeled to the interpretation of modal verbs: the distinction between deontic and dynamic modality turns out to be the key to understanding the links between modal verbs and their complements.

Hypothesis 1: Dynamic modal verbs are main verbs; deontic and epistemic modal verbs are functional elements.

The second thesis concerns the underlying structure of sentences with prepositional, adjectival, and particle predicates. Based on their shared semantics, they seem to have an identical underlying structure: In contrast to the sentences in (2) and (3), in which the modal verb relates the subject to the object, the complements in (4)-(6) are directly predicated onto the subject. The subject is obliged or permitted to undergo a change, resulting in the state denoted by the prepositional, particle, or adjectival predicate.

Barbiers (1995, 2002, 2005a, 2005b) argues in favor of a Small Clause analysis (11)a for all three types of complements; Small Clauses are syntactic constituents that contain a subject and a predicate and formally express a predication relation (Stowell 1981, 1983, 1991). Van Riemsdijk (2002, 2009) claims that all complements are verbal, containing a phonetically null lexical verb *GO* (11)b.

- (11) Jan moet naar huis.
Jan must to home
 ‘John must go home.’
- | | |
|--|--------------------|
| a. [TP Jan moet [SC Jan naar huis]] | Barbiers 1995 |
| b. [TP Jan moet [vP Jan [VP [naar huis] <i>GO</i>]]] | Van Riemsdijk 2002 |

Based on arguments on Dutch, to be elaborated on in the next chapter, the null hypothesis in this thesis is that Barbiers’s hypothesis holds. Both in the synchronic and the diachronic study this hypothesis is tested; do they provide us with new arguments in favor of or against Barbiers’s analysis? In the theoretical chapter 5 the evidence is reviewed and the score is made up.

Hypothesis 2: Prepositional, particle, and adjectival complements of modal verbs are Small Clause predicates.

⁴ In chapter 2 the categorical status of modal complements is discussed.

1.2. Non-verbal complements of modal verbs: Two phenomena

Hypothesis 1 makes a number of predictions that can be stated in three sub hypotheses. First of all, the idea that the availability of nominal and sentential complements is a diagnostic for the presence of argument structure in the verb suggests that there are two phenomena that are both labeled as ‘modal verbs with non-verbal complements’. In both the synchronic and the diachronic study this hypothesis will be tested. Do the two phenomena in all languages cluster together? Do they combine with the same modal interpretations?

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

Besides the descriptive value that the results of testing hypothesis 1a gives us, namely, an overview of the possibilities in a language, hypothesis 1 makes clear predictions about the availability of the different types of complements. Main verbs have argument structure and as such they select the categories of complements with which they can combine (Chomsky 1965, Grimshaw 1979, among many others). The prediction is that in each language dynamic modal verbs can select for one or more of the five types of complements: Direct objects (3), embedded sentences (3), and adjectival, particle, and prepositional predicates (12).

- (12) a. ?Jan wil niet schoon. Dutch
Jan wants not clean
‘John does not want to be clean.’
b. Marie durft niet weg.
Mary dares not away
‘Mary does not dare to go away.’
c. Jan durft niet naar huis.
Jan dares not to house
‘John does not dare to go home.’

Concerning deontic modal verbs, as they are claimed to be functional elements and as such not to have argument structure, hypothesis 1 predicts that these verbs can only select for complements that satisfy the EPP without needing to assign a thematic role to the subject; these are Verbal complements and Small Clauses. Since prepositional, adjectival, and particle phrases are claimed to be either complements of verbal phrases with a phonetically null lexical verb *GO* (11)b (Van Riemsdijk 2002), or a Small Clause predicate, (11)a (Barbiers 1995), only these predicates are expected to occur with deontic modal verbs. Epistemic modal verbs are like deontic modal verbs in that they do not have argument structure; as such they are expected to pattern with these verbs in that they can only combine with particle, prepositional, and adjectival complements.

Hypothesis 1b: Only dynamic modal verbs can combine with nominal and sentential complements.

Hypothesis 1c: Deontic and epistemic modal verbs can combine with particle, prepositional, and adjectival complements.

The expectations following from hypotheses 1a-1c for both the synchronic and the diachronic study are that a classification of non-verbal complements in the three types of modal interpretations shows a dissociation: While dynamic modal verbs can combine with all types of non-verbal complements, deontic and epistemic modal verbs are only able to combine with prepositional, adjectival, and particle complements. If this hypothesis is correct, it confirms the distinction between dynamic main verbs and deontic and epistemic functional elements, and provides us with a further diagnostic to distinguish the two.

1.3. Structure and expected results

In chapter 2 the relevant literature on modality and their complements is summarized and reviewed; as the notions of modality, modal verbs, and non-verbal complements are studied across the boundaries of space and time in chapter 3 and 4, definitions of these components are also provided. This leads to a consistent approach of modality and modal verbs throughout this thesis.

In chapter 3 modal verbs and their complements are studied in 16 European languages; based on a questionnaire the hypothesis on the link between the interpretation of a modal and the presence of argument structure is tested. In chapter 4 the syntactic development of English preterite-present verbs and their complements is studied. Based on the hypothesized difference in their underlying structures, clear differences are expected to be found between nominal and sentential complements of preterite-present verbs on the one hand, and prepositional, particle, and adjectival complements on the other hand. In the theoretical chapter 5 the two studies are brought together, which leads to a unified analysis of the syntax of modal verbs and their complements. The conclusion follows thereafter.

2.1. Introduction

In this chapter the research carried out on modal verbs and their complements is summarized and reviewed. In section 2.2. the notions of modality, modal verbs, and non-verbal complements are defined. After these sections the hypotheses that were stated in the introduction are explored by going into further detail on the links between argument structure, modal verbs, and their possible complements. In section 2.3. the state of the art of the syntactic and semantic analyses proposed for the non-verbal complements of modal verbs is described; in section 2.4. and 2.5 the available synchronic and diachronic data on modal verbs and their complements are presented. These last two sections are necessary for setting up the case studies in chapter 3 and 4 of this thesis.

2.2. Modal verbs and their complements

In this thesis modal verbs and their complements are studied across the borders of space and time. Because of the synchronic and diachronic components it is necessary to define the notions with which I will work beforehand. In section 2.2.1. and section 2.2.2 modality and modal verbs are defined; in section 2.2.3. the different types of non-verbal complements are discussed.

2.2.1. The semantics of modality

The underlying idea in research on modality is that different meanings that are cross-linguistically expressed by one and the same linguistic element are somehow related. In (1), the verb *can* either evaluates the truth-conditions of the proposition (1)i, which is called *epistemic modality*, it denotes a permission (1)ii, which is called *deontic modality*, or it expresses a force internal to the subject (1)iii, which is called *dynamic modality*.

- (1) John can be in Paris.
- i. ‘According to what the speaker knows, it is possible that John is in Paris.’
 - ii. ‘John is allowed to be in Paris.’
 - iii. ‘John is able to be in Paris.’

Kratzer (1977), following Peirce (1933), hypothesizes that it is not a coincidence that one linguistic element in a language can express these three notions since the modal has an identical effect in all three interpretations: The ‘in view of’ paraphrases of the interpretations in (1), as in (2), makes clear that the modal verb denotes a relation between a restriction on the world and the part of the sentence that the verb ranges over. In the case of epistemic modality (2)i, the speaker’s knowledge of the world restricts the possible situations – the speaker evaluates the proposition of John being in Paris as ‘possibly true’. In the case of deontic modality (2)ii, the norms and values of the speaker restrict the world by allowing John to be in Paris. In the case of dynamic modality (2)iii, finally, John’s dispositions are restricted by stating the possibility for him to be in Paris. The relation between the restriction on the world and the part of the sentence that the modal ranges over is the universal semantic contribution of the modal.

- (2) John can be in Paris.
- i. ‘In view of what the speaker knows, John can be in Paris.’
 - ii. ‘In view of what is allowed for John, he can be in Paris.’
 - iii. ‘In view of what is possible for John, he can be in Paris.’

A second property that characterizes the three types of modality is the involvement of the notions *possibility* and *necessity*, which were taken from modal logic (Lyons 1977:787). Epistemic and deontic modality, and possibly dynamic modality, too, have a sub type in which the relation holds existentially (3)-(4)a, or universally (3)-(4)b. Based on the notions of *possibility* and *necessity*, Kratzer (1977) formulates a truth-conditional account of modality within which these notions are used as operators that quantify over possible worlds.

- (3) a. Mary can be in Paris. epistemic
 b. Mary must be in Paris.
- (4) a. Mary may go. deontic
 b. Mary must go.

Palmer (1979) and Huddleston and Pullum (2002) furthermore claim that dynamic or *dispositional* modality also carries a notion of possibility or necessity. *Can*, for them, expresses dynamic possibility in the sense of ‘to be able to’, while *must* expresses dynamic necessity in the sense of ‘to be necessary for’. A distinction between dynamic possibility and dynamic necessity is problematic, however, as for many dynamic interpretations it is not clear whether they operate as universal or existential quantifiers. As an example, a number of dynamic interpretations of Dutch modal verbs is given in table 1.

Table 1: Dynamic modality in Dutch

Verb	Interpretation	Example
<i>kunnen</i>	‘to be able to’	Jan kan het deksel open doen. <i>Jan can the lid open do</i> ‘John can open the lid.’
	‘to be skilled in’	Marie kan vioolspelen. <i>Marie can violin-play</i> ‘Mary can play the violin.’
<i>willen</i>	‘to want’	Jan wil nog even blijven. <i>Jan will yet shortly stay</i> ‘John wants to stay some more.’
<i>mogen</i>	‘need’	Jan mag geen zuivel. <i>Jan may no dairy</i> ‘John cannot have dairy.’
	‘to like’	Marie mag graag hard werken. <i>Marie may gladly hard work</i> ‘Mary likes to work hard.’
<i>moeten</i>	‘need’	Jan moet zijn medicijnen hebben. <i>Jan must his medicins have</i> ‘John needs his medicins.’
	‘to like’	Jan moet Marie niet. <i>Jan must Marie not</i> ‘John does not like Mary.’

<i>hoeven</i>	‘need’	Marie hoeft geen fiets. <i>Marie needs no bike</i> ‘Mary does not need a bike.’
<i>durven</i>	‘dare’	Jan durft niet naar huis te gaan. <i>Jan dares not to house to go</i> ‘John does not dare to go home.’
<i>zullen</i>	‘to promise’	Ik zal je vanavond bellen. <i>I will you tonight call</i> ‘I will call you tonight.’

Following Palmer’s analysis of *can* and *must*, *kunnen* ‘to be able to’ and *moeten* ‘need’ in Dutch might indeed support a distinction between possibility and necessity dynamic modals. What this suggests is that the verbs that function as existential operators in their deontic and epistemic interpretations would also express dynamic possibility, and the verbs that function as universal operators in their deontic and epistemic interpretations would also express dynamic necessity. This idea is immediately falsified for *mogen* ‘to like’ and *moeten* ‘to like’: In their deontic and epistemic interpretation, *mogen* is a possibility modal and *moeten* a necessity modal but in their dynamic interpretation, there is no difference in force between the two. A second problem for Palmer’s and Pullum and Huddleston’s analysis is that other verbs, like *willen* ‘to want’, do not seem to fit in with any of the two possibilities: Is volitionality a matter of necessity or possibility? At this point there does not seem to be any additional value to categorize the dynamic modals into these two categories; instead, specific characterizations such as the ones exemplified in table 1 are used throughout this thesis.

The discussion of the different interpretations of modality results in the classification in figure 1. The English modal verbs are classified within these five categories⁵.

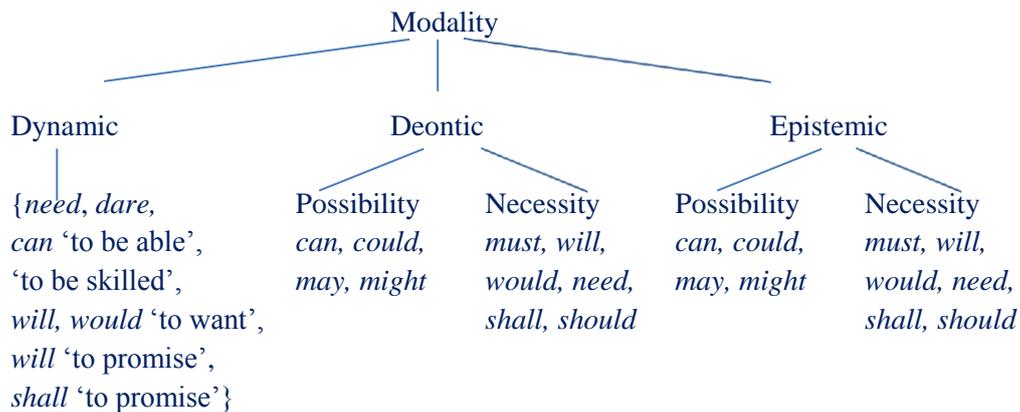


Figure 1: Categorization of modality and the English classification

⁵ There have been proposed many other systems that capture the different interpretations of modality: dynamic and deontic modality, for instance, are sometimes classified together as ‘root modality’ (Hoffmann 1966, Ross 1969, among many others). In this research the two types of modality are separated because of the hypothesis that dynamic modal verbs, but not deontic modal verbs, can combine with nominal and sentential complements. There have also been proposed many other types of modality (*evidential modality*, *alethical modality*, *metaphysical modality*, to name but a few; for an overview see Palmer 1979, 1986, Cinque 1999 or Portner 2009); in order to keep the synchronic research accessible for the informants only the five categories from figure 1 are included.

There is a hot debate in the semantic literature on the modal verbs that can also express future tense: Is *will* in English, for instance, purely a future tense marker (Kissine 2008), or does it belong to the class of modal verbs (Palmer 1979, Broekhuis & Verkuyl 2013 for Dutch *zullen* ‘will’)? The two approaches have found ways to derive a future interpretation as in (5) from a modal interpretation as in (6), or the other way around. Fact is that the two interpretations are closely related, which is in line with the idea that different meanings that are expressed by one and the same linguistic element are somehow related.

- | | | |
|-----|--------------------------------------|------------|
| (5) | Mary will come. | ?future |
| (6) | Mary will be at the opera right now. | ?epistemic |

Because *will* and its European equivalents have the morphosyntactic characteristics of a modal verb, these verbs are included in this study; the syntactic and semantic deviations are reviewed in chapter 3. Following Palmer (1979:108) *will* is classified as an epistemic necessity modal in case it denotes a probability in the future (7), as a deontic necessity modal in case it denotes a promise (8), and as a dynamic modal in case it denotes a wish (9)⁶. This classification is followed by Barbiers (1995) for Dutch, and by Eide (2005) for Norwegian.

- | | | |
|-----|---|-----------------|
| (7) | My babe-in-arms will be fifty-nine on my eighty-ninth birthday. | Palmer 1979:112 |
| (8) | I shall be back tomorrow. | Palmer 1979:112 |
| (9) | But she loves him and she won’t leave him. | Palmer 1979:109 |

2.2.2. The syntax of modality

The three types of modality seem to be located in different structural positions: While epistemic modality seems to scope above tense, deontic modality seems to scope below it (Groenendijk and Stokhof 1975, Iatridou 1990, Picallo 1990, Abusch 1997, Condoravdi 2002, Stowell 2004 and Hacquard 2010, Barbiers & Van Dooren to appear). Moreover, deontic modal verbs can be embedded under epistemic modal verbs, and dynamic modal verbs can be embedded under deontic modal verbs, but other possibilities seem to be ruled out (Picallo 1990, Wurmbrand 2001).

Hacquard (2010:93) presents a clear example of the unavailability of epistemic modality to scope under tense, which is in sentence (10): “Imagine that the evidence gathered at the beginning of a murder investigation (a week ago) pointed to Mary being home at the time of the murder: Both Mary and her roommate testified that they were having lunch together there. Yesterday however, Poirot established that Mary’s roommate had lied, as she was seen by several eyewitnesses elsewhere at that time, debunking Mary’s alibi.” In this context, sentence (10) is false. It cannot describe the modal evaluation of the necessity of Mary being at home in the past.

- | | |
|------|--|
| (10) | Mary had to be home (at the time of the crime) |
| | i. It is necessarily true, given what is known now, that Mary was home then. |

⁶ Brennan (1993), following Huddleston (1978), shows that *would* also has a clear dynamic interpretation of volitionality in the fossilized form *would rather*:

- | | | |
|-----|---|-----------------|
| (i) | I’d rather that you didn’t tell her about it. | Brennan 1993:54 |
|-----|---|-----------------|

on the complements of modal verbs). In the end, this analysis possibly explains why only deontic modals can combine with non-verbal complements (Barbiers 1995:206-207, to be elaborated on in section 2.5.).

2.2.3. Modal verbs

The three types of modality are encoded in different linguistic items: They can be encoded in the inflection, as is the case in synthetic languages, or in separate linguistic items, as is the case in analytical languages. The linguistic items can be further divided into modal adverbs, modal particles, and modal verbs. This research is limited to the complementation patterns of modal verbs.

Not all verbs that express epistemic modality, deontic modality, or dynamic modality, are classified as modal verbs: A verb like *to want*, for instance, expresses the dynamic notion of volitionality but still deviates both in its morphology and in its syntax from the English verb class consisting out of *can*, *could*, *may*, *might*, *must*, *shall*, *should*, *will*, and *would*. Only this set of verbs misses the *-s* inflection in the third person singular (14)b, for example, and can occur with a bare infinitive (15)b⁷.

- (14) a. Mary wants
b. Mary can
- (15) a. John wants *(to) know.
b. John can (*to) ride a bike.

In order to exclude lexical verbs with a modal meaning, the requirement set for verbs to be included in this research is that they pattern with auxiliaries and contrast with lexical verbs in their morphology and/or their syntax. The clearest example is English with the **NICE**-properties (Palmer 1979). In contrast to lexical verbs, modal verbs and auxiliaries can occur before **N**egation (16), they show **I**nversion with the subject (17), they can **C**ode discourse effects by allowing ellipsis (18), and they encode **E**mphasis by being stressed (19)⁸. Participles and gerunds are moreover absent (20).

- (16) a. Mary hasn't got a car.
b. Mary can't drive a car.
- (17) a. Does John have a car?
b. Must John come?
- (18) a. Mary isn't coming, is she?

⁷ This property distinguishes the modals from semi-modals like *have to* (Palmer 1979:25).

⁸ One verb form can both be a lexical verb and a modal verb, as Palmer (1979:105) shows for *need* in English: As a lexical verb, *need* needs to be followed by the full infinitive (i)a, and it requires *do*-support in negated sentences (ii)a and questions (iii)a. As a modal verb, *need* is followed by the bare infinitive (i)b, and it does not require *do*-support (ii)-(iii)b.

- (i) a. I may need to stay a couple of nights at Minna [...].
b. [...] her field isn't one that I think we need go for. Palmer 1979:105
- (ii) a. Do I need to say more?
b. Need I say more?
- (iii) a. Don't I need to come?
b. Needn't I come?

- b. Mary can drive a car, and so can John.
- (19) a. John *does* have a car.
 b. John *will* be there.
- (20) a. *He has might to do it. Roberts 1985:21
 b. *They are canning to do it

Modal verbs pattern with auxiliaries⁹ in their syntactic and/or morphological behavior in other language families as well; an example in the Romance language family is the occurrence of modals with infinitives in the same clause (21).

- (21) Jean doit faire du vélo. French
Jean must do-INF of-the bike
 ‘John must ride a bike.’

2.2.4. Intermediate summary – setting up the requirements

The definition of a modal verb in this thesis is, to summarize, two-faced: the modals that are included must at the same time meet the semantic and the syntactic requirement as stated below; the classification of modal verbs, lexical verbs, and auxiliaries is stated in table 2.

Syntactic requirement: Modal verbs pattern with auxiliaries and not with lexical verbs in their syntax and morphology.

Semantic requirement: Modal verbs express epistemic, deontic, and/or dynamic modality.

Table 2: Auxiliaries and modals

Classification		Syntax	
		- Auxiliary	+ Auxiliary
Semantics	- Modal	Lexical verb	Auxiliary
	+ Modal	Lexical verb	Modal verb

2.2.5. Modal verbs – further subdivisions

In this section the development of the links between modal interpretations and the availability of argument structure is discussed. As it was stated in the introduction, modal verbs can occur with expletive subjects in some, but not in all modal interpretations. Expletive subjects do not bear a theta role and they are therefore expected to combine with modal verbs that do not have argument structure. Following the main hypothesis of this thesis, they are thus expected to combine with deontic and epistemic modal verbs, but not with dynamic modal verbs. For Norwegian, this prediction is borne out: while *ville* ‘want’, ‘will’, combined with an expletive subject can have a deontic necessity interpretation (22)i, it cannot have a dynamic interpretation.

- (22) Det vil komme en mann hit i morgen. Norwegian

⁹ Kayne (1993) proposes that modal verbs are in fact auxiliaries with incorporated preposition-like complements; see Schütze for observations on the differences between modal verbs and auxiliaries.

- there will come a man here in morning* Eide 2005:177
- i. ‘There will come a man here tomorrow.’ deontic
- ii. #‘There wants to come a man here tomorrow.’ dynamic

Transitive-intransitive

The onset for a further distinction between modals based on the availability of argument structure is given by Ross (1969); in his study of modal verbs he observes a difference between ‘transitive’ and ‘intransitive’ modals. While *may* combined with the adverb *possibly* can occur with an expletive subject, the same verb with the adverb *gladly* cannot:

- (23) a. *There may gladly be windows broken by rioters. Ross 1969:89
- b. There may possibly be windows broken by rioters.

The modal in (23)a is called a transitive modal, while the modal in (23)b is called an intransitive modal. The distinction between transitive and intransitive modals is moreover linked to a specific syntactic structure: While transitive modals link the subject to the complement, intransitive modals range over prepositions. Although using a different terminology, Hofmann (1966), Ross (1969), and later on Perlmutter (1970), Jackendoff (1972), and Klooster (1984, 1986) thus link the distinction between ‘intransitive’ epistemic modals and ‘transitive’ root modals to the distinction between ‘intransitive’ raising and ‘transitive’ control verbs:

- (24) a. John must be home. epistemic
 must (John be home)
- b. John seems to be home. raising
 seems (John to be home)
- (25) a. John must go home. root
 must (John, go home)
- b. John tries to go home. control
 tries (John, to go home)

Dynamic – deontic – epistemic

Brennan (1993) studied the class of root modals and observed a difference between deontic and dynamic modals: While dynamic modals are always transitive, deontic modals sometimes behave like transitive verbs, and sometimes like intransitive verbs. First of all, deontic modal verbs can occur with expletive subjects (26), for instance, but dynamic modal verbs cannot (27)¹⁰.

¹⁰ Hackl (1998) argues that ability modals can occur with expletive subjects:

- (i) (looking outside of the window:) Hackl 1998:17
- a. It can rain hard here. ability/circumstantial
- b. *It might rain hard here. epistemic

Hacquard (2006:130) states that Hackl’s observation most likely involves circumstantial modality and not dynamic ability, as it ranges over the facts of the world (and suggests Thomason 2005 for an overview of all ability interpretations).

- (26) a. There may be up to five cars in the lot at one time. Brennan 1993:41-42
 b. It must be quiet in the reading room at all times.
- (27) a. It can be hard for Joan to climb that tree. Brennan 1993:42
 # It has the ability for Joan to climb that tree.
 b. There will be three students answering the phones.
 #There is willing/is disposed to be three students answering the phone.

The availability of expletive subjects shows that deontic modal verbs can be intransitive. They seem to assign semantic roles to their arguments, however, in the case of symmetric predicates. The two statements in (13) have the same truth values and as such express a symmetric relation. When a modal is added to this statement, as in (14), sentence (a) only has the same truth value as (b) when *may* carries an epistemic, but not a deontic interpretation: In an interpretation of permission, it is possible to think of two separate rules for governors and prisoners. The governor is granted the right to shake hands, while the prisoners are not. In this case, deontic modals thus seem to assign the agent role to the subject.

- (13) a. The governor shook hands with all the prisoners. Brennan 1993:45
 b. All the prisoners shook hands with the governors.
- (14) a. The governor may shake hands with all the prisoners. Brennan 1993:46
 b. All the prisoners may shake hands with the governor.

For Brennan (1993), epistemic modals are always intransitive and dynamic modals are always transitive; deontic modals can be either transitive or intransitive, depending on the specific interpretation.

Deontic and epistemic

Bhatt (1998) and Wurmbrand (1999) directly oppose to Brennan's claim as they bring together a number of arguments that show that deontics are always intransitive raising verbs. A first argument supporting this claim is that the subject does not have to be the agent with respect to the modal verb (28). In these sentences, the deontic modal verb *must* does not denote an obligation towards the subject *an opening hand* or *the traitor*, but rather, to an agent outside of the sentence. Sentences like these raise the question whether subjects of deontic modal verbs ever receive an agent theta role from the verb. It might be the case that even the case of directed deontic interpretations, there is not a theta role present; Wurmbrand (1999) suggests that in these cases the semantic roles are contextually determined.

- (28) a. An opening hand must contain thirteen points. Wurmbrand 1999
 b. The traitor must die.

Von Stechow and Iatridou (2009) use Wurmbrand's analysis of (28) to reanalyze Brennan's argument on deontic modals being transitive. Since the agent of a deontic modal verb can be contextually determined, in sentence (14) either 'the governor' or 'all the prisoners' can be chosen as the bearer of the obligation; this explains the asymmetry without assuming that deontics assign an agent theta role to their subject.

A second argument in favor of the idea that deontic modal verbs are like epistemic modal verbs in that they are raising verbs comes from Icelandic. Wurmbrand (1999), following Thráinsson & Vikner (1995), shows that the presence of argument structure in Icelandic is shown by means of morphological case: While subjects of verbs lacking argument structure retain the case that is assigned by the embedded lexical verb (29)a, subjects of verbs having argument structure always need to be assigned nominative case (29)b. Modal verbs, whether they have an epistemic or a deontic interpretation, always retain their ‘quirky case’ assigned by the lexical verb (29)c,d, which shows that both deontics and epistemics both lack argument structure.

- (29) a. Harald / %Haraldur virðist ekki vanta peninga. Thráinsson & Vikner 1995:60
Harald-ACC/ Harald-NOM seems not lack money
 ‘Harold seems not to lack money.’
- b. Haraldur / *Harald vonast til a vanta ekki peninga.
*Harald-NOM / *Harald-ACC hopes for to lack not money*
 ‘Harold hopes not to lack money.’
- c. Haraldur / *Haraldur ætlar a líka vel í Stuttgart.
*Harald-DAT / *Harald-NOM intends to like well in Stuttgart*
 ‘It looks like Harold will like it in Stuttgart.’
- d. Umsækjandann verður a vanta peninga.
the-applicant-ACC must to lack money
 ‘The applicant must lack money.’ (in order to apply for this grant)

A third and final argument to be mentioned here is that subjects of both deontic and epistemic modal verbs can scope below and above the modal verb. Since subjects of verbs lacking argument structure start out below the finite verb, they are expected to be able to scope above and below this verb. Since control structures involve a PRO subject in the embedded clause, the subjects of these verbs are expected to scope only above the finite verb. Wurmbrand shows that subjects of deontic modal verbs pattern with raising verbs in this respect, as they can scope above the finite verb, resulting in a specific interpretation of the subject (30)i, and below the finite verb, resulting in a non-specific interpretation of the modal verb (30)ii.

- (30) Some philosophers must go to those seminars.
 i. ‘There are some philosophers which are required to go to those seminars.’ S>M
 ii. ‘It is required that some philosophers go to those seminars (as a condition on our being given money to run them).’ M>S

Dynamic versus deontic and epistemic

Wurmbrand (2001) identifies deontic and epistemic modal verbs as functional elements, while dynamic modal verbs are semi-functional in the sense that they pattern with functional elements in their syntax, but still carry argument structure.

Recent work on Norwegian modals furthermore gives strong support for Brennan’s (1993) original claim that only dynamic modal verbs have argument structure. Eide (2005) presents seven arguments in favor of this claim; interestingly, the tests that show that deontics do not have argument structure all fail for dynamics. First of all, the dynamic modal verbs

ville ‘want’ and *kunne* ‘can’ in Norwegian cannot occur with expletive subjects or weather predicates:

- (31) #Det vil komme en mann hit I morgen. #volitional
there will come a man here in morning
 ‘There wants to come a man here tomorrow.’
- (32) Det kan komme ti gjester I fødselsdagen din. #ability
there can come ten guests to birthday you
 ‘There are able to com ten guests to your birthday party.’
- (33) #Det vil snø sort. #volitional
it will snow soon
 ‘It wants to snow soon.’
- (34) Det kan sno mye mer enn dette. #ability
it can snow much more than this
 ‘It can snow much more than this.’

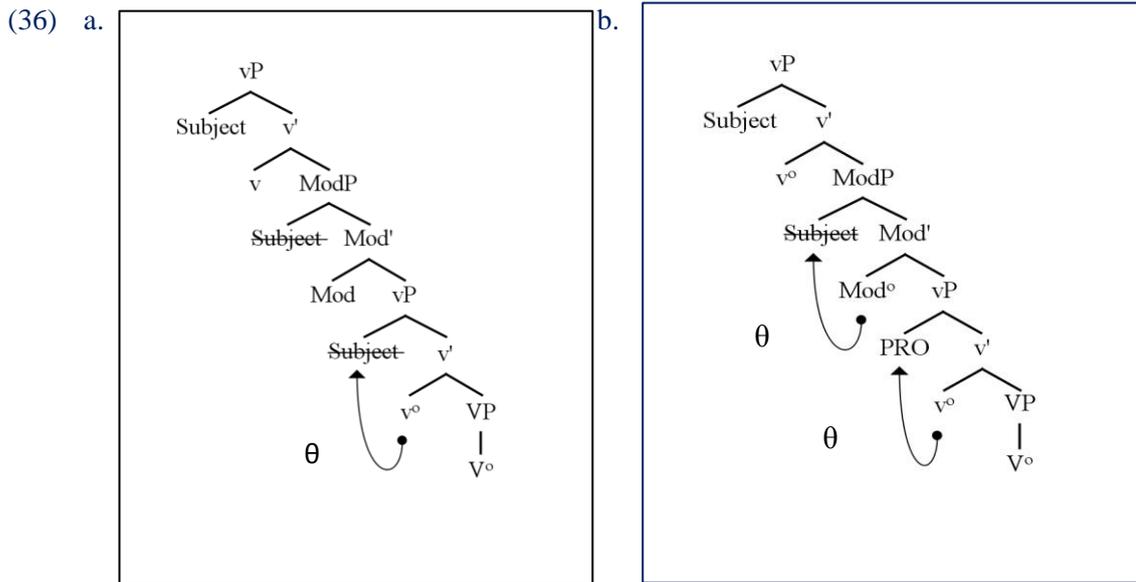
In Icelandic, furthermore, the subjects of the dynamic modal verbs *kunna að* ‘can’ and *vilja* ‘want’ do not get quirky case in Icelandic; they only occur with nominative case.

- (35) a. Haraldur vill ekki látá sér leiðast.
Harald-NOM wants not let self bore-PST
 ‘Harold won’t let himself be bored.’
- b. Haraldur kann ekki að látá sér leiðast.
Harald-NOM can not to let self bore-PST
 ‘Harold does not know how to be bored.’

Based on the previous paragraphs it is clear that epistemic and deontic modal verbs are functional elements in the sense that they do not have argument structure, while dynamic modal verbs are main verbs in the sense that they have argument structure. This moreover leads to hypothesis 1.

Hypothesis 1: Dynamic modal verbs are main verbs; deontic and epistemic modal verbs are functional elements.

The structures that are assumed for modal verbs with verbal complements are in (36) and correspond to the basic distinction between raising and control: While deontic and epistemic modal verbs do not assign an agent theta role to their subjects (36)a, dynamic verbs do (36)b. In order not to violate the theta criterion, which states that each argument may only be assigned one theta role (Chomsky 1981), PRO is inserted in the subject position of the verbal complement; it is assigned the second agent theta role.



Based on the significant morphosyntactic behavior, modal verbs are assumed to be base-generated in a special functional projection ModalP¹¹. The verbal complements are furthermore labeled vP, although their exact categorial status is still under debate (see Ross 1969, Barbiers 1995, 2005b, Barbiers & Van Dooren to appear, among many others).

What is clear is that the complements of modal verbs do not contain tense: The tense marker *to* is most often absent, and two contrasting adverbs are in general not allowed¹² (Barbiers 1995:202 following Cremers 1983). What is more, in at least Dutch (Barbiers 1995:202) and Danish (Thráinsson & Vikner 1995:77), the modal verbs that are also future markers are not allowed to be embedded under other modals (37)-(38); this shows that the complement cannot be a TP.

- (37) *Jan moet/mag/kan/wil/hoeft niet te zullen werken. Barbiers 1995:202
Jan must may can wants needs not to will work
- (38) a. *Han vil skulle have læst bogen. Thráinsson & Vikner 1995:77
he will shall have read book-the
 c. *Han skal ville opføre sig pænt.
he shall will behave self nicely

¹¹ There can in principle be different functional projections for epistemic, deontic, and/or dynamic modal verbs, as many authors have proposed (Cinque 1999, Wurmbrand 2001; cf. section 2.2.2.); as there are no empirical differences connected to any further divisions in this thesis, they are not included.

¹² In Dutch, at least the sentential adverb *gisteren* ‘yesterday’ can appear with a contrasting adverb in a sentence involving a modal. Sentence (i) probably does not contradict the general observation, however, as this adverb can appear in other non-tensed environments, such as DPs (ii) (p.c. Sjef Barbiers).

- (i) *Gisteren kon Jan morgen nog komen.*
yesterday can-PST Jan tomorrow still come
 ‘Yesterday, John was able to come tomorrow.’
- (ii) *Die man gisteren wist jouw naam.*
that man yesterday knew your name
 ‘That man we met yesterday knew your name.’

Landau (1999:75), partly based on the arguments mentioned above, concludes that the complements of modal verbs are either bare VPs or untensed CPs. As embedded *wh*-clauses are not allowed as complements of modal verbs (Barbiers 2005b, Barbiers & Van Dooren to appear), the second option is disfavored. The single problem with the first option is that PRO is governed in (36)b by the dynamic modal verb; this is a violation of the PRO Theorem (Chomsky 1981). If we follow Landau (1999, 2004, 2006) in his recent analysis of control and allow PRO to be governed (which is supported by the fact that PRO can bear lexical case in the Balkan languages and Hebrew), the structures in (36) are theoretically valid; these structures, in a slightly modified version, have been proposed for German as well by Wurmbrand (1999, 2001).

2.2.6. Non-verbal complements of modal verbs

In the previous sections the syntax and semantics of modal verbs with a verbal complement were discussed; in a number of languages, moreover, modal verbs can combine with clauses that do not contain a second verbal element. In Dutch, for instance, modal verbs can combine with clauses that are headed by a preposition (39), an adjective (40), a particle (41), or a nominal (42). In Afrikaans, they can furthermore combine with sentential phrases (43).

- (39) Ik moet naar huis. Dutch
I must to house
 ‘I must go home.’
- (40) De muur mag rood.
The wall may red
 ‘The wall may become red.’
- (41) Het licht moet uit.
the light must off
 ‘The light must be switched off.’
- (42) Het kind mag geen ijsje.
the child needs no ice-DIM
 ‘The child is not allowed to have ice cream.’
- (43) Ek sal dat Wanda die boeke bestel. Afrikaans
I will that Wanda those books order Biberauer & Oosthuizen 2011:3
 ‘I will make sure that Wanda orders the books.’

The phrases with which the modals combine in (39)-(43) are called non-verbal complements because they do not contain a verbal element, and syntactically, the phrases function as complements. In Dutch, for instance, they pass all the tests for argumenthood (Hoekstra & Mulder 1990) as they cannot be omitted (44)a, they cannot occur in PP-over-V constructions (44)b, and they cannot be separated from the verb by an adverb (44)c.

- (44) a. Ik moet *(naar huis). Dutch
I must to house
 ‘I must go home.’
- b. *... dat de muur moet blauw.
... that the wall must blue

- ‘...that the wall must become blue.’
 c. *... dat ik een koekje (*morgen) moet.
 ... *that I a cookie tomorrow must*
 ‘... that I must have a cookie tomorrow.’

In the following subsections the syntactic and semantic behavior per category is described based on Barbiers (1995, 2002, 2005a) for the prepositional, the particle, the adjectival and the nominal complements and on Biberauer & Oosthuizen (2011) for the sentential complements. After that, a comparison between the five categories is given.

Prepositional complements

In Dutch, all prepositions can head the complement of a modal verb. The combination of a modal verb and a prepositional complement denote a change (a ‘polarity transition’, Barbiers 1995): the subject has the obligation or permission to undergo a change in order to be located in the place that the complement denotes. Directional prepositions as in (45) easily fit in with this interpretation; in (45)b, for instance, *John* has the obligation to go *to the village*.

- (45) a. Jan gaat naar het dorp. directional
Jan goes to the village
 ‘John goes to the village.’
 b. Jan moet naar het dorp.
Jan must to the village
 ‘John must go to the village.’

Locative prepositions are coerced into a directional interpretation and as such fit in with the interpretation of denoting a change (Barbiers 1995, Van Dooren 2014): The prepositional complement in (46)b is interpreted in the sense that the museum needs to *become* in Amsterdam.

- (46) a. Het museum is in Amsterdam. locative
the museum is in Amsterdam
 ‘The museum is in Amsterdam.’
 b. Het museum moet in Amsterdam.
the museum must in Amsterdam
 ‘The museum must be located/built in Amsterdam.’

The single modal verb that cannot occur with a prepositional complement is *zullen* ‘will’:

- (47) Marie zal naar het dorp *(gaan)¹³.
Mary will to the village go
 ‘Mary will go to the village.’

¹³ When the modal is stressed, the sentence improves; the interpretation is then not one of futurity, but of mere obligation:

- (iv) En Marie ZAL naar huis.
and Marie WILL to house
 ‘Mary must go home.’

Particle complements

Particles are in general difficult to define semantically, as they can be derived from adverbs or prepositions, they show up in many different contexts and they denote a wide range of interpretations (see *Studia Linguistica* 68:1 for a special on particles; further studies are, among others, Bolinger 1973, Den Dikken 1995, Elenbaas 2007). In many languages, nonetheless, particles share certain syntactic properties. In the case of Dutch, for instance, particles can all function as part of a particle verb and as such they can be left behind in Verb Raising (Koster 1975).

- (48) a. ... dat hij haar [*morgen*] wil *[*morgen*] bellen.
... *that he her tomorrow wants tomorrow call*
... ‘that he wants to call her tomorrow.’
b. ... dat hij haar [*op*] wil [*op*] bellen.
... *that he her up wants up call*
... ‘that he wants to call her.’

When modal verbs are combined with particle complements the interpretation is identical to the combination of modal verbs and prepositional complements: Again, the subject is obliged or permitted to undergo a change in order to be located in the place that the complement denotes. In sentence (49)a, lights are allowed to become switched off.

- (49) Het licht mag uit.
the light may out
‘The lights are allowed to be switched off.’

Again, the exceptional modal is *zullen* ‘will’:

- (50) Het licht zal uit *(gaan).
the light will out go
‘The light will go out.’

Adjectival complements

A third category of non-verbal items that can head the complement of a modal verb, is the category of adjectives. This category is structurally different from particles as not all adjectives can be left behind in Verb Raising:

- (51) ... dat Jan de auto *rood* moet ??(*rood*) verven.
... *that Jan the car red must red paint*
‘... that John must paint the car red.’
(52) ... dat Jan het pak *leeg* mag *leeg* maken.
... *that Jan the carton empty may empty may*
‘... that John is allowed to empty the carton.’

In combination with a modal, adjectival complements are semantically similar to prepositional and particle complements: The subject in sentence (53), for instance, needs undergo a change in order to have the property denoted by the complement¹⁴.

- (53) Het hekje moet groen.
the fence-DIM must green
 ‘The small fence must become green.’

Zullen ‘will’ cannot combine with an adjectival complement:

- (54) Het hekje zal groen *(worden).
the fence-DIM will green become
 ‘The small fence will become green.’

Nominal complements

Nominal predicates are impossible in complement position in Dutch (55) (Barbiers 1995:169). DPs are available in combination with a subset of the Dutch modal verbs (56); the interpretation of a sentence like (56)a in a dynamic interpretation denotes a physical need, and it denotes an obligation in a deontic interpretation. In both cases the interpretation is stative.

- (55) *Jan moet voorzitter.
Jan must chair
- (56) a. Jan moet een koekje.
Jan must a cookie
- | | |
|--|---------|
| i. ‘John definitely wants to have a cookie.’ | dynamic |
| ii. ‘John needs to have a cookie.’ | deontic |
- b. *Jan zal/kan een koekje.
Jan will/can a cookie

The combinations of *moeten* ‘must’ or *mogen* ‘may’ and a definite DP moreover expresses positive or negative feelings of the subject towards the nominal object (57) (Barbiers 1995:170).

- (57) Jan mag Marie niet.
Jan may Mary not
 ‘John does not like Mary.’

Only *moeten* ‘must’ and *mogen* ‘may’ can have this interpretation when combined with a DP. Barbiers (1995:157) sees this as evidence for a direct selection of nominal complements by the modal verbs: the only combinations possible are the ones in which the basic interpretation

¹⁴ Interestingly, adjectival complements that do not seem to be available (ii) (Barbiers 1995), are available in an interpretation in which the subject needs to be created first (Van Dooren 2014).

- | | |
|--|---|
| (i) De broek moet lang.
<i>the trousers must long</i>
‘The trousers must be created long.’ | (ii) ?Marie moet lang.
<i>Marie must long</i>
‘Marie must become long.’ |
|--|---|

of the modal verb can be complemented by an object. *Moeten* ‘must’ is available with all nominal complements, for instance, since it expresses the subject’s physical needs.

Sentential Complements

In Dutch, only *willen* ‘want’ (58), and identificational clauses with an expletive subject (59) can be complemented by a sentential complement.

- (58) Jan wil dat Marie weggaat.
Jan wants that Mary away-goes
‘Jan wants Mary to go away.’
- (59) Het kan niet dat je moet stoppen.
it can not that you must stop
‘It’s impossible that you need to stop.’

In contrast to Dutch, in Afrikaans all modal verbs can be complemented by a sentential complement (60) (Biberauer & Oosthuizen 2011). The interpretation of the sentences in (60) is stative as the subject needs to make sure that the proposition stated in the complement becomes true (Biberauer & Oosthuizen 2011:5).

- (60) Ek sal/moet/wil/kan dat Wanda die boeke bestel. Biberauer&Oosthuizen 2011:3
I will/must/want/can that Wanda the books order
‘I will/must/want to/can make sure that Wanda orders the books.’

2.2.7. Comparison: one label, two phenomena

Based on semantic and distributional properties, the modal verbs combined with the five types of complements seem to fall into two sub classes. Initial support for the distinction into two categories comes from the fact that the modals with prepositional, particle, and adjectival complements have a dynamic interpretation, as the subjects need to undergo a change, while the modals with a nominal or a sentential complement have a stative ‘to obtain’ or ‘to be controlled for’ interpretation.

Besides a difference in meaning, the three types of complements show distributional differences: while sentential complements are syntactically restricted in Dutch, they freely combine with all modal verbs in Afrikaans. Besides differences *between* languages, the distribution of complements also differs *within* a language: In contrast to sentential complements, most Dutch modal verbs can combine with a prepositional, an adverbial, and a particle complement.

The semantic and distributional differences support the first sub hypothesis that modal verbs combined with nominal and sentential complements need to be separated from modal verbs combined with prepositional, adverbial, and particle complements. The synchronic and diachronic study carried out can further test the distinction between the two types.

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

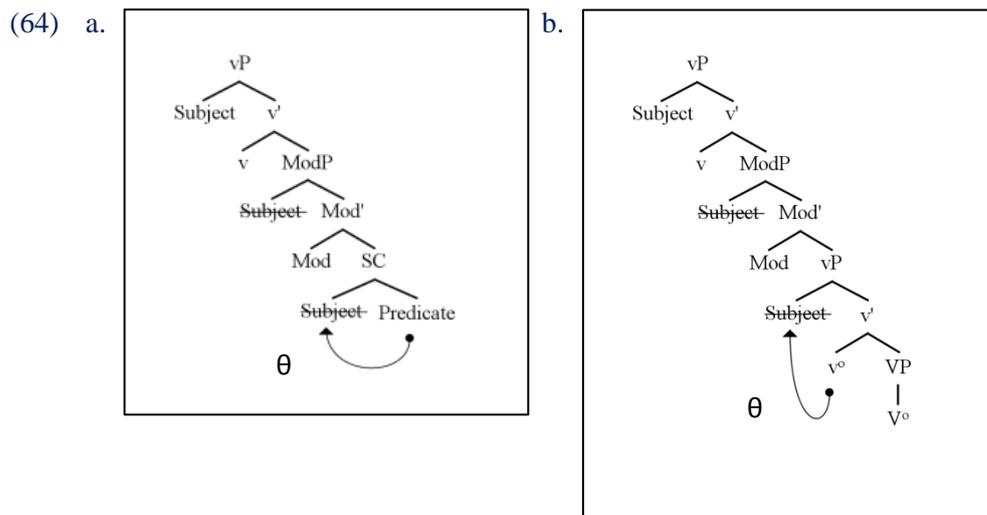
Based on the syntactic properties of epistemic, deontic, and dynamic modal verbs explained in the previous section, the two types can be related to different modal interpretations having different underlying structures.

Since deontic and epistemic modal verbs do not have argument structure, they cannot assign the semantic role of an agent to their subject. Nominal complements and sentential complements are ruled out because of the theta criterion (Chomsky 1981): In sentences like (61) and (62), the subject *Jan* ‘John’ does not get assigned its agent theta role and as such, the sentences are ungrammatical¹⁵.

- (61) **Jan moet voorzitter.* deontic
Jan must chair
- (62) **Jan moet dat hij weggaat.* deontic
Jan must that he leaves

Adjectival, prepositional, and particle complements are expected to be fully available, whether they are analyzed as Small Clauses (63)a or as full verbal phrases with an elided or silent infinitive GO (63)b. In both analyses, the complement namely contains an argument that is identified as an agent by the Small Clause predicate (64)a or by the lexical verb GO (64)b, which raises to the subject position of the modal verb. This way, the syntactic criterion that every clause should have a subject (the Extended Projection Principle (EPP), Chomsky 1981) is satisfied, while at the same time, the verb does not have to assign an agent theta role to its subject.

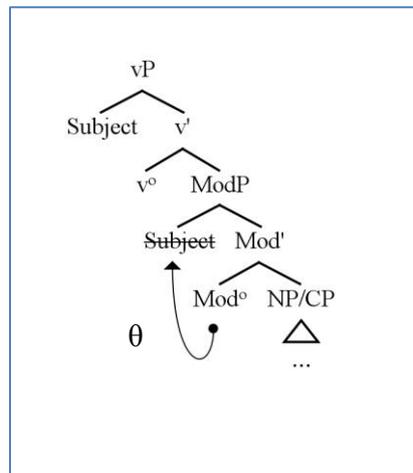
- (63) a. *Jan moet [SC Jan naar huis]* Barbiers 1995
Jan must Jan to house
- b. *Jan moet [vP Jan naar huis GAAN]* Van Riemsdijk 2002
Jan must Jan to house GO



¹⁵ The apparent possibility of deontic modal verbs with nominal complements in Dutch, and with sentential complements in Afrikaans, mentioned in section 2.2.6., seem to contradict this claim. These cases are thoroughly investigated and reanalyzed in section 3.5.

Dynamic modal verbs have argument structure and as such are in principle compatible with all types of complements (65); like main verbs, they are expected to select for different categories of complements in different languages (Chomsky 1965, Grimshaw 1979).

(65) a.



Hypothesis 1b: Only dynamic modal verbs can combine with nominal and sentential complements.

Hypothesis 1c: Deontic and epistemic modal verbs can combine with particle, prepositional, and adjectival complements.

If proven correct, the possible combinations of modal verbs and their complements function as a new diagnostic for the distinction between dynamic modal verbs on the one hand, and deontic and epistemic modal verbs on the other hand.

2.2.8. Silent infinitives and Small Clauses

The main syntactic issue that is at stake with respect to the combinations of modal verbs and prepositional, particle, and adjectival complements is whether the modal verbs in these sentences occur without a complementary verbal element or not. In the following two subsections the arguments in favor of and against the two analyses are summarized; based on this review, it is claimed that for Dutch the Small Clause hypothesis receives most support which functions as the null hypothesis throughout this thesis. Are there any indications coming from the two case studies that this hypothesis holds cross-linguistically?

Hypothesis 2: Prepositional, particle, and adjectival complements of modal verbs are Small Clause predicates.

The modal auxiliary analysis

Van Riemsdijk (2002, 2009) hypothesizes that modal verbs in combination with particle and prepositional predicates are auxiliaries¹⁶ as they combine with full verbal complements in which a phonologically null light verb *GO* is present (66).

¹⁶ Van Riemsdijk (2002, 2009) focuses on particle and prepositional complements; he glances over two other cases, namely, (i) and (ii), which are discussed in chapter 3.

The phonetically null element, which has a directional interpretation, has the status of a verb but does not have an overt counterpart. Based on cross-linguistic differences in word order in these sentences, the modal verb either licenses directly the verbal head or the full verbal phrase (Van Riemsdijk 2002:188).

Van Riemsdijk puts forward four diagnostics that point toward the presence of an underlying infinitive in the clause. A first argument (Van Riemsdijk 2002:146) comes from Swiss German. In contrast to languages like Dutch and German, languages like Swiss German and West Flemish do not allow Verb Raising (67)-(68)a; instead, the complete Verbal Projection needs to be raised (67)-(68)b (Haegeman & Van Riemsdijk 1986).

- (67) a. *... da Jan wilt kopen een hus. West Flemish
 ... *that Jan wants buy a house* Haegeman & Van Riemsdijk 1986:419
 ‘... that John wants to buy a house.’
 b. ... da Jan wilt een hus kopen.
 ... *that Jan wants a house buy*
 ‘... that John wants to buy a house.’
- (68) a. *... dass de Hans wil chaufe es Huus. Swiss German
 ... *that the Hans wants buy a house*
 ‘... that Hans wants to buy a house.’
 b. ... dass de Hans wil es Huus chaufe.
 ... *that the Hans wants buy a house*
 ‘... that Hans wants to buy a house.’

In Swiss-German Verb Raising is allowed when a particle complement is combined with a modal verb (108). Van Riemsdijk explains the contrast between (68)a and (108) by stating that in the modal case, the directional is not truly at the right edge, since there is a silent verb GAA (=GO) present (70).

- (69) Wil mer hettet söle häi. Swiss German
 Because we would-have had-to home Van Riemsdijk 2002:146
 ‘Because we would have had to go home’
- (70) Wil mer hettet söle häi GAA.
 Because we would-have had-to home GO

This argument holds for Afrikaans, Alsatian, and Luxembourgish as well as they all have Verb Projection Raising; as such, it is a strong argument in favor of the silent infinitive hypothesis. The only problem is West Flemish, since this language has Verb Projection Raising but nonetheless does not allow right edge directionals in combination with a modal (71); this suggests that the Verb Projection Raising rule and the presence of empty verbs

-
- (i) Stoute kinderen mogen geen snoepje (ii) Jan wil dood.
 naughty children may no candy *Jan wants dead*
 ‘Naughty children can’t have candies.’ ‘John wants to die.’

might not be directly linked. Van Riemsdijk's solution is to parameterize the two elements by means of adjacency; for further details, see section 7 in Van Riemsdijk (2002).

- (71) *... da ze nie meer hee gewild/willen no tschule
 ... *that she no longer has wanted/want to school*
 ... that she no longer wanted to go to school
- West Flemish
 Van Riemsdijk 2002:183

Two further arguments that count in favor of the silent infinitive analysis are on Swiss German and West Flemish, and Frisian. In Swiss German and West Flemish, infinitives can be introduced by a phonologically reduced copy of the same verb. For Swiss-German, this is shown in (72). In combination with modals, in contrast to lexical verbs, the phonologically reduced copy suffices (73). In order to hold on to the generalization that these verbs are copies, it needs to be assumed that there is a silent infinitive GAA (=GO) present (74) (Van Riemsdijk 2002:159).

- (72) Si gaat de zmittag go choche.
She goes the lunch COPY cook
 'She will cook lunch.'
- Swiss German
 Van Riemsdijk 2002:159
- (73) Wän i mues go poschte
When I must COPY shop
 'When I must go shopping.'
- (74) Wän i mues GAA go poschte
When I must GO copy shop
 'When I must go shopping.'

In 19th Century Frisian, furthermore, three verb clusters are always present when the highest verb is *soe(ne)* 'would'. There is one exception to this rule, namely, when a non-verbal complement is involved. The presence of two verb clusters in these sentences suggests that a silent infinitive is present (Van Riemsdijk 2002:175).

The fourth argument put forward does not count in favor of the silent infinitive analysis as it can be reanalyzed within the Small Clause analysis. Van Riemsdijk (2002:180) states that in Dutch, only DPs with a stranded preposition can be left dislocated (75)a-b. For modals, however, this is not the case (76).

- (75) a. De hoofdstad, daar verhuisde zij pas later naartoe.
The capital, there moved she only later to
 'The capital, she moved (to) there only later'
- Dutch
 Van Riemsdijk 2002:180
- b. *Naar de hoofdstad, daar verhuisde zij pas later.
To the capital, there moved she only later
 'To the capital, she moved there only later'
- (76) Naar de hoofdstad, dat moest zij pas later.
To the capital, that must-past she only later
 'To the capital, she had to go there only later'

Since the pronoun *dat* 'that' indicates the presence of a verbal element of the left dislocated constituent (77), it supports the analysis with a silent infinitive GO (78).

- (77) Naar de hoofdstad verhuizen, dat moest zij pas later.
To the capital move, that must-past she only later
 ‘Move to the capital, she only had to do that later’
- (78) Naar de hoofdstad GAAN, dat moest zij pas later.
To the capital GO, that must-past she only later
 ‘To the capital, she had to go there only later’

An alternative analysis is present, however, for the data in (75)-(77). First of all, sentence (76) is compatible with a Small Clause analysis as Dutch Small Clause predicates can have a stranded preposition (79). Moreover, the fact that *dat* ‘that’ can refer to topicalized Small Clause predicates (80) suggests that this test does not unambiguously identify left dislocated verbal clauses.

- (79) a. Naar Parijs, ?(dat) was ik van zondag tot donderdag.
to Paris that was I from Sunday to Thursday
 ‘I was to Paris from Sunday to Thursday.’
- b. Helemaal van de ellende af, ?(dat) zijn we dus nog niet.
completely from the misery off that are we thus not yet
 ‘We are thus not yet completely out of misery.’
- (80) Groen, dat maakten we het gras, en blauw de lucht.
green that made we the grass and blue the sky
 ‘We made the grass green and the sky blue.’

Eide (2005:62-73) puts forward two arguments coming from Norwegian in favor of a silent infinitive theory. One argument is from the dialect Trøndersk; in this language, modal verbs can be complemented by full infinitival complements with the infinitival marker *å* ‘to’ (81)a. Crucially, the infinitival marker is present even when the infinitive is absent (81)b.

- (81) a. Han had itj løst te å færre heim. Trøndersk Norwegian
he had not will for to go home Eide 2005:61
 ‘He did not want to go home.’
- b. Han had itj løst te å heim.
he had not will for to home
 ‘He did not want to go home.’

The fact that this modal verb is complemented by a full infinitive makes it a pseudo-modal according to the definition of modal verbs set up in 2.2.2. The fact that a silent infinitive might be present in (81)b does not tell us whether this holds for the modal verbs that are marked as auxiliaries.

Stronger support for the silent infinitive analysis comes from Eide’s argument on tag questions. In Norwegian, main verbs get the pro-verb *gjør* in tag questions (82)a, while aspectual auxiliaries do not (82)b. Sentence (82)c shows that modal verbs pattern with the aspectual auxiliaries in these sentences; this also holds for modal verbs with non-verbal complements (83).

- (82) a. Jan går i butikken, *går/ gjør han ikke det? Norwegian
Jan goes in store goes/does he not that
 ‘John goes into the store, doesn’t he?’ Eide 2005:66
- b. Jon har gått i butikken, har/* gjør han ikke det?
Jan has gone in store has/does he not that
 ‘John has gone into the store, hasn’t he?’
- c. Jan må gå i butikken, må/* gjør han ikke det?
Jan must go in store must/does he not that
 ‘John must go into the store, mustn’t he?’
- (83) Jon må hjem, må/*gjør han ikke det? Eide 2005:71
Jan must home, must/does he not that
 ‘John must go home, mustn’t he?’

Two further arguments that are compatible with both a silent infinitive and a Small Clause analysis come from Marušič and Žaucer (2005) and Kyncl (2008) on Czech (84) and Slovene (85). In Slavic, too, modal verbs seem to occur with prepositional and particle complements¹⁷.

- (84) a. Jan musí domů. Czech
Jan must home Kyncl 2008:175
 ‘Jan must go home.’
- b. Jan může do kina.
Jan can to cinema
 ‘Jan can/is allowed to go to the cinema.’
- (85) Vsak Slovenec mora vsaj enkrat na Triglav. Slovene
every Slovenian must at-least once onto Triglav Marušič and Žaucer 2005:234
 ‘Every Slovenian must go up Mount Triglav at least once.’

Marušič and Žaucer (2005) analyze these complements as full verbal phrases with an underlying silent infinitive, because they can occur with two contrasting adverbials (86), and they can be coordinated with full verbal clauses (87).

- (86) Včera se Lini ni ljubilo jutri domov. Slovene
yesterday NON-ACTIVE Lina not-PAST felt-like tomorrow home
 ‘Yesterday, Lina didn’t feel like going home tomorrow.’ Marušič&Žaucer 2005:236
- (87) Vid ni mogel več niti do avta niti postaviti šotora. Slovene
Vid not can still neither to car neither put-up tent
 ‘Vid could neither go to the car nor put up a tent.’ Marušič&Žaucer 2005:239

¹⁷ Although the Slavic phenomenon differs from the Germanic phenomenon since, for instance, they can occur with purpose clauses (i), the general interpretation seems similar. In appendix 4 the phenomenon in the Slavic languages is described based on cross-Slavic data.

- (i) a. Peter mora (v trgovino) po kruh. Slovene
Peter must to store for bread Marušič and Žaucer 2005:237
 ‘Peter must go (to the store) and get some bread.’
- b. Peter moet voor brood *(naar de bakker). Dutch
Peter must for bread to the baker
 ‘Peter must go to the bakery for bread.’

Both of these diagnostics do not favor a silent infinitive analysis over a Small Clause analysis, however. First of all, Bowers (1993:609) already showed that Small Clauses have a position for adverbs; sentence (86) is thus compatible with both a silent infinitive and a small clause analysis. Moreover, small clauses and VP phrases seem to be able to combine, based on the grammaticality of (88).

- (88) Marie moet 10 kilometer rennen en over de stormbaan.
Marie must 10 kilometers run-INF and over the obstacle course
 ‘Mary needs to run for 10 kilometers and cross the obstacle course.’

Summarizing, there is one strong empirical argument for a silent infinitive analysis coming from Norwegian, two from Swiss-German, and one from Old Frisian. There is, moreover, a general consideration that can count in favor of a silent infinitive analysis as it unifies the behavior of modal verbs in the Germanic languages. It was stated in the introduction that English differs from many other Germanic languages since the modals in this language can only be combined with verbal complements; the silent infinitive analysis unifies all Germanic languages since the non-verbal complements underlyingly also have a full verbal structure¹⁸.

The modal main verb analysis

Barbiers (1995, 2002, 2005a, 2005b) presents five syntactic arguments and one semantic argument in favor of the analysis in which modals can combine with prepositional, particle, and adjectival complements in a Small Clause structure. A first general consideration that favors a Small Clause analysis over a silent infinitive analysis is that this analysis includes adjectival complements as well; as the silent infinitive analysis only has been shown to hold for prepositional and particle complements, Barbiers’s theory has more explanatory power in this respect.

¹⁸ Van Riemsdijk (2002:161) furthermore states that an analysis in which modal verbs are always modal auxiliaries is more economical in the sense that less information has to be stored in the lexicon: instead of two lexical entries per modal verb - an entry with the syntactic information of a modal main verb and an entry of a modal auxiliary - only the entry of the modal auxiliary has to be stored. This does not count in favor of the silent infinitive analysis for two reasons. First of all, instead of two lexical entries per verb, an extra lexical item needs to be stored (Sjef Barbiers p.c.). Secondly, the storage of two lexical entries per verb is fully available, for instance with the verbs *beloven* ‘promise’ and *dreigen* ‘threaten’. These verbs can be used both as main verbs (i)-(ii)a and as epistemic auxiliaries (i)-(ii)b (Barbiers 2005b:10).

- (i) a. Jan heeft beloofd te komen. Barbiers 2005b:10
Jan has promised to come
 ‘John promised to come.’
 b. Het belooft een mooie dag te worden.
it promises a fine day to become
 ‘It promises to be a fine day.’
 (ii) a. Jan heeft gedreigd op te stappen.
Jan has threatened on to step
 ‘John threatened to leave.’
 b. Het dreigt te gaan regenen.
it threatens to go rain
 ‘There’s a threat of rain.’

A first syntactic argument is that there are cases for which a single light verb would not suffice; as is shown in (89), a complex passive verb cluster has to be available as well. If Van Riemsdijk's analysis would be adjusted by claiming that passive verb clusters can be light, then we cannot account for the sentence in (90): If there would be an underlying passive verb cluster, it should in principle be able to license a *by*-phrase but sentence (90) shows that this prediction is not borne out.

- (89) Deze lampen moeten uit #GAAN/#ZIJN/WORDEN GEDAAN. Dutch
These lights must out GO BE BECOME DONE Barbiers 1995:151
 'These lights must be switched off'
- (90) Deze lampen moeten uit *(door Jan).
These lights must out by Jan
 'These lights must be switched off by John.'

A second syntactic argument from Barbiers (2005b) is the absence of the so-called Infinitive pro Participio effect (IPP) with modals. Modal verbs in the perfect tense occur as an infinitive when combined with an infinitival complement, not as a participle (91); when combined with a non-verbal complement, modals occur as a participle (92). The ungrammaticality of (92) is not expected if an underlying verb is assumed.

- (91) Jan had dat best kunnen/*gekund doen. Dutch
Jan had that best could-INF/could-PTC do (Barbiers 2005b:10)
 'John would very well have been able to do that'
- (92) Jan had dat best *kunnen/gekund.
Jan had that best could-INF/could-PTC
 'John would very well have been able to do that'

The absence of the IPP effect in sentence (92) is furthermore not due to the fact that the verbal complement is elided; evidence comes from sentence (93) in which the verbal complement is elided but the IPP effect is still present.

- (93) Jan had de kamer mogen/ *gemogen ~~opruimen~~ maar niet hoeven opruimen.
John had the room may-INF/may-PCP clean but not need-INF clean
 'John was allowed to clean the room but he did not have to do it.' Barbiers 2005b:10

Two more arguments concern the specific sentences in which a proper light verb cannot be found, as in (94), or, the other way around, a proper light verb cannot be deleted (95).

- (94) Jan kan zijn werk niet aan #GAAN/#ZIJN/#DOEN/#WORDEN. Dutch
Jan can his work not on GO BE DO BECOME Barbiers 1995:152
 'John cannot cope with his work.'
- (95) Deze maatregel moet vandaag in *(gaan). Barbiers 1995:153
This measure must today in go
 'This measure must be effective as from today.'

It can be shown that these sentences do not support a Small Clause analysis. Van Riemsdijk's (2002:163) solution for sentence (90) is that this sentence does not involve a passive, but rather, that an external agent is implied. He proposes to stipulate a phonetically empty light verb that has all the right properties: 'Yet, there really is nothing to stop us from positing some abstract source which has all the right properties: it is not passive, hence it will not tolerate a passive by-phrase, it implies a change-of-state, and it pragmatically implies the involvement of some external agent.' (Van Riemsdijk 2002:163). Besides the stipulative character of the solution, positing an empty verb in the lexicon misses the cross-linguistic generalization that *by*-phrases cannot be licensed in these sentences.

Van Riemsdijk (2002:164) further notices that sentence (95) contains the particle verb *in-gaan* 'to take effect'. Based on Fiengo's Generalization (1980), which states that the verbal part of particle verbs cannot be empty or deleted, he explains the impossibility of deleting the verbal part *gaan* 'go'. A similar claim can be made for sentence (94): In this sentence, the presence of the particle verb *aan-kunnen* 'to cope with' explains the impossibility of adding a second verbal element.

Barbiers's (1995:153) semantic argument is based on the paradigm in (96)-(97). He observes that modal verbs can have an epistemic and a deontic interpretation when they are combined with verbal complements (96), but when the verbs are combined with non-verbal complements, the epistemic interpretation is absent (97).

(96)	Jan kan naar huis gaan. <i>Jan can to house go</i> i. 'John is allowed to go home' ii. 'It is possible that John goes home'	Dutch deontic epistemic
(97)	Jan kan naar huis. <i>Jan can to house</i> i. 'John is allowed to go home' ii. #'It is possible that John goes home'	 deontic epistemic

Following Cinque (1999) in the hierarchy of functional projections, and linking these to the different types of complements, Barbiers (1995:206-207) hypothesizes that the absence of an epistemic interpretation in (97) is the result of a height mismatch: Epistemic modal verbs are inserted high - which is shown by their impossibility to scope under deontic modals, for instance (Piccolo 1990) - and as such they cannot select for low prepositional or particle complements (cf. section 2.2.2.).

Barbiers (2002, 2005) argues that the absence of the epistemic interpretation counts as a strong argument in favor of his small clause analysis. Since this property sets the non-verbal complements apart from the verbal complements of modal verbs, a different syntactic structure seems necessary. If an underlying infinitive would be present, the asymmetry would remain unexplained.

In response to this analysis, Van Riemsdijk (2002:166) claims that epistemic interpretations are not ruled out: He mentions the example in (98) in which *zouden* 'would' tends towards an epistemic interpretation.

- (98) Jij zou toch naar Antwerpen?
you would part. to Antwerp?
 ‘Weren’t you supposed to have gone to Antwerp?’

Van Riemsdijk 2002:166

This interpretation is only available with the modal verb *zouden* ‘would’; even if this sentence would have an epistemic interpretation, the question that remains is why the other modal verbs cannot occur with a similar interpretation. A second problem is that sentence (98) is unavailable in the present tense (99).

- (99) Hij zal wel naar Antwerpen *(zijn).
he will part. to Antwerp be
 ‘He presumably has gone to Antwerp.’

In fact, the verb *zullen* ‘will’ in Dutch is the only verb that is morphosyntactically a modal auxiliary, but nonetheless cannot occur with non-verbal complements. These facts all raise doubts about the alleged counterexample in sentence (98).

Zouden ‘would’, finally, has an evidential rather than an epistemic interpretation in Dutch as it denotes reported speech; in contexts that normally trigger an epistemic interpretation *zouden* results in a hearsay interpretation, and not in an evaluative interpretation. These contexts are stative complements which contain an individual-level predicate, provided that the subject has fixed reference (100)a, and perfect complements, but only if the completion stage of the event has taken place in the past (100)b (Barbiers 2005:19).

- (100) a. Jan zou een moedertaalspreker van het Fins zijn
Jan would a mother-language-speaker of the Finnish be
 i. ‘John is supposed to be a native speaker of Finnish.’ evidential
 ii. #‘It is necessarily the case that John is a native speaker of Finnish.’ epistemic
 b. Ze zouden deze kamer gisteren hebben opgeruimd.
The would this room yesterday have cleaned
 i. ‘They were supposed to clean this room yesterday.’ evidential
 ii. #‘It is necessarily the case that they cleaned the room yesterday.’ epistemic

This latter observation contradicts Van Riemsdijk’s (2002) claim as an epistemic interpretation of a modal combined with a non-verbal complement is ruled out. However, it also forms a problem for Barbiers’s (1995) analysis as evidentials are located higher than epistemics (Cinque 1999); the absence of epistemic interpretations therefore seems unlikely to be a height-mismatch.

Eide (2005:384) confirms the absence of the epistemic interpretation in Norwegian modals in combination with a prepositional and a particle complement and presents an alternative explanation. She follows Ross (1969) by stating that epistemic modals are one-place predicates that grade, qualify or modify the truth-value of the single argument. An example is in (78): the modal verb *must* modifies the truth-value of John being the killer.

(101) John must be the killer.

‘According to what the speaker knows, it is necessary that John is the killer.’

It thus follows from Ross’s analysis that epistemic modal verbs are always complemented by clauses with a truth-value. Eide states that these clauses must be tensed since only finite clauses can have a truth-value (Platzack and Rosengren 1998). From these assumptions it follows that epistemic modal verbs are always followed by a tensed complement¹⁹. This analysis fits into the Small Clause analysis as prepositional and particle complements are not tensed; by stipulating that phonetically unrealized verbs are not tensed (Eide 2005:390), Eide claims that it also holds within the silent infinitive analysis.

A fourth and final potential explanation of the observation that modal verbs with non-verbal complements cannot have an epistemic interpretation comes from Sabine Iatridou (p.c., 1990), and is followed by Van Dooren (2014). A first relevant fact is that in English, modal verbs cannot have an epistemic interpretation if the predicate refers to the future (102).

(102) Mary must be in Paris next week.

- i. ‘Mary is obliged to be in Paris next week.’ deontic
- ii. #‘It is necessarily the case that Mary is in Paris next week’ #epistemic

A second relevant fact is that dynamic predicates have a future interpretation in their default interpretation. Since Vendler (1967) it is known that dynamicity implies futurity. As an example, the default interpretation of the stative predicate in (103)a does not refer to the future, while the default interpretation of the dynamic predicate in (103)b does. This is shown by the cancellation in the follow-up sentence: only the dynamic predicate is cancellable with respect to the time of utterance.

- (103) a. Marie woont in Parijs, #maar ze woont niet nu in Parijs. stative
Mary lives in Paris but she live not now in Paris
‘Mary is living in Paris, but she is not living in Paris right now.’
- b. Marie vertrekt naar Parijs, maar ze vertrekt niet nu naar Parijs. dynamic
Mary leaves for Paris but she leaves not now to Paris
‘Mary is leaving for Paris, but she is not leaving for Paris right now.’

The two observations would be sufficient to account for the absence of an epistemic interpretation: Since the sentences in which a modal verb is combined with a non-verbal predicates denote a change, and changes are dynamic by definition, the dynamic interpretation would simply be incompatible with an epistemic interpretation. This line of reasoning would account for the paradigm in (104) as well: Abraham (2001) observed that dynamic *verbal* predicates that are embedded under a modal verb (104)b also result in an absence of the epistemic interpretation.

¹⁹ In contrast to this statement, obviously, epistemic modal verbs can be complemented by non-tensed infinitives (i). For these cases, Eide (2005:388) introduces the notion of a *tense chain*: the infinitive is linked to the main verb and inherits the tense feature from this verb.

(i) He must be in the class room.

- | | |
|---|------------------------------|
| (104) a. Er mag slapen.
<i>he may sleep</i> | German
Abraham 2001:11-12 |
| i. ‘It is possible that he is asleep.’ | epistemic |
| ii. ‘He is allowed to sleep.’ | deontic |
| b. Sie mag einschlafen ²⁰ .
<i>she may in.sleep</i> | |
| i. #‘It is possible that she falls asleep.’ | #epistemic |
| ii. ‘She is allowed to fall asleep’ | deontic |

There are, however, at least two problems with the first step of this analysis. First of all, Pranav Anand (p.c.) mentioned that modals in English show heterogeneous behavior with a future-referring predicate. An epistemic interpretation of necessity modals like *must* is then indeed difficult to get, but this interpretation is available when a future-referring predicate is combined with possibility modals like *may* and *might* (105).

- | | |
|---|-----------|
| (105) a. Mary may be in Paris next week. | |
| i. ‘Mary is permitted to be in Paris next week.’ | deontic |
| ii. ‘It is possibly the case that Mary is in Paris next week’ | epistemic |
| b. Mary might be in Paris next week. | |
| i. ‘Mary is permitted to be in Paris next week.’ | deontic |
| ii. ‘It is possibly the case that Mary is in Paris next week’ | epistemic |

A second problem with the absence of an epistemic interpretation with a future-referring predicate is that in Dutch, sentence (102) can have an epistemic interpretation (Sjef Barbiers, p.c.); the only condition is that a specific the point in the future is added:

- (106) Marie moet volgende week in Parijs zijn; ik zag de datum op haar ticket.
Mary must next week in Paris be I saw the date on her ticket
 ‘It is necessarily the case that Mary is in Paris next week; I saw the date on her ticket.’

The correct restriction thus seems to be that unplanned futures cannot be combined with epistemic necessity modals. Futurates as in (102), which do not contain a future verb form and denote planned or scheduled futures (Huddleston 1977, Copley 2002, among others) are compatible with an epistemic interpretation. More research is necessary on the distinction between planned and unplanned futures in the context of modals.

Which of the four analyses that try to explain the absence of an epistemic interpretation is correct, is not yet clear; the studies reported in chapter 3 and 4 might be useful in this matter. If the absence of epistemic modality is indeed a cross-linguistic phenomenon, this furthermore means that hypothesis 1c needs to be modified: Although

²⁰ The equivalent in Dutch can have a circumstantial interpretation (i) (Sjef Barbiers, p.c.); this interpretation is compatible with future-denoting complements (ii).

- | | |
|--|--|
| (i) Ze mag dan wel vroeg inslapen, maar morgen wordt ze toch weer laat wakker.
<i>she may then yet early in-sleep, but tomorrow becomes she yet again late awake</i>
‘Although she falls asleep early, she will get up late tomorrow.’ | |
| (ii) Ze mag dan wel morgen in Amsterdam zijn, toch zal ze haar oom niet bezoeken.
<i>she may then yet tomorrow in Amsterdam be still will she her uncle not visit</i>
‘Although she will be in Amsterdam tomorrow, she won’t visit her uncle.’ | |

epistemic modal verbs do not have argument structure, they still cannot combine with prepositional, particle, and adjectival predicates.

Review

In this section the two current theories on modal verbs with prepositional, particle, and adjectival complements were discussed. Summarizing, there are two strong arguments in favor of the Small Clause analysis in Dutch, which are the absence of *by*-clauses, and the absence of the IPP-effect. There furthermore are four strong arguments in favor of the silent infinitive analysis in Norwegian, Swiss-German, and Old Frisian. The working hypothesis is that the Small Clause analysis is correct; in chapter 3 and 4 more arguments are collected in favor of either one of the two hypotheses after which the discussion is continued in chapter 5.

2.2.9. Intermediate summary

In the previous eight sections the syntax and semantics of modality, modal verbs, and their complements have been discussed. The central notions have been defined, and have clarified the four hypotheses. In the next two sections the state of the art on the topic of modal verbs with non-verbal complements in synchronic and diachronic perspective are given.

2.3.Synchronic overview

The available data on modals verbs with non-verbal complements are almost all from Germanic languages. Besides Barbiers's (1995) study on Dutch (107), and Van Riemsdijk's (2002) study on Dutch, German (108), Frisian (109), Afrikaans (110), Swiss German (111), Alsatian (112), and Luxemburgish (113), Vikner (1988) included examples from Danish. The unavailability of the phenomenon in English (116) has been known at least since Visser (1963-1973); the unavailability of particle and prepositional complements in Icelandic (117) was first reported in Eide (2005).

- | | |
|---|--|
| (107) Jan mag naar de overkant.
<i>Jan may to the other-side</i>
'John is allowed to go to the other side.' | Dutch |
| (108) Marie muss nach Hause.
<i>Marie must to house</i>
'Mary is allowed to go home.' | German |
| (109) Jan sil nei Grins ta.
<i>Jan will to Groningen to</i>
'John will go to Groningen.' | Frisian
Hoekstra 1997:143 |
| (110) Hy moet biblioteek toe.
<i>he must library to</i>
'He must go to the library.' | Afrikaans
Biberauer & Oosthuizen 2011:5 |
| (111) Wil mer hettet söle häi.
<i>because we would've had-to home</i>
'Because we would have gone home.' | Swiss German
Hoekstra 1997 in Van Riemsdijk 2002:73 |
| (112) Mr han gråd velø ens bed.
<i>we have just wanted into bed</i>
'We just wanted to go to bed.' | Alsatian
Heitzler 1975 in Van Riemsdijk 2002:73 |

- (113) Mir lousen aus, wien als éischte muss op d' wuecht. Luxemburgish
we draw lots who as first must on the guard Bruch 1973 in Van Riemsdijk 2002:74
 'We draw lots for who must become on the guard first.'
- (114) Hun skal hjem Danish
she must home Vikner 1988:17
 'She must go home.'
- (115) Jon må på skolen. Norwegian
Jon must to school Eide 2005:60
 'John must go to school.'
- (116) He must *(go) home.
- (117) Hann geta *(fara) hjem. Icelandic
he will go home Asgrímur Agantýsson p.c.
 'He will go home.'

Concerning the other language families, it is known that in French and in Italian nominal complements are available (118); modal verbs are claimed to combine with prepositional and particle phrases in at least Slovene (Marušič and Žaucer 2005) and Czech (Kyncl 2008).

- (118) Elle veut un livre. French
she wants a book Marion Selosse p.c.
 'she wants to have a book'
- (119) Vsak Slovenec mora vsaj enkrat na Triglav. Slovene
every Slovenian must at-least once onto Triglav Marušič and Žaucer 2005:234
 'Every Slovenian must go up Mount Triglav at least once.'
- (120) Jan musí domů. Czech
Jan must home Kyncl 2008:175
 'Jan must go home.'

The data in (108)- (118) make clear that a consistent overview of this phenomenon is lacking as the set is far from complete: It is first of all unknown whether Icelandic and English are the only two Germanic languages that lack non-verbal complements, and whether there are any specific restrictions in the other languages. It is furthermore unknown which complements with which types of modals are available in languages besides the Germanic languages and French, Italian, Slovene, and Czech.

The data furthermore make clear that the phenomenon is an example of microparametric variation in the Germanic languages: There is a distinction between languages in which the modal verbs are and are not able to license particle complements (most Germanic languages versus English and Icelandic), for instance, and there are different possibilities and restrictions per language. There are restrictions with respect to the modal verb (the impossibility of *zullen* 'will' with non-verbal complements in Dutch (121)), and with respect to the licensing category (the impossibility of CP complements in all languages except for Afrikaans (122) (Biberauer & Oosthuizen 2011:5)).

- (121) Ik moet/*zal naar huis. Dutch
I must will to house
 'I must/will go home.'

- (122) Ek sal dat Wanda die boeke bestel. Afrikaans
I will that Wanda those books order Biberauer & Oosthuizen 2011:3
 ‘I will make sure that Wanda orders the books.’

Following the thesis of a Universal Grammar (Chomsky 1957), the cross-linguistic differences need to be explained. In order to explain the variation, however, a systematic overview of the possibilities and restrictions of the phenomenon in the different languages must be created first. By investigating the possibilities of modals and their complements in a number of languages, hypothesis 1 and the sub hypotheses can be tested: Are the theoretically motivated correlations between the interpretation of the modal and the possible complements supported by the empirical data?

2.4. Diachronic change

In the previous section it was shown that at least two of the Germanic languages radically differ in the licensing possibilities of the modal verbs: In contrast to the other Germanic languages, the modal verbs in Modern English (123) and Modern Icelandic (124) do not seem to be able to license particle complements; nominal and sentential complements are unavailable in at least English as well²¹. Within the framework of a Universal Grammar this split within the Germanic language family is intriguing: How can verbs in closely related languages differ this radically in their complementation pattern?

- (123) He must *(go) home. English
 (124) Hann geta *(fara) heim. Icelandic
he will go home Asgrímur Agantýsson p.c.
 ‘He will go home.’
 (125) He can *(have) a cookie.
 (126) He can *(make sure) that Wanda orders the books

The explanation of the present day situation is found in diachronic change, as diachronic change leads to synchronic variation. The modal verbs in older stages of English had the ability to combine with prepositional predicates and direct objects (127); modals in older stages of Icelandic had at least the ability to combine with adjectival predicates (128).

- (127) a. þenne heo wulle ut of þon licome Old English
then she will out of the body
 ‘then she (the soul) wants out of the body.’
 (ca. 1100; *Morris’ Homilies* i. 35 in Visser 1963-1973:164)
 b. euerych bakere of þe town...shal to the þe clerke of þe town a penny
every baker of the town... owes to the clerk of the town a penny
 (a1400: *Usages of Winchester*, p.64; Visser 1963-1973, §549; in Roberts 1993:313)
 (128) Spakt skyldi it ellzta barn. Old Norse
good-NOM must-3.SG the oldest child

²¹ Exceptions are with *would* (fn. 6), *need* (i), *dare* (ii); following Palmer (1979:127) and his analysis of *need* and *dare* as being both lexical and modal, it is shown in chapter 3 that in these cases the verbs are not modal, but lexical (fn. 8).

- (i) I need a bike. (ii) I dare you.

‘the oldest child must be good’
(ca. 1150; *First Grammatical Treatise*; translation George Walkden)

In order to understand the variation present in the Germanic languages, the loss of this phenomenon in the older stages of English and Icelandic needs to be studied. If it is known when, how, and most importantly why it was lost, the cross-linguistic differences are explained within a Universal Grammar. Moreover, the information gained about the different types of complements might be used to test sub hypothesis 1a about the differences between particle, prepositional, and adjectival complements as opposed to nominal and sentential complements. In chapter 4 the loss of non-verbal complements in the history of English is studied; in the following sections an introduction to the English modals, an overview of the present data, and a summary of the current theories on the loss are given. The implications of the study on English for the Icelandic case is discussed at the end of section.

2.4.1. English modals

In Old English, the verbs *agan* ‘to owe’, *cunnan* ‘can’, *magan* ‘may’, *motan* ‘must’, *sculan* ‘shall’, and *þurfan* ‘need’ formed a separate class of verbs together with the now obsolete verbs *witan* ‘to know’, *dugan* ‘to suffice’, *durran* ‘to dare’ *mon* ‘need’, *munan* ‘to remember’, (*be-/ge-*)*nugan* ‘to suffice’ and *unnan* ‘to grant’. These twelve verbs are called the preterite-present verbs since the strong past paradigm was used as the present paradigm; the weak past formed the past paradigm. They are furthermore morphologically marked by the absence of the *þ*-ending in the third person singular (Lightfoot 1979:101-102).

It is uncontroversial that in Old English (until 1150) the preterite-present verbs resembled main verbs in a number of properties: Besides the fact that they could license non-verbal complements, they had non-finite forms (129)a and they could be iterated (129)b. Moreover, all verbs, including the modal verbs, could precede *not* (129)c, and could be inverted (129)d (Roberts 1985:21-24).

- (129) a. but it sufficeth too hem to kunne her *Pater Noster*...
but it suffices to them to know their Pater Noster...
(?c1425 (?c1400) *Loll. Serm.* 2.325 in Roberts & Roussou 2003:38)
- b. Who this booke shall wylle lerne...
He-who this book shall wish learn...
He who wishes to master this book.
(c1483 (?a1480) Caxton, *Dialogues* 3.37 in Roberts & Roussou 2003:38)
- c. If I gave not this accompt to you
If I gave not this account to you
‘I did not give this account to you.’
(1557: J. Cheke, Letter to Hoby; Görlach 1991:223 in Roberts & Roussou 2003:38)
- d. How cam’st thou hither?
How camest thou here?
‘How did you come here?’
(1594: Shakespeare, *Richard III* in Roberts & Roussou 2003:38)

It is also uncontroversial that in Modern English (from 1700 onwards), a subset of the preterite-present verbs plus the reanalyzed anomalous verb *willan* ‘will’ form a class that is morphologically and syntactically distinct from main verbs. The original past forms of these verbs normally do not function as past tenses any more, which is the reason why they are normally treated as separate verbs in studies on English modals (Palmer 1979:43). The eleven verbs *can*, *could*, *may*, *might*, *must*, *shall*, *should*, *will*, and *would* cannot license direct objects (116), they do not have infinitival forms (130)a, and they cannot be iterated (130)b. Moreover, as opposed to lexical verbs, only the modals can precede negation (130)c, and can occur before the subject in inversion contexts (130)d. In these respects the modals function like auxiliaries (Roberts 1985:21).

- (130) a. *To can swim is useful.
b. *He shall must do it.
c. *I not can speak Chinese.
d. *How many languages you can speak?

What happened in the Middle English (1150-1500) and the Early Modern English (1500-1700) period is controversial: Lightfoot (1979) combines the changes in (129)-(130) and speaks of a ‘radical restructuring’ of the English auxiliary system at the end of the fifteenth Century. The category ‘modal’ arises and directly afterwards, the quasi-modals *be going to*, *be able to* and *to have to* appear in the language (Lightfoot 1979:112). These analytical verb phrases are semantically equivalent to the modal verbs, but have the properties of lexical verbs.

Plank (1984) opposes to Lightfoot’s analysis by stating that the changes in (129)-(130) cannot be linked because they occurred over different time spans. Moreover, the appearance of the quasi-modals in English both preceded and antedated the fifteenth Century (Plank 1984:320-322). Plank furthermore argues that the syntactic changes should not be viewed in isolation since many morphological and semantic changes took place in the same period. The modals changed in meaning, for instance, and the subjunctive was lost in the fifteenth Century as well (Plank 1984:345).

2.4.2. Non-verbal complements of modal verbs: a case study

The debate set out in the previous section makes clear that a thorough study on the loss of the non-verbal complements in the English language is necessary. Since a group of verbs was able to combine with non-verbal complements in its lexical period, but not in its functional period, a precise description of the phenomenon in the history of English and of its loss will ultimately strengthen one of the presented analyses.

The data

The most extensive collection of modal verbs with non-verbal complements in older stages of English is from Visser (1963-1973). Visser collected a great number of examples of modal verbs with direct objects (§548-§568), and with prepositions and particles, which he called ‘directional adjuncts’ (§178). In this collection direct objects occurred in combination with the modal verbs *shall*, *should*, *can*, *could*, *may*, *might*, *will*, and *would*; prepositional and particle

predicates occurred in combination with the modal verbs *shall, should, will, would, may, might, must, and can*, plus the now obsolete preterite-present verbs *mun* ‘to remember’ (131) and *mote* ‘to be allowed to’ (132). The latest example furthermore is from 1898:

- (131) Thou mon to Paris to the King.
you remember to Paris to the king
 ‘You remember that you should go to Paris to the king.’
 (c. 1475 *Rauf Coilzear* 425 in Visser 165)
- (132) Now fele I that myn herte mot a-two.
now feel I that my heart must in-two
 ‘Now I feel like my heart is split in two.’
 (c.1374 Chaucer *Troilus* III 1475 in Visser 165)
- (133) What would you?
 (1898, Anthony Hope *Rupert of Hentzau* 64 in Visser 1963-1973:504)

Besides Visser’s collection the phenomenon has not been studied in any detail; it is merely mentioned as an argument in favor for either the radical (Lightfoot 1979, Roberts 1985, 1993, Van Kemenade 1990, Roberts and Roussou 2003, Barbiers 2005a and Coupé and Van Kemenade 2008) or the more gradual analysis of the change of English modal verbs (Plank 1984).

The current theories

Two analyses have been proposed to explain the loss of non-verbal complements of modal verbs in English. The first proposal is in Roberts (1985, 1993). Roberts follows Lightfoot (1979) and connects the loss to the ‘radical restructuring’ of the modals in the 15th Century. He claims that the change from a main verb to an auxiliary led to the loss of argument structure: While lexical elements can assign argument structure, functional elements cannot (Roberts 1985:30). Therefore, the possibility of having a complement other than a verb was lost.

Following Roberts, Roberts and Roussou (2003) analyze the loss of direct objects as a side-effect of the radical restructuring of the modals. The loss of the infinitival morpheme – *e(n)* had led to the restructuring of the modal clause: In Old and Middle English, modals were in a biclausal configuration, in which the higher T^0 attracted the modal verbs to V^0 and assigned tense to them, while the lower T^0 assigned the infinitival morpheme *-en* to the lexical verb in V^0 (134)a (Roberts & Roussou 2003:41). Once the morpheme was lost, there was no evidence for the presence of the lower TP, and hence, there was no evidence for a biclausal structure. The structure was reanalyzed as monoclausal within which the modal verb is base-generated in T^0 (134)b (Roberts and Roussou 2003:41).

- (134) a. [TP modal [VP t_{modal} [TP T [VP V]]]]
 b. [TP modal [VP V]]

This process of grammaticalization of modal verbs in its turn caused the loss of the argument structure since elements in functional heads cannot assign argument structure (Roberts

1985:30). This means that the possibility of having a complement other than a verb was lost (Roberts & Roussou 2003:42).

A second hypothesis about the loss in English comes from Barbiers (2005a) and is followed by Coupé and Van Kemenade (2008). Barbiers assumes that there are two positions for modal verbs (135), and that, abstracting away from terminological differences, modal1 is a position for both deontic and epistemic modality while modal2 is a position for deontic modality only. A non-verbal complement is available when the modal is in the position modal2, since the modal in this position directly selects for the complement, which is in RootP.

(135) [TP modal1 [vP subject [modal2 [RootP]]]]

The cross-linguistic variation can be explained if we assume that English, in contrast to the other Germanic languages, does not have a modal2 position. Evidence for the lack of this position comes from the absence of infinitival and participial forms of modals, which are always licensed in a low position, and from the absence of double modals. These facts suggest that the modals always have to be in the higher position. Since Modern English does not have the modal2 position, it does not have non-verbal complements.

Barbiers's hypothesis is that English has lost the modal2 position when it became obligatory to move the verb from Root^0 to v^0 . The overt movement was caused by the deprived verbal inflectional system; the verb moves up to compensate for this loss of inflection. For a verb to obligatorily move up, which resulted in the famous word order change in English from OV to VO (Van Kemenade 1987 among others), there cannot be a verb intervening in between the two positions. As a result, the modal2 position was lost:

(136) [TP modal1 [vP subject [~~modal2~~ [RootP]]]]



Coupé & Van Kemenade (2008) slightly modify Barbiers's analysis in order to extend the analysis to the history of Dutch modal verbs; this modification is irrelevant for the present purposes, however.

Icelandic as a test case

The recent finding of a modal verb complemented by an adjective from ca. 1100 in the *Icelandic Parsed Historical Corpus* puts Barbiers's theory to the test²². The availability of modals with adjectival complements, combined with the knowledge that this structure is unavailable in Modern Icelandic, turns the development of this language into the perfect test case. If, after further investigation, it is shown that the phenomenon was fully productive in earlier stages of Icelandic, any theory that wants to explain the loss of non-verbal complements in general needs to cover this second instance as well.

²² Roberts's (1985, 1993) theory only covers modal verbs with direct objects; as this phenomenon is still available in Modern Icelandic (section 1.1.), Roberts's theory cannot be carried over to the Icelandic case.

When Barbiers's analysis is carried over to the Icelandic case, the main problem that shows up is that Icelandic has not undergone any of the changes mentioned for English: In Modern Icelandic, the modal verb can still be doubled, for instance (Thráinsson & Vikner 1995:77):

- (137) Þau munu vilja byggja hús. Thráinsson & Vikner 1995:77
they will want-INF buy-INF house
'They are said to want to build a house.'

The sentence in (137) is problematic for Barbiers's theory: Since modal verbs can be doubled, the modal2 position is available. As such, non-verbal complements of modal verbs should be allowed. The prediction of this theory is not borne out since adjectival complements are not allowed in Modern Icelandic.

One way out for Barbiers's theory would be to identify two causes, one for English and one for Icelandic; although this solution is less favorable because it goes against the principle of simplicity – the most efficient analysis for two closely related languages that have undergone the same change is to assume one causal effect – it is considered a possibility.

2.4.3. Set-up

A large-scale quantitative analysis can provide us with more information about the loss of preterite-presents with non-verbal complements; this can provide support for the current theories on the change of the modals and their complements in the history of English.

Moreover, the case study can be used to test the theory that non-verbal complements of modal verbs need to be divided into two categories. Kroch (1989) hypothesized that phenomena that have one underlying cause, show a similar rate of change through time; he called this the *Constant Rate Hypothesis* and provided evidence by reanalyzing the replacement of *have* by *have got* in British English, the rise of the definite article in Portuguese possessive noun phrases, the loss of verb-second word order in French, and the rise of periphrastic *do* in English. Kroch thus combines theories on E-language with theories on I-language as a single underlying cause for language change can manifest itself at different times in different contexts (Kroch 1989:205).

Kroch's idea can be applied to the modal case as the different complements can be treated as the different contexts in which language change occurs. Following hypothesis 1a it is expected that the application of Kroch's technique of the logistic transformation results in different rates of change for preterite-presents combined with nominal and sentential complements, and for preterite-presents combined with prepositional, particle, and adjectival complements.

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

A further strengthening of hypothesis 1a comes from a different time of loss; the estimations of the loss of preterite-presents with direct objects range from the end of the fifteenth Century

(Lightfoot 1979) until the seventeenth Century (Plank 1984:310). If the time of the loss of preterite-presents with directional complements is before or after this period, this helps identify two different causes that led to the loss of the phenomena.

2.5. Review and a quick look ahead

In this chapter the literature on modal verbs and their complements have been discussed, both in synchronic and diachronic perspective; moreover, the necessary ingredients for carrying out the case studies on the phenomenon have been defined. At this point the literature supports the four hypotheses that were stated in the introduction, namely that:

- the phenomenon of modal verbs with non-verbal complements falls within two types;
- dynamic modal verbs have argument structure and as such can combine with nominal and sentential complements;
- deontic and epistemic²³ modal verbs do not have argument structure and as such can combine with prepositional, particle, adjectival and verbal complements;
- prepositional, particle, and adjectival complements are Small Clause predicates.

In the next two chapters further support is expected to be found for these hypotheses. The results from the case study on modal verbs and their complements in the Modern European languages is expected to show major differences between the possible combinations of modal verbs with direct objects and embedded sentences on the one hand, and the possible combinations of modal verbs with prepositional, particle, and adjectival predicates on the other hand. This is also expected to show up in the case study on preterite-presents and their complements in the older stages of English; the two phenomena are expected to have a different rate of change and a different time of loss. Finally, the verbs that combine with direct objects and embedded sentences are expected to have argument structure and to have a dynamic interpretation, while the verbs that combine with prepositional, particle, and adjectival predicates are expected not to have argument structure and to have a deontic interpretation.

²³ In section 2.3. it has been shown that epistemic modal verbs cannot occur with prepositional, adjectival, and particle complements in Dutch and Norwegian. The theoretically driven null hypothesis is that these complements can be available, which is tested in chapter 3.

3.1.Introduction

In this chapter an overview of modal verbs and their possible complements in 16 Modern European languages is given; with this overview the theses presented in the introduction and elaborated on in chapter 2 are tested. The main thesis is that dynamic modal verbs have argument structure, while deontic and epistemic modal verbs do not have argument structure. From this hypothesis it follows that dynamic modal verbs can select for different types of complements, while deontic and epistemic modal verbs can only be expected to combine with prepositional, particle, and adjectival complements; only these complements satisfy the EPP without needing an agent theta role. Summarizing, the three hypotheses to be tested in this chapter are:

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

Hypothesis 1b: Only dynamic modal verbs can combine with nominal and sentential complements.

Hypothesis 1c: Deontic and epistemic modal verbs can combine with particle, prepositional, and adjectival complements.

In order to test the three hypotheses, data from 16 Modern European languages were collected by means of a questionnaire: In the next section the method is described with the modal verbs were studied in these languages; the selection of the modal verbs is based on the syntactic and the semantic requirement given in chapter 2 and repeated below. The selection results in an overview of the modals presented in section 3.3.1. In section 3.3.2, the modal verbs are classified according to the five categories identified in chapter 2, represented in figure 2, plus four more specific classifications for dynamic modality. In section 3.4. the different types of complements are linked to the different modal verbs in their specific interpretations; this forms the test for the three hypotheses.

Syntactic requirement: Modal verbs pattern with auxiliaries in that they can combine with a second verbal element in the same clause.

Semantic requirement: Modal verbs express epistemic, deontic, and/or dynamic modality.

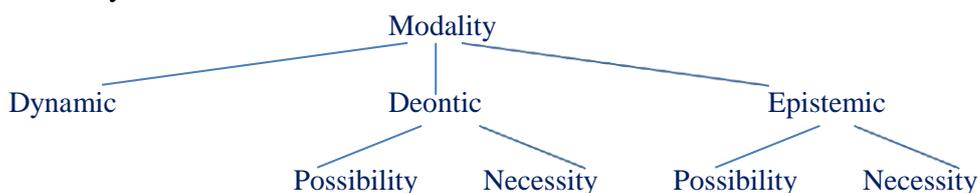


Figure 2: Five interpretations of modality

3.2.Method

The method of the questionnaire gives us a consistent overview of the microvariation present in different languages. With this method, it is possible to ask native speakers of different languages about one specific phenomenon; the data can therefore easily be compared.

Languages

Data were collected from four different language families with a total of twenty-one different languages. Since this thesis focuses on the Germanic languages, the major part of this language family was included: All the official languages are included, plus a number of dialects. The twelve languages represented in this study are English, Dutch, Afrikaans, Frisian, German, Swiss German (as spoken in Bern, Zürich and Lucerne), Luxembourgish, Alsatian, Icelandic, Danish, Norwegian and Swedish.

In order to make a comparison with other language families, eleven languages from three other Indo-European language families were furthermore included. From the Celtic language family, Scottish Gaelic, Irish and Welsh were investigated; French, Italian (as spoken in the North of Italy), and Romanian are the three representatives of the Romance family; from the Slavic language family these are Bulgarian, Czech, Polish, Russian, and Serbian.

Informants

A questionnaire was sent out to two (or more) native speakers of each of the twenty-three languages. The informants were first asked about their native language(s), about the other languages that they speak and about the country or region in which they have spent most of their lives. The latter two questions were present to make sure that the target language is not influenced too much by other languages.

The group of thirty informants consists out of two groups that are both involved with the technical side of language on a daily basis, namely students of linguistics and professional translators. These informants were selected since some linguistic knowledge is required for answering the questions.

Questionnaire

In order to consistently collect the answers on a number of questions, a questionnaire was sent to all informants. This questionnaire can be found in appendix 1. The level of difficulty of the questions increased throughout the questionnaire; the first questions were merely introductory as the phenomenon under investigation is somewhat complicated and may be unfamiliar to some informants. After all, some speakers might not be aware of the existence of this phenomenon since it is not available in all languages. In order to give the informants more guidance, the answers for English and Dutch were provided in order to show a range of possible answers. After each question, the informants were given the opportunity to write down the comments or questions that they had.

The first question in the questionnaire was about the modal verbs in the language under investigation. In the introduction to this question, it was explained that modal verbs combine a syntactic component with a semantic component: Syntactically, modal verbs are able to function as an auxiliary verb, which means that they should be able to be followed by

a second verbal element in the same clause. Semantically, modal verbs carry a deontic, an epistemic, or a dynamic modal interpretation. It was also mentioned that the modal verbs might show different syntactic behavior as a group, which could help the informants in their selection process.

Based on this description, which follows the syntactic-semantic definition of a modal verb set up in chapter 2, the informants were asked whether the target language has modal verbs. If the language has one or more modal verbs, they were asked to write them down with a rough translation.

The second set of questions is about the possible complements of modal verbs. These questions will lead to an overview of the microparametric variation. In the introduction to this question it is explained that in some languages, modal verbs do not need infinitival complements, but instead, can occur with non-verbal complements; an example is given of a prepositional complement. The informants are first asked whether the modals in the target language can have infinitival complements. Secondly, examples are given of a prepositional, an adverbial, a particle, an adjectival, a nominal, and a complementizer complement; the informants are asked whether the modals in their language can have one of these types of complements. In case a type of non-verbal complements is available, the informants are asked to give a glossed example. Finally, the informant is asked to list all the modal verbs that can occur with each of the available non-verbal complements in the target language. Combining the translations of the verbs with this information, it is possible to make an overview of the interpretations of the verbs and the possible complements for each language.

Distribution and collection

The questionnaires were sent by e-mail; the informants were asked to rely on their native judgments by answering the questions. After the responses had been collected, the data were analyzed. In order to have reliable results only those languages were included from which two or more filled out questionnaires were received; Swedish and Alsatian were excluded for this reason.

The Slavic languages were furthermore excluded from this study: The different sets of modal verbs that two informants gave for the same Slavic language supported the idea that modal verbs are not perceived as a special class in these languages (Clancy 2010). This idea was further strengthened by the different sets of verbs covered by the label ‘modal verbs’ in studies on Slavic modality (Kakietek 1980 on Polish, Weidner 1986 on Russian, Kyncl 2008 on Czech, Rudin 1983 on Bulgarian, Clancy 2010 on Russian, Czech, Polish, and Bulgarian, and Hansen 2001 on Polish, Czech, Russian, Serbian/Croatian, and Old Church Slavonic) and by the useful information given by linguists working on the Slavic languages. Because accurate information is not available on the identification of the verbs that belong to the set of modals, or on the possible modal interpretations of these verbs, the data from the Slavic languages are discussed in a separate section; this can be found in appendix 4.

Verification of the results

The results from questionnaire 1 lead to a preliminary classification of modal verbs in the different languages, their interpretations, and their possible complements. The exact classification of modality as it was set up in chapter 2, however, was too technical to include

in the questionnaire; in order to make a final classification based on the semantic and syntactic characteristics the preliminary classification was sent out to linguists, if possible linguists working on modality, and asked them to check the results. For this the list of possible complements in their language were given, and the modal verbs with their specific interpretations combined with the possible complements as filled out by the first set of informants. An example for Norwegian is in figure 3.

<u>Non-verbal complements in Norwegian:</u>				
1. Nominal	–	Jeg kan engelsk .		
2. Sentential	–	Jeg ville at han skulle like meg .		
3. Preposition	–	Jeg skal til Oslo .		
4. Particle	–	Jeg skal ut .		
<u>Possible combinations in Norwegian:</u>				
Verb	Interpretation	Example in English	Possible complements	Comments?
<i>kunne</i>	‘to be skilled’	‘I can speak Dutch.’	only nominals, but restricted (<i>John kunne Dutch; *I kunne a bike</i>)	
	‘to be allowed to’	‘John can go home; the rest needs to stay until 5PM.’	none of the above	
<i>ville</i>	‘to want’	‘I want to leave.’	all complements (nominal, sentential, preposition, particle)	
	‘to promise’	‘I will call you tonight.’	only prepositions and particles	
	‘to be obliged to’	‘You will do your homework today.’	only prepositions and particles	
<i>burde</i>	‘to be obliged to’	‘John must go home because he forgot his homework.’	only prepositions and particles	
<i>måtte</i>	‘to be obliged to’	‘John can go home; the rest needs to stay until 5PM.’	only prepositions and particles	
<i>skulle</i>	‘to promise’	‘I will call you tonight.’	only prepositions and particles	
	‘to be obliged to’	‘John must go home because he forgot his homework.’	only prepositions and particles	

Figure 3: Check for Norwegian modals and their complements

The contexts in the column ‘example in English’ provided the informant with the exact interpretation; these interpretations are discussed in section 3.3. Because the informants were all linguists, the importance of having this exact interpretation is obvious to them.

In contrast to a questionnaire, the method of verifying data has a drawback. Since there are no original data elided, but instead, given data are checked, the chance of missing combinations is present. In a new questionnaire the linguists could have come up with new modal verbs that match the syntactic criteria, or with new interpretations of the modals that had already been recorded. Because of two reasons, a new questionnaire would not be the best option: First of all, there were a number of complaints about the first questionnaire. It was

generally thought of as being too long. Since I did not want to ask the linguists for more time than absolutely necessary, a simple check of the data is the better option. Moreover, it turned out that the second group of informants, as they are linguists, very easily added new modal verbs and new interpretations to the data. I am therefore confident that the method used lead to a reliable overview of the modal verbs, their interpretations, and their possible complements in the European languages.

3.3.Modals in the European languages

In this section the classes of modal verbs and their interpretations in the twenty European languages are discussed. In section 3.3.1. the classes of verbs are identified based on the morphosyntactic and semantic criteria; in section 3.3.2 their interpretations are discussed.

3.3.1. The selection of the modals

In order to be able to compare the syntactic and semantic behavior of modal verbs across different languages and different language families, the modals need to pass the syntactic and semantic requirement. Based on the information given by the informants, and the additional information in language-specific grammars, it will be checked in this section which of the modals carry an epistemic, deontic, and/or dynamic interpretation, which of the modals can function as modal auxiliaries, and which of the modals display extra syntactic and/or morphological characteristics that further mark the auxiliary status.

Germanic In the Germanic languages, epistemic, deontic, and dynamic modality are encoded in a set of morphosyntactically distinct verbs. All verbs that were enlisted as modal verbs by the informants meet the semantic requirement: Both the informants and the language-specific grammars give an epistemic, a deontic and/or a dynamic interpretation.

The modal auxiliaries are syntactically easy to distinguish in Germanic; besides the fact that they can be followed by an infinitive, these verbs are marked by two special properties. First and foremost, the verbs can be followed by a bare instead of a full infinitive: In English, for instance, the particle *to* is lacking for the modal verbs (15).

- (15) a. I can drive a car.
b. I want to drive a car.

Two special verbs in this sense are the equivalents of *need* and *dare*: In Dutch, for instance, these verbs need to occur with a *to*-infinitive when they are finite (16)a, but they can occur without *to* when they are infinite (16)a. In other languages, like German, *brauchen zu* ‘need to’ is still the norm, but there are examples found on the internet in which *to* is absent. Only include equivalents of *need* and *dare* that are accepted without *to* are included in this study.

- (16) a. Hij hoefde dat niet *(te) zeggen. Dutch
he need that not to say-INF
‘He didn’t have to to say that.’
b. Hij had dat niet hoeven (te) zeggen.
he had that not need-INT to say-INF

‘He didn’t need to say that.’

The Scandinavian languages are a second exceptional case. Thráinsson et al. (2004:308) and Eide (2005:57ff) mention certain dialects in Faroese and Norwegian in which there is a semantic distinction between modals occurring with and without a *to*-infinitive; in Icelandic, moreover, *to*-selection seems to be idiosyncratic as there has not yet been given a syntactic or a semantic explanation for the distribution of modal verbs occurring with a full or a bare complement (Thráinsson 2007:422). In this study only modal verbs that can occur with a bare infinitive are included as *to* is seen as a tense marker in generative grammar that heads the Tense Projection (Chomsky 1965), and as such might influence the underlying structure. The pseudo-modals, which are followed by a full infinitive, are therefore disregarded in this study. In a follow-up study it would be interesting to investigate the distribution of *to*.

Besides the occurrence with bare infinitives, modal verbs in the Modern Germanic languages are ancestors of the class of older Germanic preterite-present verbs (Lightfoot 1979:101-102) which is still visible in the lack of inflection in the third person singular. This requirement obviously does not hold for the Scandinavian languages that do not show verbal inflection anymore; for some of these languages, however, the class is still morphologically distinct since the *-er* ending in the present tense is lacking (Eide 2005:19). The most specific requirements are applied to the English modals, which are the NICE properties (section 2.4).

In language-specific grammars the information given by the informants was checked; the complete set of verbs per language with a basic translation is in table 3.

Table 3: Modal verbs included from the Germanic languages

Language	Verb	Translation	Language	Verb	Translation
Afrikaans (Source: Donaldson 1993:240- 257)	<i>kan</i>	‘can’, ‘to be able to’	German (Source: Donaldson 2007:131- 135)	<i>dürfen</i>	‘may’
	<i>mag</i>	‘may’		<i>können</i>	‘can’, ‘to be able to’
	<i>moet</i>	‘must’		<i>müssen</i>	‘must’
	<i>sal</i>	‘will’		<i>mögen</i>	‘may’, ‘to like’
	<i>wil</i>	‘to want’		<i>sollen</i>	‘shall’
				<i>wollen</i>	‘to want’
Danish (Source: Brandt 1999:69- 76)	<i>burde</i>	‘should’	Icelandic (Source: Thráinsson 2007:421- 422)	<i>geta</i>	‘may’
	<i>kunne</i>	‘can’, ‘to be able to’		<i>mega</i>	‘may’
	<i>mätte</i>	‘may’, ‘must’		<i>munu</i>	‘will’
	<i>skulle</i>	‘must’		<i>skulu</i>	‘shall’, ‘must’
	<i>turde</i>	‘dare’		<i>vilja</i>	‘want’
	<i>ville</i>	‘will’, ‘to want’			
Dutch	<i>durven</i>	‘dare’	Luxem- burgish (Source: Bruch 1973:74- 75)	<i>däerven</i>	‘may’
	<i>hoeven</i>	‘need’		<i>kënnen</i>	‘can’, ‘to be able to’
	<i>kunnen</i>	‘can’, ‘to be able to’		<i>magen</i>	‘may’
	<i>mogen</i>	‘may’, ‘to like’		<i>mussen</i>	‘must’
	<i>moeten</i>	‘must’		<i>sollen</i>	‘shall’
	<i>willen</i>	‘to want’		<i>wëllen</i>	‘to want’
	<i>zullen</i>	‘will’			
English (Source: Palmer)	<i>can</i>		Norwegian (Source: Eide)	<i>burde</i>	‘ought to’
	<i>could</i>			<i>kunne</i>	‘can’, ‘to be able to’
	<i>dare</i>				

1979)	<i>must</i> <i>may</i> <i>might</i> <i>need</i> <i>shall</i> <i>should</i> <i>will</i> <i>would</i>		2005:19)	<i>mätte</i> <i>skulle</i> <i>ville</i>	‘must’ ‘shall’ ‘to want’
Frisian (Source: Tiersma 1985:114- 116)	<i>kinne</i> <i>mei</i> <i>moat</i> <i>sil</i> <i>wol</i> <i>doare</i>	‘can’, ‘to be able to’ ‘may’ ‘must’ ‘will’ ‘to want’ ‘dare’	Swiss- German	<i>chönne</i> <i>dörffe</i> <i>möge</i> <i>müesse</i> <i>sölle</i> <i>wöuue</i>	‘can’, ‘to be able to’ ‘may’ ‘may’ ‘must’ ‘should’ ‘to want’

Celtic The Celtic languages have a small set of verbs in which modality is encoded. More common ways to encode modality are idiomatic expressions, modal adverbs and particles, and impersonal constructions (Lamb 2001:58-60). The Celtic languages do not have infinitival verb forms; instead, verbal nouns (VNs) are used. The VNs can occur only with auxiliaries in the same clause (King 2003:131), which shows that their behavior in this respect is the same as infinitives in Germanic.

The two Irish verbs that meet the semantic and the syntactic requirement are *caithfidh* ‘must’ (17) and *féadaidh* ‘can’ (18), which are literally the analytic futures of *caith* ‘use’ and *féad* ‘to be able’. Just as the auxiliary verbs they are followed by a verbal noun in the same clause. The verbs differ morphologically from other verbs in that they lack a past tense paradigm (McQuillan 2009:78). This behavior is confirmed by the informants.

- (17) *Caithfidh mé imeacht anois* Irish
use-will I leave-VN now
‘I have to leave now.’
- (18) *Ní fhéadfaidh sin a bheith amhlaidh.*
not can-will that to be-VN so.
‘That cannot be so.’

There are two Scottish Gaelic verbs that meet the semantic and syntactic requirement, namely *feum* ‘must’ (19) and *faod* ‘may’ (20) (Lamb 2001:58). Both verbs can, just as other auxiliaries in Scottish Gaelic, be followed by a verbal noun. One informant states that *feum* and *faod* differ from other auxiliaries in that they do not have an inflectional past tense.

- (19) *Feumaidh mi dhol dhan bhùth.* Scottish Gaelic
must-will I go-INF to shop
‘I must go to the shop’
- (20) *Faodaidh tu snàmh.*
may-will you swim-INF
‘You may swim.’

In Welsh, there are many verbal elements that express modality. *Gallu* ‘can’ and *medru* ‘can’, ‘to be able to’ are followed by a verbal noun, just as auxiliaries. *Gallu* and *medru* can furthermore be morphologically distinguished from other verbs that express modality since they do not have inflectional past tenses (King 2003:203); this behavior was confirmed by one informant. The informant states that instead of a past tense, a conditional form is used (22).

- (21) *Galla i fynd nawr.* Welsh
can-1.SG I go-VN now King 2003:208
 ‘I can go now.’
- (22) *Gallwn i fynd.*
can-1.ev.COND I go-VN
 ‘I could go.’

Romance The Romance languages have different ways to encode modality. Besides synthetic means such as the conditional, the three languages under investigation have a number of auxiliaries that encode modality. The verbs that meet the semantic and syntactic requirement are in table 4.

Table 4: Modal verbs in the Romance languages

Language	Verb	Translation
French	<i>vouloir</i>	‘to want’
	<i>savoir</i>	‘to know’
	<i>pouvoir</i>	‘can’
	<i>devoir</i>	‘must’
Italian	<i>volere</i>	‘to want’
	<i>sapere</i>	‘to know’
	<i>potere</i>	‘can’
	<i>dovere</i>	‘must’
Romanian	<i>voi</i>	‘to want’
	<i>pot</i>	‘can’

The Romance modal verbs do not have any extra syntactic or morphological characteristics; the only property that sets between these verbs aside is that they can occur with an infinitive in the same clause (23)-(24) (Ledgway 2012:119).

- (23) *Jean doit faire du vélo.* French
Jean must do-INF of-the bike
 ‘John must ride a bike.’
- (24) *Gianni sa pedalare.* Italian
Gianni knows bike-INF
 ‘John can ride a bike.’

A note on Romanian: In Romanian, the equivalents of *to want* and *must*, *chtít* and *trebui*, are excluded since these verbs cannot combine with an infinitive. Instead, they *only* select for an embedded complementizer clause²⁴.

- (25) Eu trebuie să vin joi. Romanian
I must-1.SG that come-1.SG.COND Thursday
 ‘I must come on Thursday.’

The fact that the Romanian verbs *voi* ‘will’ and *pot* ‘can’ can select for a complementizer phrase (26)b besides an infinitival phrase (26)a is not a reason to disregard them: According to the definition set up in chapter 2, the fact that they *can* select for a complement that lexical verbs cannot select for, sets them aside from lexical verbs that express modality.

- (26) a. (Eu) pot veni joi. Romanian
I can-1.SG come Thursday
 ‘I can come on Thursday.’
 b. (Eu) pot să vin joi.
I can-1.SG that come-1.SG Thursday
 ‘I can come on Thursday.’

3.3.2. Interpretation of the modal verbs

In chapter 2 five categories of modality were identified: Epistemic necessity, epistemic possibility, deontic necessity, deontic possibility, and dynamic (figure 2). In the following sections the modals presented in the previous section are classified within these five categories.

Epistemic necessity modals evaluate a proposition as necessarily true in all possible worlds. *Epistemic possibility modals* evaluate a proposition as possibly true in some possible worlds. *Deontic necessity modals* express an obligation. *Deontic possibility modals* express a permission. *Dynamic modals* express a force internal to the subject; the informants mentioned seven different forces which are enlisted in table 5.

Table 5: Dynamic modalities identified in the European languages

Interpretation	Example	Sentence
‘to be able to’	<i>can</i>	John can ride a bike.
‘to be skilled in’	<i>sapere</i> (It.)	<i>Gianni sa Italiano.</i> <i>Gianni knows Italian</i> ‘John can speak Italian.’

²⁴ These structures are not considered to involve CP complements: Just as in a number of Slavic languages, the embedded CPs do not form a separate proposition but instead, they are part of the proposition in the main sentence (Rudin 1983). One diagnostic for the analysis that the CPs are not separate propositions is that the embedded verb is always in agreement with the subject in person and number:

- (i) *(Eu) trebui să vinit joi
I must-1.SG that come-3.SG.COND Thursday

‘to want’	<i>wil</i> (Af.)	Jan wil fietsry. <i>Jan will bike-ride</i> ‘John wants to ride a bike.’
‘to like’	<i>mögen</i> (G.)	Jan mag es, dass du die Tür grün gestrichen hast. <i>Jan may it that you the door green painted have</i> ‘John likes it that you painted the door green.’
‘need’	<i>need</i>	John needs a bike.
‘dare’	<i>dare</i>	Jan doesn’t dare to go home.
‘to promise’	<i>will</i>	I will call you tonight.

The list in table 5 is not meant to be exhaustive; these are merely the meanings that were distinguished by the informants. The first two categories express ability: The subject is able to do something, or is skilled in it. Since there are no languages in which ‘to be able to’ does not mean ‘to be skilled in’, and since it is in general hard to distinguish these two interpretations which both express ability, the two categories are classified together. Volitionality is expressed by the verbs that can mean ‘to want’. A third interpretation is positive or negative feelings towards the object, as discussed in section 2.2, which is translated as ‘to like’; ‘to need’ and ‘to dare’ are two further categories, which show syntactic behavior closest to lexical main verbs (section 2.2., Palmer 1979). A final category is ‘to promise’, which is expressed by modal verbs that also function as indicators of future tense.

Based on the questionnaire, the language-specific grammars and the check by the linguists all modal verbs can be classified in the eleven categories. In table 6 the verbs are enlisted per interpretation.

Table 6: Modals in the Modern European languages

Modality	Sub type	Verbs
Epistemic	Necessity	<i>GERMANIC must, moet (Af.), moeten (Du.), moat (Fri.), müssen (G.), müesse (S-G.), müssen (L.), måtte (Da.), måtte (N.); shall, should, sal (Af.), zullen (Du.), sil (Fri.), sollen (G.), sölle (S-G.), sollen (L.), skulle (Da.), skulle (N.), skulu (Ice.); will, would; need, hoeven (Du.), hoeve (Fri.); burde (Da.); munu (Ice.), mega (Ice.)</i> <i>ROMANCE devoir (Fr.), dovere (It.), voi (Rom.)</i> <i>CELTIC caith (Ir.), feum (Gae.)</i>
	Possibility	<i>GERMANIC can, could, kan (Af.), kunnen (Du.), kinne (Fri.), können (G.), chönne (S-G.), können (L.), kunne (Da.), kunne (N.); may, might, mag (Af.), mogen (Du.), mei (Fri.), mögen (G.), möge (S-G.), mogen (L.); dürfen (G.), dürffe (S-G.), däerven (L.), turde (Da.); willen (Du.); geta (Ice.)</i> <i>ROMANCE pouvoir (Fr.), potere (It.), pot (Rom.)</i> <i>CELTIC féad (Ir.), faod (Gae.), gallu (W.), medru (W.)</i>
Deontic	Necessity	<i>GERMANIC must, moet (Af.), moeten (Du.), moat (Fri.), müssen (G.), müesse (S-G.), müssen (L.), måtte (Da.), måtte (N.); shall, should, sal (Af.), zullen (Du.), sil (Fri.), sollen (G.), sölle (S-G.), sollen (L.), skulle (Da.), skulle (N.), skulu (Ice.); will, would; need, hoeven (Du.), hoeve (Fri.); burde (Da.)</i> <i>ROMANCE devoir (Fr.), dovere (It.), voi (Pot.)</i> <i>CELTIC caith (Ir.), feum (Gae.)</i>
	Possibility	<i>GERMANIC can, could, kan (Af.), kunnen (Du.), kinne (Fri.), können (G.), chönne (S-G.), können (L.), kunne (Da.), kunne (N.); may, might, mag (Af.), mogen (Du.), mei (Fri.); dürfen (G.), dürffe</i>

		(S-G.), <i>däerven</i> (L.); <i>mätte</i> (Da.); <i>geta</i> (Ice.), <i>mega</i> (Ice.) ROMANCE <i>pouvoir</i> (Fr.), <i>potere</i> (It.), <i>pot</i> (Rom.) CELTIC <i>féad</i> (Ir.), <i>faod</i> (Gae.), <i>gallu</i> (W.), <i>medru</i> (W.)
Dynamic	‘to be able to’/ ‘to be skilled in’	GERMANIC <i>can, kan</i> (Af.), <i>kunnen</i> (Du.), <i>kinne</i> (Fri.), <i>können</i> (G.), <i>chönne</i> (S-G.), <i>kennen</i> (L.), <i>kunne</i> (Da.), <i>kunne</i> (N.) ROMANCE <i>savoir</i> (Fr.), <i>sapere</i> (It.) CELTIC <i>medru</i> (W.)
	‘to want’	GERMANIC <i>will</i> (Eng.), <i>would</i> (Eng.), <i>wil</i> (Af.), <i>willen</i> (Du.), <i>wol</i> (Fri.), <i>willen</i> (G.), <i>wöuue</i> (S-G.), <i>wëllen</i> (L.), <i>ville</i> (Da.), <i>ville</i> (N.), <i>vilja</i> (Ice.); <i>mögen</i> (G.) ROMANCE <i>vouloir</i> (Fr.), <i>volere</i> (It.)
	‘to like’	GERMANIC <i>mogen</i> (Du.), <i>mögen</i> (G.); <i>moeten</i> (Du.),
	‘need’	GERMANIC <i>need, hoeven</i> (Du.), <i>hoeve</i> (Fri.), <i>moet</i> (Af.), <i>moeten</i> (Du.), <i>moat</i> (Fri.), <i>mag</i> (Af.), <i>mogen</i> (Du.), <i>mei</i> (Fri.)
	‘dare’	GERMANIC <i>dare, durven</i> (Du.), <i>doare</i> (Fri.), <i>turde</i> (Da.), <i>dare</i>
	‘to promise’	GERMANIC <i>will, shall, sal</i> (Af.), <i>zullen</i> (Du.), <i>sil</i> (Fri.), <i>skulle</i> (Da.), <i>skulle</i> (N.)

In appendix 3 the possible interpretations of the modal verbs that have a common ancestor are included; some of the parallels for the Germanic languages are shown in table 7 and 8. One conclusion that can be drawn from tables 6-8 is that the necessity and possibility modals are separated in all three language families; the single exception is Danish *mätte* which can denote both deontic necessity and deontic possibility (table 7).

A striking fact furthermore is that possibility modals optionally carry the dynamic notions of ability and ‘to like’ (table 7), while the necessity modals optionally carry the dynamic notion of ‘to promise’ (table 78). This seems to provide further empirical evidence for Palmer’s (1979:37) observation that the notions of necessity and possibility are also present in the case of dynamic modality. Further research is necessary before this idea can be applied, however. A third interesting parallel among the Germanic languages is that the verb *will* in English carries interpretations that the Germanic equivalents do not have: Out of the four interpretations that the English modal has (Palmer 1979:108), the Germanic equivalents can only denote volitionality (table 8). This observation will become important later on in this chapter and in the next chapter, when the different possible complements of this verb are discussed.

Table 7: *Can* and *must* in the Germanic languages

Language	Verb	EP	DP	ability	Language	EN	DN	DP	like
English	<i>can, could</i>	+	+	+	<i>must</i>	+	+	-	-
Afrikaans	<i>kan</i>	+	+	+	<i>moet</i>	+	+	-	-
Dutch	<i>kunnen</i>	+	+	+	<i>moeten</i>	+	+	-	+
Frisian	<i>kinne</i>	+	+	+	<i>moat</i>	+	+	-	-
German	<i>können</i>	+	+	+	<i>müssen</i>	+	+	-	-
Luxembourgish	<i>kënnen</i>	+	+	+	<i>müesse</i>	+	+	-	-
Swiss-German	<i>chönne</i>	+	+	+	<i>mussen</i>	+	+	-	-
Danish	<i>kunne</i>	+	+	+	<i>mätte</i>	+	+	+	-
Norwegian	<i>kunne</i>	+	+	+	<i>mätte</i>	+	+	-	-

EP = Epistemic possibility, DP = Deontic possibility

EN = Epistemic necessity, DN = Deontic necessity

Table 8: *Should* and *will* in the Germanic languages

Language	Verb	EN	DN	promise	Verb	EN	DN	promise	volitionality
<i>English</i>	<i>shall, should</i>	+	+	+	<i>will, would</i>	+	+	+	+
Afrikaans	<i>sal</i>	+	+	+	<i>wil</i>	-	-	-	+
Dutch	<i>zullen</i>	+	+	+	<i>willen</i>	-	-	-	+
Frisian	<i>sil</i>	+	+	+	<i>wol</i>	-	-	-	+
German	<i>sollen</i>	-	+	-	<i>willen</i>	-	-	-	+
Luxembourgish	<i>sollen</i>	+	+	-	<i>wëllen</i>	-	-	-	+
Swiss-German	<i>sölle</i>	+	+	-	<i>wöuue</i>	-	-	-	+
Danish	<i>skulle</i>	+	+	+	<i>ville</i>	-	-	-	+
Norwegian	<i>skulle</i>	+	+	+	<i>ville</i>	-	-	-	+
Icelandic	<i>skulu</i>	+	+	-	<i>vilja</i>	-	-	-	+

EP = Epistemic possibility, DP = Deontic possibility

EN = Epistemic necessity, DN = Deontic necessity

3.4.Modals and their complements

The different interpretations of the modal verbs in the sixteen languages can be linked to the available complements for these modals; the overall results are in appendix 2. In this section the hypotheses stated in the introduction of this chapter are tested, namely, that:

- there is a distinction between direct objects and embedded sentences as complements of modal verbs on the one hand, and prepositional, particle, and adjectival complements on the other hand;
- only modal verbs in a dynamic interpretation can select for nominal and sentential complements, while
- deontic and epistemic modal verbs can select for adjectival, prepositional, and particle complements.

In the following paragraphs it is shown that the three hypotheses hold for the majority of the languages; the exceptions and the theoretical consequences of these exceptions are discussed afterwards.

3.4.1. Hypothesis (1a): Directional versus nominal and sentential complements

Strong support is found for the first sub hypothesis, as there are major distributional differences between prepositional, particle, and adjectival complements of modal verbs on the one side, and nominal and sentential complements on the other side; an overview is in table 9.

Table 9: Overview modal verbs and their complements in 16 modern European languages (to be revised)

Language	Class	V	N	S	P/ Part.	A	Language	Verb class	V	N	S	P/ Part.	A
Modern English	dyn.	+	-	-	-	-	Danish	dyn.	+	+	+	+	-
	deon.	+	-	-	-	-		deon.	+	-	-	+	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Modern Icelandic	dyn.	+	+	+	-	-	Norwegian	dyn.	+	+	+	+	-
	deon.	+	-	-	-	-		deon.	+	-	-	+	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Afrikaans	dyn.	+	+	+	+	+	French	dyn.	+	+	+	-	-
	deon.	+	-	+	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Dutch	dyn.	+	+	+	+	+	Italian	dyn.	+	+	+	-	-
	deon.	+	+	-	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Frisian	dyn.	+	+	+	+	+	Romanian	dyn.	+	-	-	-	-
	deon.	+	+	-	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
German	dyn.	+	+	+	+	+	Welsh	dyn.	+	+	-	-	-
	deon.	+	-	-	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Luxembourgish	dyn.	+	+	+	+	-	Irish	dyn.	+	-	-	-	-
	deon.	+	-	-	+	-		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Swiss-German	dyn.	+	+	+	+	-	Scottish Gaelic	dyn.	+	-	-	-	-
	deon.	+	-	-	+	-		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-

V = verbal complement, N = nominal complement, S = sentential complement, P = prepositional complement, Part. = particle complement, A = adjectival complement
 dyn. = dynamic modality, deon. = deontic modality, epi. = epistemic modality
 + = attested, - = unattested, ?- = reanalyzed as a verbal complement

The hypothesis that modal verbs combined with adjectival, particle, and prepositional predicates are radically different from modal verbs combined with direct objects and embedded sentences is supported by the fact that the latter, but not the former type is attested in the Romance and Celtic languages. The split is moreover visible within the Germanic languages, as only nominal and sentential complements are allowed in Icelandic. The single exception for the hypothesis is the distribution of adjectival complements: They cannot immediately be grouped together with the particle and prepositional complements as they do not occur in all languages in which the other two types of complements occur.

Exception 1: Adjectival complements. Adjectival complements can only combine with dynamic and deontic modal verbs in Afrikaans, Dutch, Frisian, and German²⁵:

(27) a. Hierdie muur moet blou.

Afrikaans

²⁵ In German this combination is judged by my informants as highly colloquial but nonetheless correct.

- here-that wall must blue*
 ‘This wall must become blue.’
- b. De muur moet blauw. Dutch
the wall must blue
 ‘The wall must become blue.’
- c. Dizze muorre moat blau. Frisian
this wall must blue
 ‘This wall must become blue.’
- d. Die Mauer kann blau. German
the wall can blue
 ‘The wall can become blue.’

An interesting follow-up study is to find out why adjectival complements are only allowed in these four languages; the fact that the combination of a modal verb and an adjectival complement is (still) highly colloquial in German, and not accepted in German dialects like Luxembourgish and Swiss-German suggests that it is a recent innovation in at least this language.

A second exception concerning the adjectival complements is that even within the four languages that accept adjectival complements, they do not combine with all deontic and dynamic modal verbs. None of the informants found adjectival complements acceptable with modal verbs expressing ‘to want’, ‘to be able’, or ‘to dare’; this is most likely due to an unfortunate example in the questionnaire. The question was whether verbs that have dynamic interpretations are acceptable in sentences like (28). The reason that the informants responded with ‘no’ probably is due to the fact that the subject is inanimate and therefore cannot have any desires, abilities, or courage to do something²⁶.

(28) The wall ... blue.

Support for this analysis comes from Dutch, in which some dynamic modal verbs with an animate subject can in the right contexts occur with adjectival complements. Sentence (29)a is grammatical in the context of a story about a unicolored zebra that wants to have stripes, and sentence (29)b can be the response of a child that needs to be washed. In a follow-up study it will have to be tested whether these items, as well as with the other modal verbs²⁷, are available in Afrikaans, Frisian, and German as well.

²⁶ The adjectives *open*, *loose*, and *free* can freely combine with inanimate subjects (i); the similarity with prepositional and particle complements in this respect further supports Bolinger’s (1971) hypothesis that these adjectives have a directional interpretation.

(i) Het melkpak kan open. Dutch
the milk-carton can open
 ‘It is possible to open the milk carton.’

²⁷ Sentences with animate subjects and adjectival complements are questionable with the modal verbs expressing ‘to be able to’ (ii) and ‘to dare’ (iii). More research is necessary.

(ii) ?De andere zebra’s kunnen niet gestreept; zij zijn altijd effen.
the other zebras can-PL not striped they are always unicolored
 ‘The other zebras are not able to be striped; they are always unicolored.’

(iii) ?De zebra durft niet gestreept; straks wordt hij uitgelachen!

- (29) a. De zebra wil niet effen; hij wil gestreept! Dutch
the zebra wants not unicolored; he wants striped
 ‘The zebra does not want to be unicolored; it wants to be striped!’
 b. Ik wil niet schoon!
I want not clean
 ‘I don’t want to be clean!’

3.4.2. Hypothesis (1c): epistemics and deontics select for APs, PPs, and PartPs

The expectation for modal verbs expressing deontic and epistemic necessity and possibility is that they only combine with infinitival and directional complements. This prediction is partly borne out: As is shown in (30), in the Germanic languages Afrikaans (a), Dutch (b), Frisian (c), German (d), Swiss-German (e), Luxembourgish (f), Danish (g) and Norwegian (h), the modal verbs in the deontic interpretation can indeed combine with particle and prepositional complements:

- (30) a. Jan mag huis toe. Afrikaans
John may home to
 ‘John is allowed to go home.’
 b. Het licht moet uit. Dutch
the light must off
 ‘The light must be switched off.’
 c. Jan mei nei hûs. Frisian
Jan may to house
 ‘John may go home.’
 d. Das Licht kann aus. German
the light can off
 ‘The light can be switched off.’
 e. I mues uf d bank. Swiss-German
I must on the bank.
 ‘I must go to the bank.’
 f. D’Luucht muss un. Luxembourgish
The-light must on
 ‘The light must be switched on.’
 g. Hun skal to London. Danish
she shall to London.
 ‘She shall go to London.’
 h. Jeg skal ut. Norwegian
I shall out.
 ‘I’m about to leave.’

The exceptions for hypothesis (1c) are that epistemics with directional complements are not attested, that deontics with directional complements are only attested in the Germanic

the zebra dares not striped later becomes he out-laugh
 ‘The zebra does not dare to be striped; what if others will laugh at him!’

languages, and that within the Germanic languages Icelandic and English modals cannot combine with these complements. The exceptions are discussed below.

Exception 1: Absence of epistemic modality In all 16 languages the modal verbs in the epistemic interpretation can only combine with infinitives or verbal nouns. They cannot combine with nominal, sentential, particle, prepositional, or adjectival complements. Question 4 from the questionnaire explicitly asks for the availability of an epistemic interpretation of a modal verb in combination with a non-verbal complement; part of this question is presented in (31). In question 4 the formats for the different combinations of modals and their complements were given, after which the informants were presented with two follow-up sentences; the informants were asked to judge whether these sentences were available for them. In example (31) the format of a modal with a sentential complement is given. If the modal *must* in this type of sentences can have an epistemic interpretation, sentence (31)b should be a felicitous follow-up sentence: While sentence (31)a triggers the deontic interpretation of the modal because the obligor is present, sentence (31)b triggers the epistemic interpretation because empirical support is present. For extra guidance, the intended interpretations were given below each sentence.

- (31) Could you please answer which of the follow-up sentences are available for the combination of a modal verb and an embedded *that*-sentence?
Type of sentence: *Mary must that Wanda orders the books...*
- a) ... *because John said so.*
Intended interpretation: ‘John obliges Mary to make Wanda order the books.’
 - b) ... *because I saw Mary calling Wanda.*
‘It is necessarily the case that Mary is making Wanda order the books because I saw Mary calling Wanda.’

For Afrikaans, which is the only language accepting sentential complements of modal verbs, the informants claimed that sentence (31)a was available, but sentence (31)b was not; the same holds for other types of complements in other languages. Although the question was not repeated for possibility modals I asked one Afrikaans informant whether her answer for (31) were similar for *kan* ‘can’. She confirmed that this was the case.

The finding that epistemic modals cross-linguistically cannot combine with complements other than infinitives confirms Barbiers’s (1995) observation and further weakens Van Riemsdijk’s (2002) analysis in which epistemic modal verbs are not ruled out.

Exception 2: Deontics with directional complements outside of the Germanic languages The combination of a modal verb in a deontic interpretation and a directional complement only occurs in the Germanic languages²⁸; in the Romance and Celtic language family these are not attested as the modal verbs can only combine with infinitives (32)a or verbal nouns (32)b.

²⁸ In some of the Slavic languages the combination of a deontic or a dynamic modal verb with a directional complement might be possible (appendix 4); more research is necessary, however, before it can be claimed that the phenomenon in this language is identical with the Germanic phenomenon.

- (32) a. Jean doit faire du vélo. French
Jean must do of-the bike
 ‘John must bike’
- b. Féadfaidh tú imeacht anois. Irish
can-will you go-VN now
 ‘You may go now.’

This finding might favor a Small Clause structure of the sentences under investigation, as Small Clauses are in general not very productive in the Romance languages (Talmy 1991, 2000, Mateu 2000, 2011). Resultatives, which also involve Small Clauses (Stowell 1981, 1983), are for instance unavailable:

- (33) a. John hammered the metal flat.
 b. *María martilleó el metal plano. Spanish
María flattened the metal flat Mateu 2000:2
 ‘Maria hammered the metal flat.’

Exception 3: Deontics with directional complements within the Germanic languages An exception that is connected to the previous one, is the fact that in two Germanic languages none of the modal verbs included in this study can combine with a directional complement: English and Icelandic²⁹. The absence in English is thoroughly studied in the diachronic research in chapter 4; what is striking about the Icelandic case is that, again, Small Clause structures seem to be restricted (Whelpton 2006, 2010). Adjectival resultatives, though allowed with unergative verbs, are mostly unavailable with unaccusative and transitive verbs:

- (34) a. Dóra æpti sig hása. Icelandic
Dóra screamed herself hoarse Whelpton 2010:6
 ‘Dóra screamed herself hoarse.’
- b. *Tjörninn fraus gegnheil.
lake-the froze solid.
 ‘The lake froze solid.’
- c. ??Hann frysti ísinn svo harðan að við gátum ekki tekið hann upp með skeiðinni.
he froze icecream-the so hard that we could not take it up with spoon-the
 ‘He froze the icecream so hard that we could not scoop it out with the spoon.’

²⁹ Although the verb is not included in this study as it always combines with a full infinitive, Icelandic *ætla* ‘intend to’ can combine with prepositional (i) and particle (ii) complements. More research is necessary to find out why this combination is possible; what is important for now is that the majority of the Icelandic modal verbs, in contrast to the other Germanic languages, cannot combine with directional complements.

- (i) Jan ætlar í burtu.
Jan will to away
 ‘John will go away.’
- (ii) Jan ætlar heim.
Jan will home
 ‘John will go home.’

In the Germanic languages in which directional complements are found, which are Afrikaans, Dutch, Frisian, German, Swiss-German, Luxembourgish, Danish and Norwegian, not all possible combinations are attested. First of all, in languages in which the future tense marker is syntactically a modal verb, this verb cannot combine with particle and prepositional complements in its deontic interpretation of ‘to be obliged to’. This holds for Afrikaans, Frisian, and Dutch (35)³⁰.

- (35) Ze zal naar huis *(gaan)³¹. Dutch
she will to house go
 ‘I oblige her to go home.’

Secondly, the verb that carries the notions of deontic possibility and ability in Danish and Norwegian, which is *kunne*, and the verb that carries deontic possibility and ‘to dare’ in Danish, which is *turde*, cannot combine with directional complements. What is interesting about these cases is that the equivalents of these verbs in the other Germanic languages can combine with these complements. For *turde*, moreover, the fact that it can appear with the infinitival marker *at* (Vikner 1988:4) might play a role.

3.4.3. Hypothesis (1b): only dynamics select for NPs and CPs

The prediction for modal verbs expressing the six different types of dynamic modality is that they can combine with nominal and sentential complements. This prediction is partly borne out: In all three language families most of the modal verbs expressing dynamic modality can combine with direct objects and embedded sentences.

The first sub type of dynamic modality with which nominal complements can occur is ability/‘to be skilled in’. Sentences as in (36), in which the modal verb is combined with a language, are judged grammatical in all Romance and Celtic languages that have a modal verb

³⁰ The fact that the equivalents of *shall* and *should* in the Scandinavian languages, which are future tense markers in these languages, can combine with directional complements (i) further marks the exceptional status of *zullen* in Dutch and its equivalents in Afrikaans and Frisian.

- (i) a. Hun skal to London. Danish
she shall to London.
 ‘She shall go to London.’
 b. Jeg skal ut. Norwegian
I shall out.
 ‘I’m about to leave.’

This observation suggests that a syntactic property of these modals, rather than the semantic property of denoting future tense, is responsible for the gap in the data. Further support for this idea comes from the fact that the same modals cannot combine with any non-verbal complement in the dynamic interpretation of ‘to promise’ (section 3.4.3.); possibly, these verbs are not modals after all and as such have a different underlying structure. More research is necessary.

³¹ Sentence (35) is grammatical when the modal is focused (ii). What this sentence shows is that it is not the modal that is ungrammatical in (35), but rather, the interpretation, as the modal *zal* ‘will’ in sentence (ii) does not have a future interpretation but is equivalent to a purely deontic necessity modal like *must*.

- (ii) En ze ZAL naar huis.
 and she WILL to house
 ‘And she WILL go home.’

with this interpretation and in almost all Germanic languages. The exception is English (37): Although *can* can express ‘to be skilled in’, it cannot combine with a nominal complement. This is one of the issues to be explained in chapter 4.

- | | | |
|---------|--|--------------|
| (36) a. | Je sais le Français.
<i>I know the French</i>
‘I know French.’ | French |
| b. | Mae e’n medru Iseldireg
<i>is he-prt can Dutch</i>
‘He can speak Dutch.’ | Welsh |
| c. | Ech cha Schwitzerdütsch.
<i>I can Swiss-German.</i>
‘I know Swiss-German.’ | Swiss-German |
| (37) | I can *(speak) English. | |

A second type of dynamic modality with which both nominal and sentential complements can occur is volitionality. In all languages, again except for English³², the verbs expressing volitionality can combine with a nominal (38) and a sentential complement (39). The interpretation of these sentences is one of desire; the subject wants to have the object, or wants the embedded sentence to become true.

- | | | |
|---------|---|-----------|
| (38) a. | Voglio una auto.
<i>want-1.SG a car</i> | Italian |
| b. | Ég vil þennan bíl.
<i>I want this-ACC car</i>
‘I want this car.’ | Icelandic |
| (39) a. | Voglio che tu mi dica la verità.
<i>want-1.SG that you me say-INF the truth</i>
‘I want you to tell me the truth’ | Italian |
| b. | Ég vil að hann komi hingað.
<i>I want that he comes-CONJ here</i>
‘I want him to come here.’ | Icelandic |

A third type of modality that has a broad range of non-verbal complements is ‘to need’. In the three languages in which this interpretation is present in a modal verb as defined in chapter 2, which are Afrikaans, Dutch, and Frisian, it can combine with a nominal complement:

- | | | |
|------|--|-------|
| (40) | Ik hoef geen fiets.
<i>I need no bike</i>
‘I don’t need a bike.’ | Dutch |
|------|--|-------|

³² This holds at least for the nominal complements; in sentences as in (v), if they are not analyzed as fossilized expressions, volitional *would* combines with sentential complements (fn. 4).

(iii) I’d rather that you wouldn’t do that.

Note that, although English *need* can combine with a nominal complement (41), in this structure it is not a modal in the traditional sense because it does not express the NICE properties (see chapter 2, Palmer 1979:127):

- (41) I need a bike. English
 (42) a. I don't need a bike.
 b. *I needn't a bike.

In Dutch and Frisian there are two more modal verbs that can express the subject's physical needs (Barbiers 1995:157); these can also combine with nominal complements (43).

- (43) a. Jan moat in fyts. Frisian
Jan must a bike
 'John needs a bike.'
 b. Jan moet een fiets. Dutch
Jan must a bike
 'John needs a bike.'
 c. Jan mag geen chocola.
Jan may no chocolate
 'John cannot have chocolate.'

A fourth type of dynamic modality is 'to dare'. In Dutch, in which these notions are expressed by a modal verb, it can combine with a nominal complement:

- (44) Ik durf een heleboel dingen. Dutch
I dare a many things
 'I dare to do many things.'

The fifth and final type of dynamic modality for which the modal verbs behave as expected, is 'to like', in which the verbs express negative or positive feelings from the subject towards the complement. In German *mögen* expresses this notion and can combine with both with a nominal and a sentential complement (45)-(46); the two verbs in Dutch that can express this notion can only combine with a nominal complement (46)b³³.

- (45) a. Jan mag (es), dass du die Tür grün gestrichen hast. German
Jan may it that you the door green painted have
 'John likes (it) that you painted the door green.'
 b. Jan moet *(het) niet dat de muur geverfd wordt. Dutch
Jan must it not that the wall painted becomes
 'John does not like it that the wall becomes painted.'
 (46) a. Sie mögen ihn. German
they may-PL him
 'They like him.'

³³ There are presumably other languages in which modal verbs can express this notion; this interpretation was, unfortunately, not included in the questionnaire. This type of dynamic modality deserves further investigation.

- b. Jan mag Marie.
Jan may Marie
 ‘John likes Mary’

Dutch

The exceptions for the hypothesis that only dynamic modal verbs can combine with direct objects and embedded sentences are that not all dynamic modal verbs have all possibilities. There furthermore seem to be two instances of deontic modal verbs that can combine with these two types of complements, however: The occurrence of deontics with direct objects in Dutch, and Frisian, and the occurrence of deontics with embedded sentences in Afrikaans contradicts the predictions made in the introduction. I will follow Biberauer & Oosthuizen (2011) and argue that these instances need to be reanalyzed as modal verbs that are complemented by full verbal phrases and as such do not contradict the claims made in the introduction.

Exception 1: Sentential and Nominal complements Not all dynamic modal verbs can combine both with sentential and nominal complements; neither can they combine with all possible embedded sentences or direct objects. This does not falsify hypothesis (1c), however, as dynamic modal verbs are analyzed as main verbs: since main verbs select for both the type and the semantics of the complement (Chomsky 1965, Grimshaw 1979), there are expected to be differences both within a language and between languages.

An example of the first restriction is that dynamic modal verbs expressing ‘to like’ in Dutch can only combine with DPs (Barbiers 1995), while in German they can combine with DPs and CPs (45)-(46); an example of the second restriction is that in Norwegian *kunna* ‘can’ combines with Nominal Phrases denoting ‘languages, songs, texts, and some other nouns’ (Kristin Eide, p.c), while in Dutch *kunnen* ‘can’ in general cannot combine with texts:

- (47) a. ??Ik kan de bijbel.
 I can the Bible
 b. *Ik kan de grondwet.
 I can the constitution

Dutch

One type of modality which, although it was classified as dynamic modality and as such is expected to occur with nominal and sentential complements, can only occur with full verbal complements is ‘to promise’. This holds for *skulle* in Danish and Norwegian, as well as for *sal* in Afrikaans, *sil* in Frisian, and *zullen* in Dutch:

- (48) *Ik zal een fiets/een truc/een belofte.
 I will a bike a trick a promise

Dutch

One explanation would be that modal verbs carrying the notion of ‘to promise’ simply do not select for a nominal or sentential complement; it could also be the case, however, that these verbs are syntactically different from modals after all (fn.30). A study on future tense markers in the European languages is necessary before any conclusions can be drawn.

Exception 2: Sentential complements An important exception is that in Afrikaans deontic modal verbs can be complemented by Sentential Phrases (49). In this sentence, the subject needs a theta role and the only possible assigner is the deontic modal verb – this seems to contradict one of the main hypotheses that deontic modal verbs are functional elements in that they do not have argument structure.

- (49) Ek moet dat Wanda die boeke bestel. Afrikaans
I must that Wanda the books order
 ‘I must make sure that Wanda orders the books.’

Biberauer & Oosthuizen (2011) provide a solution for this problem as they claim that the modal verb in (49) underlyingly is a functional element as they assume there to be present an empty lexical verb *MAAK* ‘make’. In contrast to sentence (49), sentence (50) does not cause any problems for the main hypothesis as the lexical verb assigns argument structure; this sentence is compatible with a modal auxiliary analysis of deontic modal verbs.

- (50) Ek moet *MAAK* dat Wanda die boeke bestel. Afrikaans
I must make that Wanda the books order
 ‘I must make sure that Wanda orders the books.’

As Afrikaans, in contrast to most other Germanic languages, always selects for *have* in the perfect tense (52), the presence of the *have* auxiliary in (51)b is compatible with a modal auxiliary analysis. What is more, the selection of *is* in combination with a prepositional or particle complement (51)a shows that Afrikaans makes a clear distinction between the two phenomena.

- (51) a. Hij is biblioteek toe. Afrikaans
he is library to
 ‘He has gone/has to go to the library’
 b. Ek het dat Wanda die boeke bestel.
I has that Wanda the books order
 ‘I have organized that Wanda orders the books.’
 (52) Hij *is/het biblioteek toe gegaan.
he is has library to went
 ‘He has gone to the library.’

Biberauer & Oosthuizen provide a further argument in favor of a silent verb *MAAK* in sentences like (49), since that the complement always needs to start with the complementizer *dat* ‘that’, in contrast to embedded sentences with overt lexical verbs (53); the researchers claim that this follows from the fixed expression *maak dat* ‘make sure that’. Further support for this idea comes from the fact that even in interrogative sentences, *dat* is selected.

- (53) a. Ek het gereël (dat) Wanda die boeke bestel. Afrikaans
I have organized that Wanda the books order
 ‘I organized that Wanda orders the books.’

- b. Ek moet *(dat) Wanda die boeke bestel.
I must that Wanda the books order
 ‘I must make sure that Wanda orders the books.’

Exception 3: Nominal complements A second important exception is that at least in Dutch and Frisian Nominal Phrases can combine with deontic modal verbs. In the sentences in (54) the subjects need to be assigned an agent theta role which seems to contradict the claim that deontic modal verbs do not have argument structure.

- (54) Jan mag (van mij) een koekje. Dutch
Jan may from me a cookie
 ‘I allow John to have a cookie.’

Following up on the proposal for Afrikaans, it is however possible to posit an empty verb in sentences like (54), as in (55). The semantics of the empty verb in Dutch would be equal to ‘to have’, since for all three deontic modal verbs that can combine with a nominal complement this is the shared interpretation (56).

- (55) Jan mag (van mij) een koekje HEBBEN. Dutch
Jan may from me a cookie have
 ‘I allowe John to have a cookie.’
- (56) a. Jan mag (van mij) een koekje HEBBEN/ETEN/#BAKKEN.
Jan may from me a cookie have eat bake
 ‘I allow John to have/eat/bake a cookie.’
- b. Jan hoeft (van mij) geen auto TE HEBBEN/TE KRIJGEN/#TE LENEN.
Jan needs from me no car to have to get to loan
 ‘I don’t oblige John to have/get/borrow a car.’
- c. Jan moet (van mij) een boterham HEBBEN/ETEN/#KRIJGEN.
Jan must from me a sandwich
 ‘I oblige John to have/eat/get a sandwich.’

Barbiers (1995:155) suggested the analysis in (55) but rejected it after presenting a number of counterarguments. In order to see whether this proposal is feasible, let us review Barbiers’s (1995) arguments against this analysis. The main claim is that deontic modal verbs do not have argument structure; sentences that are compatible with this claim thus (a) contain a dynamic modal verb instead of a deontic modal verb, or (b) are compatible with an analysis in which an empty verb *HAVE* is present. First of all, Barbiers presents the following paradigm:

- (57) a. Jan mag Marie. Dutch
Jan may Marie Barbiers 1995:154-155
 ‘John likes Mary.’
- b. Jan moet Marie *(niet).
Jan must Marie not
 ‘John does not like Mary.’
- c. *Jan kan Marie.
Jan can Marie

- d. *Jan zal Marie
Jan will Marie
- e. Jan hoeft Marie *(niet).
Jan needs Marie
'John does not need Mary.'
- f. Jan wil Marie.
Jan wants Marie
'John wants Mary.'

Barbiers (1995:156) argues that the presence of a phonologically empty *DO* or *HAVE* is semantically problematic, especially for (57)a and (57)b as they do not have an interpretation of 'have' or 'do', but rather, of 'to like'. By now we know that the modal verbs in these sentences, as well as in sentence (57)f, have a dynamic interpretation; as such, they are expected to assign argument structure. The relevant sentence, which is (57)e, is compatible with an interpretation of empty *HAVE*.

The fact that some modal verbs cannot combine with nominal complements, as is the case in (57)c and (57)d, does not cause any further problems: *Kan* 'can' and *zal* 'will' can carry dynamic modality and in this main verb analysis, they are expected to select for the type and the semantics of the complement (Chomsky 1965, Grimshaw 1979).

A third argument that Barbiers puts forward is based on the paradigm below: Many of the ungrammatical sentences in (58) are fine when they are complemented by a verbal element (59).

- | | |
|--|--------------|
| <ul style="list-style-type: none"> (58) a. Jan mag een koekje/*een ingewikkelde truc/??een plas.
<i>Jan may a cookie an intricate trick a pee</i>
'John may have a cookie.' b. Jan moet een koekje/*een ingewikkelde truc/een plas.
<i>Jan must a cookie an intricate trick a pee</i>
'John definitely wants a cookie.' c. Jan kan *een koekje/een ingewikkelde truc/*een plas.
<i>Jan can a cookie an intricate trick a pee</i>
'John is able to do an intricate trick.' d. Jan zal *een koekje/*een ingewikkelde truc/??een plas.
<i>Jan will a cookie an intricate trick a pee</i> e. Jan hoeft geen koekje/*geen ingewikkelde truc/geen plas.
<i>Jan needs no cookie no intricate trick no pee</i>
'John does not need a cookie' f. Jan wil een koekje/*een ingewikkelde truc/??een plas.
<i>Jan wants a cookie an intricate trick a pee</i>
'John wants a cookie' | <p>Dutch</p> |
| <ul style="list-style-type: none"> (59) a. Jan mag een koekje hebben/een ingewikkelde truc doen/een plas doen.
<i>Jan may a cookie have an intricate trick do a pee do</i> b. Jan moet een koekje hebben/een ingewikkelde truc doen/een plas doen.
<i>Jan must a cookie have an intricate trick do a pee do</i> c. Jan kan een koekje hebben/een ingewikkelde truc doen/ een plas doen.
<i>Jan can a cookie have an intricate trick do a pee do</i> | <p>Dutch</p> |

- d. Jan zal een koekje hebben/een ingewikkelde truc doen /een plas doen.
Jan may a cookie have an intricate trick do a pee do
- e. Jan hoeft geen koekje te hebben/geen ingewikkelde truc te doen/geen plas te doen.
Jan needs no cookie to have no intricate trick to do no pee to do
- f. Jan wil een koekje hebben/een ingewikkelde truc doen/een plas doen.
Jan wants a cookie have an intricate trick do a pee do

The sentences in the paradigm above are again compatible with the main thesis as they all involve either dynamic modality or are compatible with a silent verb *HAVE*. First of all, the sentences which are grammatical combinations of modal verbs and nominal complements and need *DO* instead of *HAVE*, all involve dynamic modal verbs; these sentences, repeated in (60) either express a physical need (60)a and (60)c, or ability (60)b. Positing a silent *DO* is unnecessary as dynamic modal verbs can assign argument structure.

- (60) a. Jan moet een plas (doen). dynamic
Jan must a pee do
 ‘John has the physical need of going for a pee.’
- b. Jan kan een ingewikkelde truc (doen). dynamic
Jan can an intricate trick do
 ‘John is able to do an intricate trick.’
- c. Jan hoeft geen plas (te doen). dynamic
Jan needs no pee to do
 ‘John does not have the physical need of going for a pee.’

The sentences in (57)c and (57)d, repeated in (61), are ungrammatical with a nominal complement, while they are grammatical with a verbal complement. What should be noted first is that these sentences are ambiguous, at least between an epistemic, and a dynamic interpretation; with an overt obligor present, as in (62), only the deontic interpretation is triggered.

- (61) a. Jan kan een koekje *(hebben).
Jan can a cookie have
 i. ‘It is possible that John has a cookie.’ epistemic
 ii. ‘John is able to have a cookie.’ (i.e., he won’t get fat) dynamic
- b. Jan zal een koekje *(hebben).
Jan will a cookie
 i. ‘It is necessary that John has a cookie.’ epistemic
 ii. ‘John promises to have a cookie.’ dynamic
- (62) a. #Jan kan van mij een koekje (hebben)³⁴. deontic
Jan can from me a cookie have
- b. *Jan zal van mij een koekje (hebben). deontic
Jan will from me a cookie have

³⁴ (62)a is grammatical when the PP-phrase *van mij* ‘from me’ has a possessive interpretation:

- (i) Jan kan van mij een koekje *(hebben).
Jan can of me a cookie have
 ‘John can have one of my cookies.’

What happens in (62) is that with an overt obligor present, the sentences are ungrammatical with and without a verbal complement. This shows that these sentences cannot express deontic modality and as such, the hypothesis that deontic modal verbs do not have argument structure still holds³⁵.

From all sentences in (59) only three sentences are indeed deontic modal verbs with a nominal complement, and crucially, (58)a, (58)b, and (58)e are all compatible with an underlying *HAVE*; this was already shown in (56).

A further argument from Barbiers (1995:157) against a silent verb is that while modal verbs with nominal complements can only express dynamic and deontic modality, modal verbs with verbal complements can express epistemic modality as well:

- | | |
|--|---|
| (63) a. Jan moet een koekje.
<i>Jan must a cookie</i>
i. ‘John is obliged to have a cookie.’
ii. # ‘John necessarily has a cookie.’
b. Jan moet een koekje hebben.
<i>Jan must a cookie</i>
i. ‘John is obliged to have a cookie.’
ii. ‘John necessarily has a cookie.’ | Dutch

deontic
epistemic

deontic
epistemic |
|--|---|

In Barbiers’s (1995) analysis of the absence of epistemic modality, this is indeed a valid argument: For Barbiers, epistemic modal verbs are located high in Cinque’s hierarchy (1999) and as such it cannot select for a low nominal complement. Eide (2005), however, proposes that complements without tense are not compatible with an epistemic interpretation and that silent infinitives do not contain tense; Van Dooren (2014), following Iatridou (p.c., 1990), moreover claims that dynamic complements are incompatible with epistemic interpretations (section 2.2.). For both Eide (2005) and Van Dooren (2014) the absence of an epistemic interpretation is not directly linked to a Small Clause analysis.

Barbiers (1995:160) finally claims that ‘a particularly convincing example’ of a non-verbal complement is in (64). Since *stiletto*’s is the surface subject it must have raised from an embedded clause with silent *HAVE*; this embedded verb must be either unaccusative or passive as there is no internal argument. The verb *hebben* ‘have’, however, cannot occur as an unaccusative (65)b, or a passive (65)c.

- | | |
|---|-------------------|
| (64) Stiletto’s mogen tegenwoordig niet meer.
<i>switchblades may nowadays not more</i>
‘Switchblades aren’t allowed anymore.’
(65) a. Jan heeft een stiletto. | Barbiers 1995:160 |
|---|-------------------|

³⁵ The ungrammaticality of the sentences in 0 confirms that the empty verb has a stative interpretation, as a deontic interpretation is available with a dynamic verbal complement like *krijgen* ‘get’:

- | | |
|--|---------|
| (i) Jan kan van mij een koekje krijgen.
<i>Jan can from me a cookie get</i>
‘I allow John to have a cookie.’ | deontic |
|--|---------|

- Jan has a stiletto*
 ‘John has a stiletto.’
- b. *Een stiletto heeft.
a switchblade has
- c. * Een stiletto wordt door Jan gehad.
a switchblade becomes by Jan had

Recall from chapter 2 that there are directed and non-directed deontic interpretations (Barbiers 1995). Wurmbrand (1999) uses this distinction to elaborate on sentences in which the subject seems to be the agent of the deontic modal verb, as in (66)a. Wurmbrand saves the claim that deontic modal verbs do not have argument structure by stating that even in these cases, the deontic modal verb does not assign an agent theta role to the subject, but rather, that the semantic roles are contextually determined. An argument in favor of this view comes from sentences like (66)b, in which the obligation in an unmarked interpretation is not directed towards the subject; since the subject is not the agent of the modal verb in these cases, it is likely that the same holds for sentence (66)a.

- (66) a. John must go to Alaska
 b. The traitor must die.

In sentence (64), it is exactly the non-directed deontic interpretation that is present: The obligation is not directed towards the subject, but towards a contextually determined agent. The verb therefore does not assign a semantic role to the subject, and therefore this sentence is compatible with the hypothesis that deontic modal verbs do not assign argument structure.

By reanalyzing Barbiers’s arguments it is therefore possible to stipulate a silent *HAVE* for the three sentences in (55)-(56); as a result, the hypothesis that deontic modal verbs cannot assign argument structure is saved for Dutch. Further research is necessary, as in Frisian, too, deontic modal verb appear to occur with a direct object; it needs to be shown whether the present reanalysis can be carried over to Frisian.

3.5. Conclusion

The 16 Modern European languages from three different language families provide us with strong support in favor of the three hypotheses that were tested in this chapter; an updated overview is in table 10.

Table 10: Overview of modal verbs and their complements in 16 modern European languages (final version)

Language	Class	V	N	S	P/ Part.	A	Language	Verb class	V	N	S	P/ Part.	A
Modern English	dyn.	+	-	-	-	-	Danish	dyn.	+	+	+	+	-
	deon.	+	-	-	-	-		deon.	+	-	-	+	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Modern Icelandic	dyn.	+	+	+	-	-	Norwegian	dyn.	+	+	+	+	-
	deon.	+	-	-	-	-		deon.	+	-	-	+	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Afrikaans	dyn.	+	+	+	+	+	French	dyn.	+	+	+	-	-
	deon.	+	-	-	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Dutch	dyn.	+	+	+	+	+	Italian	dyn.	+	+	+	-	-
	deon.	+	-	-	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Frisian	dyn.	+	+	+	+	+	Romanian	dyn.	+	-	-	-	-
	deon.	+	?-	-	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
German	dyn.	+	+	+	+	+	Welsh	dyn.	+	+	-	-	-
	deon.	+	-	-	+	+		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Luxembourgish	dyn.	+	+	+	+	-	Irish	dyn.	+	-	-	-	-
	deon.	+	-	-	+	-		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-
Swiss-German	dyn.	+	+	+	+	-	Scottish Gaelic	dyn.	+	-	-	-	-
	deon.	+	-	-	+	-		deon.	+	-	-	-	-
	epi.	+	-	-	-	-		epi.	+	-	-	-	-

V = verbal complement, N = nominal complement, S = sentential complement,
P = prepositional complement, Part. = particle complement, A = adjectival complement
dyn. = dynamic modality, deon. = deontic modality, epi. = epistemic modality
+ = attested, - = unattested, ?- = to be reanalyzed as a verbal complement

The set of languages shows a direct link between the interpretation of a modal and the availability of certain types of complements: While dynamic modal verbs can combine with nominal and sentential complements, deontic modal verbs cannot (hypothesis 1c). Rather, they can only combine with verbal, prepositional, particle, and in some cases adjectival complements (hypothesis 1b). The two cases that seem to contradict the direct link between verb type and possible complements, namely, the availability of sentential complements of deontics in Afrikaans, and of nominal complements of deontics in Dutch, are compatible with the alternative analysis in which a silent infinitive is underlyingly present. In sum, the presence of nominal and sentential complements can function as a diagnostic for the distinction between main verbs and functional elements:

Hypothesis 1: Dynamic modal verbs are main verbs; deontic and epistemic modal verbs are functional elements.

The distribution of adjectival, prepositional, and particle complements across the three language families in comparison to the overall distribution of Small Clauses in these

languages finally shows a remarkable parallel: In the languages in which Small Clauses are restricted, which can be shown by the absence of certain types of resultatives, the modal verbs cannot be complemented by Adjectival, Prepositional, and Particle Phrases either. This parallel holds for the Romance languages, and, interestingly, also for Icelandic. Future research will have to show whether there is one underlying cause for these two restrictions, which would lead to a confirmation of hypothesis 2:

Hypothesis 2: Prepositional, particle, and adjectival complements of modal verbs are Small Clause predicates.

4.1. Introduction

Language change can explain at least part of the variation present for modal verbs with non-verbal complements in the Germanic languages. The two Modern Germanic languages that showed deviating results as they have very limited or no possibilities to combine with complements other than infinitives, which are English and Icelandic, were able to occur with direct objects and prepositional predicates (1) or adjectival predicates (2) at earlier stages of these languages.

- (1) a. *euerych bakere of þe town...shal to the þe clerke of þe town a penny* Old English
every baker of the town... owes to the clerk of the town a penny
 (a1400: Usages of Winchester, p.64; Visser 1963-1973, §549; in Roberts 1993:313)
- b. *Binnan þrim nihtum cunne ic his mihta*
within three nights can-SBJ I his powers
 ‘may I know his powers within three nights’
 (Metrical Charms, 9, 14 in Van Kemenade 1993:151)
- c. *gif hi motan to helle.*
if they must to hell
 ‘if they must go to hell.’
 (1150-1250; Morris 1969; Lambeth Homilies)
- (2) *Spakt skyldi it ellzta barn* Old Icelandic
good-NOM must-3.SG the oldest child
 ‘the oldest child must be good’
 (ca. 1150; *First Grammatical Treatise*; translation George Walkden)

In the previous chapter it was shown that the sentences as in (1) and (2) are unavailable for modal verbs in Modern English and Modern Icelandic; if the phenomenon of modal verbs with non-verbal complements is similar to the phenomenon in the Modern Germanic languages, and if we know when, how, and most importantly why this phenomenon was lost in the two languages, we are able to explain the cross-linguistic differences that are present in the contemporary language situation. Moreover, we automatically learn more about the necessary conditions for this phenomenon to be available in a language. In this chapter a start is made on answering these questions by studying the loss of non-verbal complements in the history of English.

What needs to be discussed first, is which preterite-present verbs occurred with which types of complements. In section 4.2. an overview of the possible combinations is given, and it is argued that the phenomenon shows syntactic and semantic similarities with the Modern Germanic counterparts. In section 4.3. the method is described that was used to collect the quantitative data of the phenomenon in the history of English.

Following up on the semantic and distributional differences found between modal verbs complemented by directional predicates on the one hand, and by direct objects and embedded sentences on the other hand, in section 4.4. the hypothesis is tested that two different phenomena fall within the category of ‘non-verbal complements of modal verbs’: Modal verbs combined with Directional Phrases, which are Adverbial, Particle, and Prepositional Phrases, and modal verbs combined with Nominal and Sentential Phrases.

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

In order to test this hypothesis Kroch's (1989) *Constant Rate Hypothesis* was applied to the English phenomenon. Kroch's hypothesis is that similar phenomena do not have to change at the same time; what matters is that they show a similar rate of change. Kroch, and later Postma (2010) convincingly show that phenomena that seem to be different based on a different actuation time, might very well be instances of one and the same phenomenon based on an identical rate of change.

By applying Kroch's approach to a collection of almost 3000 sentences collected from different historical corpora a third argument can be given in favor of the claim that Prepositional, Particle, and Adjectival Phrases differ from Nominal and Complementizer Phrases when combined with a modal verb: In the history of English, the rate of loss for the latter category is sharper than the rate of loss for the former category. Following Postma, Kroch's technique was furthermore applied to specific lexical items; this shows that the differences found are not due to individual verbs, as the combinations all have a similar rate per type.

Section 4.4. zooms in on the times of losses for the different categories. Based on the ratio between the preterite-present verbs and the number of times they occur with one of the types of non-verbal complements, it will be argued that the onset of the loss of Prepositional, Particle, and Adjectival Phrases functioning as the complement of English preterite-present verbs is after the Old English period (ca. 1100); of Nominal Phrases it is after the Middle English period (ca. 1600). These dates present another argument for the distinction between two types of complements, and moreover confirms the current theories on the loss of direct objects in English (Lightfoot 1979, Roberts 1993, Roberts & Roussou 2003). The puzzle that these dates gives us, however, is the loss of Prepositional, Particle, and Adjectival Phrases.

4.2. Preterite-presents and their complements

In section 2.5. it was stated that the modern English modals started out in the class of preterite-present verbs. The twelve verbs *agan* 'owe', *cunnan* 'can', **dugan* 'benefit', *durran* 'dare', *magan* 'may', *mon* 'need', **motan* 'must', *munan* 'remember', *(be-/ge-)nugan* 'suffice', *sculan* 'shall', *þurfan* 'dare', *unnan* 'grant', and *witan* 'know'³⁶ form a morphologically distinct class as they do not have the *-þ* ending in the third person singular (Fischer 2003 for an overview of studies on these verbs; for further discussion cf. Lightfoot 1979, Plank 1984, Roberts 1985, 1993, Van Kemenade 1990, Denison 1993, Warner 1993, Nagle & Sanders 1996, Roberts & Roussou 2003). Besides these twelve verbs the anomalous verb *willan* 'will' is included in this study because it also misses the inflection in the third person singular (Lightfoot 1979:103). *Need*, although it is a marginal modal now, never

³⁶ A starred (*) verb form means that it is reconstructed; the infinitival forms *dugan* and *motan* have not been attested.

shared any characteristics with the group of preterite-presents; as such it is not included in this study.

In Old English (until 1150) the preterite-present verbs resembled main verbs in a number of properties: They had non-finite forms (3)a, and they could be iterated (3)b, for instance (Roberts 1985:21-24).

- (3) a. but it sufficeth too hem to kunne her *Pater Noster*...
but it suffices to them to know their Pater Noster...
(?c1425 (?c1400) *Loll. Sermon* 2.325 in Roberts & Roussou 2003:38)
- e. Who this booke shall wylle lerne...
He-who this book shall wish learn...
He who wishes to master this book.
(c1483 (?a1480) Caxton, *Dialogues* 3.37 in Roberts & Roussou 2003:38)

A further diagnostic for the main verb status is that the preterite-presents occurred without a second verb in the same clause: They could occur with direct objects (1) and embedded sentences (4), for instance.

- (4) hwile þe God wille ðæt ðeara ænig sie þe londes weorðe sie
while the God will that there any is who land-GEN worth is
‘while God wants that there is someone who is worthy of the land.’
(800; Harmer 1914 & Robertson 1956 (1939); *Charters and Wills*)

They moreover occurred with two other types of non-verbal phrases: In (5), the preterite-present *motan* ‘must’ is combined with a Prepositional Phrase, and in (6), *sculan* ‘shall’ is combined with a Particle Phrase. Adjectival Phrases were not attested in this study.

- (5) gif hi motan to helle.
if they must to hell
‘if they must go to hell.’
(1150-1250; Morris 1969; Lambeth Homilies)
- (6) heo sceal aweg
she shall away
‘it [the disease] will go away’
(950-1050; Grattan 1952; *Anglo-Saxon Magic and Medicine* 31.1)

The phrasal status of the predicates in (5)-(6) is not difficult to determine: Following Elenbaas & Van Kemenade (2014) in their analysis of particles in particle verbs, the particle and prepositional predicates are unmistakably full phrases as they can be topicalized (7), and modified (8).

- (7) Out she would,
(1608; Armin; *A Nest of Ninnies*)
- (8) that wil not easely downe
(1553-1563; Stevenson; *Gammar Gurton’s Needle*)

The categorical status of the predicates in (5)-(8) is difficult to determine in historical languages. Visser (1963-1973:§173) assumes that the particle and prepositional phrases

function as directional adjuncts, but there are at least two indications of a complement status: First of all, the distribution and the interpretation of the sentences seems to be identical to the combinations of modal verbs with prepositional and particle phrases in the Modern Germanic languages; it is exactly the class of preterite-present that can combine with these predicates and the overall interpretation is that the subject is obliged or permitted to undergo the change of state denoted by the predicate. The complement status of the predicates in the Modern Germanic languages therefore suggests a similar analysis for the sentences in the older English stages.

Independent evidence in favor of the complement status comes from facts on word order. As the literature on word order in the history of English is very elaborate (see, for instance, Van Kemenade 1987, Lightfoot 1991, Pintzuk 1999, 2002, and Kroch and Taylor 2000, among many others), even an introduction to this topic would carry us too far from the current issue. The word order pattern of modal verbs combined with Particle and Prepositional Phrases is therefore merely compared to recent findings about the ordering of particle verbs in the history of English (Pintzuk 1997, 2002, Elenbaas en Van Kemenade 2014).

Following the hypothesis that particles do not move (Van Kemenade 1987), particles can function as a diagnostic for the basic word order pattern. What Elenbaas and Van Kemenade (2014) found out is that particles in Old English both precede and follow the main verb, while in Middle English they mainly follow the main verb. Strikingly, the preterite-present verbs combined with prepositional and particle predicates have the same tendency in surface order: In table 11 Elenbaas and Van Kemenade's (E&VK) results are combined with the results from the current study, to be elaborated on in the next sections. In Old English, the Particle and Prepositional Phrases precede or follow the preterite-present verb, while in Middle English, they only follow the verb. The loss of preverbal PPs in embedded clauses is highly significant (Fisher's Exact, $p < 0,000$).³⁷

Table 11: Ordering of particle verbs and modal verbs in Old and Middle English

Period		O3 (950-1050)			M1 (1150-1250)		
Clause type	Order	Main verb (E&VK 2014: table 3&4)	Pret.- Pres. + PP	Pret.- Pres + PartP	Main verb (E&VK 2014: table 3&4)	Pret.- Pres +PP	Pret.- Pres + PartP
<i>Main clause</i>	<i>Pred-V</i>	56	0	1	1**	0	0
	<i>V-Pred</i>	68	16	3	36	5	1
<i>Embedded clause</i>	<i>Pred-V</i>	82	21	3	4**	0**	0
	<i>V-Pred</i>	23	15	9	33	12	7

Pret.-pres. = Preterite-present verb

**highly significant ($p < 0,005$)

³⁷ For the sake of clarity, many details are skipped over: the difference between main clauses and embedded clauses, and between particle and prepositional predicates, to name a few. More research is necessary to confirm the argument set up in this paragraph.

Table 11 provides a second piece of evidence against Visser’s claim that Particle and Prepositional Phrases are structured as directional adjuncts: A characteristic of adjuncts is that they have a relatively free word order, and as such the loss of preverbal particles and prepositions cannot be accounted for if they are structured as adjuncts.³⁸

Summarizing, the combinations to be studied in this research consist out of 13 verbs and four types of complements.

4.3. The collection

Although negative evidence, i.e. the loss of a phenomenon, is in general difficult to date (Fischer 2003:26), a good set-up made it possible to study the non-verbal complements of modal verbs in the history of English. In order to analyze the loss almost 3000 sentences were collected in which the preterite-present verbs are combined with complements that do not contain an infinitive; the sentences in the collection were extracted from texts from the earliest stages of Old English (before 850) to Modern English (1999), which made it possible to follow the loss throughout the history of English.

Source corpora

The collection consists out of the results of a search query in three different source corpora of older stages of English. The primary source is the collection of the *Penn Historical Corpora*, as it contains texts from Old to Modern English and is designed for syntactic studies as it is syntactically annotated and has Part-of-Speech tags. The collection of sub corpora contains the *York-Toronto-Helsinki Parsed Corpus of Old English (YCOE)*, (Kroch, Santorini & Delfs 2004), the *Penn-Helsinki Parsed Corpus of Middle English 2 (PPCME2)*, (Kroch & Taylor 2000b), the *Penn-Helsinki Parsed Corpus of Early Modern English (PPCEME)* (Kroch, Santorini & Diertani 2004), and the *Penn-Helsinki Parsed Corpus of Modern British English (PPCMBE)*, (Kroch, Santorini & Diertani 2010). The results from this last corpus can be checked by means of two other source corpora, namely, *A Representative Corpus of Historical English Registers (ARCHER)* (Biber, Finegan et al. 1990-2014) and the *Corpus of Late Modern English Texts (CLMET)* (De Smet, Diller & Tyrkkö).

The *Penn Historical Corpora* are a collection of corpora ranging from Old English to Modern English. The exact time periods per corpus and their sizes are shown in table 12.

Table 12: Information *Penn Historical Corpora*

Period	YCOE O1	YCOE O2	YCOE O3	YCOE O4	PPCME2 M1	PPCME2 M2	PPCME2 M3	PPCME2 M4
	0-850	850- 950	950- 1050	1050- 1150	1150-1250	1250- 1350	1350- 1420	1420- 1500
Word count	1,753	311,66	773,058	355,968	237,338	93,999	403,007	389,688

³⁸ A second implication following from table 6 is that modal verbs in these sentences seem to pattern with main verbs; more data on the ordering of main verbs, auxiliaries and their respective complements and adjuncts, including the phenomenon of Verb (Projection) Raising (Van Kemenade 1987, Koopman 1990, Haeberli 2005, Wurmbrand 2006, Haeberli & Pintzuk 2011) is necessary, however, before any conclusions can be drawn.

Period	PPCEME E1	PPCEME E2	PPCEME E3	PPCMBE MB1	PPCMBE MB2	PPCMBE MB3
	1500-1570	1570-1640	1640-1710	1710-1780	1780-1850	1850-1920
Word count	567,795	628,463	541,595	298,764	368,804	281,317

The YCOE and the PPCME2 are not balanced for genre and register: The Old English texts are mainly homilies and histories, while the Middle English texts are mostly religious treatises (figure 4 and 5). The Old English texts moreover mainly come from the West Saxon dialect, while the East and West Midlands texts are dominant in the Middle English corpus (figure 6 and 7). The PPCEME and the PPCMBE are balanced per genre and are comparable with the ARCHER and the CLMET corpus consisting out of Early Modern and Modern British English texts. The exact numbers for genre and dialect per sub period are in appendix 5.

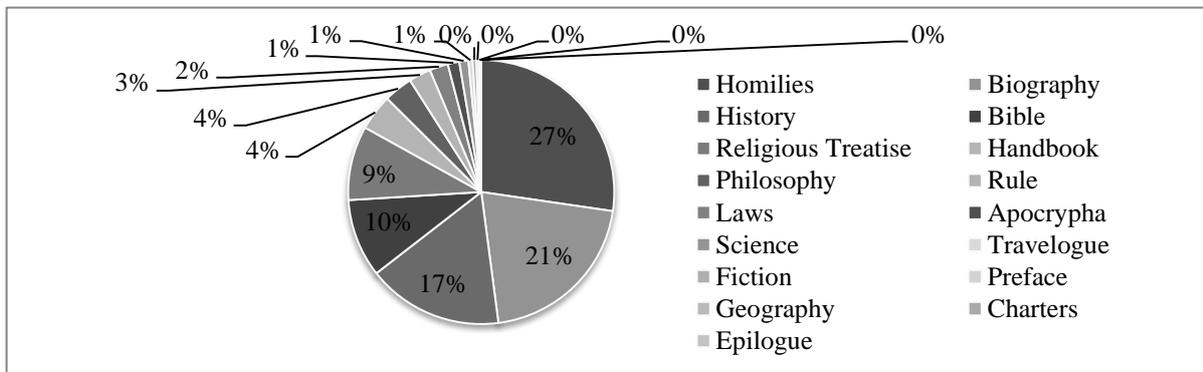


Figure 4: Distribution per genre in the *York Toronto Corpus of Old English* (-1150)

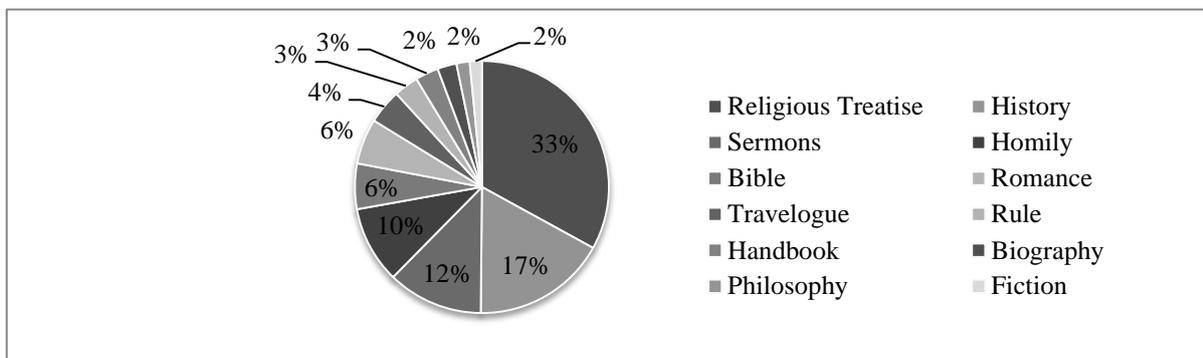


Figure 5: Distribution per genre in the *Penn Parsed Corpus of Middle English version 2* (1150-1500)

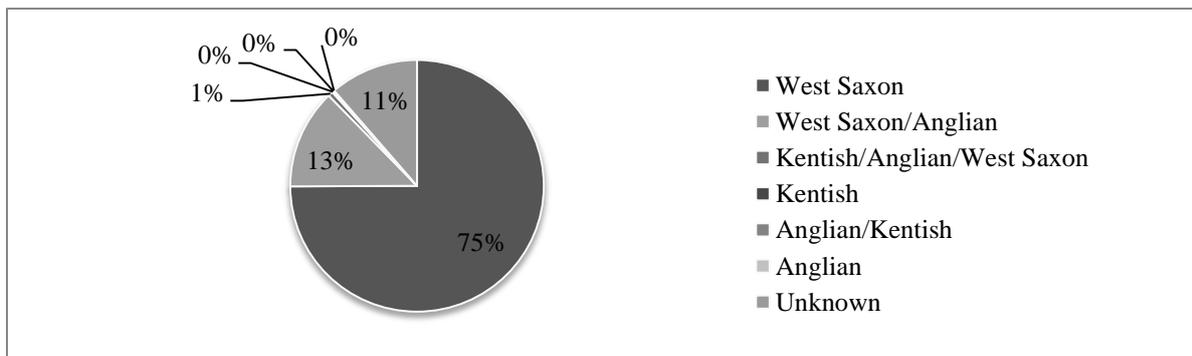


Figure 6: Distribution per dialect in the *York Corpus of Old English* (-1150)

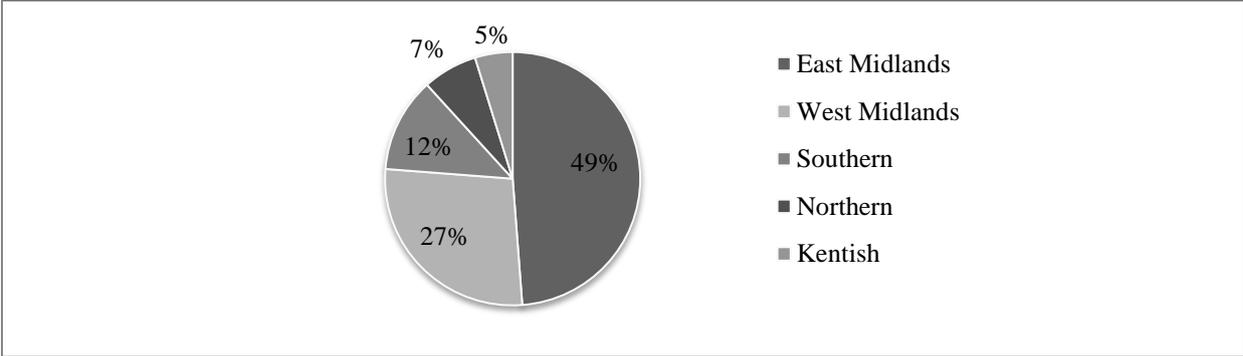


Figure 7: Distribution per dialect in the *Penn Parsed Corpus of Middle English version 2* (1150-1500)

ARCHER 3.3 is a well-balanced corpus of British and American English texts from advertising, drama, fiction, sermons, journals, legal, medicine, news, early prose, science, letters, and diaries. It ranges from 1600 to 1999. Only the British part of the corpus is used; the size of this part divided by time period is shown in table 13. The distribution per genre is in figure 8 and the exact numbers are in appendix 5.

Table 13: Information *ARCHER*

Period	1600-1649	1650-1699	1700-1749	1750-1799	1800-1849	1850-1900	1900-1949	1950-1999
Word count	86,109	262,262	256,891	278,876	270,485	272,044	266,814	264,018

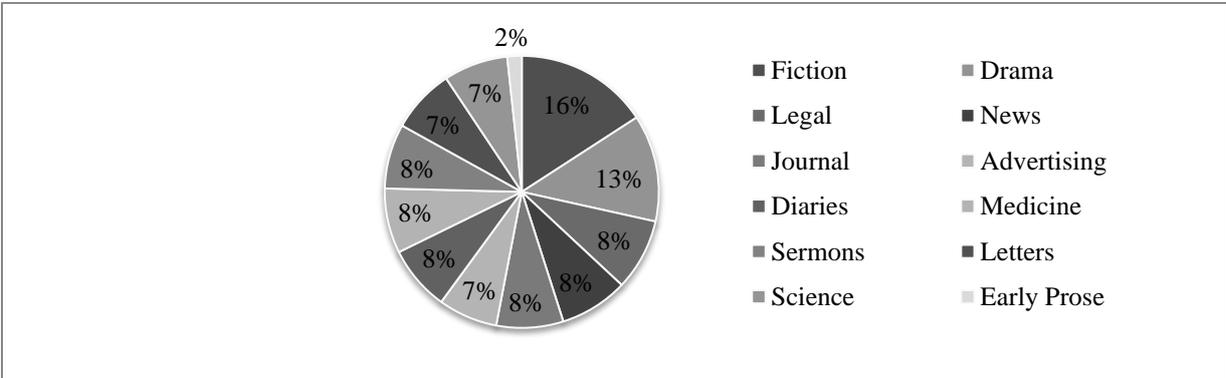


Figure 8: Distribution per genre in the *A Representative Corpus of Historical English Registers* (1600-1999)

CLMET 3.0 contains texts from *Project Gutenberg* and the *Oxford Text Archive* and ranges from 1710 to 1920. The sizes of the three sub corpora are shown in table 14. The corpus mostly contains fictional texts (figure 9); the exact numbers per genre are in appendix 5.

Table 14: Information *CLMET*

Period	1710-1780	1780-1850	1850-1920
Wordcount	10,480,431	11,285,587	12,620,207

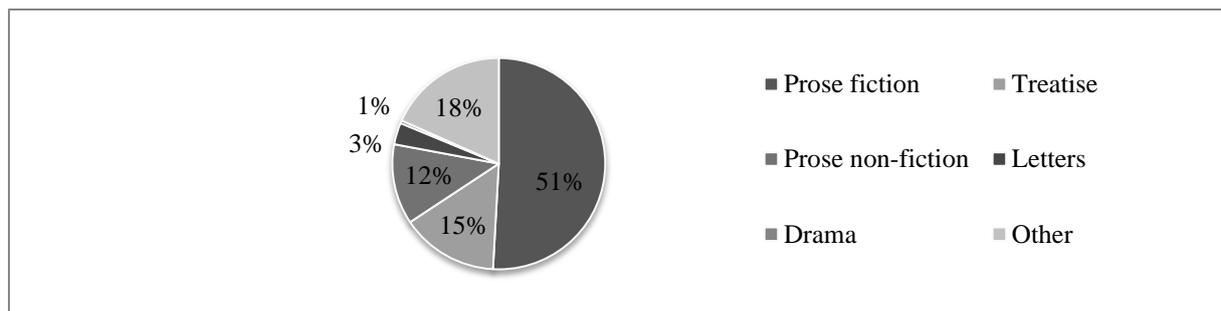


Figure 9: Distribution per genre *Corpus of Late Middle English Texts (1710-1920)*

Source corpora – search queries

In the three source corpora the combination of a preterite-present verb and a non-verbal complement was searched for. For the Penn corpora the user interface *CorpusStudio 1.3.3.27* (Komen 2011) was used in combination with the syntax tool *Cesax 1.4.3.2*. (Komen 2012); for the ARCHER corpus the search tools on *CQPweb 3.1.7*. (Hardie 2008-2014) were used; because there was no search software readily available for the CLMET corpus a specific search program in *Python* was written.

The search query consists out of two parts, namely, the presence of preterite-present verbs, and the presence of these verbs in combination with a non-verbal complement. In the Penn corpora the preterite-present verbs *cunnan* ‘can’, *durran* ‘dare’, *magan* ‘may’, **motan* ‘must’, *sculan* ‘shall’, *þurfan* ‘need’, and the anomalous verb *willan* ‘want’, ‘will’ were tagged as modal verbs, while *unnan* ‘to grant’, *dugan* ‘suffice’ and *witan* ‘know’ were tagged as main verbs, and *agan* ‘ought’ was sometimes tagged as a modal verb and sometimes as a main verb³⁹; *mon* ‘need’ and *(be-/ge-)nugan* ‘to suffice’ did not occur at all. As the Old and Middle English corpora have been lemmatized it was possible to search for the lemmas of these verbs; for the Early Modern English and the British English corpus the search query contained the start of a modal verb (for instance, *mi** for *might*, *miht(e)* etc.) after which the results were filtered manually. In the CLMET and the ARCHER corpus the Modern English modal verbs were tagged as modals.

Concerning the combination with non-verbal complements, the Penn corpora are syntactically annotated which made it possible to exclude the verbal complements of the preterite-present verbs⁴⁰. The combinations of *willan* ‘want’ and *witan* ‘know’ with a nominal and a sentential complement (9) are highly frequent: they occur up to 400 times per sub corpus. Since it is very time-consuming to filter out, tag, and translate all sentences I limited this study to 50 examples per verb-complement combination per sub corpus.

- (9) a. Whatsoever ye would that Men should do unto you, do ye even so unto them.
(1716; Butler; *Sermons*)
b. and He wate all oure nede;
and he knows all our needs

³⁹ This seems to be an error as there is no correlation between the tags and a particular interpretation of *agan* ‘ought’.

⁴⁰ Preterite-present verbs in combination with a prepositional complement in the *PPCME2* are tagged as full verbal phrases with an empty verb present. This combination was therefore also included in the search query.

(1440; Perry 1969; *The Mirror of St. Edmund (Thornton MS.)*)

The tags in the CLMET corpus made it possible to exclude any other verb in the same sentence. Some of the latest examples are in (10)-(12).

- (10) Now,' she bent coaxingly down to me, 'can you not a few words of German? Only a smallest sum!
(1870; Meredith; *The Adventures of Harry Richmond*)
- (11) I must out - out! (HE SHAKES THE DOOR VEHEMENTLY.)
(1892; Henley & Stevenson; *Admiral Guinea*)
- (12) "I know it well," said Nathan; "but wottest thou that Lucas de Beaumanoir, the chief of their Order, and whom they term Grand Master, is now himself at Templestowe?"
(1819; Scott; *Ivanhoe*)

In the ARCHER corpus, finally, the combination of the negation sign (“exclude”) and the range sign (“search for x words before and x words after a certain item”) cannot be combined. In order to find a modal verb without a second verb in the clause, the verbs needed to be excluded per position in the sentence (“there cannot be a verb three, two, or one places before the modal or one, two, or three places after”). Some of the latest examples are in (13)-(15).

- (13) Well! thou insolent ! " said the prince , "what would thou with me? "
(1764; Walpole; *The Castle of Otranto*)
- (14) MARIA . Dear Sprightly , adieu -- I must to my old Cambyses .
(1776; Francklin; *The Contract*)
- (15) Captain Targett, why were you born an Englishman? I would to Heaven you were a man of any other country;
(1925; Garnett; *The Sailor's Return*)

Source corpora – filters

After filtering out the preterite-present verbs with complements that do not contain an infinitival complement, I manually checked all the examples. There are, namely, a number of phenomena in English that contain the two ingredients of a preterite-present verb and a complement without an infinitive but nevertheless should not be included in this study.

First of all, the phenomenon of Verb Phrase Ellipsis (Hankamer & Sag 1976, Williams 1977, Fox 2000, Van Craenenbroeck & Merchant 2013, among others) interferes with the results. In a sentence like (16), the verb phrase *go* is elided in the conjoined main clause. As all auxiliaries in English can license this elided verb phrase, and as these sentences match the search query since the verbs are not complemented by a verbal phrase, this type of sentence frequently shows up in the results. This is not an instance of a modal verb licensing a non-verbal complement, however, since there is not an adjectival, adverbial, particle, nominal, or prepositional complement present. More examples of Verb Phrase Ellipsis are in (17); for an overview of this phenomenon see Van Craenenbroeck & Merchant (2013).

- (16) You should go and I must ~~go~~ too.
- (17) a. He should do all that he can ~~do~~.
b. She fastened the sails as fast as she could ~~fasten the sails~~.
c. A: Will you tell the truth?
B: I will ~~tell the truth~~.

Secondly, instances of pseudogapping as in (18) show up in the results. In these sentences the complement *to London* is extracted out of the ellipsis site before the verb *go* is elided (Jayaseelan 1990). This is not the type of sentences that is under investigation: Although there is a modal verb and a non-verbal complement present, it is not licensed by the modal verb but by the elided lexical verb.

(18) Peter will go to Paris so he won't ~~go~~ to London.

Thirdly, the phenomenon of Verb Phrase Fronting (Chomsky 1986) cannot be included in the results. A sentence like (19) is sometimes encoded as two separate sentences; based on the second part (*he thought he would*), this sentence matches the search query as it involves a modal verb without a verbal complement. These sentences, however, contain a verbal complement which is moved to the beginning of the sentence.

(19) Win the elections, he thought he would ~~win the elections~~.

A final type of sentences that needs to be mentioned is the fixed expressions. In Modern English the sentences in (20), (21) and (22) are still present but neither the verb, nor the complement shows much variation (see also chapter 2 on *would rather*). These sentences are included in the collection as they used to be fully productive instances of the combination of a preterite-present verb and a non-verbal complement; if they show up in the Modern English collection they should be seen, however, as fossilized instances of a once productive mechanism (Visser 1963-1973:§814).

(20) Would to heaven I could leave prison.

(21) a. The truth will out⁴¹.
b. Murder will out.

(22) I'd rather you wouldn't do that.

The raw data

The overall results of the *Penn Corpora* are in table 15; the results of *ARCHER* are in table 16, and the results of the *CLMET* are in table 17.

What is important to note is that the results from the *Penn Parsed Corpus of Modern British English* are similar to the results from the *ARCHER* and the *CLMET* corpus. When the size differences of the sub corpora are accounted for by calculating the relative frequencies of the phenomenon per 50,000 words in each sub corpus, the phenomenon under investigation occurred was highly infrequent in all three corpora after 1700. Table 18 thus demonstrates the compatibility of the corpora, as well as the validity of the results for the later stages of English.

⁴¹ The sentences in (21) would only be instances of modal verbs licensing a non-verbal complement if *out* is used as a preposition; it could also be the case that the verb *to out* is used.

Table 15: Overall results YCOE, PPCME2, PPCEME and PPCMBE

Period	O1	O2	O3	O4	M1	M2	M3	M4
	0-850	850-950	950-1050	1050-1150	1150-1250	1250-1350	1350-1420	1420-1500
Word count	1,753	311,660	773,058	355,968	195,494	93,999	385,994	260,116
Preterite-Present + Non-verbal complement	5	449	612	556	299	76	251	269
Period	E1	E2	E3	B1	B2	B3	Total	
	1500-1570	1570-1640	1640-1710	1710-1780	1780-1850	1850-1920	0-1920	
Word count	567,795	628,463	541,595	298,764	368,804	281,317	5,064,780	
Preterite-Present + Non-verbal complement	165	95	15	5	11	8	2816	

Table 16: Overall results ARCHER

Period	1600-1699	1700-1799	1800-1899	1900-1999	Total
Word count	348,371	535,767	542,529	530,832	1,957,499
Preterite-Present + Non-verbal complement	7	10	0	1	18

Table 17: Overall results CLMET

Period	1710-1780	1780-1850	1850-1920	Total
Word count	10,480,431	11,285,587	12,620,207	34,386,225
Preterite-Present + Non-verbal complement	44	45	11	100

Table 18: Comparison Penn, CLMET, and ARCHER

Corpus	Type	1710-1780	1780-1850	1850-1920
Penn	Absolute	15	5	11
	Relative	0,5	0,9	0,7
CLMET	Absolute	44	45	11
	Relative	1,2	1,4	0,04
		1700-1799	1800-1899	1900-1999
ARCHER	Absolute	10	0	1
	Relative	0,9	0	0,09

Absolute = Absolute occurrences of preterite-present + non-verbal complement

Relative = Occurrences of preterite-presents + non-verbal complement per 50,000 words in each sub corpus

Test 1: The Constant Rate Hypothesis

In section 4.4. the line of reasoning follows Kroch's (1989) *Constant Rate Hypothesis*. Kroch hypothesizes that language changes that are different based on their actuation time can be underlyingly related when they have an identical rate of change. Four case studies support this hypothesis and the method of logistic regression with which it is applied since they show that related language changes can manifest themselves in different contexts with different actuation times.

For the English modals, this test tells us whether the phenomenon of modal verbs with non-verbal complements consists out of different sub phenomena; the prediction is that the preterite-presents with nominal complements have a different rate of decrease from preterite-presents with prepositional and particle complements. The method can be applied to the modal case as the rates of the combinations of modal verbs with the different types of non-verbal complements can be compared. In this case, the occurrences of the three complements are the ‘different contexts’ in which the phenomenon occurs.

In order to compare the decrease of the different complements, the collection of sentences coming from the Penn corpora were divided into four categories: preterite-presents with Prepositional Phrases (PPs), with Particle Phrases (PartPs), with Nominal Phrases (NPs), and with Sentential/Complementizer Phrases (CPs)⁴²; Adjectival Phrases have not been attested. In order to cancel out the differences between the sizes of the sub corpora, Kroch (1989) furthermore uses two different ratios: In the rise of *do* in English, Kroch (1989:216) uses Priestley’s (1955) numbers that were set to the size of the corpus. In the modal case, likewise, the ratio of the different types of complements per 50,000 words in each sub corpus was calculated. The exact numbers are in appendix 5; the results for the Penn Corpora are presented in figure 10.

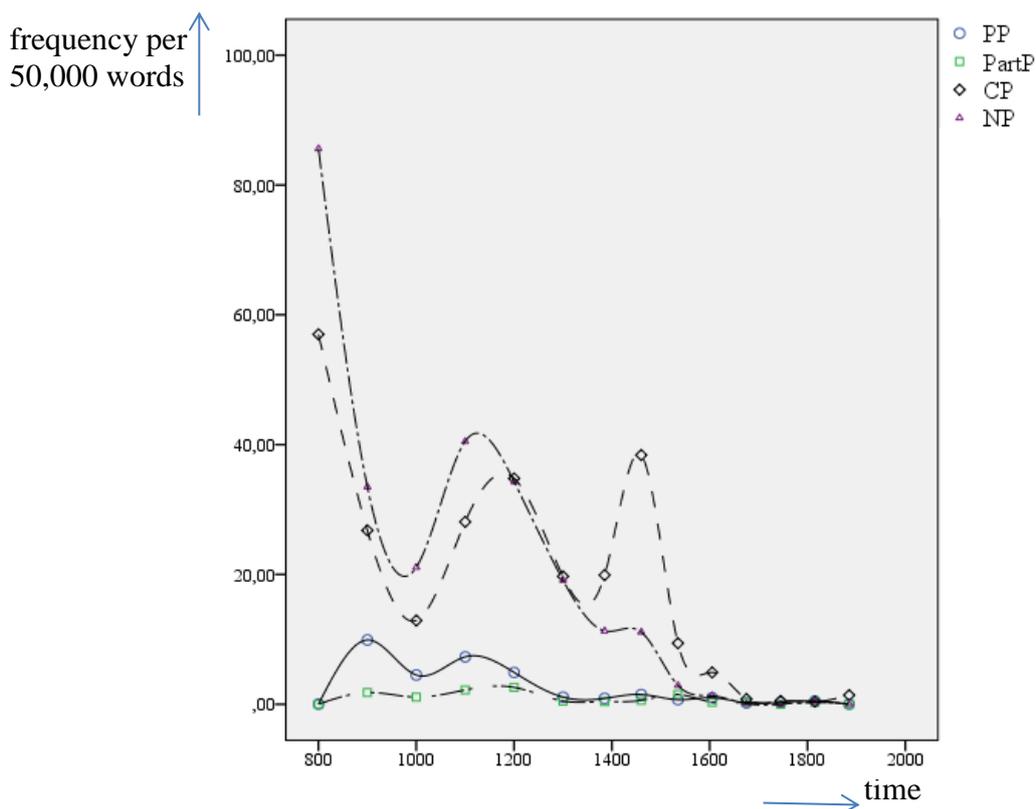


Figure 10: Relative decrease per complement type

A second ratio that was used in Kroch’s case studies on the rate of change, is the number of preterite-presents with a non-verbal complement as part of the total of the preterite-presents in

⁴² The standard abbreviation CP for Complementizer Phrase is used although not all embedded sentences contain a complementizer.

a certain time period. This ratio is more fine-grained than the relative size as it controls for the losses of linguistic items over time. In the case of the English preterite-presents, the rate needs to be sensitive for the frequency changes in the verb, for example because of the loss of *munan* ‘to remember’, (*be-/ge-*) *nugan* ‘to need’, *þurfan* ‘to need’, and *unnan* ‘to grant’. The absolute numbers of the preterite-presents are in table 19; in figure 11 the decrease in the ratio per complement type is shown.

Table 19: Absolute frequencies of preterite-presents in the Penn Corpora.

Period	O1	O2	O3	O4	M1	M2	M3	M4	E1	E2	E3	B1	B2	B3
<i>agan</i>	0	61	130	174	170	1	164	109	98	107	138	87	96	65
<i>cunnan</i>	1	111	303	181	97	40	122	266	806	1305	1415	788	898	758
<i>dugan</i>	0	38	4	15	4	0	0	0	0	0	0	0	0	0
<i>durran</i>	0	72	120	87	28	13	33	81	51	42	37	14	18	9
<i>magan</i>	3	1557	2212	1669	1278	254	1666	1650	1668	1773	1886	903	1061	820
<i>motan</i>	2	162	425	260	165	3	181	130	409	700	624	367	459	425
<i>munan</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>nugan</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>sculan</i>	1	1082	1865	1547	1473	1421	3929	3280	2934	3762	2401	1097	1566	1279
<i>þurfan</i>	0	58	58	41	21	0	4	5	0	0	0	0	0	0
<i>unnan</i>	3	11	13	10	10	0	0	0	0	0	0	0	0	0
<i>willan</i>	7	1228	2744	1660	1247	198	1291	1844	2631	3334	2939	1480	1623	1487
<i>witan</i>	1	417	740	551	364	49	273	211	90	13	0	1	0	1
total	18	4797	8614	6195	4858	1979	7663	7576	8687	11036	9440	4737	5721	4844

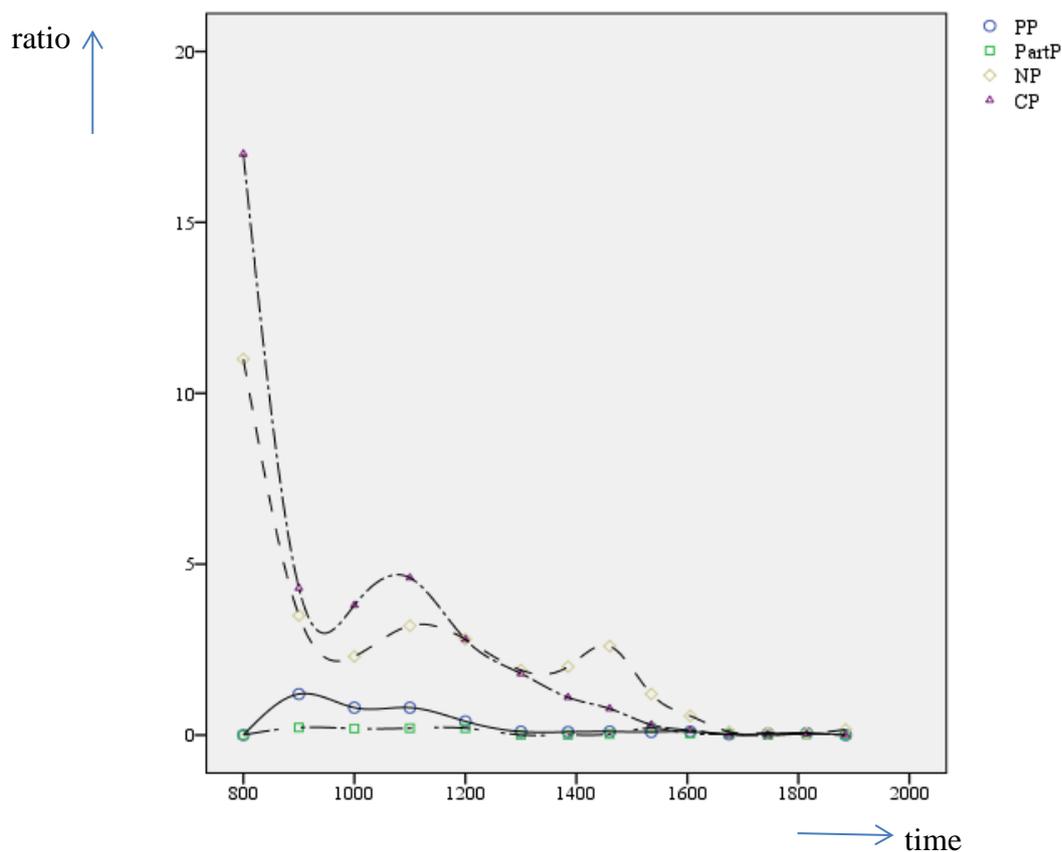


Figure 11: Decrease of the ratio of preterite-presents per complement type

Figure 10 and 11 display the same tendencies; they both show a decrease of the preterite-presents with non-verbal complements over time. What is different for the two figures is the sharpness of the decrease, as the lines representing the relative frequencies are much steeper than the lines representing the ratio as part of the total occurrences of the preterite-presents. This is in line with the expectations as the data in figure 13 have canceled out decreases that are due to the overall loss of a preterite. The Constant Rate Hypothesis was applied to the two sets of results; besides a test on the modal cases, section 4.4. thus also reports on a methodological study as the results from the two ratios can be compared.

Two deviations in both figure 10 and figure 11 that blur the S-shaped curve that is normally present for language change are the low numbers around 1100, and the unexpected increase of CP complements around 1450.

The first deviation is located in the O3 corpus (950-1050). This corpus contains twice as many words as the corpora directly before and directly after, but the number of tokens is not twice as high (table 12). This might be due to the corpora being off-balanced in genre: As the phenomenon of non-verbal complements of modal verbs belongs to informal language use (cf. chapter 2), the fact that the O3 corpus consists largely out of homilies, while the O2 and the O4 corpus consist out of histories and biographies, might account for the skewedness in this corpus. Support for this idea is shown in figures 12 and 13: The percentage of homilies in period O3 (950-1050) is twice as high as in period O4 (1050-1150), while the percentage of biographies is twice as low.

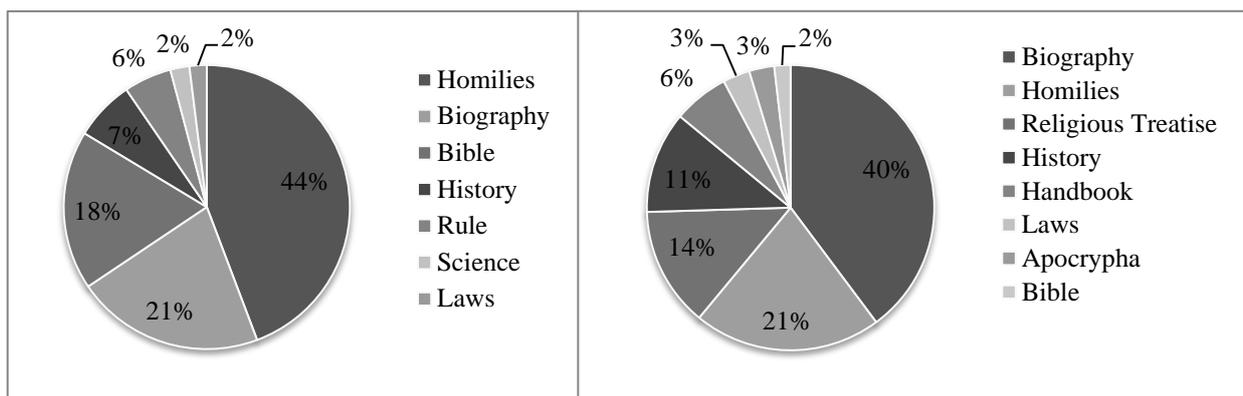


Figure 12: Genres Old English 3 (950-1050)

Figure 13: Genres Old English 4 (1050-1150)

The increase of CP complements around 1450 marks the remarkable make-up of the category: Not only is there a general increase while the other complement types are only decreasing, but there are also only two verbs that frequently occur with an embedded sentence, which are *willan* ‘to want’ and *witan* ‘to know’. Because of the significant properties of preterite-presents with CP complements, this type is not included in the general tests; instead, section 4.6. focuses solely on this deviating category.

The follow-up question for the results of the application of the *Constant Rate Hypothesis* is whether the results are due to the properties of specific lexical items; in order to control for this, the test of logistic regression was also performed on the individual preterite-present verbs. Following Postma (2010), the individual lexical items can also function as the ‘different contexts’ in which a certain type of complement occurs.

Test 2: The time of loss

In section 4.5. the time of the most significant losses is calculated by means of Fisher’s exact test. This way it can be shown which time periods were crucial in the loss of the three types of complements. The prediction is that the preterite-present verbs with nominal complements have a different time of loss from preterite-present verbs with prepositional and particle complements.

The follow-up question again is whether the results are due to the properties of specific lexical items; in order to control for this, the test was also performed on the individual preterite-present verbs.

4.4. One label, two different phenomena: The Constant Rate Hypothesis

In this section the hypothesis is tested that non-verbal complements of preterite-present verbs correspond to two different sub phenomena, namely, the combination of preterite-present verbs with prepositional, particle, and adjectival predicates, and the combination of preterite-present verbs with direct objects. The null hypothesis is that the phenomenon of non-verbal complements of modal verbs is a homogeneous phenomenon. This hypothesis is expected to be rejected by applying Kroch’s *Constant Rate Hypothesis* to the English case: the slopes of decrease of the preterite-present verbs are expected to differ from one another in two different

contexts, namely, in combination with prepositional and particle predicates, and with direct objects. This shows that the two phenomena are underlyingly unrelated.

The slopes of decrease can be compared after the logistic transformation of the data. While the S-curves (Bailey 1973) which capture language change, cannot be compared, Kroch (1989) showed that the curves of the logistic transformation of the data can be compared for different contexts (figure 14).

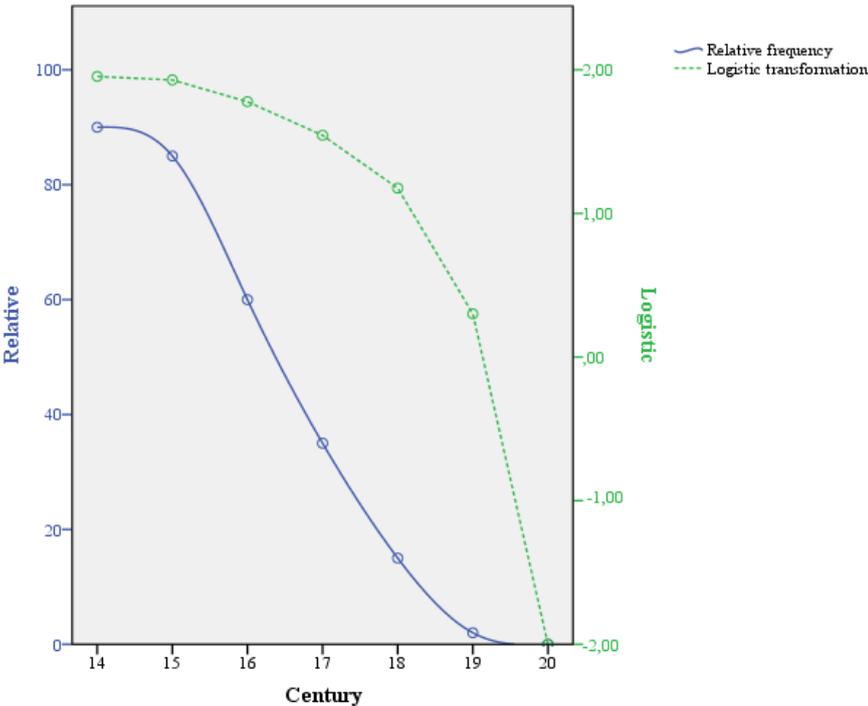


Figure 14: Fictional relative decrease and its logistic transformation

After applying the Constant Rate Hypothesis to the different types of complements in section 4.5.1., in section 4.5.2. an alternative analysis is excluded in which the differences found are due to individual lexical items. Following Postma (2010), the Constant Rate Hypothesis is applied to individual lexical items; in this section, the specific lexical items are the different contexts which can be compared by means of logistic regression.

4.4.1. Rate per complement type

As it was stated in the previous section, the decrease in the different sub corpora can be compared by means of two rates: The relative frequency per 50,000 words in each corpus, or the ratio of the occurrences of the preterite-presents with a specific non-verbal complement as part of the total occurrences of the preterite-presents. Both numbers were transformed to a logistic scale; the transformed data are shown in figure 15 and 16. Because of the small numbers the data points are not exactly in a straight line; the estimated fitted line, however, shows that the slopes of the decrease in Prepositional and Particle Phrases seem to be highly different from the slope of the Nominal Phrases.

logistic transformation of frequency per 50,000 words

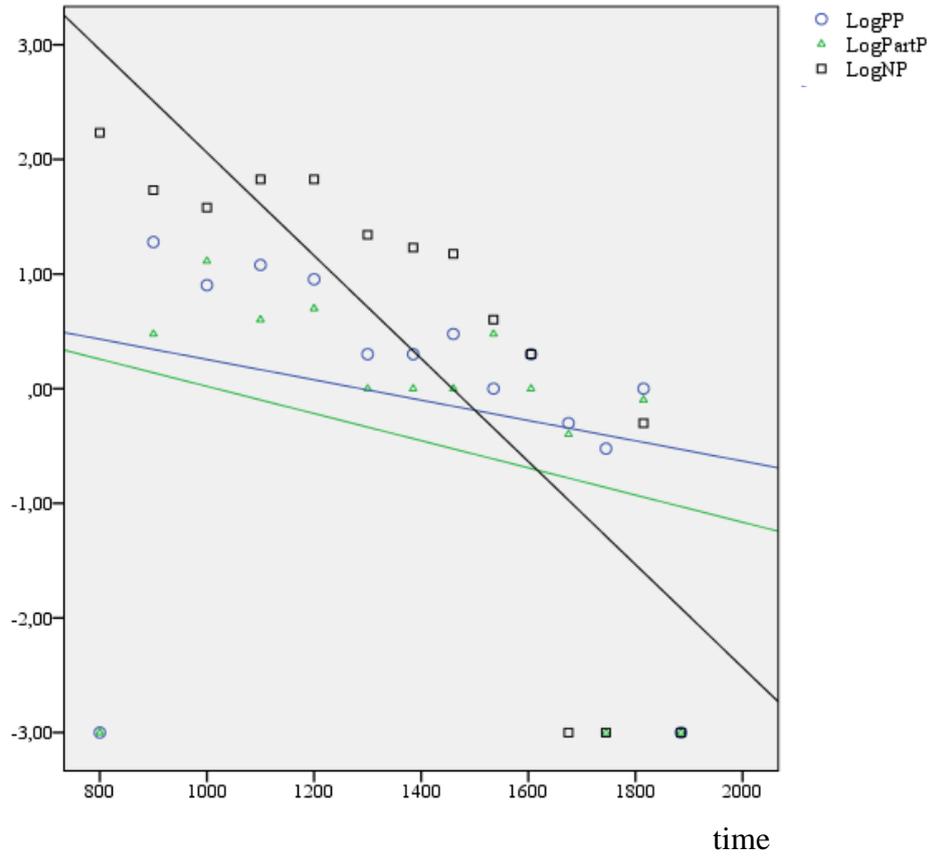


Figure 15: Logistic transformation of the relative frequency and fitted line.

logistic transformation of the ratio

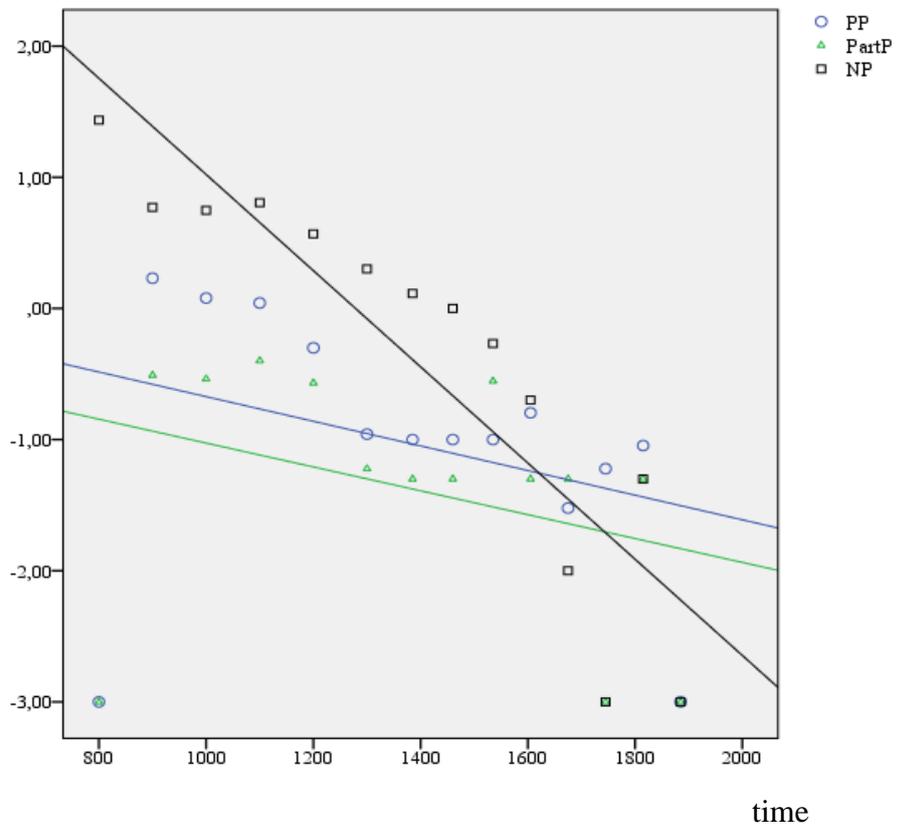


Figure 16: Logistic transformation of the ratio per complement and fitted line

The differences in slopes are calculated by means of linear regression. The differences between the coefficients and their significance are shown in table 20 (for the relative frequencies) and 21 (for the ratios). Table 20 shows that the difference between the slopes of the Prepositional and Particle Phrases is quite small, while the difference between the slopes of the Prepositional and the Nominal Phrases is much larger. This holds even more so for the difference between the slopes of the Particle and the Nominal Phrases. None of the differences found are significant, however; the lowest p-level, which holds for the difference between NP and PP Phrases is 0,161.

Table 20: Slope differences per complement – relative frequency

Difference in slope	Particle Phrase	Prepositional Phrase	Nominal Phrase
Particle Phrase	0	+0,762	+0,413
Prepositional Phrase	-0,350	0	+0,413
Nominal Phrase	-0,762	+0,413	0

Table 21 shows the same tendencies, as the differences between the slopes of the Nominal Phrases and the Prepositional and Particle Phrases are much larger than the difference between the slopes of the latter two categories. Based on this rate, however, the slope of the Nominal Phrases differs significantly from the slope of Particle Phrase ($p=0,010$).

Table 21: Slope differences per complement type – ratio

Difference in slope	Particle Phrase	Prepositional Phrase	Nominal Phrase
Particle Phrase	0	+0,343	+0,984*
Prepositional Phrase	-0,343	0	+0,641
Nominal Phrase	-0,984*	-0,641	0

*significant, linear regression $p<0,05$

The difference between the two sets of results is not surprising, as figure 15 and 16 show that the slopes of the logistic transformation of the Particle and Prepositional Phrases based on the ratio are much closer to one another than the slopes of these phrases based on the relative frequency. Therefore, the slope of the logistic transformation of the Nominal Phrases, which is somewhat similar in both cases, stands out more in the second rate.

The results are important for two reasons. First of all, the two sets of results together make clear that there is a strong tendency in the history of English that the preterite-presents with Nominal Phrases were lost at a higher rate than the preterite-presents with Prepositional and Particle Phrases. Based on table 20 and 21 the null hypothesis can partly be rejected, as there is a significant difference between preterite-presents with nominal complements, and preterite-presents with particle complements. The overlap between the particle and prepositional complements moreover gives a good indication that the category of ‘modals with non-verbal complements’ consists out of two different phenomena: preterite-present verbs with Prepositional and Particle Phrases, and preterite-present verbs with Nominal Phrases. The results in the next sections further support hypothesis 1a, but further research with more data or different statistics are required to fully confirm the hypothesis.

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

The methodological importance of the results in tables 20 and 21 furthermore is in the fact that a different rate of measurement makes a world of difference: Although the rough rate of relative frequency per 50,000 words gives the same tendencies as the fine-grained ratio of the total occurrences of the preterite-presents, the exact outcomes are different. This stresses the importance of choosing the the precisest rate; the ratio per preterite-present verb is used in the following sections.

4.4.2. The rate of individual lexical items

In this section an alternative analysis is excluded in which the differences found in the previous section are due to differences between the verbs. Following Postma (2010), the Constant Rate Hypothesis is applied to individual lexical items; the preterite-present verbs are the different contexts of which the slopes are compared. The null hypothesis in this section is that the slopes of the verbs are equal per complement; by conducting linear regression on the different verbs split out per complement, the hypothesis is expected not to be rejected.

Direct objects In a linear regression in which one of the more frequent verbs, *cunnan* ‘can’, is taken as the initial model, the difference with the four other most frequent verbs *agan* ‘to owe’, *unnan* ‘to grant’, *willan* ‘to want’, and *witan* ‘to know’ is not significant. In table 22 it is shown that their slopes do not differ significantly from one another.

Table 22: Slopes and significance per modal verb with direct object

Verb	Slope difference	Verb	Slope difference
<i>Cunnan</i>	0	<i>Sculan</i>	-1,312**
<i>Agan</i>	+0,338	<i>Purfan</i>	-1,188*
<i>Magan</i>	-1,068*	<i>Unnan</i>	-0,448
<i>Motan</i>	-1,644**	<i>Willan</i>	-0,292
<i>Munan</i>	-1,485**	<i>Witan</i>	+0,251

**highly significant, linear regression $p < 0,005$

*significant, linear regression $p < 0,05$

The fact that five verbs combined with a direct object differ significantly from the slope of *cunnan* does not necessarily mean that they represent a different phenomenon, as two alternative explanations can be given: First of all, the relevant verbs do not show up in all sub corpora and/or have a low frequency. Because of these low amount of data and their low frequencies the shape of the logistic curve cannot be estimated very precisely. *Motan* ‘must’, *purfan* ‘to need’ and *munan* ‘to suffice’ combined with a direct object show up in less than 5 of the 14 sub corpora (table 23). *Magan* ‘may, can’, *motan* ‘must’, and *sculan* ‘owe’ combined with a direct object moreover have an average ratio of less than 1% of the total occurrences of these verbs in the corpus (table 23). The average ratio is calculated by dividing the sum of the ratios for each verb by the 14 sub corpora. Compare in this respect for instance

agan ‘to ought’ with a direct object, which forms almost 20% of the overall occurrences of this verb and in 9 sub periods.

Table 23: Number of periods and average ratio per preterite-present with direct object

Verb	Number of subcorpora	Average ratio	Verb	Number of subcorpora	Average ratio
<i>Willan</i>	10	1,9	<i>Magan</i>	8	0,12
<i>Agan</i>	9	19,9	<i>Sculan</i>	5	0,09
<i>Witan</i>	9	10,1	<i>Purfan</i>	3	1,7
<i>Cunnan</i>	9	9,0	<i>Motan</i>	2	0,04
<i>Unnan</i>	5	20,4	<i>Munan</i>	1	7,14

A second explanation can be given for *munan* ‘to suffice’ and *purfan* ‘to need’: These preterite-presents have disappeared in Middle English only and as such the slopes of *munan* and *purfan* with non-verbal complements are most likely influenced by the decrease of these verbs in general. The absolute frequencies of the disappeared preterite-present verbs are in table 24.

Table 24: Absolute frequencies of the *munan*⁴³ and *purfan*

Period	O1	O2	O3	O4	M1	M2	M3	M4	E1
Verb	0-850	850-950	950-1050	1050-1150	1150-1250	1250-1350	1350-1420	1420-1500	1500-1570
<i>munan</i>	0	0	0	0	1	0	0	0	0
<i>purfan</i>	0	58	58	41	21	0	4	5	0

Prepositional and particle predicates In a linear regression in which one of the more frequent verb-predicate combinations, *sculan* ‘owe, shall’ with a particle predicate, is taken as the initial model, only the slopes of *motan* ‘must’ with a Particle and a Prepositional Phrase differ significantly from the initial model (table 25). This result shows that the finding in the previous section is most likely not due to individual lexical verbs: The slopes of the logistic transformation of the two complements show a remarkable similarity. Table 25 shows that this holds for most individual lexical items. This strongly supports the claim that these two types can be grouped together as preterite-presents combined with Directional Phrases.

⁴³ The verb *munan* ‘to suffice’ occurs only once in the collection of Penn Corpora and combines then with a direct object:

- (i) giu muned on his godspel þe wunderlich hider kume.
who remembered on his gospel the miraculous hither come
‘who remembered in his gospel the miraculous return.’
(1150-1250; Morris 1873; *Trinity Homilies*)

Table 25: Slopes and significance per modal verb with prepositional and particle predicates

Verb	Phrase	Slope difference	Verb	Phrase	Slope difference
<i>Sculan</i>	Particle	0	<i>Motan</i>	Particle	+0,705*
	Preposition	+0,212		Preposition	+0,915**
<i>Cunnan</i>	Particle	-0,431	<i>Willan</i>	Particle	+0,142
	Preposition	-0,267		Preposition	+0,430
<i>Dugan</i>	Particle	-0,343	<i>burfan</i>	Preposition	-0,440
	Preposition	+0,194	<i>Witan</i>	Particle	+0,159
<i>Magan</i>	Particle	-0,164	<i>Durran</i>	Preposition	-0,374
	Preposition	+0,179			

**highly significant, linear regression $p < 0,005$

*significant, linear regression $p < 0,05$

The deviation of *motan*, although it is strong, cannot be claimed to have much weight: The significantly less sharp decrease is caused by the relatively long presence of the combinations of this verb with particle and prepositional phrases (table 26), but as there are only very few occurrences from the Middle English period onwards, more research is necessary before any strong conclusions can be drawn.

Table 26: Comparison *sculan* and *motan* with directional complements

Time period	M1	M2	M3	M4	E1	E2	E3	B1	B2	B3
	1150-1250	1250-1350	1350-1420	1420-1500	1500-1570	1570-1640	1640-1710	1710-1780	1780-1850	1850-1920
<i>sculan</i> 'shall'+ PartP	0	0	0	0	3	1	0	0	0	0
<i>motan</i> 'must'+ PartP	1	1	1	1	1	1	1	0	1	0
<i>motan</i> 'must'+ PP	2	1	1	1	0	3	0	1	2	0

For now, it is important to see that the slopes of the individual lexical items pattern together: For the results found in section 4.5.1. the slopes of the specific verbs do not differ significantly from one another if the ratios are relatively high, and if the verbs have survived until the Modern British English period. Following Postma's (2010) application of Kroch's *Constant Rate Hypothesis*, this strongly suggests that the difference found between preterite-presents with Nominal Phrases on the one hand, and preterite-presents with Particle Phrases on the other hand is not due to individual verbs but instead holds across the board. For Particle and Prepositional Phrases it is furthermore shown that the slopes of the specific lexical items do not differ from one another; this supports an analysis in which the two types of complements are grouped together as 'Directional Complements'.

In the next section, the time of decrease of the different categories are determined.

4.5. Time of decrease

In the previous section two different phenomena were identified that are both labeled as non-verbal complements of modal verbs: Based on the slope of decrease there are verbs combined with Particle Phrases, and with Nominal Phrases. Particle Phrases and Prepositional Phrases moreover overlap for a great deal. In this section the critical times of loss of the three categories are determined by means of Fisher's exact test.

In section 4.5.1., it is shown that the critical period in the loss of the combination with particle and prepositional predicates was almost four centuries before the loss of the combination with direct objects; in section 4.5.2. it is shown that this result is not due to the behavior of one or more specific preterite-presents. This result leads to empirical support for Lightfoot's (1979), Roberts's (1985, 1993), and Roberts and Roussou's (2003) theories about the loss of direct objects, but at the same time presents a new puzzle of the loss of directional predicates.

4.5.1. Decrease per complement type

By means of Fisher's Exact test the ratio of the occurrences of preterite-presents with the three types of complements as part of the overall occurrences of preterite-presents across two sequential time-periods were compared; the results per complement type are described below.

Direct objects The three periods with a highly significant decrease for Nominal Phrases are from M4 to E1 (Fisher's Exact, $p=0,000$), from E1 to E2 (Fisher's Exact, $p=0,000$), and from E2 to E3 (Fisher's Exact, $p=0,000$).

Table 27: The decrease of nominal complements

Period	M4	E1	E2	E3
	1420-1500	1500-1580	1580-1640	1640-1710
<i>Absolute frequency preterite-presents</i>	7576	11036	9440	4737
Absolute frequency preterite-presents + Nominal Phrases	58	33**	16**	1**

**highly significant, Fisher's Exact $p<0,005$

Particle complements For the particle complements, the decrease is not significant for any of the sequential periods; the sharpest decrease is from M1 to M2 (Fisher's Exact, $p=0,19$).

Table 28: The decrease of particle complements

Period	M1	M2
	1150-1250	1250-1350
<i>Absolute frequency preterite-presents</i>	4858	1979
Absolute frequency preterite-presents + Particle Phrases	10	1

Prepositional complements For the prepositional complements, finally, the decrease is highly significant from O4 to M1 (Fisher's Exact, $p=0,004$); the decrease in the period directly following, from M1 to M2 was also significant (Fisher's Exact, $p=0,054$).

Table 29: The decrease of prepositional complements

Period	O4	M1	M2
	1050-1150	1150-1250	1250-1350
<i>Absolute frequency preterite-presents</i>	6195	4858	1979
Absolute frequency preterite-present + Prepositional Phrases	52	19**	2*

**highly significant, Fisher's Exact $p<0,005$

* significant, Fisher's Exact $p<0,05$

Comparison The results show there is a difference between the time of loss for preterite-present verbs with Prepositional and Particle Phrases on the one hand, and for preterite-present verbs with Nominal Phrases on the other hand. While the first phenomenon seems to have been lost at the end of Old English (1150), the sharpest decreases for preterite-presents combined with Nominal Phrases seem to be at the end of Middle English (1500).

The non-significant results for the particle complements are probably due to the small numbers; the period with the sharpest decrease nonetheless coincides with one of the crucial periods for the prepositional complements. This once again confirms the overlap between the two categories.

4.5.2. Decrease per individual lexical item

In order to exclude an alternative analysis in which the difference found between nominal and prepositional complements is due to individual lexical items, it was tested whether the decreases found between the sub corpora are present for all, or, the majority, of the preterite-present verbs. Because of the overlap found between the particle and the prepositional complements in the previous section, and because of the small number of particle phrases, the two types of complements are accumulated in this section.

Nominal phrases The decrease between 1420 and 1710 is highly significant for all verbs that are still present in Early Modern English, namely, for *agan* 'ought', and *cunnan* 'can', (table 30). It does not hold for *witan* 'to know', as this verb was lost in Early Modern English; the decrease is due to the overall loss of the verb and as such, the ratio is 0/0.

Table 30: The decrease of nominal phrases per verb⁴⁴

Period		M4	E3
		1420-1500	1640-1710
<i>agan</i> ‘ought’	Absolute	109	138
	+ Nominal Phrase	13	0**
<i>cunnan</i> ‘can’	Absolute	266	1415
	+ Nominal Phrase	14	0**
<i>witan</i> ‘know’	Absolute	211	0
	+ Nominal Phrase	13	0

**highly significant, Fisher’s Exact $p < 0,005$

Directional phrases For the two preterite-present verbs that had the highest ratio of prepositional and particle complements at the end of Old English, which are *magan* ‘can’ and *sculan* ‘owe’, the decrease from 1050-1420 is highly significant. For the other verbs, the decrease is not significant; it is nonetheless present, however. In table 31 it is shown that the ratio is lower for all verbs in period M3 than in O4.

Table 31: The decrease of directional complements per verb⁴⁵

Period		O4	M3
		1050-1150	1350-1420
<i>dugan</i> ‘owe’	Absolute	15	4
	+ Directional Phrase	2	0
<i>magan</i> ‘can’	Absolute	1669	1666
	+ Directional Phrase	17	1**
<i>motan</i> ‘must’	Absolute	260	165
	+ Directional Phrase	5	2
<i>sculan</i> ‘owe’	Absolute	1547	3929
	+ Directional Phrase	27	1**
<i>þurfan</i> ‘dare’	Absolute	41	21
	+ Directional Phrase	1	0
<i>witan</i> ‘know’	Absolute	551	364
	+ Directional Phrase	2	0

**highly significant, Fisher’s Exact $p < 0,005$

Review Summarizing, the difference found between the time of decrease for preterite-presents combined with Prepositional and Particle Phrases and for preterite-presents combined with Nominal Phrases holds for all individual lexical items, and is significant for the most frequent combinations. The ability of preterite-present verbs to combine with prepositional (and particle) predicates is drastically reduced after the Old English period, while the ability to combine with direct objects is reduced after the Middle English period. Although the

⁴⁴ *Magan* ‘can’, *sculan* ‘owe’, *þurfan* ‘need’ and *unnan* ‘grant’, although they can combine with nominal complements, are not included as they do not occur with these complements in these sub corpora.

⁴⁵ *Durran* ‘dare’ and *cunnan* ‘can’, although they can combine with nominal complements, are not included as they do not occur with these complements in these sub corpora.

combinations are still found in later periods, as is shown by the S-shaped curve in figure 14, the productivity is low.

The theoretical consequences of these findings are discussed in section 4.7.; what needs to be discussed first, is the case of the sentential complements (figure 15). Does this category fit in with the results?

4.6. Sentential complements

As it was mentioned in section 4.3., the sentential complements displayed a remarkable make-up: The category shows a significant increase around 1500 while the other categories only showed a decrease, and there are only two verbs that frequently occur with these complements, which are *willan* ‘will’ and *witan* ‘know’.

The link between these two deviations is the verb *willan*: First of all the increase is necessarily due to this verb as *witan* was lost at the end of Middle English (table 19), and secondly, this verb seems to deviate from other verbs with nominal, prepositional, and particle complements as well; a comparison with two other frequently occurring verbs is in table 32. For all four categories, the ratio of *willan* with a non-verbal complement as part of the overall occurrences of this verb is relatively high; what is more, there are also much longer occurrences found. A separate study on the history of *will* is necessary, but what the data seem to suggest is that this verb might have a different structural analysis: this verb, which has a different history to begin with as it was a reanalyzed anomalous verb, might have been a truly transitive verb that at the end of Middle English lost its ability to combine with any other predicate than a verbal predicate.

Table 32: *Willan* in the history of English

Period		M1	M2	M3	M4	E1	E2	E3	B1	B2	B3
Verb	Type	1150-1250	1250-1350	1350-1420	1420-1500	1500-1570	1570-1640	1640-1710	1710-1780	1780-1850	1850-1920
PP	<i>Willan</i>	5	0	2	2	3	3	0,3	0	1	0
	<i>Sculan</i>	7	0	0,3	0,6	0,5	0	0,4	0	0	0
	<i>Magan</i>	0,8	4	0	0,6	0,6	0	0	0	0	0
PartP	<i>Willan</i>	0,8	0	0,8	0,5	3	0,6	0,3	0	0,6	0
	<i>Sculan</i>	2	0	0	0	2	0,3	0	0	0	0
	<i>Magan</i>	4	0	0,6	0	0	0	0	0	0	0
NP	<i>Willan</i>	15	66	85	9	3	2	0	0	0,6	0
	<i>Sculan</i>	0	0	0,3	0	5	0	0	0	0	0
	<i>Magan</i>	4	4	1	0	0,6	0,6	0	0	0	0
CP	<i>Willan</i>	5	7	4	5	22	16	0,37	0,2	0,18	0,47

4.7. Review and consequences

Based on the fact that the Prepositional and Particle Phrases have the same rate of decrease, the same time of loss, and their individual lexical items do not differ from one another, it is

possible to identify the phenomenon of modal verbs combined with directional complements⁴⁶ in the history of English; this phenomenon was lost at the end of the Old English period.

The decrease of preterite-presents combined with Nominal Phrases is significantly different from the decrease of preterite-presents combined with Particle Phrases; moreover, the time of loss differs from both the time of loss of the preterite-presents with Particle and Prepositional Phrases as the sharpest decreases were at the end of the Middle English period. For these two reasons, this phenomenon is highly likely to be different, which supports the hypothesis stated in the introduction of the sentence:

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

The fact that the logistic curve of nominal complements does not differ significantly from the logistic curve of prepositional complements is one reason why hypothesis 1a is not fully confirmed; following Kroch (1989), a different onset of language change does not necessarily mean that the phenomena are unrelated. More data are required. Another reason is the exclusion of the sentential complements because of the deviating behavior of *willan* ‘will’. A separate study on the history of this verb might tell us whether the nominal and the sentential complements pattern together.

What do the results tell us about the theories proposed in the literature? It first of all tells us that Lightfoot (1979) was approximately correct in dating the loss of direct objects in his ‘radical restructuring analysis’ of modals in English: Lightfoot (1979:101), followed by Roberts (1985, 1993), Roberts and Roussou (2003), Barbiers (2005a), and Van Kemenade & Coupé (2008), hypothesizes that the cause of the loss of direct objects is located in the 15th Century.

Although Planck (1984) is right in his ‘gradual change analysis’ that modal verbs with direct objects are still attested in the 17th Century, their productivity had then already significantly increased. This brings the discussion to a higher theoretical level, namely, that the definition of a loss depends on the view on language and language change; although the combinations are still in the E-language after 1500, it can be assumed that the disappearance in the I-language is close to 1500. This is in accordance with most generative theories; for recent work on this theoretical issue see Longobardi 2001, Fischer 2003, Walkden 2012, among many others.

The cause of the loss of direct objects is furthermore most likely to be separated from the cause of the loss of prepositional and particle predicates: While Roberts’s (1985, 1993) and Roberts and Roussou’s (2003) theories that assume the cause of the loss of direct objects is related to the loss of the argument structure, and therefore only affects this category, Barbiers (2005a) followed by Coupé and Van Kemenade (2008), hypothesizes that the overall ability to have a complement other than an infinitive was lost. The second type of analysis

⁴⁶ A remaining question is why adjectives were not attested; what should be noted is that this gap in the data is found in the Modern Germanic languages as well (chapter 3).

probably needs to be adjusted so that the distinct behavior of the nominal and directional complements of preterite-presents is accounted for.

The cause of the loss of preterite-presents is at this point still unknown and is given highest priority in a follow-up study. A starting point for this study would be the loss of directional complements in Icelandic: recall that in older stages Icelandic, modal verbs were able to combine with adjectival predicates but in modern stages, they are not. What was suggested in chapter 3 is that the availability of this phenomenon is linked to the overall productivity of Small Clause structures: In the Modern European languages, the absence of modal verbs with directional complements seems to go hand in hand with a limited productivity of resultatives, after all. What is more, a detailed study of Icelandic could further support hypothesis 1a as this language seems to make a clear distinction between at least nominal and sentential complements on the one hand, and adjectival complements on the other; while adjectival complements are no longer available in Modern Icelandic, nominal and sentential complements are (chapter 3).

In sum, this study has resulted in both the confirmation of the current theories, and the attestation of a new phenomenon that needs to be accounted for in terms of language change and variation. Finally, the methodological issue of transforming the natural S-shaped curve of language change in order to compare the rates of change has once again been proven fruitful. Based on theoretical issues and the synchronic research, the Constant Rate Hypothesis predicted that at least two different rates of change should be attested while examining non-verbal complements of modal verbs in the history of English; while using the precisest rate possible, this hypothesis was borne out.

5.1. Introduction

In this fifth and final chapter the findings of the previous chapters are combined and put in a theoretical perspective. This summarizes the strong support found for the four hypothesis stated in the introduction.

In section 5.2. it is shown that the new synchronic and diachronic data support the hypothesis that the label ‘modal verbs with non-verbal complements’ is a term that covers two different phenomena: Modal verbs with particle, prepositional, and adjectival predicates, and modal verbs with direct objects and embedded sentences. The study of language variation, of E-language, gives us the necessary information to understand the underlying structures.

The underlying structures of the two sub phenomena are discussed in section 5.3., as well as the direct links between the interpretation of modal verbs and their possible complements. The links between dynamic modality and nominal and sentential complements, and between deontic modality and adjectival, prepositional, and particle complements are shown. In this section on language structure, on I-language, the support in favor of and against hypothesis 2 is reviewed – do the modal verbs with particle, prepositional, and adjectival complements cross-linguistically fit in with a Small Clause analysis?

5.2. Part 1: Variationist Approach.

The theoretically driven first hypothesis was that modal verbs combined with direct objects and embedded sentences are different from modal verbs combined with adjectival, particle, and prepositional predicates. Both the new synchronic and diachronic data strongly support this claim.

Within the sixteen Modern European languages, three classes of languages can be distinguished: languages in which none of the complement types are available in combination with modal verbs (1) (English, Scottish Gaelic, Irish, Romanian); languages in which only direct objects and embedded sentences are available (2) (Icelandic, French, Italian, Welsh); and languages in which all or almost all types of complements are available (3) (Afrikaans, Dutch, Frisian, German, Luxembourgish, Swiss-German, Danish, Norwegian).

- | | | |
|-----|---|---------|
| (1) | I must go home. | English |
| (2) | a. Voglio una auto.
<i>want-1.SG a car</i>
b. Voglio che tu mi dica la verità.
<i>want-1.SG that you me say-INF the truth</i>
‘I want you to tell me the truth’ | Italian |
| (3) | a. Jan wil in fyts
<i>Jan wants een fiets</i>
‘John wants to have a bike.’
b. Ik wol dat hy aonpakt wurde.
<i>I want that he on-take becomes</i>
‘I want him to be taken care of.’
c. Jan mei nei hûs.
<i>Jan may to house</i> | Frisian |

- ‘John may go home.’
- d. It ljocht kin út.
The light can off
‘The light can be switched off.’
- e. Dizze muorre moat blau
this wall must blue
‘This wall must become blue.’

The historical stages of English can also be divided in three types of languages: Old English, in which direct objects, particle predicates, and prepositional predicates could be combined with modal verbs ; Middle English, in which direct objects could complement these verbs; and (Early) Modern English, in which none of these complement types are available. Besides the different time of loss, the different tendency in the rate of the change supports the division into the two phenomena.

- | | | |
|-----|---|----------------|
| (4) | <p>a. nan man ne mihte ne ing ne ut
<i>NEG-one man NEG-might-SBJ NEG in NEG out</i>
‘no man was able to go in or out’
(950-1050; Rositzke, H.A. 1967 (1940); <i>Anglo-Saxon Chronicle</i> 1016)</p> <p>b. fela ðinga sceal to tune
<i>many things shall to garden</i>
‘many things shall go to the garden’
(1050-1150; Lieberman, F. 1903-16; <i>Gerefa</i> 9)</p> <p>c. þæt he cunne pater noster and credon
<i>that he can pater noster and credo</i>
‘that he knows the pater noster and the creed’
(1050-1150; Fowler 1972; <i>Canons of Edgar</i>)</p> | Old English |
| (5) | <p>þat þei may þe trewþe of þe gospel;
<i>that they may the truth of the gospel</i>
‘that they are able to know the truth of the gospel;’
(1400; Hudson 1987; <i>Wycliffites Sermons</i>)</p> | Middle English |
| (6) | <p>I must go home.</p> | Modern English |

The two case studies fit right in with hypothesis 1a as there are big differences between Nominal and Sentential Complements of modal verbs on the one hand, and Prepositional, Particle, and Adjectival complements on the other hand. The overview of the synchronic and diachronic data is shown in table 33.

Hypothesis 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.

Table 33: Overview of synchronic and diachronic data

Language	Verb class	V	N	S	Dir	Language	Verb class	V	N	S	Dir
Old English	n/a	+	+	+	+	Swiss-German	dynamic	+	+	+	+
Middle English	n/a	+	+	+	-		deontic	+	-	-	+
Early Modern English	n/a	+	-	-	-		epistemic	+	-	-	-
Modern English	dynamic	+	-	-	-	Danish	dynamic	+	+	+	+
	deontic	+	-	-	-		deontic	+	-	-	+
	epistemic	+	-	-	-		epistemic	+	-	-	-
Old Icelandic	n/a	+	?	?	+	Norwegian	dynamic	+	+	+	+
							deontic	+	-	-	+
							epistemic	+	-	-	-
Modern Icelandic	dynamic	+	+	+	-	French	dynamic	+	+	+	-
	deontic	+	-	-	-		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-
Afrikaans	dynamic	+	+	+	+	Italian	dynamic	+	+	+	-
	deontic	+	-	?	+		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-
Dutch	dynamic	+	+	+	+	Romanian	dynamic	+	-	-	-
	deontic	+	?	-	+		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-
Frisian	dynamic	+	+	+	+	Welsh	dynamic	+	+	-	-
	deontic	+	?	-	+		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-
German	dynamic	+	+	+	+	Irish	dynamic	+	-	-	-
	deontic	+	-	-	+		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-
Luxembourgish	dynamic	+	+	+	+	Scottish Gaelic	dynamic	+	-	-	-
	deontic	+	-	-	+		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-

V = Verbal, N = Nominal, S = Sentential, Dir = Directional

n/a = not included in the study, ?- = probably not attested,

?+ = probably attested, ? = unknown

The highlighted boxes represent the significant results and therefore require some elaboration. First of all, the semantics of the older stages of English and Icelandic have not been included in this study and as such cannot be displayed (cf. section 5.3.). In Old Icelandic at least the combination of a modal and an adjectival predicate has been attested; in Old English, the three types of complements were available, which have been lost at the end of Old English (for directional complements), and at the end of Middle English (for nominal complements).

The diachronic changes explain part of the variation present in the Modern European languages, as directional complements of modal verbs are available in all Germanic languages except for English and Icelandic. This phenomenon does not occur in the Romance or Celtic languages. Moreover, the loss of modal verbs with nominal complements in English explains why only in this language this phenomenon is unavailable; the phenomenon occurs in all three European language families.

The two phenomena that seem to contradict the main hypotheses, namely, the occurrence of deontic modal verbs with nominal complements in Dutch, and Frisian, and with sentential complements in Afrikaans, have been reanalyzed in chapter 3: In both cases, the

deontic modal verb is complemented by an underlyingly verbal complement with a silent verb *HAVE* (for Nominal Phrases) and *MAKE* (for Sentential Phrases, Biberauer & Oosthuizen 2011).

Table 33 thus convincingly supports hypothesis 1a, as Adjectival, Particle, and Prepositional Phrases are found in a limited number while Nominal and Sentential Phrases combined with modal verbs are found in a great number of languages, and both phenomena can be lost separately.

5.3. Part 2: Structural Approach

In this section the variation found in the contemporary and historical languages is translated into a structural analysis. Based on the new synchronic and diachronic data the final three hypotheses are evaluated and an analysis is given for modal verbs combined with directional predicates, with direct objects, and with embedded sentences.

Hypothesis 1b: Only dynamic modal verbs can combine with nominal and sentential complements.

The synchronic data displayed in table 33 supports hypothesis 1b as dynamic modal verbs can occur with both nominal and sentential complements. This holds for all three language families (7) and five types of dynamic modality identified in chapter 3 (8)⁴⁷.

- | | | |
|-----|--|------------------------------------|
| (7) | a. De kan russisk.
<i>they can Russian</i>
'They know Russian.' | Danish |
| | b. Je sais le Français.
<i>I know the French</i>
'I know French.' | French |
| | c. Mae e'n medru Iseldireg
<i>is he-prt can Dutch</i>
'He can speak Dutch.' | Welsh |
| (8) | a. Ech cha Schwitserdütsch.
<i>I can Swiss-German.</i>
'I can speak Swiss German.' | Swiss-German

<i>ability</i> |
| | b. Je veux qu'il part.
<i>I want that he leaves</i>
'I want him to leave.' | French

<i>volitionality</i> |
| | c. I hoef geen fiets.
<i>I need no bike</i>
'I don't need a bike.' | Dutch

<i>'to need'</i> |
| | d. Ik durf twee dingen.
<i>I dare two things</i>
'I dare to do two things.' | Dutch

<i>'to dare'</i> |
| | e. Jan mag (es), dass du die Tür grün gestrichen hast.
<i>Jan may it that you the door green painted have</i> | German |

⁴⁷ It does not hold for the modal verbs that are also future markers; in chapter 3.2. it was argued that this fact suggested that these verbs might not be modals semantically.

‘John likes (it) that you painted the door green.’

‘to like’

What is furthermore striking to see is that in the older stages of English, the combinations of preterite-present verbs and nominal or sentential complements also mainly have a dynamic interpretation. Visser (1963-1973: §548-§572) claims that the preterite-presents in the history of English combined with direct objects most frequently have dynamic interpretations like ‘to be skilled in’, for *cunnan*, or ‘to possess’, for *agan*; combined with embedded sentences the verbs have an interpretation of ‘will or desire’ for *willan*, for instance (Visser 1963-1973: §560). In the fossilized idiomatic expressions ‘I would he was here’ and ‘Would God he was here’ this dynamic interpretation is still present (Visser 1963-1973: §814). More research on the semantics of modals in the history of English is necessary before any strong conclusions can be drawn, however.

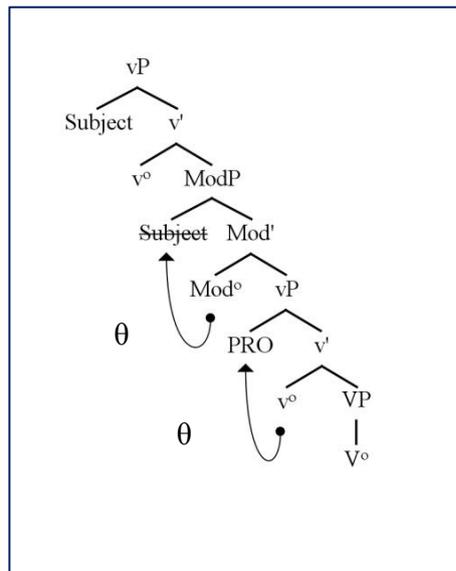
The link between the interpretation of the modal and the possibility of having a nominal and a sentential complement is that dynamic modal verbs have argument structure: They can assign the semantic role of an agent to their subject, like main verbs, and correspondingly, they can select both for the type and for the semantics of the complement.

The standard tests that show whether a verb has argument structure or not, as discussed in chapter 2, confirm the correctness of the first claim. At least for Dutch, Wurmbrand’s (1999) test on scope ambiguities shows that the modal verbs with nominal complements have argument structure. In contrast to epistemic and deontic modal verbs, dynamic modal verbs with nominal complements do not have scope ambiguities:

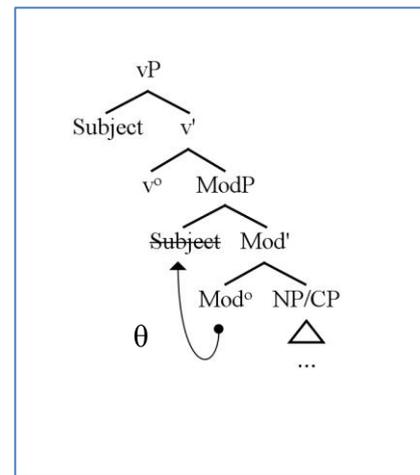
- (9) a. Twee filosofen mogen een onderscheiding. deontic
two philosophers may a award
i. ‘There are two philosophers who are allowed to have an award.’ Subject>Modal
ii. ‘It is allowed that two philosophers have an award.’ Modal > Subject
- b. Twee filosofen willen een onderscheiding. dynamic
two philosophers want a award
i. ‘There are two philosophers who want an award.’ Subject>Modal
ii. #‘It is wanted that two philosophers have an award.’ #Modal > Subject

This test gives us more information about the syntactic structure of dynamic modal verbs: Since the subject cannot scope under the modal verbs, it has to originate above it. With verbal complements, this results in a control structure (10)a; with a nominal and a sentential complement it results in a simple transitive structure (10)b.

(10) a.



b.



The structure in (10)b explains the cross-linguistic differences present with dynamic modal verbs; Chomsky (1965) and Grimshaw (1979), among others, have shown that verbs carrying argument structure select for both the type and the semantics of their complements. The property of s(ematic)-selection explains, for instance, why dynamic modal verbs expressing ability in Norwegian combine with ‘languages, songs, texts, and some other nouns’ (Kristin Eide, p.c), while the category of ‘texts’ is ruled out in Dutch:

(11) a. ??Ik kan de bijbel.

Dutch

I can the Bible

b. *Ik kan de grondwet.

I can the constitution

The property of c(ategorical)-selection furthermore explains why dynamic modal verbs expressing ‘to like’ can combine with sentential complements in German, but not in Dutch (12): the main verb selects for the categories with which the verb can combine.

(12) a. Jan mag (es), dass du die Tür grün gestrichen hast.

German

Jan may it that you the door green painted have

‘John likes (it) that you painted the door green.’

b. Jan moet *(het) niet dat de muur geverfd wordt.

Dutch

Jan must it not that the wall painted becomes

‘John does not like it that the wall becomes painted.’

Hypothesis 1c: Deontic and epistemic modal verbs can combine with particle, prepositional, and adjectival complements.

The overview in table 33 partly supports hypothesis 1c: Within the Germanic languages, except for English and Icelandic, deontic modal verbs can combine with particle and prepositional (and adjectival) complements (13). In none of the languages epistemic modal verbs can combine with a non-verbal complement (14).

- | | | |
|---------|--|-----------|
| (13) a. | Hun skal hjem
<i>she must home</i>
'She must go home.' | Danish |
| b. | Jeg skal til Oslo.
<i>I will to Oslo.</i>
'I'll go to Oslo.' | Norwegian |
| (14) | Jan kan naar huis.
<i>Jan can to house</i> | Dutch |
| i. | 'John is allowed to go home' | deontic |
| ii. | #'It is possible that John goes home' | epistemic |

The first exception for hypothesis 1c is the absence of the phenomenon in English – and probably the Icelandic. This absence is due to diachronic change; a first hypothesis on the loss of this phenomenon is that it is due to the loss of the Small Clause structure (chapter 4). Support for this idea comes from the fact that Small Clause structures are in general less productive in languages in which modal verbs cannot combine with particle, prepositional, and adjectival complements (Talmy 1991, 2000 and Mateu 2000, 2011 for the Romance languages; Whelpton 2006, 2010 for Icelandic). If correct, this could also account for the overall absence of this phenomenon in the Romance and Celtic language family.

The second exception for hypothesis 1c is the absence of epistemic interpretations. This finding further confirms Barbiers's (1995) observation that epistemic modal verbs cannot combine with non-verbal complements. In future research, Barbiers's (1995), Eide's (2005), and Van Dooren's (2014) explanations of the absence of epistemic interpretation need to be compared in order to find out whether the absence is due to a height mismatch, an incompatibility of epistemics with non-tensed complements, or an incompatibility of epistemics with dynamic complements.

Two phenomena seemed to directly contradict hypothesis 1c as deontic modal verbs can be complemented by Nominal Phrases in Frisian and Dutch (15), and by Sentential Phrases in Afrikaans (16).

- | | | |
|------|--|-----------|
| (15) | Jan mag (van mij) een koekje.
<i>Jan may from me a cookie</i>
'I allow John to have a cookie.' | Dutch |
| (16) | Ek moet dat Wanda die boeke bestel.
<i>I must that Wanda the books order</i>
'I must make sure that Wanda orders the books.' | Afrikaans |

In chapter 3 these sentences have been shown to involve full verbal complements with a silent infinitive *HAVE* (for nominal complements) or *MAKE* (for sentential complements). The current theories on nominal complements are at least compatible with the presence of a silent or elided infinitive. Biberauer & Oosthuizen (2011) moreover present initial evidence in favor of the empty elements in Afrikaans as the complementizer *dat* 'that' is obligatorily present (17); the selection of *have* instead of *be* (51) provides further support.

- (17) Ek moet *(dat) Wanda die boeke bestel. Afrikaans
I must that Wanda the books order
 ‘I must make sure that Wanda orders the books.’
- (18) a. Hij is biblioteek toe.
he is library to
 ‘He has gone/has to go to the library’
 b. Ek het dat Wanda die boeke bestel.
I have that Wanda the books order
 ‘I have organized that Wanda orders the books.’

The link between deontic modals and the possibility of having a directional complement is that deontic modal verbs do not have argument structure; they do not assign a semantic theta role to their agent. As a result, only those complements that contain an agent that can be raised to subject position are allowed, as they satisfy the EPP without needing an agent theta role. The available complements are Verbal Phrases and Small Clauses; directional complements in combination with modal verbs have been analyzed as either Verbal Phrases (Van Riemsdijk 2002) or Small Clauses (Barbiers 1995) so in both analyses, directional complements are available.

In chapter 2 it was shown that both the deontic and the epistemic modal verbs pass all the tests for raising verbs; crucially, this also holds for the deontic modal verbs that combine with a prepositional, particle, or adjectival complement: In this case, the subject can for instance scope under the modal (19)ii (Wurmbrand 1999).

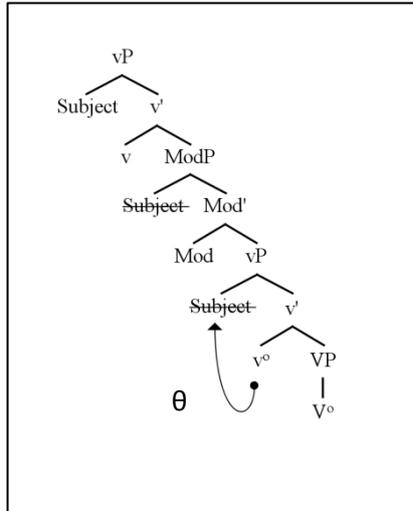
- (19) Twee filosofen mogen van mij naar dit congres. deontic
two philosophers may from me to this conference
 i. ‘There are two philosophers that I allow to go to this conference.’ Subject > Modal
 ii. ‘I allow two philosophers to go to this conference.’ Modal > Subject

This test gives us more information about the syntactic structure of deontic modal verbs: Since the subject can scope under the modal, it has to originate under it. With verbal complements, this results in a raising structure (20)a; this structure has also been hypothesized for deontic modal verbs with sentential complements in Afrikaans, and for deontic modal verbs with nominal complements in Frisian and Dutch as the complements are full Verbal Phrase with an underlying silent infinitive in V^0 . With directional complements, finally, the structure can be either as in (20)a containing the phonetically null infinitive *GO* in V^0 , or as in (20)b containing a Small Clause. In the next section both options are evaluated⁴⁸.

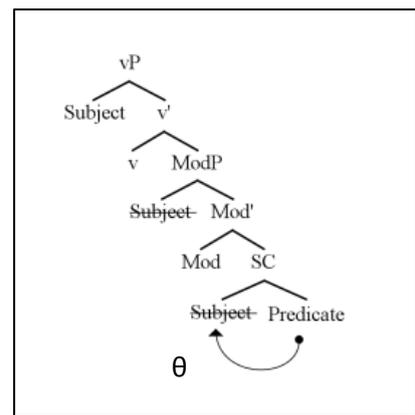
⁴⁸ A remaining issue is the combination of dynamic modal verbs with directional complements; combining the underlying structure of dynamic modals and the underlying structure of directional complements, the agent in sentences like (i) appear to receive two thematic roles. Subjects of modals have for this reason been problematic for a long time; possible solutions come from Zubizarreta (1982), followed by Roberts (1985) and Vikner (1988), who assumes that modal verbs assign adjunct theta-roles which do not violate the theta-criterion, and from Barbiers (1995) and Ramchand (2010), who propose a different structural mechanism for interpretation.

- (i) Jan wil naar huis. Dutch
Jan wants to house
 ‘John wants to go home.’

(20) a.



b.



Because deontic modal verbs are functional elements in the sense that they do not carry argument structure, they are not expected to select for the category or the semantics of their complement (Chomsky 1965, Grimshaw 1979); as long as there is an agent in the complement that can raise to the subject position of the modal, all complements should be allowed. This prediction is only partly borne out: There are indeed no semantic restrictions on the complement (Barbiers 1995, Van Dooren 2014), but the fact that Adjectival Phrases are only allowed in a subset of the languages that allow Prepositional and Particle Phrases as the complement of deontic modal verbs, suggests that functional elements can c-select for their complements. For this reason the cross-linguistic difference between languages in which modals combine with adjectival complements – Afrikaans, Dutch, Frisian, and German – and in which modals do not – Luxembourgish, Swiss-German, Danish, and Norwegian – deserves further research.

Hypothesis 2: Prepositional, particle, and adjectival complements of modal verbs are Small Clause predicates.

In this study the arguments in favor of and against hypothesis 2 have been reviewed. Moreover, the new synchronic and diachronic data provide more general considerations on this matter. The arguments that still stand in favor of and against the analysis of modal verbs with directional complements are briefly summarized in this section, and are followed by a review.

Arguments in favor of the Small Clause analysis

The distribution across modern and historical languages seems to favor a Small Clause analysis as the absence of directional complements of modal verbs goes hand in hand with a restricted availability of Small Clauses in general; more research is necessary, but the fact that at least in Icelandic and in the Romance languages Small Clause structures are restricted, and that, at the same time, modal verbs cannot be complemented by Directional Phrases in these languages, provides the onset for an explanation of the cross-linguistic differences.

The two language-specific arguments from chapter 2 that still stand are in (21)-(22): a Small Clause analysis, but not a silent infinitive analysis is compatible with the fact that a *by*-phrase cannot be licensed (Barbiers 1995:202), and with the fact that the IPP-effect does not occur (Barbiers 2005b:10)⁴⁹.

- (21) Deze lampen moeten uit *(door Jan).
These lights must out by Jan
 ‘These lights must be switched off by John.’
- (22) Jan had dat best *kunnen/gekund.
Jan had that best could-INF/could-PTC
 ‘John would very well have been able to do that’

Arguments in favor of the silent infinitive analysis

What is economical about the silent infinitive analysis is that it unifies the behavior of modal verbs in the Germanic languages, as deontic modal verbs would always be auxiliaries. Besides this general consideration there are a number of language-specific facts discussed in chapter 2 that cannot be accounted for in a Small Clause analysis: The Verb Projection Raising facts from Swiss-German (23), Afrikaans, Alsatian, and Luxembourgish, the phonologically reduced copy verbs in Swiss-German (24) and in West Flemish, and the verb clusters in 19th Century Frisian (Van Riemsdijk 2002).

- (23) Wil mer hettet söle häi. Swiss German
Because we would-have had-to home Van Riemsdijk 2002:146
 ‘Because we would have had to go home’
- (24) Wän i mues go poschte Swiss German
When I must COPY shop Van Riemsdijk 2002:159
 ‘When I must go shopping.’

Eide’s arguments on Norwegian also support a silent infinitive analysis, as in this language modal verbs with non-verbal complements pattern with auxiliaries and not with main verbs in the sense that they do not get the pro-verb *gjør* in tag questions:

- (25) a. Jan går i butikken, * går/ gjør han ikke det?
Jan goes in store goes/does he not that
 ‘John goes into the store, doesn’t he?’
- b. Jan må gå i butikken, må/* gjør han ikke det?
Jan must go in store must/does he not that
 ‘John must go into the store, mustn’t he?’
- c. Jon må hjem, må/* gjør han ikke det?
Jan must home, must/does he not that
 ‘John must go home, mustn’t he?’

⁴⁹ Although the absence of epistemic modality is confirmed throughout the synchronic data, it does not necessarily support a Small Clause analysis as there have been given other analyses that do not link this interpretation to a particular syntactic structure (Eide 2005, Van Dooren 2014).

Review

Since both structures in (26) are theoretically valid, and different languages provide us with arguments in favor of either one of the structures, a solution could be that the phenomenon is a matter of structural variation. In Dutch, the modals with a directional complement would be in a Small Clause structure, while in Swiss-German, Old Frisian and Norwegian, the directional complements would be full Verbal Phrases with a phonetically null infinitive.

- (26) Jan moet naar huis.
Jan must to home
'John must go home.'
- a. [TP Jan moet [vP ~~Jan~~ [VP [naar huis] GO]] Van Riemsdijk 2002
b. [TP Jan moet [SC ~~Jan~~ naar huis]] Barbiers 1995

Initial evidence for a parametric setting comes from Kristin Eide (p.c.), who mentions that modal verbs in Norwegian cannot easily combine with an expletive subject and a Small Clause; the single observed combination is with *måtte* 'must' in (27).

- (27) Nå må det noen på scenen.
Now must there someone on stage
'Now there must go someone on stage.'

In Dutch, contrastively, all modals can combine with an expletive subject and a Small Clause (28). What this suggests is that in Norwegian, but not in Dutch, the availability of Small Clause complements of modal verbs might be restricted; this pleads for a different analysis for modal verbs combined with directional complements in Norwegian and in Dutch.

- (28) Er moet/mag/kan/hoeft niet/wil iemand op het podium.
there must may can need not wants someone on the stage
'There must/can/can/doesn't need to/wants someone to go on stage.'

5.4. Conclusion

In this chapter the cross-linguistic variation that is present for modal verbs and their complements is linked to the structural possibilities of modals. The variation that is present in the overview in table 33, which is summarized in table 34, neatly links the possible interpretations of the modals to the possible complements. In general, dynamic modal verbs can combine with different types of complements, while deontic modal verbs can only combine with verbal and directional complements. This is due to the presence of argument structure in dynamic, but not in deontic modal verbs.

The variation within the Germanic languages can be traced back to diachronic change; ideas for the variation between the language families are discussed in the next chapter.

Table 34: Summary of synchronic and diachronic data

Language	Verb class	V	N	S	Dir	Language	Verb class	V	N	S	Dir
Old English	n/a	+	+	+	+	Germanic	dynamic	+	+	+	+
Old Icelandic	n/a	+	?	?	deontic		+	-	-	+	
					epistemic		+	-	-	-	
Modern English	dynamic	+	-	-	-	Romance	dynamic	+	+/-	+/-	-
	deontic	+	-	-	-		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-
Modern Icelandic	dynamic	+	+	+	-	Celtic	dynamic	+	+/-	-	-
	deontic	+	-	-	-		deontic	+	-	-	-
	epistemic	+	-	-	-		epistemic	+	-	-	-

V = Verbal, N = Nominal, S = Sentential, Dir = Directional

n/a = not included in the study, ? = unknown,

+/- = attested in a subset of the languages

The links between the interpretation of modal verbs, the presence of argument structure and the distribution of complements have been shown to very strong: While deontic modal verbs can only combine with verbal and directional complements, dynamic modal verbs can moreover combine with nominal and sentential complements. This supports the theoretical claim that dynamic modal verbs are main verbs in the sense that they have argument structure, while deontic modal verbs are functional elements in the sense that they do not have argument structure.

The distribution of complements in the Modern European languages gives us a stable diagnostic for the presence of argument structure in the modal verb by means of the availability of nominal and sentential complements. Both the synchronic and the diachronic data furthermore display a sharp distinction between the availability of modal verbs with nominal complements on the one hand, and modal verbs with directional complements on the other hand: In the synchronic study it is shown that only in the Germanic languages, the latter phenomenon is available. In the history of English the phenomenon of preterite-presents with directional complements is moreover newly established as its rate and time of loss differs from the rate and time of loss of preterite-presents with nominal complements. In Icelandic, moreover, only the combination with directional complements seems to have been lost.

The diachronic study gives us information about the necessary ingredients in a language for the different phenomena to be available. The loss of nominal complements at the end of the Middle English period is most likely linked to the overall restructuring of English modals in the 16th Century (Lightfoot 1979, Roberts 1985, 1993): When the modal verbs were reanalyzed as functional elements, they lost their argument structure and as such, they could not combine with nominal complements anymore. The loss of directional complements at the end of the Old English period might be linked to an overall restriction on Small Clause complements, as this seems to account for the loss of directional complements in the history of Icelandic, and for the overall absence of this phenomenon in the Romance family.

The above discussion can be summarized as follows:

Claim 1: Dynamic modal verbs are main verbs; deontic modal verbs are functional elements.

- **Claim 1a: Modal verbs with non-verbal complements are to be divided in modal verbs with nominal and sentential complements, and modal verbs with prepositional, adjectival, and particle complements.**
- **Claim 1b: Only dynamic modal verbs can combine with nominal and sentential complements.**
- **Claim 1c: Deontic modal verbs in the Germanic languages can combine with particle, prepositional, adjectival, and infinitival complements.**

The question *why* dynamic modal verbs assign argument structure while deontic modal verbs do not, is very difficult to answer, if not impossible. For ideas about to the question *how* the verbs are stored in the lexicon with the different interpretations and the different syntactic

properties, see Chomsky (1965), Grimshaw (1979) on the general mechanisms, and for modal verbs specifically see Barbiers (1995) or Eide (2005).

A link between the availability of directional complements of modal verbs and the overall productivity of Small Clause complements would support the second main hypothesis: Besides directional complements of modal verbs in Dutch (Barbiers 1995), directional complements of modal verbs in Old English and in older stages of Icelandic would then be in a Small Clause structure. At this point, however, the underlying structure for directional complements seems to be a matter of parametric variation as there are strong arguments in favor of a silent infinitive analysis for Afrikaans, Alsatian, Luxembourgish, Swiss-German, West Flemish, 19th Century Frisian (Van Riemsdijk 2002), and Norwegian (Eide 2005). As it was shown at the end of chapter 5, this variation might again be linked to differences with respect to the productivity of Small Clause structures in the different languages.

The modified claim is stated below:

Claim 2: Prepositional, particle, and adjectival complements of modal verbs are a matter of parametric variation as they can be Small Clause predicates or full verbal complements with a phonetically null infinitive.

Besides the specific claims made above, the current studies have also provided us with more general insights: The application of Kroch's (1989) Constant Rate Hypothesis has once again been proven successful in identifying related and unrelated phenomena, which clearly demonstrates the benefits of diachronic research. The comparison of the different rates in chapter 4 furthermore stresses the importance of choosing the precisest rate possible.

The joint approach of syntax and semantics has furthermore been crucial as the identification of the fine-grained interpretations of dynamic modality gave us the key to understand the links between the interpretation of modal verbs, the presence of argument structure, and the distribution of modal complements.

Future research should include studies on modal verbs and their complements in a larger set of languages: Do the claims made in this thesis hold for other languages from other language families as well? At this point, the most interesting language family to include would be the Slavic family as directional complements of modal verbs seem to occur in languages from this family as well. More specific research on the modern languages would involve a study on the distribution of the infinitival marker *to/te/at* in combination with modals and their complements, a study on the syntax and semantics of future tense markers that cannot license any non-verbal complement, and on ability modals and their complements in the Scandinavian languages.

The most challenging case, however, is the development of the Icelandic modals and their complements. Because Icelandic modals seem to have lost the possibility to combine with directional complements, but not with nominal complements, a diachronic study on Icelandic would give us an even better understanding of the separation of the two phenomena.

Moreover, a comparison between the developments in Icelandic and in English would help to further clarify the loss of directional and nominal complements in English.

There are, finally, theoretical questions that are left unresolved. Why is the epistemic interpretation of a modal verb absent when it is combined with a non-verbal complement? What is the categorial status of modal complements? And why do dynamic modal verbs with directional complements not violate the theta criterion? These questions all deserve separate follow-up studies.

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Appendix 1: Questionnaire Modern European Languages

Dear Sir, Madam, (aspiring) linguist,

Thank you so much already for opening this questionnaire. This means that you are willing to participate in a large-scale data collection that – hopefully – will lead to new insights on the way that languages work. It is not a test: there is no right and no wrong. We are only interested in what you can say in your language.

The questionnaire is completely anonymous; we will not publish your name anywhere. We therefore do not ask for any personal details. The three questions on the next page about your language situation are only to make sure that the data are reliable.

We would like you to include as much data as possible: we're not native speakers of your language, so it would help a lot if you could clearly translate all the examples in English. Just for matters of clarity, we will give an example of a Dutch translation:

- (1) a. Dutch sentence: Hij mag mij niet.
 Dutch glosses: *he may me not*
 Dutch translation: ‘He does not like me’
 b. Dutch sentence: *Niet mag hij mij
 Dutch glosses: *not may he me*
 Dutch translation: ‘He does not like me’

If you have never seen the Dutch sentences in (1) above, then the *glosses* in italics underneath can provide you with a precise characterization of all the separate linguistic elements. Moreover, the less literal translation in between the quotation marks gives you a decent translation in English. Finally, the star (*) before sentence (1b) means that it is not grammatical in this language. We will work with this notation throughout the questionnaire.

In the next three sections we will guide you through 3 questions about your language. It is important that you fill in all the fields in **red** in the text boxes; we have indicated which questions can be skipped. If something is unclear about either the guidelines or the contents, please contact us via the e-mail address below.

Thank you again for participating, and enjoy!

Kind regards,

Annemarie van Dooren
a.m.f.vandooren@students.uu.nl

Three questions about your language situation:

1. What are your native language(s)? I.e. what is/are your mother tongue(s)?
2. What other language(s) do you speak?
3. In what country (and, if you think it is relevant, what region) have you spent most of your life?

Section 1: Modal verbs

Introduction

When you start learning English you necessarily come across the strange behavior of a set of verbs, called the *modal verbs*. These verbs, which include *can, could, may, might, will, would, must, may,* and *need* are different from other verbs both in the way they behave in a sentence, and in their interpretation. They behave differently in a sentence since they are always followed by an infinitive (2). In contrast to a verb like *want*, they are furthermore always followed by a infinitive without *to* (2a), and they can occur before the element *not* (3a).

- (2) a. I can drive a car.
- b. I want to drive a car.
- (3) a. I cannot drive a car.
- b. *I want not to drive a car.

The interpretation of these modal verbs is threefold: they can express either an obligation or a permission (4), something which is necessarily or possibly the case (5), and/or the possession of a certain skill or of specific knowledge (6).

- (4) John can go to Paris for his work.
- (5) John can be in Paris because I saw him going on the plane this morning.
- (6) John can speak English.

Can in sentence (4) expresses a permission: it states that John is allowed to go to Paris for business. The same *can* in sentence (5) expresses a possibility: it states that John might be in Paris, because the utterer of the sentence saw him leave. Finally, *can* can also express that the subject is able to do something; for instance, as in (6), to speak a language.

Question 1

Does your language have modal verbs? I.e., are there verbs in your language that are followed by an infinitive and that at the same time express one of these three interpretations? If so, could you please write them down with an English translation? If you can think of any modal verbs that do not have a direct English equivalent, could you write them down as well with a rough translation?

The modal verbs in my language are...

- | | |
|-----|-----------------|
| 1. | Meaning: can |
| 2. | Meaning: could |
| 3. | Meaning: may |
| 4. | Meaning: might |
| 5. | Meaning: must |
| 6. | Meaning: will |
| 7. | Meaning: would |
| 8. | Meaning: shall |
| 9. | Meaning: should |
| 10. | Meaning: need |
| 11. | Meaning: |
| 12. | Meaning: |
| 13. | Meaning: |
| 14. | Meaning: |

If your language does not have modal verbs, you can skip the rest of the questions.

Question 2

Modal verbs are sometimes named *auxiliary verbs*, because they can support other verbs. This is the case when modal verbs occur in a sentence in which also an infinitive is present, as in (7). Infinitives are the verb forms occurring after *to* in English, as in ‘to bike’.

(7) I can bike.

In some languages, however, the modal verb does not always need an extra verb: it can occur on its own. English only has the first option, which is shown in (8); Dutch, for example, also has the second one, as is shown in (9).

(8) a. I must buy a bike.

b. *I must a bike.

c. *I must on a bike.

(9) a. Dutch sentence: Ik moet een fiets kopen.

Dutch glosses: *I must a bike buy*

Dutch translation: ‘I must buy a bike.’

b. Dutch sentence: Ik moet een fiets.

Dutch glosses: *I must a bike*

Dutch translation: ‘I have to have a bike.’

c. Dutch sentence: Ik moet op een fiets.

Dutch glosses: *I must on a bike*

Dutch translation: ‘I have to get on a bike.’

Question 2.1. Does your language have the first option?

The modals in my language, written down in question 1, can occur with an infinitive (the verb form occurring after *to* in English; example ‘to bike’): **Yes/No**

Dutch example: Jan kan fietsen.

My example:

Dutch glosses: *John can bike*

My glosses:

Dutch translation: ‘John can bike.’

My translation:

Question 2.2. Does your language have the second option? Can you indicate with which of the possible categories the modal verbs can occur? And can you give an example in case the combination is possible?

The modals in my language, written down in question 1, can occur with a(n)...

1. Nominal (a noun, i.e. a word that occurs after a determiner; example ‘the car’): **Yes/No**

Dutch example: Jan moet een fiets.

My example:

Dutch glosses: *John must a bike*

My glosses:

Dutch translation: ‘John has to have a bike.’

My translation:

2. Preposition (a word that occurs before a noun indicating a path or location; examples at the desk, in the house, from the car, on the table): **Yes/No**

Dutch example: Jan mag naar huis.

My example:

Dutch glosses: *John must to home*

My glosses:

Dutch translation: ‘John is allowed to go home.’

My translation:

3. Adverb (here: a word that indicates a place or path; examples home, gone, there, everywhere, away):

Yes/No

Dutch example:	Jan wil weg.	My example:
Dutch glosses:	<i>John will away</i>	My glosses:
Dutch translation:	'John wants to go away.'	My translation:

4. Adjective (a word that qualifies a noun; examples a beautiful car, a big island, a red nose): Yes/No

Dutch example:	Deze muur moet blauw.	My example:
Dutch glosses:	<i>This wall must blue</i>	My glosses:
Dutch translation:	'This wall must become blue.'	My translation:

5. Particle (a preposition that occurs on its own; example 'the coat is on'): Yes/No

Dutch example:	Het licht kan uit.	My example:
Dutch glosses:	<i>The light can out</i>	My glosses:
Dutch translation:	'The light can be switched off.'	My translation:

6. Embedded *that*-sentence (a sentence that occurs within another sentence and start with *that*; example 'I said that he wanted to leave.'): Yes/No

Afrikaans example:	Mary moet dat Wanda die boeke bestel	My example:
Afrikaans glosses:	<i>Mary must that Wanda the books order</i>	My glosses:
Afrikaans translation:	'Mary must ensure that Wanda orders the books'	My translation:

If the modal verbs in your language can only be combined with infinitival verbs, i.e., you have answered 'no' for all options in question 2.2., you can skip the rest of this questionnaire.

Question 3

For the next more specific question you need to work with the data given in question 2.2. That is, you can re-use the sentences in which a modal verb combines with a nominal, a preposition, an adjective, an adverb, a particle or a complement *in your language*.

Are all the modal verbs mentioned in question 1 possible with all the types of categories mentioned in question 2.2? In Dutch, for instance, *zullen* 'will' cannot occur with a nominal phrase.

(10) Dutch sentence: *Jan zal dat lied.
Dutch glosses: *John will that song*
Dutch translation: 'John will do that song.'

In my language, all modal verbs can occur with a(n)...

1. Infinitive: Yes/No

Example: [John ... ride a bike]

Check whether all modals mentioned in question 1 can be filled in on the dots.

Dutch check: *moeten mogen willen kunnen hoeven zullen OK*

My check: ... OK; ... not OK

2. Nominal: Yes/No

Example: [John ... a bike]

Check whether all modals mentioned in question 1 can be filled in on the dots.

Dutch check: *moeten mogen willen kunnen hoeven OK; zullen 'will' not OK*

My check: ... OK; ... not OK

3. Preposition: **Yes/No**
 Example: [John ... to home]
Check whether all modals mentioned in question 1 can be filled in on the dots.
 Dutch check: *moeten mogen willen kunnen hoeven zullen OK; not one not OK*
My check: ... OK; ... not OK

4. Adverb: **Yes/No**
 Example: [John ... away]
Check whether all modals mentioned in question 1 can be filled in on the dots.
 Dutch check: *moeten mogen willen kunnen hoeven OK; zullen 'will' not OK*
My check: ... OK; ... not OK

5. Adjective: **Yes/No**
 Example: [The wall ... red]
Check whether all modals mentioned in question 1 can be filled in on the dots.
 Dutch check: *moeten mogen willen kunnen hoeven OK; zullen 'will' not OK*
My check: ... OK; ... not OK

5. Particle: **Yes/No**
 Example: [The light ... off]
Check whether all modals mentioned in question 1 can be filled in on the dots.
 Dutch check: *moeten mogen willen kunnen hoeven OK; zullen 'will' not OK*
My check: ... OK; ... not OK

6. Embedded *that*-sentence: **Yes/No**
 Example: [Mary ... that Wanda orders the books]
Check whether all modals mentioned in question 1 can be filled in on the dots.
 Dutch check: embedded *that*-sentence impossible
My check: ... OK; ... not OK

Question 4:

If you think back to the introduction of the questionnaire, you may remember that one and the same modal verb can express two meanings: one of obligation or permission, and one of necessity or possibility. Can the modal verbs in your language that can combine with a preposition, an adjective, or a complementizer express both interpretations?

The availability of the two interpretations can be checked by adding extra information that favors one of the two readings: By adding a person who gives the obligation, the obligation reading comes up, and by adding visual support for the statement, the necessity reading comes up. Could you please answer which of the follow-up sentences are available for the combination of a modal verb and a(n)...

1. ...Preposition. Type of sentence: *John must to home.*

Can this sentence, if it can be translated in your language, be completed by ...

- i. ... *because of his mother*, meaning 'John's mother obliges him to go home.' YES/NO
- ii. ... *because I saw him ride his bike*, meaning 'It is necessarily the case that John is going home because I saw him ride his bike.' YES/NO

2. ... Adjective. Type of sentence: *This wall must red.*

Can this sentence, if it can be translated in your language, be completed by ...

- i. ... *because John said so*, meaning 'John obliges someone to make the wall become red.' YES/NO
- ii. ... *because I saw that the red paint bucket is running low*: 'It is necessarily the case that the wall becomes red because I saw that the red paint bucket is running low.' YES/NO

3. ... Nominal. Type of sentence: *John must a bike.*

Can this sentence, if it can be translated in your language, be completed by ...

- i. ... *from his mother*, meaning 'John is obliged to have a bike from his mother.' YES/NO
- ii. ... *because I saw him carrying a lock*: 'It is necessarily the case that John has a bike because I saw him carrying a lock.' YES/NO

4. ... Embedded *that*-sentence. Type of sentence: *Mary must that Wanda orders the books.*

Can this sentence, if it can be translated in your language, be completed by ...

- i. ... *because John said so*, meaning 'John obliges Mary to make Wanda order the books.' YES/NO
- ii. ... *because I saw Mary calling Wanda*: 'It is necessarily the case that Mary is making Wanda order the books because I saw Mary calling Wanda.' YES/NO

Appendix 2: Synchronic data

1. Afrikaans

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
kan	Infinitival; CP; %NP; PP; PartP; AdjP	Infinitival; CP; PP; PartP; AdjP	X	Infinitival	X
wil	Infinitival; CP; NP; PP; PartP; AdjP	X	X	X	X
mag	X	Infinitival; CP; PP; PartP; AdjP	X	Infinitival	X
moet	X	X	Infinitival; CP; PP; PartP; AdjP	X	Infinitival
sal	Infinitival; CP; PP; PartP; AdjP	X	Infinitival; CP; PP; PartP; AdjP	X	Infinitival

Examples

Infinitive	–	Jan kan fietsry. <i>Jan kan bike-ride</i> ‘John can ride a bike.’
Nominal	–	As ek dit mag. <i>if I this may</i> ‘If I’m allowed to do this.’
Complementizer	–	Mary moet dat Wanda die boeke bestel <i>Mary must that Wanda the books order</i> ‘Mary must make sure that Wanda orders the books.’
Prepositional	–	Jan mag huis toe. <i>John may home to</i> ‘John is allowed to go home.’
Adjectival	–	Hierdie muur moet blou. <i>here-that wall must blue</i>

Particle – ‘This wall must become blue.’
 Die lig kan uit.
the light can out
 ‘The light can be switched off.’

2. Dutch

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
kunnen	Infinitival; %NP; PP; PartP; AdjP	Infinitival; PP; PartP; AdjP	X	Infinitival	X
willen	Infinitival; CP; NP; PP; PartP; AdjP	X	X	Infinitival	X
mogen	NP	Infinitival; NP; PP; PartP; AdjP	X	Infinitival	X
moeten	NP	X	Infinitival; NP; PP; PartP; AdjP	X	Infinitival
hoeven (te)	Infinitival; NP	X	Infinitival; NP; PP; PartP; AdjP	X	Infinitival
durven (te)	Infinitival; PP; PartP; AdjP	X	X	X	X
zullen	Infinitival	X	Infinitival	X	Infinitival

Examples

Infinitive – Ik kan fietsen.
I can bike
 ‘I can ride a bike.’

Nominal – Ik moet een ijsje
I must an ice-DIM
 ‘I must have an ice cream.’

Complementizer – Ik wil dat hij weggaat.
I want that he leaves

Preposition	–	‘I want him to leave.’ Ik mag naar huis. <i>I may to house</i>
Particle	–	‘I may go home.’ Het licht moet uit. <i>the light must off</i>
Adjective	–	‘The light must be switched off.’ De muur moet blauw. <i>the wall must blue</i> ‘The wall must become blue.’

3. Frisian

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
kinne	Infinitival; %NP; PP; PartP; AdjP	Infinitival; PP; PartP; AdjP	X	Infinitival	X
wol	Infinitival; CP; NP; PP; PartP; AdjP	X	X	X	X
mei	X	Infinitival; NP; PP; PartP; AdjP	X	Infinitival	X
moat	X	X	Infinitival; NP; PP; PartP; AdjP	X	Infinitival
doare (te)	Infinitival; PP; PartP; AdjP	X	X	X	X
sil	Infinitival	X	Infinitival	X	Infinitival

Possible complements

Infinitive	–	Jan kin fytse. <i>Jan can bike</i> ‘John can bike.’
Nominal	–	Jan moat in fyts <i>Jan moet een fiets</i>

Complementizer	–	‘John must have a bike.’ Ik wol dat hy aonpakt wurde. <i>I want that he on-take becomes</i> ‘I want him to be taken care of.’
Preposition	–	Jan mei nei hûs. <i>Jan may to house</i> ‘John may go home.’
Particle	–	It ljocht kin út. <i>The light can off</i> ‘The light can be switched off.’
Adjective	–	Dizze muorre moat blau <i>this wall must blue</i> ‘This wall must become blue.’

4. German

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
können	Infinitival; %NP; PP; PartP; (AdjP)	Infinitival; PP; PartP; (AdjP)	X	Infinitival	X
wollen	Infinitival; CP; NP; PP; PartP	X	X	X	X
dürfen	X	Infinitival; PP; PartP; (AdjP)	X	Infinitival	X
mögen₁	NP;	X	X	Infinitival	X
mögen₂	Infinitival; CP; NP; PP; PartP	X	X	Infinitival	X
müssen	X	X	Infinitival; PP; PartP; (AdjP)	X	Infinitival
sollen	X	X	Infinitival; PP; PartP; (AdjP)	Infinitival	X

Examples

Infinitive	–	Jan kann radfahren.
------------	---	---------------------

		<i>Jan can bike</i> 'John can bike.'
Complementizer	–	Ich will dass es perfekt ist. <i>I want that it perfect is</i> 'I want it to be perfect.'
Nominal	–	Jan will ein Fahrrad. <i>Jan will a bike</i> 'John wants a bike.'
Preposition	–	Jan darf nach Hause. <i>Jan may to hause</i> 'John is allowed to go home.'
Particle	–	Das Licht kann aus. <i>the light can off</i> 'The light can be switched off.'
Adjective	–	Diese Wand soll blau. <i>this wall should blue</i> 'This wall should become blue.'

5. Swiss German

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
chönne	Infinitival; %NP; PP; PartP	Infinitival; PP; PartP	X	Infinitival	X
wöuue	Infinitival; CP; NP; PP; PartP	X	X	X	X
dörffe	X	Infinitival; PP; PartP	X	Infinitival	X
möge	X	X	X	Infinitival	X
müesse	X	X	Infinitival; PP; PartP	X	Infinitival
sölle	X	X	Infinitival; PP; PartP	X	Infinitival

Examples

Infinitive	–	I cha velofaare. <i>I can bike-ride.</i> 'I can bike.'
Nominal	–	Ech cha Schwitzerdütsch.

		<i>I can Swiss-German.</i> 'I can speak Swiss German.'
Complementizer	–	I wot dass du dass weisch. <i>I want that you that know</i> 'I want you to know that.'
Preposition	–	I mues uf d bank. <i>I must on the bank.</i> 'I must go to the bank.'
Particle	–	Das mues ab! <i>That must off</i> 'That part has to be cut off.'

6. Luxembourgish

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
kënnen	Infinitival; %NP	Infinitival	X	Infinitival	X
wëllen	Infinitival; CP; NP; PP; PartP	X	X	X	X
däerven	X	Infinitival; PP; PartP	X	Infinitival	X
magen	X	X	X	Infinitival	X
mussen	X	X	Infinitival; PP; PartP	X	Infinitival
sollen	X	X	Infinitival	X	Infinitival

Examples

Infinitive	–	Ech muss e Velo kafen <i>I have a bike buy</i> 'I have to buy a bike.'
Nominal	–	De Jang wëll e Vëlo. <i>the Jang wants a bike</i> 'John wants a bike.'
Complementizer	–	Dir wëllt dass eng Lëtzebuergesch Band gewennt. <i>you want that a Luxembourgish band wins</i> 'You want a Luxembourgish band to win.'
Preposition	–	De Jang muss an d'Schoul. <i>the John must in the-school.</i> 'John must go to school.'
Particle	–	D'Luucht muss un. <i>The-light must on</i>

‘The light must be switched on.’

7. Danish

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
kunne	Infinitival; %NP	Infinitival	X	Infinitival	X
ville	Infinitival; NP; PP; PartP	X	X	X	X
turde (at)	Infinitival	X	X	Infinitival	X
burde	X	X	Infinitival; PP; PartP	X	Infinitival
måtte	X	Infinitival; PP; PartP	Infinitival; PP; PartP	X	Infinitival
skulle	Infinitival PP; PartP	X	Infinitival PP; PartP	X	Infinitival

Examples

Infinitive	–	John kan cycle. <i>John can bike</i> ‘John can bike.’
Nominal	–	De kan russisk. <i>they can Russian</i> ‘They know Russian.’
Preposition	–	Hun skal to London. <i>she shall to London.</i> ‘She shall go to London.’
Particle	–	Hun skal hjem. <i>she shall home</i> ‘She will go home.’

8. Norwegian

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
kunne	Infinitival; %NP	Infinitival	X	Infinitival	X
ville	Infinitival; CP; NP; PP; PartP	X	X	X	X

burde	X	X	Infinitival; PP; PartP	X	Infinitival
måtte	X	X	Infinitival; PP; PartP	X	Infinitival
skulle	Infinitival PP; PartP	X	Infinitival PP; PartP	X	Infinitival

Examples

Infinitive	–	Jeg kann skriva. <i>I can write.</i> ‘I can write.’
Nominal	–	Jeg kan engelsk. <i>I can English</i> ‘I can speak English.’
Complementizer	–	Jeg ville at han skulle like meg. <i>I want that he shall like me</i> ‘I want him to like me.’
Preposition	–	Jeg skal til Oslo. <i>I will to Oslo.</i> ‘I’ll go to Oslo.’
Particle	–	Jeg skal ut. <i>I shall out.</i> ‘I’m about to leave.’

9. Icelandic

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
geta	Infinitival; Supine	Infinitival; Supine	X	Infinitival; Supine	X
vilja	Infinitival; CP; NP	X	X	X	X
munu	X	X	X	X	Infinitival
skulu	X	X	Infinitival	X	Infinitival
mega	X	Infinitival	X	X	Infinitival

Possible complements

Nominal	–	Ég vil þennan bíl. <i>I want this-ACC car</i> ‘I want this car.’
Complementizer	–	Ég vil að hann komi hingað <i>I want that he comes-CONJ here</i> ‘I want him to come here.’

10. English

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
can	Infinitival	Infinitival	X	Infinitival	X
could	X	Infinitival	X	Infinitival	X
will	Infinitival	X	Infinitival	X	Infinitival
would	X	X	Infinitival	X	Infinitival
may	X	Infinitival	X	Infinitival	X
might	X	Infinitival	X	Infinitival	X
must	X	X	Infinitival	X	Infinitival
shall	Infinitival	X	Infinitival	X	Infinitival
should	X	X	Infinitival	X	Infinitival
need	Infinitival; NP	X	Infinitival	X	Infinitival
dare	Infinitival; NP	X	X		X

Examples

Infinitive – I can ride a bike.

11. Welsh

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
gallu	X	Verbal noun	X	Verbal noun	X
medru	Verbal noun; NP	Verbal noun	X	Verbal noun	X

Examples

Verbal Noun – Dw i'n medru mynd.
am I-prt can-VN go-VN
'I can go'

Nominal – Mae e'n medru Iseldireg
is he-prt can Dutch
'He can speak Dutch.'

12. Scottish Gaelic

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
feum	X	X	Verbal noun	X	Verbal noun
faod	X	Verbal noun	X	Verbal noun	X

Examples

Verbal Noun – Feumaidh mi dhol dhan bhùth.
must-will I go-VN to shop
 ‘I must go to the shop.’

13. Irish

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
caithfidh	X	X	Verbal noun	X	Verbal noun
féadaidh	X	Verbal noun	X	Verbal noun	X

Examples

Verbal Noun – Féadfaidh tú imeacht anois
can-will you go-VN now
 ‘You may go now.’

14. French

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
devoir	X	X	Infinitival	X	Infinitival
pouvoir	X	Infinitival	X	Infinitival	X
savoir	Infinitival; NP	X	X	X	X
vouloir	Infinitival; CP; NP	X	X	X	X

Examples

Infinitive – Jean doit faire du vélo
Jean must do of-the bike
 ‘John must bike’

Nominal – Je veux une voiture.
I want a car
 ‘I want a car.’

Complementizer – Je veux qu’il part.
I want that he leaves
 ‘I want him to leave.’

15. Italian (North)

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
dovere	X	X	Infinitival	X	Infinitival
potere	X	Infinitival	X	Infinitival	X
sapere	Infinitival;	X	X	X	X

	NP				
volere	Infinitival; CP; NP	X	X	X	X

Examples

- Infinitive – Gianni sa pedalare
Gianni knows bike
 John can bike
- Nominal – Voglio una auto
want-1.SG a car
 ‘I want a car.’
- Complementizer – Voglio che tu mi dica la verità.
want-1.SG that you me say-INF the truth
 ‘I want you to tell me the truth’

16. Romanian

Verb	Dynamic	Deontic Possibility	Deontic Necessity	Epistemic Possibility	Epistemic Necessity
pot	X	Infinitival	X	Infinitival	X
voi	X	X	Infinitival	X	Infinitival

Examples

- Infinitive – (Eu) pot pleca joi.
(I) can-1.SG leave Thursday.
 ‘I can leave on Thursday’

Appendix 3: Semantic parallels in the Germanic, Romance, and Celtic language family

Table 1: Interpretations of Germanic equivalents for ‘can’ and ‘may’

Language	Verb	EP	DP	ability	Language	Verb	EP	DP	like
<i>English</i>	<i>can, could</i>	+	+	+	<i>English</i>	<i>may, might</i>	+	+	-
Afrikaans	<i>kan</i>	+	+	+	Afrikaans	<i>mag</i>	+	+	-
Dutch	<i>kunnen</i>	+	+	+	Dutch	<i>mogen</i>	+	+	+
Frisian	<i>kinne</i>	+	+	+	Frisian	<i>mei</i>	+	+	+
German	<i>können</i>	+	+	+	German	<i>mögen</i>	+	-	+
Luxembourgish	<i>kënnen</i>	+	+	+	Luxembourgish	<i>magen</i>	+	-	-
Swiss-German	<i>chönnen</i>	+	+	+	Swiss-German	<i>möge</i>	+	-	-
Danish	<i>kunne</i>	+	+	+	Icelandic	<i>mega</i>	-	+	-
Norwegian	<i>kunne</i>	+	+	+					

EP = Epistemic possibility

DP = Deontic possibility

Table 2: Interpretations of Germanic equivalents for ‘must’ and ‘should’

Language	Verb	EN	DN	DP	‘to like’	Language	Verb	EN	DN	promise
<i>English</i>	<i>must</i>	+	+	-	-	<i>English</i>	<i>shall, should</i>	+	+	+
Afrikaans	<i>moet</i>	+	+	-	-	Afrikaans	<i>sal</i>	+	+	+
Dutch	<i>moeten</i>	+	+	-	+	Dutch	<i>zullen</i>	+	+	+
Frisian	<i>moat</i>	+	+	-	-	Frisian	<i>sil</i>	+	+	+
German	<i>müssen</i>	+	+	-	-	German	<i>sollen</i>	-	+	-
Luxembourgish	<i>müesse</i>	+	+	-	-	Luxembourgish	<i>sollen</i>	+	+	-
Swiss-German	<i>mussen</i>	+	+	-	-	Swiss-German	<i>sölle</i>	+	+	-
Danish	<i>måtte</i>	+	+	+	-	Danish	<i>skulle</i>	+	+	+
Norwegian	<i>måtte</i>	+	+	-	-	Norwegian	<i>skulle</i>	+	+	+
Icelandic	<i>munu</i>	+	-	-	-	Icelandic	<i>skulu</i>	+	+	-

EN = Epistemic necessity

DN = Deontic necessity

Table 3: Interpretations of Germanic equivalents for ‘will’

Language	Verb	EN	DN	promise	volition
<i>English</i>	<i>will, would</i>	+	+	+	%
Afrikaans	<i>wil</i>	-	-	-	+
Dutch	<i>willen</i>	-	-	-	+
Frisian	<i>wol</i>	-	-	-	+
German	<i>willen</i>	-	-	-	+
Luxembourgish	<i>wëllen</i>	-	-	-	+
Swiss-German	<i>wöuue</i>	-	-	-	+
Danish	<i>ville</i>	-	-	-	+
Norwegian	<i>ville</i>	-	-	-	+
Icelandic	<i>vilja</i>	-	-	-	+

Table 4: Interpretations of Romance equivalents for *pouvoir* ‘can’, *devoir* ‘must’ and *vouloir* ‘want’

Language	Verb	DP	EP	Verb	DN	EN	Verb	DN	EN	volitionality
French	<i>pouvoir</i>	+	+	<i>devoir</i>	+	+	<i>vouloir</i>	-	-	+
Italian	<i>potere</i>	+	+	<i>dovere</i>	+	+	<i>volere</i>	-	-	+
Romanian	<i>pot</i>	+	+				<i>voi</i>	+	+	-

Table 5: Interpretations of Celtic equivalents for *féadaidh* ‘may’

Language	Verb	DP	EP
Irish	<i>féadaidh</i>	+	+
Scottish Gaelic	<i>faod</i>	+	+

Appendix 4: Modal Verbs and their Complements in the Slavic Languages

3.1. Introduction

An online discussion among non-linguists suggests that the combination of a modal verb and a prepositional or particle complement is not limited to the Germanic languages: In the thread *Implied “go” after verbs*⁵⁰ a speaker of Czech observes that the phenomenon in (1) is also possible in his/her language (2). More comments follow, after which it is claimed that besides Czech modal verbs in Macedonian, Polish, Russian, Serbo-Croatian, Slovak, and Slovene can combine with these complements. The interpretation is always directional, as it is in the Germanic languages.

- | | | |
|-----|---|-------|
| (1) | Ik moet naar huis.
<i>I must to house</i>
'I must go home.' | Dutch |
| (2) | Musím domů.
<i>must-1.SG home</i>
'I must go home.' | Czech |

In this thesis, following Barbiers (1995), the sentence in (1) has been claimed to involve a modal main verb combined with a Small Clause, which results in a 'change of state' interpretation. Before it can be concluded that the sentence in (2) is semantically and syntactically identical, and as such is an instance of the same phenomenon, both the modal verb and the complement need to be examined more thoroughly.

First of all, can the verb in sentence (2) be classified as a modal main verb? In this thesis modal verbs are defined both on syntactic and semantic grounds: Concerning their syntax, modal verbs are auxiliaries, in contrast to lexical verbs, as they can combine with a second verbal element in the same clause. Concerning their semantics, modal verbs can express deontic, epistemic, and/or dynamic modality. As this definition is based on the syntax and semantics of the Germanic modal verbs it does not necessarily apply to Slavic modal verbs. On modality in the Slavic languages, see among many others Kakietek 1980 on Polish, Weidner 1986 on Russian, Kyncl 2008 on Czech, Rudin 1983 on Bulgarian, Clancy 2010 on Russian, Czech, Polish, and Bulgarian, and Hansen 2002, 2003, 2006, 2008 on Polish, Czech, Russian, Serbian/Croatian, and Old Church Slavonic.

Secondly, can the complement in (2) be classified as non-verbal? Is the complement actually a non-verbal Particle Phrase or Prepositional Phrase, or are there reasons to believe that the complement is underlyingly verbal, with an elided or silent infinitive?

In the following sub sections the possible combinations that the informants provided while filling out the questionnaire from appendix 1 are described. In the discussion the questions formulated above are elaborated on and some ideas for future research are presented.

⁵⁰ Source: <http://forum.wordreference.com/showthread.php?t=1078485>

3.2. Case study

The informants provided data on Bulgarian, Czech, Polish, Russian, and Serbo-Croatian. Based on the questionnaire given in appendix 2, sets of verbs modal verbs and their possible complements have been given.

Bulgarian The verbs given by the Bulgarian informant are in (3). What is striking is that these verbs are always followed by the full infinitive starting with the infinitive marker *da* ‘to’.

- (3) *moč da* ‘can’, ‘may’
trjabva da ‘must’
šte da ‘will’

Rudin (1983) enlists four modal verbs based on their morphologically distinct behavior: The verbs *šte*, *njama*, *trjabva*, and *biva* can occur inflected and uninflected with respect to person and number, and only in their uninflected forms they are followed by *da* and carry a modal meaning (4); in their inflected form they carry a lexical meaning (5) (Rudin 1983:10).

Table 1: Meanings of Bulgarian modal verbs (from Rudin 1983:10)

	uninflected	inflected
<i>šte</i>	‘will’	‘want’
<i>njama</i>	‘will not’	‘be nonexistant’
<i>trjabva</i>	‘must’, ‘should’	‘be necessary’
<i>biva</i>	‘ought’	‘happen, be’

- (4) Ni njama da zabravim. Rudin 1983:11
we not-will to forget
 ‘We will not forget.’
- (5) Ni njamame vreme.
we not-will-1.PL time
 ‘We do not have time.’

The informant claims that none of the verbs in (3) can occur with any other complement than a full infinitive.

Czech The Czech modal verbs identified by the informant are in (6). Kyncl (2008) includes two more verbs (7) and divides up this set into two categories, which are called ‘Primary Modal Verbs’ and ‘Secondary Modal Verbs’.

- | | | | | |
|-----|-------------------|-----------------|-------------------|-----------|
| (6) | <i>chtít</i> | ‘to want’ | <i>mít</i> | ‘must’ |
| | <i>umím</i> | ‘to be able to’ | <i>moct</i> | ‘may’ |
| | <i>smět</i> | ‘may’ | <i>muset</i> | ‘must’ |
| | <i>potřebovat</i> | ‘need’ | <i>měl bych</i> | ‘must’ |
| (7) | <i>hodlat</i> | ‘to intend’ | <i>dovolit si</i> | ‘to dare’ |

The informant claims that prepositional and particle complements are unavailable in combination with modal verbs. The only combinations of modal verbs and non-verbal complements are with ability *umím* and nominal complements (8), and volitional *chtít* and nominal complements and sentential complements (9).

- (8) *Umím česky*
can-1.SG Czech
 ‘I can speak Czech.’
- (9) *Chci že studiu na VS*
want-1.SG that study-1.SG in US
 ‘I want to study in the US.’

Polish The informant enlisted five verbs that match both the syntactic and semantic criteria for being a modal verb (10). Hansen (2001:165) includes four more verbs expressing necessity (11).

- | | | | |
|--------------------|------------------------|--------------------|--------|
| (10) <i>chcieć</i> | ‘to want’ | (11) <i>należy</i> | ‘must’ |
| <i>móc</i> | ‘can’ | <i>trzeba</i> | ‘must’ |
| <i>umieć</i> | ‘can’, ‘to be able to’ | <i>powinien</i> | ‘must’ |
| <i>musieć</i> | ‘must’ | <i>wypada</i> | ‘must’ |
| <i>potrzebować</i> | ‘need’ | | |

Volitional *chcieć* can in Polish combine with nominal and sentential complements (12). The informant moreover claims that other modal verbs can also combine with a nominal complement, for instance, *móc* ‘may’ (13); she states that in this sentence the verb ‘to borrow’ is always implied.

- (12) a. *Chcę długopis.*
want-1.SG pen
 ‘I want a pen.’
- b. *Chce żeby to zrobił*
want-3.SG that-prt it do-prt
 ‘He wants him to do it.’
- (13) *Mogę długopis?*
can-1.SG pen
 ‘May I borrow a pen?’
 #‘May I have a pen.’

At least dynamic *chcieć*, (14)a deontic *móc* (14)b, and deontic *musieć* (14)c can furthermore combine with a prepositional or particle complement.

- (14) a. *Chcę do domu.*
want-1.SG to house
 ‘I want to go home.’
- b. *Możemy do kina?*
can-1.SG to movie-theatre

‘Shall we go to the movies?’
 c. Muszę do łazienki.
must-1.SG to toilet
 ‘I need to go to the toilet.’

Russian The informant enlisted the seven verbs in matching the syntactic and semantic criteria of a modal verb (15). Hansen (2001:213) enlists the three extra modal verbs in (16).

(15)	<i>xotet'</i>	‘to want’	(16)	<i>nelz'ja</i>	‘must not’
	<i>možno</i>	‘may’		<i>nado</i>	‘need’
	<i>moč</i>	‘can’		<i>sleduet</i>	‘to follow’
	<i>umet'</i>	‘can’, ‘to be able to’			
	<i>núžno</i>	‘need’			
	<i>dolžna</i>	‘must’			
	<i>prixoditsja</i>	‘have to’			

According to the informant the only possible combinations are with volitional *xotet'* and dynamic *núžno* and a prepositional or particle predicate.

- (16) Ira xóčet v otpusk.
Ira wants on vacation
 ‘Ira wants to go on vacation.’
- (17) Ira núžno domoi.
Ira needs home
 ‘Ira needs to go home.’

Serbian The Serbian informant, finally, lists five verbs matching the syntactic and semantic criteria (18). Hansen (2001:230) includes one extra verb (19).

(18)	<i>morati</i>	‘to be obliged to’, ‘to be necessarily the case’
	<i>trebati</i>	‘to be obliged to’, ‘to be necessarily the case’
	<i>moći</i>	‘to be able to’, ‘to be allowed to’, ‘to be possibly the case’
	<i>smeti</i>	‘to be allowed to’
	<i>hteti</i>	‘to want’, ‘will’
(19)	<i>valja</i>	‘to be obliged to’, ‘to be necessarily the case’

Interestingly, the informant mentions that these verbs do not get inflection in the epistemic interpretation and are always complemented by an inflected finite verb; in the deontic and the epistemic interpretations, they can both in Serbian and in Croatian be complemented by an infinitive or an inflected finite verb.

Volitional *hteti* can combine with a nominal complement (20). Concerning the prepositional and particle predicates, all verbs except *trebati* can combine with these phrases (21)-(24). Interestingly, *hteti* can combine with these phrases in both the volitional interpretation (21) and in the future interpretation (22).

- (20) Hoću bicikl.

- want-1.SG bike*
‘I want a bike.’
- (21) Hoću kući/ onamo.
want-1.SG house/ over
‘I want to go home/over.’
- (22) On će kući/ onamo.
He will-3Sg house/over
‘He is going home/over.’
- (23) Moram kući/ onamo.
must-1.SG house/over
‘I’m obliged to go home/over.’
- (24) Mogu kući/ onamo.
can-1.SG house/over
‘I’m allowed to go home/over.’

3.3. First impression: Are the Germanic and the Slavic phenomenon similar?

With this brief description of the data it is impossible to give a definite answer as to whether the phenomena in the Germanic and Slavic languages are syntactically and semantically identical. Except for the Serbian data, the examples are not yet precise enough; for future research a new questionnaire has to be sent out asking for more specific syntactic and semantic properties of these sentences.

There is more to say, however. First of all, the fact that nominal complements can only occur with dynamic modal verbs seems to imply that this feature of dynamic modal verbs holds for a broad range of languages. Besides modals in the Germanic, the Romance, and the Celtic language family the verbs that are syntactically auxiliaries and semantically express dynamic modality in the Slavic language family can combine with nominal phrases.

Two facts coming from the data moreover suggest that the phenomenon with Directional Phrases might not be equal to the Germanic case. First of all, Maaïke Schoorlemmer (p.c.) explained that modals without an infinitive in Slavic languages almost never occur in an out-of-the-blue context, which is in contrast with the Germanic languages; because these sentences can furthermore only occur in highly specific contexts, an analysis of these sentences context-dependent ellipsis cannot be excluded. Sentence (13), repeated as (25) illustrates this point as this question can only be used in case someone wants to *borrow* a pen; a slightly different interpretation of *having* a pen is impossible. See McShane (1998) and Merchant & Craenenbroeck (2002) on ellipsis (in the Slavic languages).

- (25) Mogę długopis? Polish
may-1.SG pen
‘May I borrow a pen?’
‘May I have a pen?’

A second interesting fact comes from the Serbian data. In Serbian, the verb *hteti* can express volitionality and is also used as the future tense marker. In contrast to the Germanic languages, *hteti* can in both interpretations combine with a prepositional or a particle predicate. *Zullen* in Dutch, for instance, can only occur with a verbal complement.

- (12) On će kući/ onamo. Serbian

- He will-3Sg house/over*
'He is going home/over.'
(13) Jan zal naar huis/weg *(gaan). Dutch
Jan will to home/away go
'John will go home/away.'

What needs to be done in order to answer the questions stated in the introduction, is to first of all get a better understanding of modality in the Slavic languages: Can the Germanic syntactic and semantic properties of modal verbs be projected to this language family, or is a language-specific approach necessary? What role do the modal adverbs, modal adjectives and other elements encoding modality play? Do these need to be included in the study as well? Concerning the complements, the phenomenon of context-dependent ellipsis needs to not interfere with the data. With these factors kept in mind it would be highly interesting to find out whether the two phenomena are equal – for the linguistic theory, but also for the non-professional linguists discussing this phenomenon in the thread *Implied “go” after verbs*.

Appendix 5: Bias for genre and region in the *York Corpus of Old English*, the *Penn Parsed Corpus of Middle English 2*, the *Penn Parsed Corpus of Early Modern English*, the *Penn Parsed Corpus of Modern British English*, a *Representative Corpus of Historical English Registers*, and the *Corpus of Late Modern English Texts*.

**1. York Corpus of Old English
Bias per genre**

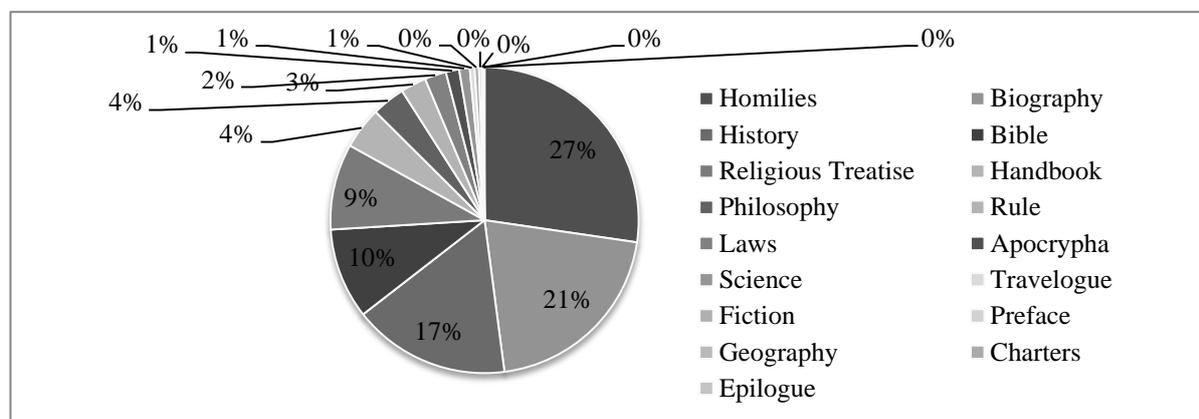


Figure 1: Genres in the YCOE (0-1150)

Table 1: Genres in the YCOE divided per sub corpus

Period	O1 0-850		O2 850-950		O3 950-1050		O4 1050-1150	
	words	% words	words	% words	words	% words	words	% words
Apocrypha	0	0	0	0	9995	1,3	9872	2,8
Bible	0	0	0	0	130628	16,8	6320	1,8
Biography	0	0	1300	0,4	152993	19,7	140362	39,4
Charters	1753	100	2110	0,7	7850	1	193	0,05
Epilogue	0	0	0	0	965	0,1	0	0
Fiction	0	0	0	0	6545	0,8	0	0
Geography	0	0	0	0	1891	0,2	0	0
Handbook	0	0	34727	11,1	7099	0,9	22213	6,2
History	0	0	146370	47	49154	6,3	40641	11,4
Homilies	0	0	0	0	316380	41	74545	20,9
Laws	0	0	8035	2,6	13566	1,8	10515	3
Philosophy	0	0	48443	15,5	0	0	2180	0,6
Preface	0	0	0	0	3030	0,4	1272	0,4
Religious Treatise	0	0	70675	22,7	11463	1,5	47855	13,4
Rule	0	0	0	0	38470	5	0	0
Science	0	0	0	0	15738	2	0	0
Travelogue	0	0	0	0	7271	0,9	0	0

Source: <http://www-users.york.ac.uk/~lang22/YCOE/info/YcoeTextInfo.htm>

Bias per dialect

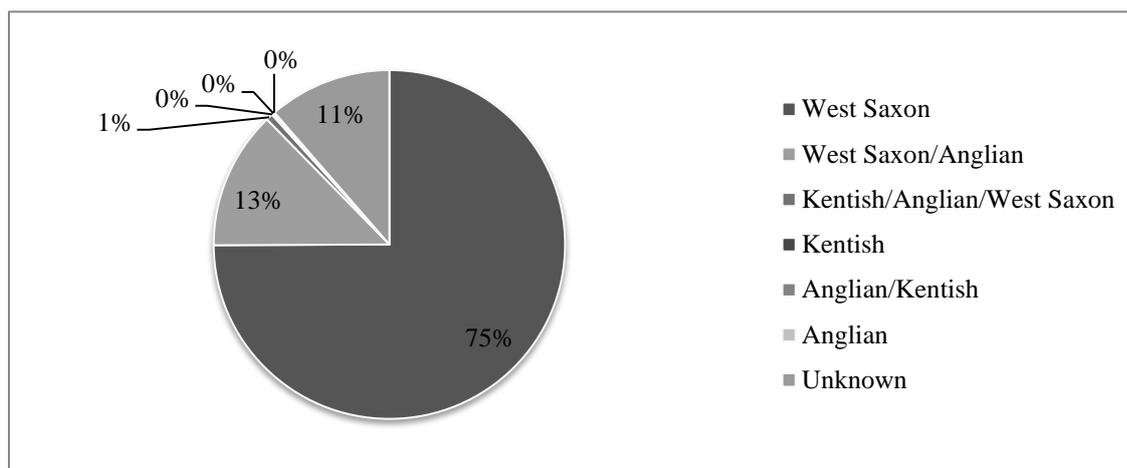


Figure 2: Dialects in the *YCOE* (0-1150)

Table 2: Dialects in the *YCOE* divided per sub corpus

Period	O1 0-850		O2 850-950		O3 950-1050		O4 1050-1150	
	words	% words	words	% words	words	% words	words	% words
Anglian	0	0	0	0	679	0,09	193	0,05
Anglian/ Kentish	1753	100	0	0	0	0	0	0
Kentish	0	0	253	0,08	0	0	1512	0,4
Kentish/ Anglian/ West-Saxon	0	0	1857	0,6	7171	0,9	0	0
West-Saxon	0	0	291548	93,5	664490	86	151436	42,5
West-Saxon/ Anglian	0	0	0	0	34771	4,5	113766	32
Unknown	0	0	18002	5,8	65947	8,5	89061	25

Source: <http://www-users.york.ac.uk/~lang22/YCOE/info/YcoeTextInfo.htm>

**2. PPCME2
Bias per genre**

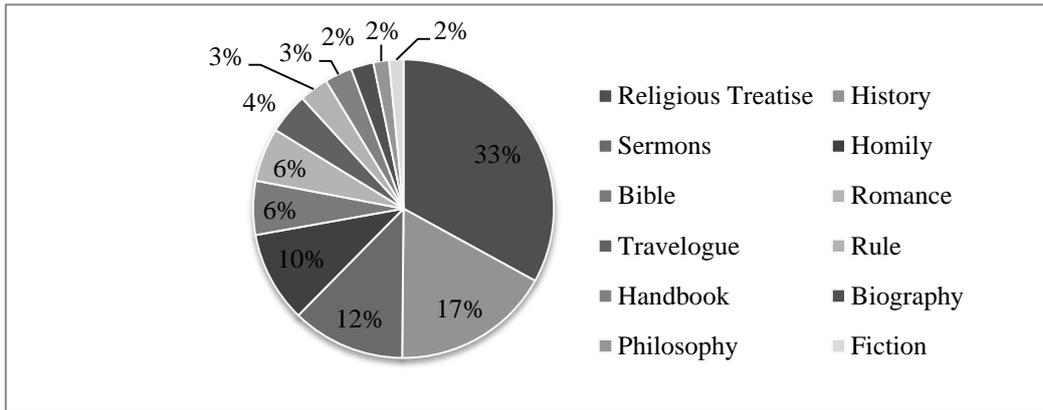


Figure 3: Genres in the PPCME2 (1150-1500)

Table 3: Genres in the PPCME2 divided per sub corpus

Period	M1 1150-1250		M2 1250-1350		M3 1350-1420		M4 1420-1500	
	words	% words						
Bible	0	0	44521	47,4	21096	5,2	0	0
Biography	23578	9,9	0	0	0	0	3847	1,0
Fiction	0	0	0	0	8505	2,1	8850	2,3
Handbook	0	0	0	0	19060	4,7	14268	3,7
History	6757	2,8	0	0	95543	23,7	90042	23,1
Homilies	107041	45,1	3534	3,8	18915	4,7	0	0
Philosophy	0	0	0	0	0	0	0	0
Religious Treatise	99962	42,1	45944	48,9	98562	24,5	126780	32,5
Romance	0	0	0	0	0	0	65434	16,8
Rule	0	0	0	0	35234	8,7	0	0
Sermons	0	0	0	0	56402	14,0	80467	20,6
Travelogue	0	0	0	0	49690	12,3	0	0

Source: <http://www.ling.upenn.edu/histcorpora/PPCME2-RELEASE-3/index.html>

Bias per dialect

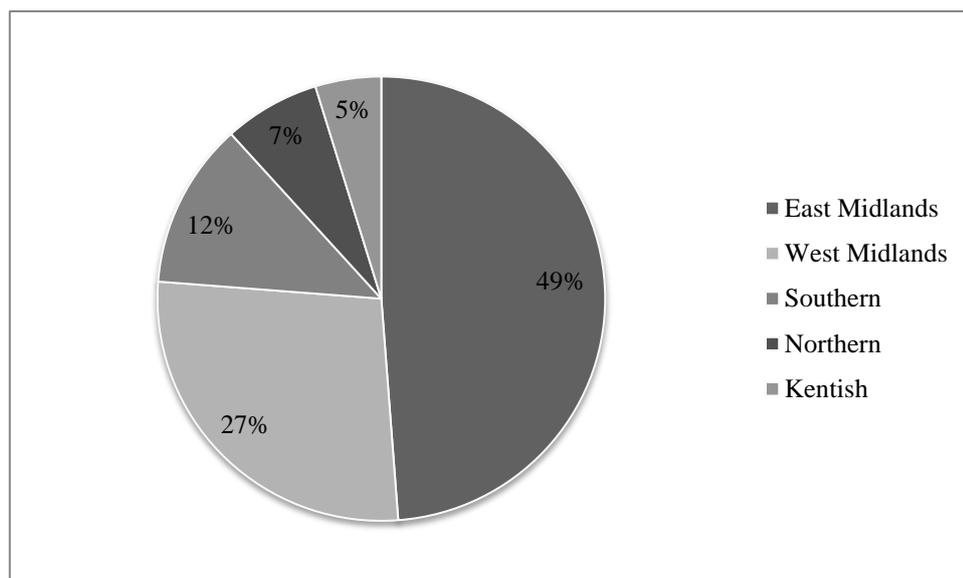


Figure 4: Dialects in the *PPCME2* (1150-1500)

Table 4: Dialects in the *PPCME2* divided by sub corpus

Period	M1 1150-1250		M2 1250-1350		M3 1350-1420		M4 1420-1500	
	words	% words						
East Midlands	126857	53,4	44521	47,4	213718	53,0	163203	41,9
Kentish	4048	1,7	49478	52,6	0	0	0	0
Northern	0	0	0	0	18221	4,5	59946	15,4
Southern	0	0	0	0	92050	22,8	43557	11,1
West Midlands	106433	44,8	0	0	78955	19,6	122982	31,6

Source: <http://www.ling.upenn.edu/histcorpora/PPCME2-RELEASE-3/index.html>

3. *PPCEME* Bias per genre

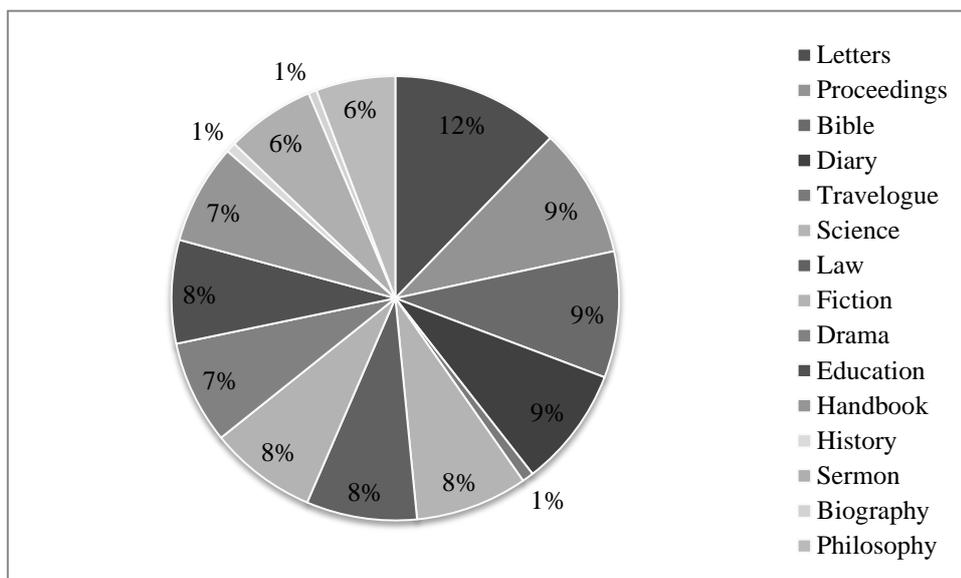


Figure 5: Genres in the *PPCEME* (1500-1710)

Table 5: Genres in the *PPCEME* divided per sub corpus

Period	E1 1500-1570		E2 1570-1640		E3 1640-1710	
	words	% words	words	% words	words	% words
Bible	55577	10,6	67982	12,4	0	0
Biography	30027	5,7	14974	2,7	31026	6,3
Diary	41223	7,9	51113	9,2	29854	6,1
Drama	29700	5,7	31783	5,8	35500	7,2
Education	32362	6,1	29671	5,4	41953	8,5
Fiction	35909	6,8	39011	7,1	22866	4,6
Handbook	27430	5,2	37514	6,8	35946	7,3
History	35853	6,8	31874	5,8	36042	7,3
Law	37018	7,0	37169	6,8	41434	8,4
Letters	54845	10,4	52132	9,5	62639	12,7
Philosophy	21553	4,1	8610	1,6	29313	6,0
Proceedings	15978	3,0	66904	12,1	38068	7,7
Science	40029	7,6	35668	6,5	31207	6,3
Sermons	26078	5,0	19111	3,5	23888	4,9
Travelogue	41545	7,9	26349	4,8	32795	6,7

Source: <http://www.ling.upenn.edu/histcorpora/PPCEME-RELEASE-2/index.html>

4. *PPCMBE*
Bias per genre

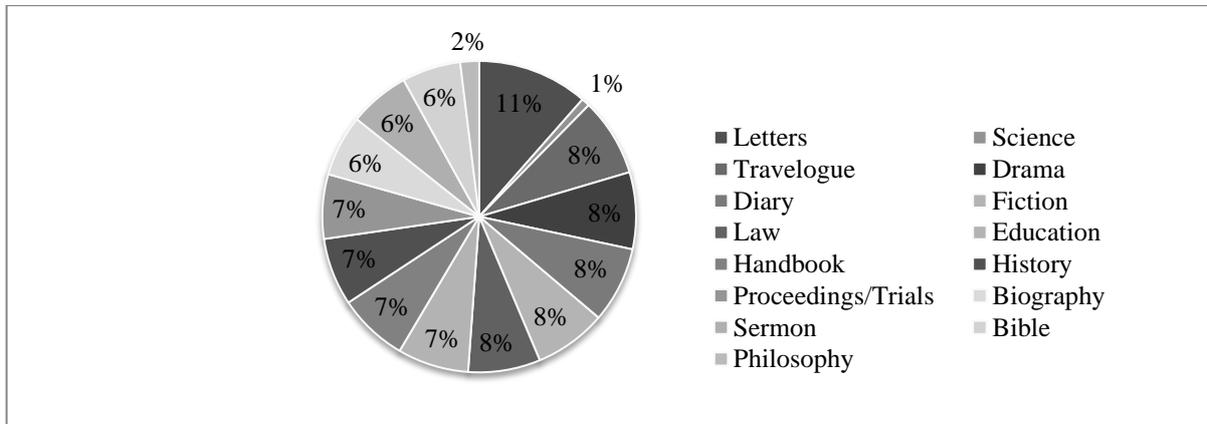


Figure 6: Genres in the *PPCMBE* (1710-1920)

Table 6: Genres in the *PPCMBE* divided per sub corpus

Period	MB1 1710-1780		MB2 1780-1850		MB3 1850-1920	
	words	% words	words	% words	words	% words
Bible	20620	5,7	11033	4,4	21256	8,4
Biography	20478	5,7	10637	4,3	17565	6,9
Diary	29704	8,3	19897	8,0	19983	7,9
Drama	30956	8,6	19620	7,9	19762	7,8
Education	28210	7,8	18492	7,4	18137	7,1
Fiction	28195	7,8	18780	7,5	18651	7,3
Handbook	19089	5,3	18176	7,3	18075	7,1
History	26424	7,3	17495	7,0	17702	7,0
Law	19683	5,5	1881	0,7	18867	7,4
Letters	39974	11,1	11419	4,6	19995	7,9
Philosophy	0	0	9173	3,7	7935	3,1
Proceedings	30702	8,5	28271	11,3	0	0
Science	25482	7,1	25784	10,3	17419	6,9
Sermons	10010	2,8	18342	7,4	18160	7,1
Travelogue	30207	8,4	20277	8,1	20661	8,1

Source: <http://www.ling.upenn.edu/histcorpora/PPCMBE-RELEASE-1/index.html>

5. ARCHER
Bias per genre

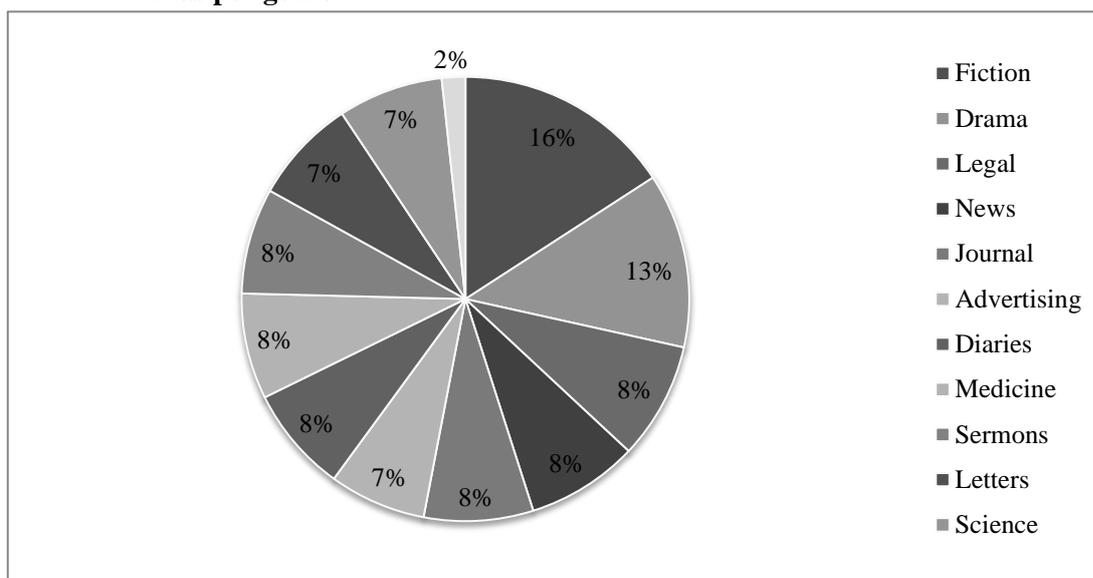


Figure 7: Genres in ARCHER 3.2. (1600-1999)

Table 7: Genres in ARCHER 3.2. divided per sub corpus

Period	1600-1699		1700-1799		1800-1899		1900-1999	
	words	% words						
Advertising	0	0	25386	4,7	61488	11,3	50154	9,4
Diaries	20488	5,9	43538	8,1	42672	7,9	44484	8,4
Drama	62670	18	55346	10,3	66067	12,2	63591	12
Fiction	41667	12	89255	16,7	88534	16,3	90517	17,1
Journal	21186	6,1	44549	8,3	44492	8,2	44931	8,5
Legal	41492	11,9	41682	7,8	41288	7,6	41881	7,9
Letters	38767	11,1	63485	11,8	23490	4,3	23890	4,5
Medicine	23811	6,8	43068	8	42551	7,8	41207	7,8
News	22304	6,4	44784	8,4	46023	8,5	44912	8,5
Prose	32741	9,4	0	0	0	0	0	0
Science	21427	6,2	41411	7,7	42825	7,9	43049	8,1
Sermons	21818	6,3	43263	8,1	43099	7,9	42216	8

Source: http://www.humanities.manchester.ac.uk/medialibrary/lc/files/ARCHER/ARCHER_3-2wordcounts.jpg

6. *CLMET*
Bias per genre

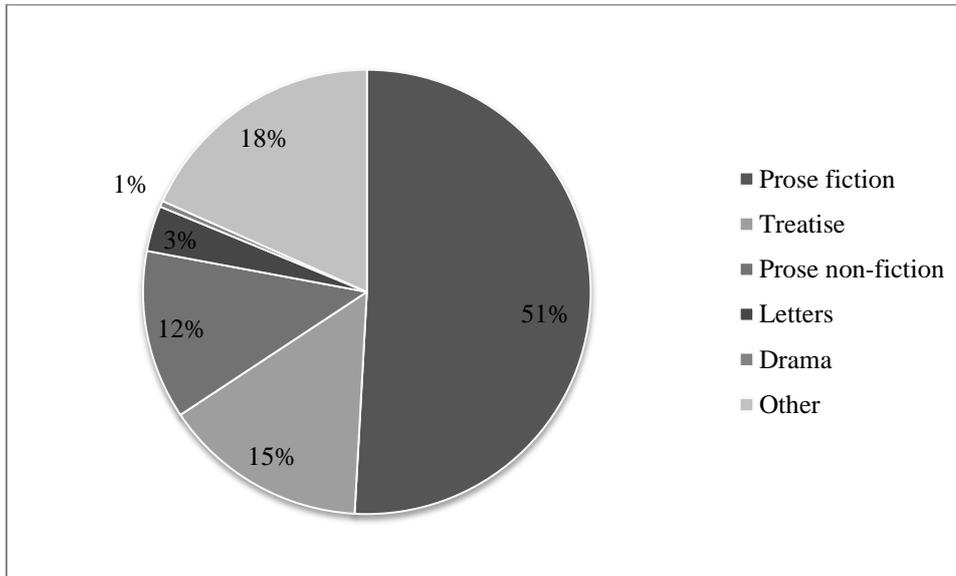


Figure 9: Genres in *CLMET* (1710-1920)

Table 9: Genres in *CLMET*, divided per sub corpus

Genre	Period	1710-1780		1780-1850		1850-1920	
		word	% word	word	% word	word	% word
Drama		407,885	3,9	347,493	3,1	607,401	5,2
Letters		1,016,745	9,7	714,343	6,3	479,724	4,1
Narrative fiction		4,642,670	44,3	4,830,718	42,8	6,311,301	53,7
Narrative non-fiction		1,863,855	17,8	1,940,245	17,2	95,841	0,8
Treatise		1,114,521	10,6	1,692,992	15,0	1,782,124	15,2
Other		1,434,755	13,7	1,759,796	15,6	2,481,247	21,1

Source: <https://perswww.kuleuven.be/~u0044428/clmet.htm>

Appendix 6: Results from the *York Corpus of Old English*, the *Penn Parsed Corpus of Middle English 2*, the *Penn Parsed Corpus of Early Modern English*, the *Penn Parsed Corpus of Modern British English*, a *Representative Corpus of Historical English Registers*, and the *Corpus of Late Modern English Texts*.

Table 1: Absolute results per complement *YCOE*

Period	O1	O2	O3	O4	Total
	0-850	850-950	950-1050	1050-1150	0-1150
PP	0	62	69	52	183
PartP	0	11	17	16	44
CP	2	167	200	200	569
NP	3	209	326	288	826

Table 2: Absolute results per complement *PPCME2*

Period	M1	M2	M3	M4	Total
	1150-1250	1250-1350	1350-1420	1420-1500	1150-1500
PP	19	2	7	8	36
PartP	10	1	3	3	17
CP	136	37	154	200	527
NP	134	36	87	58	315

Table 3: Absolute results per complement *PPCEME*

Period	E1	E2	E3	Total
	1500-1570	1570-1640	1640-1710	1500-1710
PP	8	13	2	23
PartP	8	4	3	24
CP	107	62	9	178
NP	33	16	1	53

Table 4: Absolute results per complement *PPCMBE*

Period	B1	B2	B3	Total
	1710-1780	1780-1850	1850-1920	1710-1920
PP	2	4	0	6
PartP	0	2	0	2
CP	3	3	8	14
NP	0	2	0	2

Table 5: Absolute results per complement *CLMET*

Period	B1	B2	B3
	1710-1780	1780-1850	1850-1920
PP	16	18	1
PartP	7	10	4
CP	9	4	0
NP	11	8	5

Table 6: Absolute results per complement *ARCHER*

Period	1600-1699	1700-1799	1800-1899	1900-199
PP	4	5	0	0
PartP	1	0	0	0
CP	0	4	0	1
NP	2	1	0	0

Table 6: Absolute results per verb-complement combination *YCOE*

Period		O1	O2	O3	O4
		0-850	850-950	950-1050	1050-1150
<i>agan</i> ‘owe’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	23	32	39
<i>ahte</i> ‘owed’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	13	26	29
<i>cunnan</i> ‘know’	PP	0	0	3	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	13	39	38
<i>cuðan</i> ‘knew’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	25	50	37
* <i>dugan</i> ‘benefit’	PP	0	17	3	1
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>dohte</i> ‘benefit’	PP	0	0	0	0
	PartP	0	0	0	1
	CP	0	0	0	0
	NP	0	0	0	0
<i>durran</i> ‘dare’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>dorste</i> ‘dared’	PP	0	0	3	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>magan</i> ‘can’	PP	0	10	16	12
	PartP	0	5	3	0
	CP	0	0	0	0
	NP	0	2	4	4
<i>mihtan</i> ‘could’	PP	0	6	12	5
	PartP	0	1	4	0
	CP	0	0	0	0
	NP	0	1	3	0
* <i>motan</i> ‘must’	PP	0	3	6	3
	PartP	0	1	0	2
	CP	0	0	0	0

	NP	0	0	0	0
<i>munan</i> ‘remember’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>nugan</i> ‘suffice’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>sculan</i> ‘owe’	PP	0	15	9	11
	PartP	0	1	3	0
	CP	0	0	0	0
	NP	0	1	4	4
<i>scoldan</i> ‘owed’	PP	0	5	6	6
	PartP	0	2	0	10
	CP	0	0	0	0
	NP	0	1	1	1
<i>þurfan</i> ‘dare’	PP	0	0	0	1
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	10	1	2
<i>þorfte</i> ‘dared’	PP	0	1	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>unnan</i> ‘grant’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	3	5	7	2
<i>uþan</i> ‘granted’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	1	1	0
<i>willan</i> ‘want’	PP	0	1	5	0
	PartP	0	1	2	0
	CP	1	24	50	50
	NP	0	26	34	19
<i>woldan</i> ‘wanted’	PP	0	3	5	11
	PartP	0	0	5	3
	CP	0	50	50	50
	NP	0	21	24	20
<i>witan</i> ‘know’	PP	0	0	0	2
	PartP	0	0	0	0
	CP	1	50	50	50
	NP	0	50	50	50
<i>wistan</i> ‘knew’	PP	0	1	1	0

	PartP	0	0	0	0
	CP	0	43	50	50
	NP	0	17	50	43

Table 7: Absolute results per verb-complement combination *PPCME2*

Period		M1	M2	M3	M4
		1150-1250	1250-1350	1350-1420	1420-1500
<i>agan</i> ‘owe’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	12	1	7	3
<i>ahte</i> ‘owed’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	4	0	14	10
<i>cunnan</i> ‘know’	PP	0	0	1	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	1	1	3	1
<i>cuðan</i> ‘knew’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	3	3	5	13
* <i>dugan</i> ‘benefit’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>dohte</i> ‘benefit’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>durran</i> ‘dare’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>dorste</i> ‘dared’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>magan</i> ‘can’	PP	1	1	0	0
	PartP	3	0	0	1
	CP	1	1	0	0
	NP	5	1	2	0
<i>mihtan</i> ‘could’	PP	0	0	0	0
	PartP	2	0	1	0
	CP	0	0	0	0
	NP	0	0	0	0
* <i>motan</i> ‘must’	PP	2	1	1	1
	PartP	1	1	1	1

	CP	0	0	0	0
	NP	1	0	0	0
<i>munan</i> ‘remember’	PP	0	0	0	0
	PartP	0	0	0	0
<i>munan</i> ‘remember’	CP	0	0	0	0
	NP	1	0	0	0
	PP	0	0	0	0
	PartP	0	0	0	0
<i>nugan</i> ‘suffice’	CP	0	0	0	0
	NP	0	0	0	0
	PP	9	0	1	0
	PartP	1	0	0	0
<i>sculan</i> ‘owe’	CP	0	0	0	0
	NP	0	0	1	0
	PP	1	0	0	2
	PartP	2	0	0	0
<i>scoldan</i> ‘owed’	CP	0	0	0	0
	NP	0	0	0	0
	PP	0	0	0	0
	PartP	0	0	0	0
<i>þurfan</i> ‘dare’	CP	0	0	0	0
	NP	0	0	0	0
	PP	0	0	0	0
	PartP	0	0	0	0
<i>þorfte</i> ‘dared’	CP	0	0	0	0
	NP	0	0	0	0
	PP	0	0	0	0
	PartP	0	0	0	0
<i>unnan</i> ‘grant’	CP	0	0	0	0
	NP	5	0	0	0
	PP	0	0	0	0
	PartP	0	0	0	0
<i>uþan</i> ‘granted’	CP	0	0	0	0
	NP	0	0	0	0
	PP	4	0	2	1
	PartP	0	0	0	0
<i>willan</i> ‘want’	CP	32	13	25	50
	NP	10	6	8	10
	PP	2	0	1	2
	PartP	1	0	1	1
<i>woldan</i> ‘wanted’	CP	25	1	29	50
	NP	9	7	3	8
	PP	0	0	0	1
	PartP	0	0	0	0
<i>witan</i> ‘know’	CP	27	18	50	50
	NP	50	13	20	10

<i>wistan</i> 'knew'	PP	0	0	0	1
	PartP	0	0	0	0
	CP	27	4	50	50
	NP	19	4	24	3

Table 8: Absolute results per verb-complement combination *PPCEME*

Period		E1	E2	E3
		1500-1570	1570-1640	1640-1710
<i>ought</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	8	3	0
<i>can</i>	PP	0	0	0
	PartP	1	0	0
	CP	0	0	0
	NP	4	1	0
<i>could</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	1	2	0
<i>*dugan</i> ‘benefit’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>dohte</i> ‘benefit’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>dare</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>dared</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	1	0
	NP	0	0	0
<i>may</i>	PP	0	0	0
	PartP	1	0	0
	CP	0	0	0
	NP	0	1	0
<i>might</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	1	0	0
<i>must</i>	PP	0	3	0
	PartP	1	1	1
	CP	0	0	0
	NP	0	0	0
<i>munan</i> ‘remember’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0

	NP	0	0	0
<i>nugan</i> ‘suffice’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>shall</i>	PP	1	0	1
	PartP	1	1	0
	CP	0	0	0
	NP	1	0	0
<i>should</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	1	0	0
<i>þurfan</i> ‘need’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>þorfte</i> ‘needed’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>unnan</i> ‘grant’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>uþan</i> ‘grant’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>will</i>	PP	5	8	1
	PartP	4	1	1
	CP	10	5	2
	NP	3	4	0
<i>would</i>	PP	2	2	0
	PartP	0	1	0
	CP	50	50	9
	NP	4	4	0
<i>witan</i> ‘know’	PP	0	0	0
	PartP	0	0	0
	CP	27	4	0
	NP	2	1	0
<i>wistan</i> ‘knew’	PP	0	0	0
	PartP	0	0	0
	CP	20	2	0
	NP	8	0	0

Table 10: Results per verb-complement combination *PPCMBE*

Period		B1	B2	B3
		1710-1780	1780-1850	1850-1920
<i>ought</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>can</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>could</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>*dugan</i> ‘benefit’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>dohte</i> ‘benefit’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>dare</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>dared</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>may</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>might</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>must</i>	PP	1	2	0
	PartP	0	1	0
	CP	0	0	0
	NP	0	1	0
<i>munan</i> ‘remember’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0

	NP	0	0	0
<i>nugan</i> ‘suffice’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>shall</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>should</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>þurfan</i> ‘need’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>þorfte</i> ‘needed’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>unnan</i> ‘grant’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>uþan</i> ‘granted’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>will</i>	PP	0	2	0
	PartP	0	1	0
	CP	0	0	0
	NP	0	1	0
<i>would</i>	PP	0	0	0
	PartP	0	0	0
	CP	3	3	7
	NP	0	0	0
<i>witan</i> ‘know’	PP	1	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>wistan</i> ‘knew’	PP	0	0	0
	PartP	0	0	0
	CP	0	0	1
	NP	0	0	0

Table 11: Absolute results per verb-complement combination *CLMET*

Period		B1	B2	B3
		1710-1780	1780-1850	1850-1920
<i>ought</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>can</i>	PP	0	1	0
	PartP	0	0	0
	CP	0	0	0
	NP	4	7	1
<i>could</i>	PP	0	1	0
	PartP	0	0	0
	CP	0	0	0
	NP	3	0	0
<i>dare</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>dared</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>may</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>might</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	1	0	0
<i>must</i>	PP	2	9	1
	PartP	5	5	0
	CP	0	0	0
	NP	0	0	0
<i>shall</i>	PP	1	0	0
	PartP	1	0	0
	CP	0	0	0
	NP	0	0	0
<i>should</i>	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0
<i>will</i>	PP	9	7	1
	PartP	1	5	3
	CP	0	0	0

	NP	2	0	4
<i>would</i>	PP	0	0	0
	PartP	0	0	0
	CP	7	4	0
	NP	1	1	0
<i>witan</i> 'know'	PP	4	0	0
	PartP	0	0	0
	CP	2	0	0
	NP	0	0	0
<i>wistan</i> 'knew'	PP	0	0	0
	PartP	0	0	0
	CP	0	0	0
	NP	0	0	0

Table 12: Absolute results per verb-complement combination *ARCHER*

Period		1600-1699	1700-1799	1800-1899	1900-1999
<i>ought</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>can</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>could</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>dare</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>dared</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>may</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>might</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>must</i>	PP	0	2	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>shall</i>	PP	1	2	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>should</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>will</i>	PP	3	1	0	0
	PartP	1	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0

<i>would</i>	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	4	0	1
	NP	2	1	0	0
<i>witan</i> ‘know’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0
<i>wistan</i> ‘knew’	PP	0	0	0	0
	PartP	0	0	0	0
	CP	0	0	0	0
	NP	0	0	0	0

Appendix 7: Statistics - Linear Regression

1. Complement type (relative frequency)

Table 1: Coefficients of complements

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant: PP	3,093	1,018		3,038	,004
PartP	-,350	,533	-,106	-,656	,516
NP	,413	,533	,125	,774	,444

2. Complement type (ratio)

Table 2: Coefficients of complements

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant:PartP	1,295	,690		1,878	,068
NP	,984	,361	,396	2,721	,010
PP	,343	,361	,138	,948	,349

3. Nominal Phrases

Table 2: Coefficients of Nominal Phrases

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant: Cunnan	2,280	,483		4,723	,000
Agan	,338	,415	,072	,815	,417
Magan	-1,068	,415	-,228	-2,575	,011
Motan	-1,644	,415	-,351	-3,963	,000
Munan	-1,485	,415	-,317	-3,580	,000
Sculan	-1,312	,415	-,280	-3,162	,002
Thurfan	-1,188	,415	-,254	-2,865	,005
Unnan	-,448	,415	-,096	-1,079	,282
Willan	-,292	,415	-,062	-,705	,482
Witan	,251	,415	,054	,605	,546

4. Prepositional and Particle Phrases

Table 3: Prepositional and Particle Phrases

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant: Sculan + PartP	-,289	,337		-,858	,392
Sculan + PP	,212	,314	,060	,675	,500
Cunнан + PP	-,267	,314	-,076	-,850	,397
Cunнан + PartP	-,431	,314	-,122	-1,374	,171
Dugan + PP	,194	,314	,055	,620	,536
Dugan + PartP	-,343	,314	-,097	-1,094	,276
Durran + PP	-,374	,314	-,106	-1,193	,235
Magan + P	,179	,314	,051	,570	,569
Magan + PartP	-,164	,314	-,047	-,524	,601
Motan + PP	,915	,314	,259	2,917	,004
Motan + PartP	,705	,314	,200	2,248	,026
Thurfan + PP	-,440	,314	-,125	-1,402	,163
Willan + PartP	,142	,314	,039	,466	,642
Willan + PP	,430	,314	,118	1,415	,159
Witan + PP	,159	,314	,045	,506	,614