

I should have been ill

The interaction of tense, aspect
and modality in Dutch

Richard van Gerrevink

I should have been ill

The interaction of tense, aspect and modality in Dutch

Richard van Gerrevink

Optimal Communication

Department of Linguistics

Radboud University Nijmegen

P.O. Box 9103

6500 HD Nijmegen

the Netherlands

www.ru.nl/pionier

R.vanGerrevink@let.ru.nl

I should have been ill

The interaction of tense, aspect and modality in Dutch

Master's Thesis

General Linguistics

Faculty of Arts

Radboud University Nijmegen

March 2008

Cover illustration *Thermometer* © Schoolplaten.com

Richard van Gerrevink

0224960

First supervisor: Prof. dr. Helen de Hoop

Second supervisor: Dr. Ad Foolen

Acknowledgements

Up until now I always thought I would have to become a recording artist before I would get the chance to express my gratitude towards certain people who have helped and supported me in a long and difficult process of creating something special. After writing this master's thesis I know that this is the first time that I will write up some acknowledgements, but certainly not the last time. The most important person responsible for this would have to be my first supervisor Helen de Hoop. Ever since she hired me as a student assistant some three years ago, she has not only been the nicest employer, she has been offering me chance after chance after chance for developing my academic capabilities.

Back in 2006, it was Helen who kickstarted my bachelor's thesis after all my ideas had already been catching dust for months. When it was time to begin the lengthy and exhaustive process for my master's thesis, it was thanks to her expert guidance and counseling that I did not lose faith and kept on puzzling and grinding until I (we) found the final solution. Lastly, it was Helen who forwarded me the job opening for a PhD position and who encouraged me to give it a try and apply for it. It is thanks to her that about four years from now (if all goes well) I will be writing up another acknowledgements section, but then for my dissertation. Helen, thank you for guiding me and thank you that I could be part of your Optimal Communication research group the past few years.

My second set of thank yous goes out to the other OC members. As a group I would like to thank them all for the extremely enjoyable working atmosphere, their sense of humour and their constructive comments on my work. Individual portions of gratitude go out to the following OC members for reasons of varying nature. I am very thankful to Ad Foolen for being my second supervisor and for his kindness in general. I will not forget the pleasant times we spent together doing the preliminary corpus explorations for the work in this thesis, pondering about what

people could possibly mean with this or that utterance and to what pragmatic effect. I would also like to thank Sander Lestrade and Geertje van Bergen especially for the endless amounts of coffee they provided me with during these past two or three years. My gratitude also goes out to Peter de Swart for setting the example as far as expertise, professionalism and academic ambition go; to Monique Lamers for all the effort she has put into the Nijmegen students association for linguistics InTenS (of which I have been a long-time active member); to Lotte Hogeweg for supervising my internship and for being my partner in modal crime; to Peia Prawiro-Atmodjo and Steven Westelaken for filling up the void that I am leaving behind and last but not least I want to thank Kees de Schepper for always being his linguistic self.

I would like to end on a more personal note and thank a number of people that have been important to me outside of my academic life. I would like to thank Micha Hulsbusch, Chau Nguyen, Jasper Hesselink and Aernout Casier for much needed (most of the time at least) distractions from my school endeavours. Your friendship will not be forgotten. I would like to thank my parents Ruud and Jozephine for the bareable amount (just about) of nagging about finishing up my studies. I know you mean well and I thank you for your support. The last person whom I would like to thank for her love, support and understanding, especially during those last few hectic weeks is Fabiën. I could not have finished this without you. Well, maybe I could have, but the process would have been even more difficult and stressful and the times in general would have been a lot less enjoyable.

Abbreviations

IMP	Imperfective
PAST	Past tense
PART	Participle
PRES	Present tense
PRT	Particle
RED	Reduced form

Table of contents

Acknowledgements	vii
Abbreviations	ix
Table of contents	xi
1. Introduction	1
2. Modality in formal theories	7
2.1 The core meaning of ‘must’	7
2.2 ‘Must’ in possible world semantics.....	11
2.3 The relation between deontic and epistemic modality	14
2.4 Aspect and modality in a formal framework.....	16
2.5 Concluding remarks	21
3. Modality in functional theories	23
3.1 Van der Auwera and Plungian (1998).....	23
3.2 Nuyts (2005).....	27
3.3 Narrog (2005)	33
3.4 Concluding remarks	37
4. The interaction of tense, aspect and modality in Dutch	39
4.1 Boogaart (2007).....	39
4.2 The behaviour of deontics and epistemics in Dutch.....	47
4.2.1 Actuality entailment and deontic modality in Dutch..	48
4.2.2 Actuality entailment and epistemic modality in Dutch	51
.....	
4.2.3 Comparing the results.....	53
4.3 Tearing at the seams	55
4.3.1 The role of modality	55
4.3.2 The role of perfective aspect	59
4.3.3 The role of tense	59
4.3.4 The powers combined	62
4.4 Producing and interpreting the paradigm	63
5. The paradigm exemplified.....	71
5.1 Collecting <i>moeten</i> : methodology.....	71
5.2 Applying the bidirectional model on <i>moeten</i> in context ...	73
6. Conclusions	81
References	85

1. Introduction

This master's thesis will focus on the interaction between tense and modality in Dutch. The basis of the thesis is formed by a close examination of the Dutch modal verb *moeten* 'must' in two different modal contexts: epistemic and deontic modality. Epistemic modality involves an estimation of the likelihood that a certain state of affairs is taking, has taken or will take place. This estimation can be put to words in various ways, as shown in (1) below. The epistemic markers have been italicized:

- (1) a. John is *probably* at home.
 b. *I think* that John is at home.
 c. John *might* be at home.
 d. John *must* be at home.

The first three sentences in (1) clearly give an indication that it is likely or possible that John is at home. In order to obtain an epistemic reading for the fourth sentence in (1d), some more context might be helpful. Say, for instance that we know that John lives in the house on the corner, that John lives there by himself and that the lights are on. Uttering (1d) then gives an estimation of the likelihood (very likely in this case) that John is home. Other contexts, however, can induce a different reading for (1d). Say that John is a kid who has been naughty. He has been caught by his parents and they have punished him by saying that he cannot leave the house. Uttering (1d) in this context evokes a reading of necessity that the state of affairs takes place. The ruling of John's parents states that it must be the case that John is at home. This interpretation is an example of deontic modality. Other ways of expressing deontic modality can be found in (2), where the deontic markers have been italicized.

2 1. Introduction

- (2) a. John *must* do the dishes.
- b. It is *necessary* that John does the dishes.
- c. John *is obliged* to do the dishes.
- d. John *may* do the dishes.

Traditionally, deontic modality is said to involve obligation, as in the first three sentences in (2), or permission as in (2d).

The relation between tense and modality has been studied a lot in the past (cf. Ippolito 2004, Hacquard 2006, Boogaart 2007). This thesis will revolve around one important claim made by Boogaart (2007). In an investigation of tense, aspect and modality in Dutch and English, Boogaart finds that in Dutch the perfect tense of a modal verb can only receive a deontic reading and not an epistemic reading. He supports his claim with the example sentence in (3) below:

- (3) *Hij heeft ziek moeten zijn.*
 he has ill must_{PART} be
 “He has had to be ill.”

According to Boogaart the perfective aspect of the construction *heeft moeten* ‘has must’ rules out an epistemic interpretation for the sentence in (3). The only reading available is a deontic one, meaning something like “someone has been forcing him to be ill”. On this point, however, I disagree completely with Boogaart. Apart from the deontic reading that he gets, I think the preferred reading is something like “he was destined to be ill”. A paraphrase of (3) illustrating this reading can be found in (4):

- (4) *Het heeft zo moeten zijn dat hij ziek was.*
 it has like-this must_{PART} be that he ill was
 “‘It had to be the case that he was ill.”

The paraphrase in (4) clearly says something about the likelihood that the state of affairs took place in the past. A more elaborate discussion of all the intricacies of Boogaart's analysis can be found later on in this thesis (cf. Section 4.1), but for now it seems to be the case that an epistemic reading is compatible with present perfect tense. The fallacy of his claim is actually something that Boogaart himself also noticed. While searching the internet he found the following two example sentences containing present perfect modal constructions with epistemic interpretations:

- (5) *Dit geeft ook aan hoe onzeker Beethoven geweest heeft moeten zijn.*
 this gives also PRT how insecure Beethoven be_{PART}
heeft moeten zijn.
 has must_{PART} be
 “This indicates how unsure Beethoven must have been of himself.”
- (6) *Frankrijk ontkent niet dat het vertoon van strijdmachten de aanzet heeft kunnen zijn voor de recente verandering in de houding van de Iraakse autoriteiten.*
 France denies not that the display of
 armed forces the trigger has can_{PART} be for the
recente verandering in de houding van de Iraakse
 recent change in the attitude of the Iraqi
autoriteiten.
 authorities
 “France does not deny that the display of armed forces may have been the trigger for the recent change in the attitude of the Iraqi authorities.”

As the translations of example (5) and (6) indicate, these sentences give an estimation of the likelihood that Beethoven was unsure of himself and that the display of armed forces led to

4 1. Introduction

Iraq's change of attitude respectively. The first claim by Boogaart (2007) about these sentences is that they are unacceptable for many speakers of Dutch, but he presents no data to support this claim. This is another point where my view and Boogaart's view differ greatly, as I think the examples in (5) and (6) are perfectly fine.

The second claim by Boogaart (2007) is that the verb clusters with a present tense finite auxiliary and a perfective modal complement in (5) and (6) get the same kind of epistemic interpretation as the verb cluster in sentence (7), a present tense modal with a perfective complement:

- (7) *Hij moet ziek geweest zijn.*
he must_{PRES} ill been be
“He must have been ill.”

The fact that the construction in (7) has a similar meaning as the constructions in (5) and (6) makes Boogaart question why people would want to use modal constructions with present perfect tense of the type in (5) and (6) in the first place. In his work Boogaart does not manage to answer this question. In the fourth chapter I will show that constructions as in (7) are in fact not similar to those in (5) and (6).

What I will be doing in this thesis is deal with the problems that Boogaart found for the interaction between epistemic modality and tense in Dutch. In order to get a better grip on the role of modality in the interpretation of modal expressions in various tenses, I will first discuss a number of theories about the semantics of modality. In Chapter 2 we will see what modality has to add to the meaning of the proposition from the perspective of formal semantics. In Chapter 3 the same will be done from the perspective of a number of theories of functional semantics. In the fourth chapter I will return to Boogaart's

problems and take a closer look at the role of tense and its interaction with modality in Dutch. Via a close examination of the effect of the Dutch modal verb *moeten* ‘must’ in various tenses, I will show that the incompatibility of epistemic modality and present perfect tense that Boogaart found is non-existent. It will become clear that in all tenses and with perfective as well as imperfective aspect, epistemic as well as deontic readings are available. With the help of bidirectional Optimality Theory I will also demonstrate how the interpretations resulting from the interaction between tense and modality arise. In Chapter 5 I will test the bidirectional OT model and analyse a number of actual instances of *moeten* ‘must’ taken from the Corpus of Spoken Dutch. The sixth and final chapter will contain the conclusions of this thesis.

2. Modality in formal theories

In this chapter I will discuss formal approaches to the meaning and interpretation of modality. These theories try to come to a formal definition of the core meaning of modality mainly within a framework of possible worlds semantics. One of the most influential scholars adhering to a formal treatment of modality is Angelika Kratzer. The basis for her much cited 1981 and 1991 articles lies in a 1977 exploration of the exact meaning of the English modal verbs ‘must’ and ‘can’. We will start our discussion with Kratzer’s first attempts at doing so, relating it to some of her later findings when convenient.

2.1 The core meaning of ‘must’

The point of departure for Kratzer (1977) is the fact that it is the semanticist’s task to discover for every linguistic expression the element of meaning which is invariable, independent of the context in which this linguistic expression is uttered. This is the so-called meaning proper of the linguistic expression. She of course also realises that this is a simplistic approach which will encounter many problems, yet it does convey the essential concern of the linguist. So it might still provide a good basis to start an exploration into the much reported ambiguity in the meaning of modal verbs.

The various instances of ‘must’ in the set of example sentences below are all said to be different kinds of ‘must’, namely deontic, epistemic, dispositional and preferential ‘must’ respectively.¹

¹ Taken from Kratzer (1977: 338), who has taken them from Grabski (1974).

8 2. Modality in formal theories

- (1) All Maori children *must* learn the names of their ancestors.
- (2) The ancestors of the Maoris *must* have arrived from Tahiti.
- (3) If you *must* sneeze, at least use your handkerchief.
- (4) When Kahukura-nui died, the people of Kahungunu said: Rakaipaka *must* be our chief.

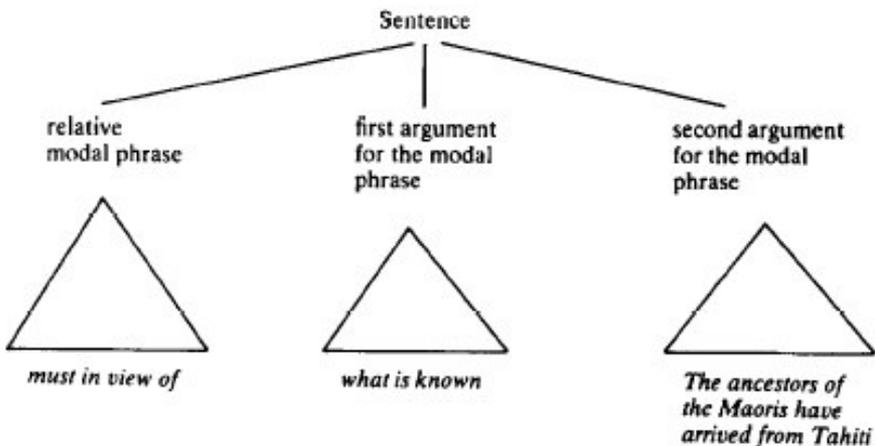
According to Kratzer, we could easily continue this division between the different instances of ‘must’ into practically infinitely small categories of ‘must’. Consider for example the category of preferential ‘must’. Each instance of preferential ‘must’ will refer to a different preference of a different person in each different context in which it is used. But does this entail that each of these instances has a completely different meaning? How do we manage to discern between all these different meanings then? We obviously manage to do so seeing that we all seem to understand each other’s utterances containing ‘must’. Kratzer argues that in interpretation we do not concentrate on the alleged differences between all these instances, we rather rely on the existing similarities in meaning. Kratzer says that there is some kind of connection, some kind of invariable element in the meaning of all these different types of ‘must’. What this element exactly is should become clear from the following set of paraphrases of the example sentences (1)–(4):

- (1') *In view of what their tribal duties are*, the Maori children *must* learn the names of their ancestors.

- (2') *In view of what is known*, the ancestors of the Maoris *must* have arrived from Tahiti.
- (3') If – *in view of what your dispositions are* – you *must* sneeze, at least use your handkerchief.
- (4') When Kahukura-nui died, the people of Kahungunu said: *in view of what is good for us*, Rakaipaka *must* be our chief.

Kratzer feels that the instances of 'must' in the primed paraphrases of our four example sentences now all contain the same core meaning. Part of the meaning of each different 'must' in (1)–(4) has shifted into the different 'in view of' phrases in its primed counterpart. The remainder of meaning in each 'must' in (1')–(4') (so the original 'must' minus the *in view of* part) should essentially be the same now. In Kratzer 1991 the 'must' in the set of primed paraphrases is called a 'neutral must' and the 'must' in the set of original phrases is called a 'non-neutral must'. This decomposition of the meaning of 'must' leads to the following schematic representation:

Figure 1: Decomposition of the meaning of 'must' (Kratzer 1977: 341)



10 2. Modality in formal theories

For the sentences in (1') – (4'), the core meaning of 'must' is captured by the relative modal phrase 'must in view of' (containing a 'neutral must'). This relative phrase requires two arguments in order to make up the entire proposition. The first argument is a phrase like 'what is known', the second argument is provided by a (non-modal) sentence like 'The ancestors of the Maoris have arrived from Tahiti'. The first argument thus specifies the type of modality, (epistemic modality in this case). If we assume that 'must in view of' is the core meaning of 'must', then in the sentences (1) – (4), we are also dealing with an (implicit) instance of 'must in view of', which needs two arguments. These sentences however, lack an argument of the type 'what is known'; the sentence-type argument is explicitly present. What Kratzer argues is that in order to obtain the different meanings of 'non-neutral must' (i.e. deontic, epistemic, dispositional and preferential), one of the missing arguments is joined with the core meaning of 'must'. The context of the utterance provides this missing argument and thus determines whether we are dealing with a deontic, epistemic, dispositional or preferential 'must'.

In short, Kratzer's conclusions come down to the following: the meaning proper (later the 'neutral meaning') of the modal verb 'must' is comprised in the relative modal phrase 'must in view of'. The modal meaning of the entire proposition requires two arguments, one argument is provided by a sentence, the other argument may be explicitly provided by a 'what is known'-type phrase or implicitly provided by the context of the utterance (the latter being the case in practically all instances of 'must' in natural language). In the next section we will see how Kratzer formally defines the meaning of 'must' within the framework of possible world semantics.

2.2 'Must' in possible world semantics

Before entering into a detailed possible world semantic analysis of the meaning of 'must', Kratzer starts out setting some preliminary definitions. The starting point is W , the complete set of all possible worlds, the set of all propositions consists of the power-set of W . The following definitions are taken directly from Kratzer 1977 (p. 344):

DEFINITION 1. A proposition p is true in a world w of W if and only if w is a member of p . Otherwise p is false in w .

DEFINITION 2. If A is a set of propositions and p is a proposition, then p follows (logically) from A if and only if there is no possible world where all members of A are true but p is false.

DEFINITION 3. A set of propositions is consistent if and only if there is a possible world where all its members are true. Otherwise it is inconsistent.

DEFINITION 4. A proposition p is compatible with a set of propositions A if and only if $A \cup \{p\}$ is consistent.

Continuing our analysis with the help of the example sentence (2'), Kratzer states that the proposition for this sentence is given (p = 'the ancestors of the Maoris have arrived from Tahiti'), turning her attention directly towards the semantics of the 'what is known'-phrase, the first argument of the relative modal phrase 'must in view of'. What is known is different in each imaginable world. For example, there are worlds thinkable where people do

12 2. Modality in formal theories

not know how to boil an egg and there are worlds thinkable where people really do know how to travel at the speed of light. What is known in a possible world can always be captured in a certain set of propositions. What is known can be seen as a function from possible worlds into sets of propositions. The ‘what is known’-function assigns to each possible world the set of propositions that is known in that world. Kratzer calls this function ‘ f ’. In her later work this function gets to be known as the conversational background (Kratzer 1991). The conversational background makes up the modal base of the utterance together with the ‘in view of’ phrase. Kratzer (1991) discerns a second, stereotypical, conversational background which is involved in modal reasoning. This second conversational background can be described as ‘in view of the normal course of events’. For each world, it poses an ordering on the set of worlds accessible from that world. The second conversational background functions as the ordering source and dictates which of the accessible worlds is most likely to concur with the actual world.

With the help of the function ‘ f ’, it is possible to define the meaning of the modal phrase ‘must in view of’. Following from Figure 1 in the previous section, we know that this modal phrase makes a sentence out of two arguments: the ‘what is known’-phrase on the one hand and the sentence ‘the ancestors of the Maoris have arrived from Tahiti’ on the other hand. So what the relative modal phrase ‘must in view of’ actually does is assign a meaning to a combination of a ‘what is known’-phrase and a sentence. The relative modal phrase makes a new proposition out of a function like f and another proposition p . Kratzer calls this function of the relative modal phrase ‘must in view of’ ‘ ζ ’ (‘zeta’). The exact meaning of this function is defined by Kratzer as follows:

‘ ζ assigns to the pair consisting of f and p that proposition which is true in exactly those possible worlds w where p follows logically from the set of propositions which f assigns to w . In other words, [this means for our example that] ζ assigns to the pair consisting of f and p that proposition which is true in exactly those possible worlds where it follows logically from what is known in these worlds, that the ancestors of the Maoris arrived from Tahiti.’ (Kratzer 1977: 345-346, phrase in square brackets added, RvG).

This leads Kratzer to formally define the meaning of ‘must in view of’ as follows:

- DEFINITION 5. The meaning of ‘must in view of’ is that function ζ , which fulfils the following conditions:
- (i) If p is a proposition and f a function which assigns a set of propositions to every $w \in W$, then (f, p) is in the domain of ζ .
 - (ii) For any f and p such that (f, p) is in the domain of ζ , $\zeta(f, p)$ is that proposition which is true in exactly those $w \in W$ for which the following holds: p follows (logically) from $f(w)$.
(Kratzer 1977: 346).

In effect, Definition 5 comes down to this: a proposition is necessary in a possible world w in view of such a function f , if it follows logically from the set of propositions which f assigns to w . From this definition it becomes clear that in Kratzer’s view the meaning of ‘must’ crucially involves a notion of necessity. Furthermore what is important to note is that Kratzer argues that each instance of ‘must’, whether it is used epistemically or deontically, has one basic semantic feature in common, namely the ‘must in view of’ phrase, the formal meaning of which is

determined in Definition 5 above. In the following section we will see another formal view on the relation between deontic and epistemic modality.

2.3 The relation between deontic and epistemic modality

Kauffman et al. (2006) adhere to the possible worlds analysis of Kratzer. An extra tool with which they describe the semantics of modality is modal logic. In the framework of modal logic, the meaning of a modal is represented by a certain operator on the sentence which qualifies the truth of the sentence in its scope. The two basic modal operators are the square operator ‘ \square ’ and the diamond operator ‘ \diamond ’. A proposition p combined with the square operator means that p is necessarily true. When p is combined with the diamond operator, it means that p is possibly true. These two modal operators can be defined in terms of each other. After all, *it is necessary that p* means the same as *it is not possible that not- p* . Conversely, *it is possible that p* comes down to the same thing as *it is not necessary that not- p* . The representations in modal logic of these operators are given in (5) and (6):

$$(5) \quad \square p = \neg \diamond \neg p$$

$$(6) \quad \diamond p = \neg \square \neg p$$

Kaufmann et al. find that when combined with different kinds of modality, “[these modal] operators take on different flavors and support additional inference patterns, which are quite distinct from case to case” (Kauffman et al. 2006: 72). For deontic modality, the square operator $\square p$ stands for *It must be the case that p or it is required that p is the case*. The diamond operator $\diamond p$

stands for *It is not required that not-p*, which can be paraphrased as *It is possible/permissible that p is the case*. Kauffman et al. also posit that it is generally agreed in deontic logic that $\Diamond p$ follows from $\Box p$: if p is required, then it is also allowed. This does not mean that if p is required that it is true. With a concrete example:

- (7) A soccer team must consist of eleven players.

In the case of (7), it is necessary that a soccer team consists of eleven players. This also means that it is allowed that a soccer team consists of eleven players. However, if halfway through the soccer match two players have been sent off the field with a red card, it is not the case (anymore) that this particular soccer team consists of eleven players.

When we apply the modal operators to epistemic logic, the square operator is equivalent to *It is known that p is the case*. The diamond operator then stands for *It is not true that p is not known to be the case*, which means the same as *It is possible that p is the case*. It should be noted that the ‘known’ element is vital here for the epistemic reading, there always has to be someone (the speaker, for instance) who possesses this knowledge about p. In epistemic logic, we see a slightly different pattern of inferences than with deontic logic. With epistemic logic, it is also true that if p is known to be the case, then it is also possible that p is the case. However, when p is known to be the case, p is necessarily true as well.

Even though the pattern of inferences for epistemic and deontic logic is slightly different, in formal representations they can be represented by the same modal operators and their meanings are described in similar terms of necessity and possibility. From this formal approach of Kaufmann et al. it becomes clear that deontic and epistemic modality have the same

16 2. Modality in formal theories

basic semantics, which can take on different flavors in different modal contexts.

In the next section I will discuss another formal approach to the semantics of modality, this time also focusing on the role of aspect. A number of findings and theoretical tools will prove to be usefull in my later analyses.

2.4 Aspect and modality in a formal framework

Hacquard (2006) starts her discussion of the relation between aspect and modality with the observation that perfective aspect places the running time of an event within a reference time interval (provided by tense or adverbials of time). Imperfective aspect places the running time of an event around the reference interval. In Hacquard's view, what aspect does is quantify over events, it makes a connection between the time of reference and the time that the event takes place. This can be illustrated by the sentence pair and their formal representations given in (8) below (the examples are adapted and translated into Dutch from Hacquard 2006):

- (8) a. *Gisterochtend las ik een boek.*
yesterday-morning read_{IMP} I a book
“Yesterday morning, I read a book.”
 $\exists t \exists e [t \subseteq \tau(e) \ \& \ \text{I read a book}(e)]$
- b. *Gisterochtend heb ik een boek gelezen.*
yesterday-morning have I a book read_{PART}
“Yesterday morning I read a book.”
 $\exists t \exists e [\tau(e) \subseteq t \ \& \ \text{I read a book}(e)]$

The sentence in (8a) contains imperfective aspect, the sentence in (8b) contains perfective aspect. In (8a) the event of reading a book has not come to an end in the time frame (t) of yesterday morning, whereas in (8b) the event of reading a book has come to an end within this time frame, implying that the subject finished the book yesterday morning.

With respect to modality, Hacquard maintains the view that modal words are used to refer to possibilities and necessities. They have the ability to go beyond directly observable facts and therefore the notion of ‘possible worlds’ comes in very handy when trying to capture the formal meaning of modality. Each possible world represents an alternative of how the world could be. Hacquard posits that modal auxiliaries quantify over different sets of possible worlds. A sentence like *Jane must go to bed at 9 o’clock* states that in all possible worlds in which Jane’s parents are obeyed, Jane goes to bed at 9 o’clock. According to Hacquard, the meaning of necessity in this example follows from the fact that the sentence is universally quantified: Jane goes to bed at 9 o’clock in all worlds in which she obeys her parents. The modal possibility meaning, on the other hand, is obtained by existential quantification over possible worlds. A sentence like *Jane may go to bed at 9 o’clock* means that there is at least one possible world in which Jane goes to bed at that time.

Hacquard stresses that it is important to note that for necessity as well as possibility modal constructions, the actual world does not have to belong to the set of possible worlds that the modal quantifies over. It can be the case that Jane is a disobedient girl and does not go to bed at 9. This makes clear that modals enable language users to “talk about non-actual (but possible) situations by invoking other worlds than the actual one” (Hacquard 2006: 2).

The semantics for aspect and modality that Hacquard has explained until now work fine independently from each other, but

18 2. Modality in formal theories

Hacquard finds that they are problematic when we want to model the interaction between the two factors. In order to understand the problem, Hacquard uses the following sentence pair:²

- (9) a. *Om naar de dierentuin te gaan kon ik de trein nemen.*
in-order to the zoo to go could I the train
take
“In order to go to the zoo, I could take the train.”
- b. *Om naar de dierentuin te gaan heb ik de trein kunnen nemen.*
in-order to the zoo to go have I the train
kunnen nemen.
can_{PART} take
“In order to go to the zoo I could take the train.”

A possible world analysis for sentence (9a) says that there is a world among all possible worlds in which the subject goes to the zoo and in which the subject takes the train to get there. This does not entail that the subject in fact did go there. It is perfectly possible that the subject in (9a) was aware of the possibility to take the train, but decided to go by car in the end. The proposition in (9a) would be true in both scenarios. Sentence (9b), on the other hand, has an entirely different possible world semantic analysis. In order for that sentence to be true, the subject needs to have travelled to the zoo by train in the actual world. Stating that she did not go by train would create a contradiction. Hacquard calls this effect of the proposition having to hold in the actual world ‘actuality entailment’.

² The examples in (9) are taken from Hacquard (2006) and are originally in French. In order to constrain the amount of languages used in this thesis I translated Hacquard’s examples into Dutch. Exactly the same effects that she found for the original sentences in French are found for the Dutch translations.

Hacquard (2006) defines actuality entailment as follows (following Bhatt 1999): a sentence is said to have actuality entailment if “the complement [is] forced to hold in the actual world” (Hacquard 2006: 3). This means that the implication that the complement holds in the actual world cannot be cancelled. An example in English demonstrating the effect is given in (10):

- (10) a. Yesterday John was able to get up in time.
b. Back in the days John was able to get up in time.

For the sentence in (10a) the affirmative continuation ‘and he did so’ is perfectly ok, whereas the contradicting continuation ‘but he did not do so’ is infelicitous. Sentence (10a) implies that John was not only able to get up in time, but that he in fact did so as well. John’s getting up in time is forced to hold in the actual world. For sentence (10b) both continuations are possible, which means that the complement does not necessarily have to hold in the actual world. (10a) is said to have actuality entailment, whereas (10b) is not. In the examples in (10) differences in actuality entailment are obtained through the use of different adverbial expressions.

This actuality entailment does not only come up with possibility modals, as in (9). If we were to replace the forms *kunnen* ‘can’ by forms of *moeten* ‘must’, we also get actuality entailment in the perfective b-sentence. As we saw earlier with the Jane’s bed time examples, Hacquard found that modal verbs do *not* force their complement to hold in the actual world. The main question that arises for Hacquard is how it can be that this effect of actuality entailment with modal verbs arises in combination with perfective aspect, but not with imperfective aspect? Does this mean that modals with perfective aspect are not modal anymore?

20 2. Modality in formal theories

Hacquard is quick in saying that she also found modalities in her data where perfective aspect did not yield an actuality entailment. This was the case with epistemics and performative deontics (deontics which involve putting an obligation on someone else). In order to explain the variation in actuality entailments with perfective aspects for different modalities, Hacquard comes up with a syntactic analysis where in some modal contexts aspect has scope over modality (resulting in an actuality entailment). In other modal contexts it is the other way around, i.e. modality has scope over aspect, resulting in no actuality entailment. She concludes that the actuality entailment that arises in certain perfective modal constructions is a side effect of the interplay between modality and aspect, but that this does not mean that these constructions cannot be categorized as modal anymore.

With respect to the difference between epistemic and deontic modality, Hacquard's (2006) findings lead us to believe that both modalities have different actuality entailment patterns and thus that the combination of aspect and modality results in different semantic implications of the proposition. However, I do not agree entirely with Hacquard's analyses of these examples. In my view, the perfective epistemic modals do have actuality entailment. This would mean that there is still no formal semantic difference between deontics and epistemics.

In Chapter 4 I will perform similar tests for actuality entailment of modality's interaction with tense and aspect for Dutch. I will do this for deontic as well as epistemic contexts and show that (in Dutch) both modalities have the same pattern of actuality entailment for the various forms in the tense/aspectual paradigm.

2.5 Concluding remarks

In this chapter I have discussed a number of formal semantic views on the meaning proper of modality, focusing on epistemic and deontic modality. I have made clear that in the theories discussed, the same meaning lies at the basis of epistemic and deontic modality. I have also given a preliminary start to the discussion of the interaction between modality and aspect. Before we will continue this discussion with an analysis of Dutch in Chapter 4, I will first discuss the view on the semantics of modality in another influential school of linguistics, namely the framework of functional semantics.

3. Modality in functional theories

Kiefer (1987) points out that for describing the semantics of modality there are two traditions. On the one hand we have a logical tradition, which concentrates on the description of propositions. This theoretical perspective was dealt with in Chapter 2. On the other hand, there is a linguistic tradition which emphasizes the non-propositional aspects of modality. In this view, modal expressions are said to be used to mainly express the speaker's attitudes towards states of affairs. This is the functional perspective that the present chapter will be focusing on. I will discuss a number of functional theories about modality and the implications that they have for the meaning of the modal verb 'must'. We will see that a lot of the functional theories are focusing on problems of determining the various types of modality and defining and categorizing them.

3.1 Van der Auwera and Plungian (1998)

In their 1998 article 'Modality's Semantic Map', Van der Auwera and Plungian's main goal is to construct a semantic map of the category of modality. This map gives an overview of the (diachronic development of all the) different types of modality and the ways in which they are connected to each other. Even though mapping is not the main concern of this thesis, one of the authors' initial statements is relevant:

“Modality and its types can be defined and named in various ways. There is no one correct way. The only requirement is that one makes clear how one uses one's own terms.” (Van der Auwera & Plungian 1998: 80)

24 3. Modality in functional theories

This seems to be one of the general basic principles for the functional perspective on modality, as we will see in this chapter. This principle is also the reason why so many different functional theories on modality co-exist and why there is so little agreement about the various types of modality and how different modal expressions should be categorized. The point is that as long as each and every author makes clear what terminology he uses, his or her theories and ideas should be understandable and more or less comparable to the work of others.

The framework of modality that Van der Auwera and Plungian work in is one where modality principally involves those domains where an expression involves either the notion of possibility or the notion of necessity. According to Van der Auwera and Plungian there are only four domains where this is the case:

- (i) participant-internal modality
- (ii) participant-external modality
- (iii) deontic modality
- (iv) epistemic modality

Participant-internal modality refers to a modality where the notion of possibility or necessity is internal to a participant engaged in the state of affairs. This means that in the case of possibility, we are dealing with the ‘ability’ or ‘capacity’ of a participant as in (1a). In the case of necessity we are dealing with the internal need of a participant as in (1b).

- (1) a. John can swim across the Channel; he is a well-trained athlete.
b. John must swim across the Channel, it is one of his life’s goals.

In (1a) we are dealing with an inherent capability of John: he is able to swim across the Channel. In (1b) we are dealing with an internal need of John, he has set a goal for himself which he wants to reach.

Participant-external modality refers to a modality where external circumstances that the participant has no influence on and that make a certain state of affairs either possible or necessary for a participant. In (2a) every set of courses will give you the possibility of enrolling in the Master's programme. In (2b) you need to do a specific set of courses if you want to enrol in the Master's programme.

- (2) a. To enter the Master's programme, you can do whatever course you want.
- b. To enter the Master's programme, you must do these courses.

The third semantic domain that Van der Auwera and Plungian discern is that of deontic modality, which according to them is a subdomain of participant-external modality. Deontic modality also involves external circumstances, which permit or oblige the participant to engage in the state of affairs, but these circumstances originate from some kind of social, ethical or personal norm.

- (3) a. You may enter the plane now.
- b. You must enter the plane now.

Sentence (3a) illustrates a case of deontic permission. Some authority figure, presumably a boarding agent at an airport in this example, allows the participant to enter the plane. In (3b) we are dealing with a case of deontic necessity: the participant is obliged

26 3. Modality in functional theories

to enter the plane, a possible reason may be that he has passed the gate and airport regulations dictate that once passed the gate, one cannot go back.

The fourth and last domain is that of epistemic modality. The notion of epistemic modality refers to a judgement of the speaker: a certain proposition is judged to be uncertain or probable with respect to a certain judgement.

- (4) a. Mary may have given birth by now.
- b. Mary must have given birth by now.

Sentence (4a) is an example of epistemic possibility. It indicates that there is a chance that Mary has given birth at the time the sentence is uttered. The speaker might know that Mary's water broke several hours ago and that she went into labour, but he does not know what has happened since. There is a certain degree of uncertainty involved in epistemic possibility. Sentence (4b) exemplifies epistemic necessity. It indicates that based on certain information, the speaker judges that it is highly likely that Mary has given birth at the time of utterance. This sentence might be uttered for instance when you see Mary's partner carrying a baby in his arms in the hospital. According to Van der Auwera and Plungian, epistemic necessity always involves certainty and a relatively high degree of probability.

Van der Auwera and Plungian are not concerned with the meaning of 'must' or any other specific modal verb. Their main goal is to distinguish a number of different types of modality and to recognize the (diachronical) links that exist between them. In their framework it does seem as if any modal verb can function in practically any of the modal domains. A more extreme view on modality is that of Nuyts, which will be discussed in the next section.

3.2 Nuyts (2005)

One of the more ‘extreme’ functional views on modality is that of Jan Nuyts. The starting point for his more recent deliberations is the theorem that the concept of modality should be altogether done away with and rather be replaced by the term ‘attitude’. Nuyts’ idea stems from his dissatisfaction with the traditional alignment of modality with other categories like tense and aspect. Where the latter two can be defined straightforwardly, there is no general definition available for modality as such. Practically every definition of modality in the literature consists of nothing more than a listing of the different kinds of modality (e.g., epistemic, deontic, dynamic). And not even these subcategories of modality are unequivocally defined. Not one definition ever manages to encompass every possible meaning that can be expressed with that particular category of modality.

Apart from the definitional problem, Nuyts also finds fault with the grouping together of the different subcategories under one super category of modality. According to Nuyts, the grouping together is based on one particular empirical view of language, dominant in current functional linguistics, which is a ‘form-to-function’ approach. What this approach does not take into account is that different meanings can be realised by various forms. An example for modals is the fact that certain meanings can be expressed by modal verbs as well as several other modal expressions like adverbial constructions, predicative adjectives or main verbs.

One argument for a super category of modality has always been that there is a fundamental semantic feature which all the different subcategories have in common (cf. Chapter 2). Nuyts vehemently disagrees with this reasoning, as he finds that this alleged overall similarity (for example the theory that all modal categories can be characterised in terms of ‘necessity’ or

‘possibility’) by no means includes all possible modal meanings. There are ample modal meanings that cannot be traced back to either of these two terms. Several different theories of similarity are done away with by Nuyts in the same way leading to his conclusion that there is no such thing as a super category of modality.

Nuyts would rather group deontic and epistemic modality, evidentiality and boulomaic attitude together into one super category (leaving out dynamic modality) based on, what he calls, the attitudinal character of these notions. With this he means the fact that these categories are all about commitment of the speaker to the state of affairs. As mentioned in the beginning of this section, Nuyts would very much like to abolish the term ‘modality’ in the end and replace it by the term ‘attitude’. However, he is realistic about this and concludes that this will probably never really happen since the term modality has been used for so long and is very much ingrained in the way that we think and talk about language.

One of Nuyts’ studies that is particularly interesting with respect to the topic of this thesis is a corpus study that he and two of his associates conducted on the Dutch modal verbs *mogen* ‘may’ and *moeten* ‘must’. These verbs are traditionally associated with the category of deontic modality. However, there are a few problems that Nuyts has with deontic modality in general and its definition in particular. He posits that deontic modality was traditionally defined in terms of ‘permission’ and ‘obligation’. Over the years many authors (re)used this definition without really reconsidering its background. Nuyts does not agree with this attitude because he sees several linguistic reasons for redefining the category of deontic modality. Based on the existence of other types of deontic expression (*it is unacceptable that...* or *I applaud/deplore that...*) Nuyts argues that a deontic meaning essentially involves the moral acceptability of a state of

affairs and not permission or obligation. These latter terms should rather be analysed as directive uses (adding an ‘action plan’ to a deontic meaning) of this newly defined deontic modality. He even takes this idea a step further and proposes that these directive meanings should not be considered deontic at all; they should rather be seen as a completely separate semantic category that may ensue from deontically as well as dynamically modal assessments of states of affairs. In doing so, the directive use of a modal should no longer be analysed as being part of this assessment of a state of affairs, it should rather be seen as a speech act use operating on a level completely different from that of a ‘traditional’ deontic meaning.

In order to support the re-analysis of the deontic category, Nuyts and two of his associates selected 100 instances of both *mogen* ‘may’ and *moeten* ‘must’ from the Corpus of Spoken Dutch (CGN) and independently from each other, each associate analyzed the meaning of each instance. After that, the independent analyses were compared to each other and disagreements about the meaning of an instance were resolved through discussion, resulting in one general analysis of the data.

For *mogen* a grand total of 63 unambiguous directive meanings was found and for *moeten* 18. As for deontic meanings, there were 7 unambiguous deontic instances of *mogen* and 9 unambiguous instances of *moeten* (percentages are even higher when ambiguous cases are included). The ensuing discussion of a number of instances of ‘purely’ deontic use and instances of directive use supports Nuyts’ view that the purely deontic uses all involve the notion of moral acceptability or moral necessity. An example of deontic *mogen* can be found in sentence (5):

- (5) *op ‘t moment dat je dialect gaat praten waar mensen bij kunnen zijn die ‘t niet verstaan ga je mensen uitsluiten en dat mag je niet.*

30 3. Modality in functional theories

‘when you start using dialect when there may be people around who do not understand it, then you are excluding them and that is unacceptable.’ (bold and italics added).

The utterance is made from what is thought to be a generally applicable norm: one should not speak in one’s dialect when there are people present that do not understand that dialect; that is morally unacceptable.

The directive use is defined by Nuyts et al. (2005) as a state of affairs in which the agent is instructed (advised, obliged or interdicted) or not hindered (allowed or permitted) to do something as rendered in the utterance. An example of directive *mogen* can be found in sentence (6):

- (6) *Karolien had vlak voor ze overleden is nog een eike gebakken en tussen de boterham. Die mocht ze niet eten hè.*

‘Karolien had, just before she died, fried an egg and eaten it on a sandwich. She was not allowed to eat that.’ (bold and italics added).

The subject in this fragment is explicitly disallowed (presumably by a doctor, for health reasons) to eat fried eggs. This sentence indeed seems to involve some kind of instruction or permission. Nuyts stresses that some examples are inspired by a deontic assessment of the situation, but others by a dynamic or even boulomaic (a term involving the ‘likeability’ of a state of events) assessment.

Nuyts proposes to take the analysis of deontic modality, and the directive use in particular, even a step further. He discusses the notion of performativity, which is defined as ‘the performance of an act is inherent in or accomplished by uttering a

certain expression' (Nuyts 2005: 41). Moreover, if the speaker is committed to her use of a certain linguistic form, then the form is performative. If the speaker is not committed, then the form is descriptive. This sense of speaker commitment means that in performative utterances the speaker herself can be held responsible for the contents of the utterance (whether it is a permission, an interdiction or an epistemic meaning is not important) and in descriptive utterances the speaker reports on the contents of an expression as uttered by someone else. In this case, the speaker herself cannot be held responsible for the contents of the utterance. The difference between deontics and directives is that when deontic modals are used performatively, it is an 'attitudinal' kind of performativity (speakers are committed to the qualification of the state of affairs) and when directives are used performatively it is a 'speech act' kind of performativity. Nuyts presents this difference as another piece of evidence for the need to exclude directives from the deontic category of modality. Deontic modals as defined by Nuyts align with attitudinal qualificational expressions like epistemic modality, evidentiality and boulomaic attitude. Descriptives on the other hand should be analysed in the same way as speech acts and they operate on the same linguistic level as mood categories like the imperative.

Nuyts ends his paper with two main conclusions: 1) the traditional definition of the semantic category of deontic modality in terms of permission and obligation is inadequate. The new definition should feature a scale containing the notion of (moral) acceptability or necessity. And 2) the dimension of directivity, as present among the uses of modal verbs, does not belong to the system of qualifications of states of affairs, but is part of the system of communicative functions steering language use.

It is not difficult to see the distinction that Nuyts makes between what he calls a directive use and a deontic 'moral acceptability' use. The latter appealing to a generally accepted

32 3. Modality in functional theories

ethical standard, the former to a more concrete and explicit permission or interdiction by a (group of) person(s). According to Nuyts the connection between moral acceptability and permission/obligation seems to be that the former can be embedded in a directive use, resulting in an explicit interdiction or permission. However, I am not quite convinced that this is how it works. By assuming that permission and obligation (can) stem from moral acceptability, you admit that there exists a strong link between the three concepts. One could even debate what the difference between moral acceptability on the one hand and moral obligation on the other exactly is. One could say that you are always obliged to act according to what is morally acceptable (whether you ignore this obligation is up to you and besides the point here). Practically every rule, whether it is a written law or a religious 'guideline', originates from some sort of idea of what is morally acceptable according to a certain person or within a certain group of people. Distinguishing between rules and morals is only useful when the two principles clash on a certain matter. A corny example would be the discrepancy between the government saying that it is forbidden to steal (this is a rule), but the church saying that a poor man stealing a bread is morally acceptable.

When returning to more linguistic matter, if you take a sentence like *ze mogen hun sluier niet af doen* 'they are not allowed to take off their veils' (according to Nuyts this is an example of a deontically inspired yet directive meaning of *mogen*). You can say that the agents are explicitly disallowed (by their religion in this context) to do something (taking off their veils) as rendered in the utterance. At the same time you can also analyse this sentence as follows: according to the morals of their religion, it is unacceptable that they take off their veils. This analysis conveys practically the same idea, but it leaves the interdiction implicit. Instead of saying that the interdictive meaning is the result of embedding the notion of moral

acceptability in a directive use of the modal (Nuyts' idea of deontic modality), why not say that the implicit interdiction of not living up to the morals of your religion has been made explicit with the help of a deontic verb (traditional idea of deontic modality)? What I want to say is: the concept of moral acceptability crucially involves the notions of permission and obligation. The difference that Nuyts discerns between a directive use and a pure morally based deontic meaning is in effect only based on the difference between implicit permission/obligation (moral acceptability) and explicit permission/obligation (directive/speech act uses). This seems a rather small basis for splitting up (or emptying) the deontic category.

The consequences that these radical ideas of Nuyts have for the meaning of 'must' are actually pretty small. Nuyts focuses on the reanalysis of deontic modality, but the most concrete implication for the meaning of the deontic use of 'must' is that we should not use terms like permission or obligation when we are describing the semantics of 'must'. I am not at all sure whether this is a good or productive way of going about the definitional problem. Instead of resolving things it only seems to (needlessly) complicate matters even further.

Another functional approach towards modality that is diametrically opposed to Jan Nuyts' attitudinal approach is the factuality approach, which will be discussed in the next section.

3.3 Narrog (2005)

The factuality approach is based on the distinction between realis and irrealis, or the dimension of factuality, whereas the approach under discussion in the previous section is based on speakers' attitudes and opinions. One of the main supporters of the

34 3. Modality in functional theories

factuality approach is the German linguist Heiko Narrog. His definition of modality is the following:

“Modality is a linguistic category referring to the factual status of a state of affairs. The expression of a state of affairs is modalized if it is marked for being undetermined with respect to its factual status, i.e. is neither positively nor negatively factual.” (Narrog 2005: 184)

The most important basis for this definition seems to be the traditional view on modality, which is held by some authors, but most of all it rests on the apparent inadequacies of the attitudinal (or subjectivity based) view that are pointed out throughout the paper. Narrog (2005) discusses two issues concerning the subjectivity approach. One is the question how to define the notion of subjectivity or speaker’s attitude and the other is the question of what actually a subjective form of language is and what an objective form is. Where do we draw the boundary?

This second problem is addressed in particular by Narrog (2005). One point of criticism is constituted by the grammatical category of voice. Apparently there has not been any author adhering to the subjectivity view, who has ever included the voice category into their definition of modality. However, it is shown that certain passive constructions in Japanese express negative affectedness of the subject, as in example (7):

- (7) *Ni-hiki-dake sime-ta-ga, ato-wa*
two-CLS-LIM catch-PST-CTR, other-TOP
nige-rare-ta.
flee-PASS-PST
‘I managed to catch two of them, but the others fled me (literally ‘[I] was fled by the others’).’
(Narrog 2005: 172)

Constructions as in (7) at the same time reflect the speaker's opinion about the event. As this can be seen as the expression of an attitude towards the proposition Narrog argues that in these contexts voice would have to be seen as a possible conveyor of a modal meaning (or attitude in Nuyts' (2005) words).

Another problem for the delimitation of subjective expressions is the fact that a speaker's choice of words can already convey a certain attitude towards a proposition. Consider for instance in Dutch the expressions *jatten*, *stelen*, *kluuwen*, *ongoorloofd meenemen* which all mean 'to steal'. Each expression has a slightly different connotation, allowing the language user to express different attitudes towards the proposition. Should we include variation in choice of words as a possible conveyor of modal meaning as well then? Then you would have to discern a group of words with no connotation whatsoever which can never have a modal meaning. It is needless to say that this would complicate matters for defining the category of modality even more.

There are a few other (cross-linguistic) examples which Narrog discusses that all touch upon the difficulty of delimiting what is subjective and what is not. None of these problems are addressed by Nuyts (2005). On top of that the cross-linguistic aspect seems to have been ignored quite a bit in Nuyts. In his work the focus mainly seems to lie on English, Dutch and a bit of German. In Narrog (2005) a few examples of Japanese are discussed which complicate the attitudinal view. Japanese has, for instance, a system of honorific markers which is yet another means of expressing your attitude towards someone. It seems that in subjectivity theories, to which Nuyts' view belongs, there are a lot of (cross-linguistic) possibilities that need some attention.

All in all, for Narrog the most important problem with the subjectivity approach is that of setting the boundaries. It appears to be quite hard, if not impossible, to determine which linguistic

devices display subjectivity characteristics and consequently which kind of expressions should be regarded as instances of modality. Narrog's preference for defining modality obviously lies with the factuality approach.

Even though I do feel that Narrog's (2005) efforts are in effect more based on his dissatisfaction with the subjectivity approach than that they are based on obvious self-supporting stand-alone evidence for the importance of factuality itself (again proving the essential vagueness of the general concept of modality), there still seems to be one major advantage to his view. The factuality approach leaves no doubt whatsoever about the modal status of an expression. Especially the phrase 'The expression of a state of affairs is modalized if it is marked for being undetermined with respect to its factual status' in his definition offers real help in determining whether a certain utterance is modal or not. It makes a clear-cut distinction, avoiding the problems that are sketched for the subjectivity approach.

And is this not the exact same problem which Nuyts (2005) is concerned about? His theory fed on his dissatisfaction with the traditional definitions of modality. He did not like the fact that certain definitions seemed to exclude (or rather: not include) a number of expressions that clearly had a modal quality to them. Where Nuyts tries to solve this problem through a very fine-grained re-analysis of the modal categories, eventually even leading up to abolition of the notion of modality, the factuality approach of Narrog tackles the same problem of definition in an entirely different way. It takes a very ponderous mechanism in order to force, as it were, a clear-cut definition through. Both theories can be considered pretty radical approaches, going through the category of modality like the proverbial bull in a china shop. At the same time both theories leave a number of other problems unsolved. For Nuyts' subjectivity/attitudinal

based view there are some cross-linguistic issues that need to be addressed, as well as the delimiting of the attitudinal category (what should we consider attitudinal and what not?). As for the factuality approach, it may be unambiguous as to what we should consider modal and what not, it does not address the subcategorization problem of modality at all. What should be the conditions for classifying a certain modal expression as deontic, epistemic or dynamic?

The factuality approach also does not really give us any clues as to how we should analyze the meaning of ‘must’. As Narrog’s definition dictates that an expression of a state of affairs is modalized when it is undetermined for its factual status, we should look at each instance of ‘must’ and try and determine what its effect is on the expression of the state of affairs.

3.4 Concluding remarks

In this chapter we saw a number of functional views on the category of modality, identifying a number of potential problems for each view. We saw that there are restrictive theories, like the one of Van der Auwera and Plungian, who only recognize a limited set of modal categories. We also saw two extreme views of the modal category, with Nuyts (2005) on the one hand, claiming that the concept of modality should be reduced to notions of attitude, while making numerous finely grained categorical distinctions between different kinds of attitudes. On the other hand we saw the global factuality approach as proposed by Narrog (2005), preferring a clear-cut definition of what is and what is not modal, but not really making any distinctions between different types of modality within the category.

Each of these functional frameworks proved to be very interesting in many different ways, yet not one of them provided

any clear ideas about the topic of interest of this thesis. Having showed and having tried to clarify the various debates on categorization and definition, these functional theories have not shed any light as to what the meaning of the modal verb ‘must’, or modality in general, can be.

In Van der Auwera and Plungian’s view, ‘must’ can be used in every modal domain (i.e. participant-internal and -external, deontic and epistemic) and that modality always has to do with either the notion of possibility or necessity. Nuyts proposes the exact opposite and says that when we are talking about deontic modality we should not be using terms like possibility or necessity. Narrog’s approach provides us with an understandable definition of modality. It helps us to conclude that when an instance of ‘must’ results in the expression of a state of affairs that is undetermined with respect to its factual status, then at least we know for sure that the expression is modal. This last notion of factuality seems closely tied with the notion of actuality entailment that we found in the previous chapter while discussing Hacquard (2006). Recall that a proposition has actuality entailment when the complement is forced to hold in the actual world (and not just some (set of) possible worlds). It seems only logical that a proposition with an actuality entailment is a proposition that displays factuality as well. Especially when this proposition is marked for past tense and when it is forced to hold in the actual world, it seems that it must be the case that it has taken place and therefore is a fact.

In the next chapter I will look at the interaction between tense, aspect and modality through a close examination of the Dutch modal verb *moeten* ‘must’ in different tenses and in different modal contexts. I will determine what kind of effect each of these factors has on the meaning of the proposition, paying special attention to the notions of factuality and actuality entailment.

4. The interaction of tense, aspect and modality in Dutch

In the previous chapters we saw a number of formal and functional perspectives on modality. We discussed what the different perspectives are on the effect of modal expressions on the meaning of proposition. In Chapter 2 we saw that formal approaches focus on the similarities in meaning of different kinds of modality. On the other side of the linguistic spectrum, as we saw in Chapter 3, functional theories busy themselves mainly with questions of categorization and definition, recognizing a seemingly ever-growing variety in types of modality, rather than zooming in on the exact meaning of specific modals or modalities. The present chapter will focus on the interaction of tense, aspect and modality in Dutch, taking the problems that Boogaart saw (as briefly sketched in Chapter 1) as a starting point. I will begin, however, with a more detailed discussion of Boogaart's view and of the problems he has with the interaction of tense, aspect and modality in Dutch.

4.1 Boogaart (2007)

As we saw in the introduction of this thesis, Boogaart builds his paper around the claim that the past tense and the perfect tense of a modal verb cannot receive an epistemic reading. Epistemic modality involves an estimation of the likelihood that a certain state of affairs is, has been or will be true. An epistemic reading requires a certain reference point in time to function as epistemic evaluation time. According to Boogaart sentence (1a) below can receive a deontic as well as an epistemic reading. The fact that the situation is beyond the control of the subject (i.e. participant

external) makes an epistemic reading more plausible than a deontic. Since sentence (1a) has present tense, the epistemic evaluation time is constituted by the moment of utterance. As for sentence (1b), Boogaart states that only a deontic reading is possible, because it is in the present perfect tense. He says the sentence is not ungrammatical and that the deontic reading, which is paraphrased as “someone has been forcing him to be ill”, is the only possibility even though this reading may seem somewhat odd. The epistemic reading for (1b) is blocked because epistemic modality necessarily involves present tense, because epistemic modality concerns the judgement of the speaker at the time of utterance (cf. Nuyts 2000).

- (1) a. *Hij moet ziek zijn.*
 he must_{PRES} ill be
 “He must be ill.”
- b. *Hij heeft ziek moeten zijn.*
 he has ill must_{PART} be
 “He has must be ill.”

However, for me sentence (1b) can also get a ‘fatal’ reading, meaning something in the vein of “he was destined to be ill”. An apt paraphrase of (1b) illustrating this reading is the one in (2):

- (2) *Het heeft zo moeten zijn dat hij ziek was.*
 it has like-this must_{PART} be that he ill was
 “It had to be the case that he was ill.”

This reading definitely says something about the likelihood that the state of affairs took place in the past and can therefore be seen as epistemic. This reading is not mentioned as a possibility by Boogaart and goes completely against his intuitions. Later on in

this chapter I will make clear how this reading comes about, but for the moment I will proceed with Boogaart's line of argument.

In Boogaart's view, the impossibility of an epistemic reading for (1b) cannot be solely due to the element of past. In Dutch simple past tense can in fact receive an epistemic reading. The past tense of epistemic modals can only occur in free indirect speech or reported thought, as in (3).

- (3) *Hij moest wel ziek zijn, want hij had gezegd dat hij de wedstrijd voor geen goud wilde missen.*
 he the game for no gold wanted to miss
 "He had to be ill, because he had said that he did not want to miss this game for anything in the world."

Sentence (3) means that it was likely that he was sick, i.e. the estimation of the likelihood that the state of affairs was true takes place at a moment in time preceding the time of utterance. The sentence means that it *was* likely that he *was* sick. It does not mean that it *is* likely that he *was* sick. The only possible epistemic interpretation for (3) is with an epistemic evaluation time that precedes the moment of utterance and which is not the same as the moment of utterance. This contrasts with claims in the literature which say that it is not the past tense *form* which is incompatible with an epistemic reading, but the *semantic category* of temporal past. The past tense of the epistemic modal in (3) indicates that the time of epistemic evaluation lies in the past, so we are in fact dealing with a combination of a temporal past and an epistemic meaning here. As a consequence, Boogaart states that his theorem that epistemic modality does not combine with perfective past tense (cf. example (1b)) cannot be solely due

to the past element of perfective past tense. There have to be more factors that play a role.

Boogaart (2007) comes to an explanation for this problem by taking not just the categories of tense and modality into consideration but by adding the category of aspect to the equation. There is a difference between imperfective aspect on the one hand and perfective aspect on the other. Formulated loosely, as their exact definitions do not really matter for our purposes, perfective aspect is associated with the description of events while imperfective aspect is used to describe states. Only the latter is capable of expressing simultaneity with a certain reference point in time. Perfective aspect can only express precedence or succession of an event with respect to a certain reference point in time. These principles are captured in the following Reichenbachian representations of the semantic notions of perfective past and imperfective past (taken from Löbner 1989):

- | | | |
|-----|-------------------|------------|
| (4) | Perfective past | $E < S$ |
| | Imperfective past | $E, R < S$ |

E stands for the evaluation time, R stands for the reference time and S stands for the time of utterance (Reichenbach 1947). These representations entail that imperfective forms cannot be used to represent ‘all new’ information, a reference time is needed. This is not the case with perfective past. (4) also says that imperfective forms always express simultaneity with a reference point, whereas perfective forms cannot do so. Boogaart views this characteristic of expressing simultaneity with a certain reference point R in time as the underlying semantics of imperfective aspect. This reference point can be a strictly temporal one as in (5a) or it can be a point of perspective/perception as in (5b). This point of perspective comes up as a reference point in past tense

narrative discourse, when no specific time of reference is explicitly mentioned.

- (5) a. *Gisteren om drie uur las Marie een boek.*
 yesterday at three o'clock read_{PAST} Marie a book
 "Yesterday at three o'clock Mary was reading a book."
- b. *John kwam de kamer binnen. Het was er*
 John came the room in it was there
pikkedonker
 pitch dark
 "John entered the room. It was pitch dark there."

In (5a) the time of reference is "yesterday at three o'clock" and in (5b) the (implicit) time of reference is the point at which John noticed that the room was dark (his point of perspective).

What does this mean for epistemic readings of past forms according to Boogaart? An epistemic modal reading is an example of a subjective or perspectivized reading. In order to get such a reading, a verb form needs to be imperfective, because only imperfective forms can express simultaneity with a reference time that is independently provided by the context. In order to receive an epistemic reading for a modal verb, such a reference time is needed to function as epistemic evaluation time. Since perfective forms cannot express simultaneity, it is not possible that an epistemic reading emerges when the verb form has perfective aspect. Going back to the example in (3), Boogaart analyses the epistemic reading of that sentence as follows. The epistemic evaluation that 'it *was* likely that he was sick' is simultaneous with an implicit reference time, provided by the context of the utterance.

44 4. The interaction of tense, aspect and modality in Dutch

Thus Boogaart finds that epistemic readings are only possible when the proposition has imperfective aspect. In the next section, however, I will show that deontic and epistemic modals have exactly the same implications for the proposition in Dutch. This is the case for sentences with perfective as well as imperfective aspect.

Despite his claim about the incompatibility of epistemic modality and perfective aspect in Dutch, Boogaart points out that it is possible to find examples of perfective modal verb forms which in fact do receive an epistemic reading. The sentences in (6) and (7) are examples of epistemic instances of present perfect forms of modals in Dutch which Boogaart found on the internet:³

- (6) *Dit geeft ook aan hoe onzeker Beethoven geweest*
this gives also PRT how insecure Beethoven be_{PART}
heeft moeten zijn.
has must_{PART} be
“This indicates how unsure Beethoven must have
been of himself.”
- (7) *Frankrijk ontkent niet dat het vertoon van*
France denies not that the display of
strijdmachten de aanzet heeft kunnen zijn voor de
armed forces the trigger has can_{PART} be for the
recente verandering in de houding van de Iraakse
recent change in the attitude of the Iraqi
autoriteiten.
authorities

³ Example (6) and (7) stem from a presentation Boogaart gave earlier in 2007. Example (6), however, did not make the cut and was replaced by another example in Boogaart (2007). In this thesis I will make use of example (6).

“France does not deny that the display of armed forces may have been the trigger for the recent change in the attitude of the Iraqi authorities.”

As the translations indicate, the sentences in (6) and (7) include estimations of the likelihood that Beethoven was unsure of himself and of the likelihood that the display of armed forces are the reason for Iraq’s changed attitude respectively. So even though the past participles of *moeten* ‘must’ in (6) and of *kunnen* ‘can’ in (7) have perfective aspect, they still occur in an epistemic environment. Boogaart argues that this is possible because for these sentences an epistemic evaluation time is made available at the moment of utterance and not at some moment in the past. Boogaart argues that these uses of the modal verbs are in some ways similar to the construction in (8):

- (8) *Hij moet ziek geweest zijn.*
 he must_{PRES} ill been be
 “He must have been ill.”

Boogaart analyses this sentence as follows: the modal verb *moet* ‘must’ presents a state that holds at the present time, the moment of utterance. Even though the complement *ziek geweest zijn* ‘have been ill’ denotes a past event, it is evaluated in the present. Going back to sentences (6) and (7), these examples can also be analysed as past events that are evaluated in the present. Boogaart argues that when the verb clusters *geweest heeft moeten zijn* ‘must have been’ in (6) and *heeft kunnen zijn* ‘may have been’ in (7) are replaced by constructions with a modal auxiliary as in (8) instead of a form of the auxiliary *hebben* ‘to have’ (this would be *moet zijn geweest* ‘must have been’ and *kan zijn geweest* ‘may have been’ respectively), the interpretations of the sentences are exactly the same. The question arises then why the perfective

modals in (6) and (7) are interpreted as if they are present tense modals.

According to Boogaart in those sentences, the modal verb receives a present tense reading because that is the only option left to the hearer. She is faced with a conflict between the form of the modal, which rules out an epistemic reading, and the lexical content of the complement which rules out a non-epistemic reading. Because of this conflicting situation, Boogaart warns that it should be noted that these sentences are actually unacceptable for many speakers of Dutch, but he does not provide any data to support this claim. I do not agree with Boogaart, as for me these sentences are perfectly well-formed. Furthermore, I also do not agree with the similarity that he sees between the construction in (8) and those in (6) and (7). As I will point out in the next section of this thesis, a construction like in (8) has a different implication for the meaning of the proposition than the constructions in sentences (6) and (7).

All in all, Boogaart's strict rule that epistemic readings can only combine with imperfective aspect seems to be disproved by sentences like (6) and (7). Boogaart's explanation that these sentences should be interpreted differently is not very convincing. After all, if a speaker would want to relate his utterance to the present, why does she not simply use a construction as in (8)? Another case in point contra Boogaart's claim is the observation that for a sentence like in example (1b) an epistemic reading *is* possible. Even though (1b) exhibits perfective aspect, the modal verb can still be interpreted epistemically with some kind of 'fatal' reading.

In the next section I will now show that epistemic and deontic modal expressions show exactly the same pattern of behaviour in different grammatical tenses in Dutch.

4.2 The behaviour of deontics and epistemics in Dutch

In this section I will take a detailed look at the behaviour of deontic and epistemic modality in Dutch. *Moeten* ‘must’ will serve as the basic modal on which I will build the paradigm. When combined with a stative predicate like *ziek zijn* ‘to be ill’ in (9), *moeten* is biased for an epistemic reading, when combined with an eventive predicate like *betalen* ‘to pay’ in (10), *moeten* is biased for a deontic reading.

- (9) *Hij moet ziek zijn.*
 he must_{PRES} ill be
 “He has to be ill.”
- (10) *Hij moet dat betalen.*
 he must_{PRES} that pay
 “He has to pay that.”

Even though there are contexts possible in which (9) gets a deontic reading and even though ‘having to be ill’ is a slightly unexpected if not odd predicate without any context, the first reading that comes up is one that addresses the likelihood that the subject of the sentence is ill. As for the example in (10) the first reading that comes up is one of obligation: the subject is obliged or even forced to pay.

What I will do now is test Boogaart’s claim and see whether it is indeed the case that deontic and epistemic modality display a different pattern of possible interpretations in various tenses. I will use the examples in (9) and (10) as the basis for the epistemic and the deontic paradigm of tenses respectively. The relevant tenses that will be analysed are the present tense and three past tenses: present perfect tense, imperfect past tense and

perfect past (pluperfect) tense. This enables me to examine all the possible cross-sections of two factors at hand: aspect (perfective and imperfective) and tense (present and past).

I will test which interpretations are possible in which tenses with the help of the notion of actuality entailment. Recall from Chapter 2 that a sentence is said to have actuality entailment if “the complement [is] forced to hold in the actual world” (Hacquard 2006: 3). I will examine whether the complement is forced to hold in the actual world by testing whether positive and/or negative continuation sentences are plausible for each form in the paradigm. Because an actuality entailment cannot be cancelled, complements that combine with only a positive continuation are said to have actuality entailment. Complements that combine with both types of continuation sentence do not have actuality entailment. I will apply this test first to the deontic paradigm (subsection 4.2.1) and then to the epistemic paradigm (subsection 4.2.2). After that we will compare the two resulting patterns of actuality entailment (subsection 4.2.3).

4.2.1 Actuality entailment and deontic modality in Dutch

The tense-deontic paradigm that will be examined in the present subsection is given in Table 1 below for the sake of completeness.

Table 1. The tense-deontic modality paradigm of *moeten* ‘must’

Tense	Form
Present tense	Hij moet dat betalen. he must _{PRES} that pay “He has to pay that.”
Present perfect tense	Hij heeft dat moeten betalen. he has that must _{PART} pay “He has had to pay that.”
Imperfect past tense	Hij moest dat betalen. he must _{PAST} that pay “He had to pay that.”
Pluperfect tense	Hij had dat moeten betalen. he had that must _{PART} pay “He should have paid that.”

For each of the sentences in Table 1 I will now determine whether they are forced to hold in the actual world or not with the help of a positive and a negative continuation sentence. The results can be found in (11) below:

- (11) [Present tense]
 a. *Hij moet dat betalen en hij doet het ook /, maar hij doet het niet.*
 he must_{PRES} that pay and he do it also but
hij doet het niet.
 he does it not
 “He has to pay that and he will do it /, but he will not do it.”

50 4. The interaction of tense, aspect and modality in Dutch

[Present perfect tense]

- b. *Hij heeft dat moeten betalen en hij heeft het ook*
he has that must_{PART} pay and he has it also
gedaan /, # maar hij heeft het niet gedaan.
done but he has it not done
“He has had to pay that and he has done it /, #but
he has not done it.”

[Imperfect past tense]

- c. *Hij moest dat betalen en hij deed het ook /, maar*
he must_{PAST} that pay and he did it also but
hij deed het niet.
he did it not
“He had to pay that and he did it /, but he did
not do it.”

[Pluperfect tense]

- d. *Hij had dat moeten betalen # en hij heeft het ook*
he had that must_{PART} pay and he has it also
gedaan /, maar hij heeft het niet gedaan.
done but he has it not done
“He should have paid that #and he has done it /,
but he has not done it.”

The example with present tense in (11a) combines with a positive as well as a negative continuation sentence. *Hij moet dat betalen* ‘he has to pay that’ does not necessarily imply that he also will pay. Thus present tense deontics do not have actuality entailment in Dutch. Present perfect deontics as the one in (11b) on the other hand, do not allow for a negative continuation sentence. *Hij heeft dat moeten betalen* ‘he has had to pay that’ implies that he in fact has paid as well. This implication cannot be cancelled, thus (11b) has actuality entailment. Imperfect past deontics as in (11c)

combine with both types of continuation sentence; this form does not require its complement to hold in the actual world so it does not have actuality entailment. We do not know whether the subject did or did not pay in the end. The pluperfect deontic in (11d) gives the most striking result. This form excludes a positive continuation. The only fitting continuation here is a negative one: the complement is forced *not* to hold in the actual world, resulting in a non-actuality entailment. The only possible interpretation for this form is that the subject in fact did not pay. I will come back to these findings later on, but I will first perform a similar analysis of actuality entailment of epistemics in Dutch.

4.2.2 Actuality entailment and epistemic modality in Dutch

In order to get a complete picture of the paradigm, I have given an overview in Table 2 below of the different forms of the epistemic predicate in the various tenses

Table 2. The tense-epistemic modality paradigm of *moeten* ‘must’

Tense/modality	Modal
Present tense	Hij moet ziek zijn. he must _{PRES} ill be “He has to be ill.”
Present perfect tense	Hij heeft ziek moeten zijn. he has ill must _{PART} be “He has had to be ill.”
Imperfect past tense	Hij moest ziek zijn. he must _{PAST} ill be “he had to be ill.”
Pluperfect tense	Hij had ziek moeten zijn he had ill must _{PART} be “He should have been ill.”

52 4. The interaction of tense, aspect and modality in Dutch

Just as in the previous subsection, I will now apply an actuality entailment test with the help of affirmative and contradicting continuation sentences to the paradigm in Table 2. The results are given in (12). Note that the English translations may seem a bit odd. I have added the adverb ‘really’ in the affirmative continuation in order to get a more ‘realistic’ utterance. I could not add this word in the contradicting continuation, because then the continuation would actually be fitting:

(12) [Present tense]

- a. *Hij moet ziek zijn en hij is het ook /, maar hij is.*
he must_{PRES} be ill and he is it also but he is
het niet
it not
“He must be ill and he really is ill /, but he is not ill.”

[Present perfect tense]

- b. *Hij heeft ziek moeten zijn en hij is het ook*
he has ill must_{PART} be and he has it also
geweest /,# maar hij is het niet geweest.
been but he has it not been
“He has had to be ill and he has really been ill /,
but he has not been ill.”

[Imperfect past tense]

- c. *Hij moest ziek zijn en hij was het ook /, maar hij*
he must_{PAST} ill be and he was it also but he
was het niet.
was it not
“He had to be ill and he really was ill /, but he was not ill.”

[Pluperfect tense]

d. *Hij had ziek moeten zijn # en hij was het ook*

he had ill must_{PART} be and he was it also

geweest /, maar hij was het niet geweest.

been but he was it not been

“He should have been ill #and he has been ill /,

but he has not been ill.”

As I announced before, all of the epistemic forms display exactly the same pattern of interpretational possibilities as the deontic forms. In (12a) there is no actuality entailment for the present tense since positive as well as negative continuation sentences are possible. We do not know for sure whether the subject is ill or not. For the present perfect tense epistemic in (12b) only a positive continuation is possible. This form does have actuality entailment. We know that there was some time in the past where the subject was ill. As for the imperfect past epistemic in (12c), the complement is not forced to hold in the actual world and therefore we do not know for sure whether the subject was ill or not. For the interpretation of (12d) we see, just as with the deontics, that a non-actuality entailment arises: the complement is forced not to hold and we know that the subject has not been ill.

4.2.3 Comparing the results

My analyses of the interpretational possibilities of deontics and epistemics in the previous two subsections show that said possibilities are completely similar for both modalities. The use of present tense and imperfect past tense does not entail that the events or situations described have actually taken place. Present perfect tense, on the other hand, does entail that the event

54 4. The interaction of tense, aspect and modality in Dutch

described in the utterance has taken place, whereas pluperfect tense strikingly enough entails that the events described have *not* taken place.

The similarity found between deontics and epistemics goes against Boogaart's analysis that epistemic readings cannot combine with perfective aspect and that deontics should be able to do so. Furthermore, Boogaart argued that perfective epistemics have a similar meaning as a construction as in (8), repeated as (13):

- (13) *Hij moet ziek geweest zijn.*
he must_{PRES} ill been be
“He must have been ill.”

However, testing this example for actuality entailment shows that positive as well as negative continuations are possible. *En hij is ook ziek geweest* ‘and he really has been ill’ and *maar hij is niet ziek geweest* ‘but he has not been ill’ both fit perfectly, whereas I showed in the previous subsection that perfective epistemics only combine with a positive continuation. Perfective epistemics and the construction in (13) are therefore not similar in meaning.

The alleged difference between epistemics and deontics then seems to be resolved: there is none (at least for Dutch). However, the pattern of actuality entailment for modality in the various tenses that I found is striking and leads to a number of questions. Why does present perfect combined with modality give an actuality entailment? Why does pluperfect combined with modality give a non-actuality entailment? What is going on here? And how do speakers arrive at these formulations and how do hearers come to the correct interpretations of these formulations? In the remainder of this chapter I will try and answer these questions.

4.3 Tearing at the seams

The answers to the questions posed at the end of Section 4.2 lie in the interplay between tense, aspect (perfective aspect in particular) and modality. I will now try and determine for each individual factor what its precise role in the interaction is, starting with modality.

4.3.1 The role of modality

The semantics of modality has already been discussed extensively in the first two chapters of this thesis. An important notion that came up in the discussion of functional treatments of modality was that of factuality. Recall that Narrog gave us the clear-cut definition that “the expression of a state of affairs is modalized if it is marked for being undetermined with respect to its factual status, i.e. is neither positively nor negatively factual” (Narrog 2005: 184). There seems to be a close connection between actuality entailment on the one hand and this notion of factuality on the other. If a proposition has actuality entailment, it is forced to hold in the actual world. If a proposition is forced to hold in the actual world, it happens or has happened and therefore is a fact. Thus a proposition with actuality entailment displays positive factuality. Applying an analysis for factuality on the paradigm of modal forms in various tenses gives us the results in Table 3:

56 4. The interaction of tense, aspect and modality in Dutch

Table 3. Factuality of the tense-deontic modality paradigm of *moeten* ‘must’

Tense	Form	Factuality status
Present tense	Hij moet dat betalen. he must _{PRES} that pay “He has to pay that.”	+/-
Present perfect tense	Hij heeft dat moeten betalen. he has that must _{PART} pay “He has had to pay that.”	+
Imperfect past tense	Hij moest dat betalen. he must _{PAST} that pay “He had to pay that.”	+/-
Pluperfect tense	Hij had dat moeten betalen. he had that must _{PART} pay “He should have paid that.”	-

The pattern of actuality entailment for modal expressions in different tenses that I found in the previous section leads to the pattern of factuality in Table 3 above. Present tense and imperfect past tense did not have actuality entailment and thus display undeterminacy with respect to their factuality status. They get a score of +/- . Present perfect tense has actuality entailment and therefore has positive factuality. Pluperfect tense has non-actuality entailment and thus negative factuality: the proposition necessarily does not hold in the actual world. In order to determine what the effect of modality is on the proposition, I will now perform a similar analysis of factuality entailment for non-modal counterparts of the sentences in Table 3. The results can be found in Table 4:

Table 4. Factuality of the non-modal paradigm

Tense	Form	Factuality status
Present tense	Hij betaalt dat. he pays that “He pays that.”	+
Present perfect tense	Hij heeft dat betaald. he has that paid “He has paid that.”	+
Imperfect past tense	Hij betaalde dat. he paid that “He paid that.”	+
Pluperfect tense	Hij had dat betaald. he had that paid “He had paid that.”	+

With respect to actuality entailment, each form in the non-modal paradigm can only be combined with a positive continuation sentence. In every tense the only possible interpretation is that it has to be the case that the event of paying takes or has taken place. This means that all non-modal forms have actuality entailment and therefore have a positive factuality score. Comparing the non-modal results with the modal results, present tense and imperfect past tense have shifted from having positive factuality in their non-modal form, to an undetermined status in their modal form. The present perfect tense maintains its positive factuality status in the modal form. The most striking shift can be observed with pluperfect tense. In its non-modal form it is positively factual, but in its modal form the effect is turned around completely into negative factuality.

The findings for the present tense and the imperfect past tense corroborate Narrog’s hypothesis. Modalising the proposition in these tenses results in a shift from positive factuality into undeterminacy with respect to factuality. This is

exactly what modality should do according to Narrog. A problem for Narrog's hypothesis of modality's meaning is posed by the perfective tenses. If modality adds uncertainty with respect to factuality status, how can it be that the two tenses with perfective aspect display positive and negative factuality? According to Narrog, the fact that these tenses do not display undeterminacy with respect to factuality would mean that these forms should not be seen as modal. However, on this point I disagree with Narrog. I maintain that the perfective modal forms are indeed still modal, despite the fact that they display determinacy with respect to their factuality status.

I think it would be strange to say that these forms are not modal anymore. After all, why would a speaker want to make use of a present perfect with a modal verb resulting in a non-modal interpretation when he can also simply use the non-modal counterpart which automatically results in that same non-modal interpretation? Denying the possibility of a modal reading for perfective modal verbs means saying that a modal verb in perfective contexts has no effect on the meaning of the proposition and that this form therefore would mean exactly the same as its non-modal counterpart. This cannot be the case.

However, I do not want to refute Narrog's hypothesis. After all, I did observe that modalisation of the present tense and the imperfect past tense leads to undeterminacy of factuality for the proposition. This observation does make it very plausible that modality essentially adds an element of uncertainty or undeterminacy to the proposition. In order to explain what is going on with the perfective forms and to see why they do display determinacy of factuality, I will take a closer look at the role of perfective aspect in the next subsection.

4.3.2 The role of perfective aspect

The relation between perfective aspect and determinacy for factuality can be explained pretty easily. As we saw earlier in this chapter (Section 4.1), perfective aspect is associated with events. More specifically, perfective aspect denotes that the events described are completed or have come to an end. When referring to an event that has come to an end, a speaker automatically implies that she knows that the event has actually taken place in reality. If an event has come to an end in reality, it can only be described as a fact. One cannot use perfective aspect to describe an event and leave the factual status of the event undetermined at the same time. This inherent characteristic of perfective aspect explains why the present perfect, whether it is a modal form or not, yields a positive factuality score. Perfective aspect implies that the event has come to an end, it does not matter whether this was necessary or possible, it simply has.

However, when this meaning of a completeness of the event is borne out in the interpretation of present perfect tense, how can it be that this is not the case with a modal pluperfect tense? We have seen that an utterance like *Hij had dat moeten betalen* ‘He should have paid that’ implies that no payment has been made by the subject. Despite the presence of perfective aspect, the event has not taken place. This is where the last factor comes into play: tense. In the next subsection we will try to discover why the finite past tense form in the pluperfect results in a negative factuality status.

4.3.3 The role of tense

One of the most basic assumptions about past tense is that it is used to refer to events or situations that have taken place in the

60 4. The interaction of tense, aspect and modality in Dutch

past, before the moment of utterance. However, cross-linguistically, there are numerous examples where past tense marking is not used to refer to some event that took place in the past. Janssen (1994), for example, discerns the following set of uses of the imperfect past tense in Dutch: advice; a diffident phrasing of an unlikely potentiality; a wish; politeness and quotative use. The following sentences are examples of these uses (the examples and translations are taken from Janssen (1994), the glosses are added by me):

- (14) [Advice]
Nou, maar ik vertrok morgen!
well but I left tomorrow
'Well, but I would leave tomorrow!'
- (15) [Unlikely potentiality]
Wat denk je? Zou hij nog wel komen?
what think you would he still PRT come
'What do you think? Will he come?'
- (16) [Wish]
Vertrok hij nu maar!
left he now PRT
'If only he would leave.'
- (17) [Politeness]
Ik wilde graag een borrel.
I wanted please a drink
'I would like a drink.'

- (18) [Quotative]
Gisteravond vertrok je morgen en nu vertrek je
 yesternight left you tomorrow and now leave you
overmorgen! Wat moet ik nu geloven?
 the-day-after-tomorrow what must_{PRES} I now
 believe
 ‘Last night you were leaving tomorrow and now
 you say you are leaving the day after tomorrow!
 What am I to believe?’

The past tense forms in examples (14)-(18) are in fact all instances of an irrealis: the events described have not actually taken place. It appears that the past tense can be used to not only refer to past time, but can also mark something as contrary to fact. It is this latter use which is involved in (14)-(18). Iatridou (2000) posits that these two uses follow from one and the same function of the past tense, namely that of exclusion. Past tense marking can range over time as well as over worlds. What it does is exclude the actual time or world from the topic time (i.e. the past tense use) or world (i.e. the contrary to fact use) respectively. Whenever this exclusion function is used, it is often implicated that the event or state under its scope does not hold at the moment of utterance, as shown by the example in (19) (taken from Iatridou 2000):

- (19) John was in the classroom.

In (19) the simple past form *was* implicates that John is not in the classroom anymore. The state of John’s being in the classroom is excluded from the actual time of reference. This implicature can, of course, be cancelled by a follow-up like *and he still is*. Going

back to (14)-(18), the past tense forms in these examples also make use of this exclusion function. Without actually referring to a time in the past, the past tense in these examples has a contrary to fact use. According to Iatridou, past tense is thus used to create distance: past tense marking excludes the topic worlds from the actual world.

Hogeweg (to appear) takes this analysis a step further. She argues that the counterfactual use of past tense is a grammaticalization of the observed pragmatic implicature that when John *was* in the classroom in the past, he *is not* in the classroom anymore in the present. Past tense marking implicates that the events described are the case in the past, but are not the case presently, at the moment of utterance. This explains why counterfactual interpretations (or interpretations with negative factuality) arise for sentences with past tense such as pluperfect modal forms. In a sentence like *Hij had dat moeten betalen* ‘He should have paid that’, the past tense form implicates that the event described is not true in the actual, present world.

4.3.4 The powers combined

In this section I have examined the role of three separate factors in the interpretation of modal verbs in various tenses in Dutch. I found that tense, aspect and modality each had different, conflicting effects on the proposition. When comparing modal forms with their non-modal counterparts, I concluded that modality itself has an effect of creating undeterminacy with respect to the factuality status. With aspect on the other hand, I argued that the property of denoting completeness of the event results in a positive factuality status. Finally, I showed that past tense marking induces negatively factual interpretations. In the next section I will model how speakers and hearers resolve the

conflict between these different forces in order to produce and correctly interpret the various forms.

4.4 Producing and interpreting the paradigm

As indicated in the previous section, there are three forces at work in the tense-modality paradigm in Dutch: tense, aspect and modality. The interpretation of the forms in the paradigm is the result of a conflict between the forces that are exerted by these different factors. A theoretical framework that has recently often been applied for resolving conflicts between different forces is Optimality Theory (OT). OT explains language phenomena in terms of violable constraints. These constraints express general statements with respect to language and they can be in conflict with each other. The constraints are ordered in a constraint hierarchy on the basis of their strength. Constraints that are higher in the hierarchy should be satisfied more than constraints that are lower in the hierarchy. OT specifies the relation between the input and output. For each input, several possible output candidates are evaluated against the constraints. The output that satisfies the ranked constraints best emerges as the optimal output for the given input (Prince and Smolensky 1993/2004). Optimality Theory has been used first in the field of phonology and has later been applied to syntax and pragmatics/semantics as well.

In order to model the production and interpretation of the tense-modality paradigm in Dutch simultaneously, I will make use of bidirectional Optimality Theory. Bidirectional OT is an extension of Prince and Smolensky's unidirectional model and it is used to integrate conversational implicatures (i.e. knowledge of the speaker about the hearer and vice versa) into the process of production and interpretation (cf. Blutner 2000, Blutner et al. 2006). In bidirectional OT a set of relevant, violable constraints is

64 4. The interaction of tense, aspect and modality in Dutch

used to determine which form-meaning pair is optimal in the set of possible form-meaning pairs. In my data, there are three possible forms for which I will determine the optimal interpretations. We have an imperfective modal form (since I found completely identical results for present and past tense, I will group them together in order to limit the complexity of the Tableaux to follow), we have a present perfect modal form and we have a perfect past (pluperfect) modal form. Possible interpretations for each of these forms consist of a positively factual, a negatively factual and an undetermined factual reading. Each form pairs up with only one of the possible meanings and each possible meaning can only pair up once with a certain form. The entire paradigm of possible form-meaning pairs is given in Table 5:

Table 5. Possible modal form-meaning pairs

Modal form	Meaning
Imperfective	+ fact
	+/- fact
	- fact
Present perfect	+ fact
	+/- fact
	- fact
Past perfect	+ fact
	+/- fact
	- fact

Having determined the set of possible form-meaning pairs, we now need constraints which determine the optimal pairs of meaning and form. As we saw in the previous section, modality, perfective aspect and past tense each had an effect on the meaning

of the proposition. We saw that modalizing an utterance leads to an undetermined factuality status. This principle can be captured by the constraint in (20):

- (20) FAITHMODAL A modal verb leads to undetermined factuality status.

We saw that perfective aspect entailed that the events described have been completed or have come to an end. This can be translated into the constraint in (21):

- (21) FAITHPERFECT Perfective aspect means the event described is completed.

This constraint implies that perfective aspect also means that the event has taken place, i.e. has positive factuality. However, as we saw before, this is not the case with the modal pluperfect form, which shows negative factuality. In order to explain this phenomenon we also need the constraint in (22):

- (22) FAITHPTI Faith past tense implicature: the implicature of past tense that the event is not true at the moment of utterance holds.

If we now combine the set of form-meaning pairs and the constraints, we can see how the optimal form meaning pairs are derived from the constraints:

Tableau 1. Production and interpretation of the tense-modality paradigm in Dutch

Modal form	Meaning	FAITH MODAL	FAITH PERFECT	FAITH PTI
Imperfective	+ fact	*	(✓)	(✓)
☞	+/- fact	✓	(✓)	(✓)
	- fact	*	(✓)	(✓)
☞ Present perfect	+ fact	*	✓	(✓)
	+/- fact	✓	*	(✓)
	- fact	*	*	(✓)
Past perfect	+ fact	*	✓	*
	+/- fact	✓	*	*
☞	- fact	*	*	✓

In Tableau 1 we can see how our three constraints successfully determine which form-meaning pairs are bidirectionally optimal (indicated by the ☞ symbol). For the imperfective modal form, pairings with the positive and the negative factual reading are ruled out, because they violate the most important constraint FAITHMODAL. Since the imperfective modal form does not contain perfective aspect, the second constraint FAITHPERFECT is vacuously satisfied by all possible form-meaning pairs. The same goes for our third constraint: because I grouped present and past together here, there is no violation of FAITHPTI. This does not really matter here, since the first constraint already picked out [imperfective, +/- fact] as the superoptimal form-meaning pair.

The next superoptimal pair is [present perfect, + fact]. Since the +/- fact reading already paired up with the imperfective modal form, it is not available anymore for the present perfect

form. The next best option for this form is to pair up with the positive factual reading. This form-meaning pair also satisfies the higher ranked constraint FAITHPERFECT, a constraint that is violated by a possible pairing with negative factuality. The FAITHPTI constraint is vacuously satisfied, because there is no past tense present in this modal form.

This leaves us with only one possible superoptimal pair remaining: [past perfect, - fact]. This pair is also predicted by the constraints, because even though it violates the two highest ranked constraints, it still satisfies FAITHPTI. The analysis so far may have been a little bit abstract, therefore I will perform a similar bidirectional analysis on a concrete example, the tense-deontic paradigm of Section 4.2.1. The forms and possible meanings are given in Table 6:

Table 6. Possible form-meaning pairs for the tense-deontic paradigm

Tense	Deontic form	Possible interpretations
Imperfective present and past	Hij moe(s)t dat betalen. he must _{PRES(PAST)} that pay “He ha(d)(s) to pay that.”	+ fact
		+/- fact
		- fact
Present perfect tense	Hij heeft dat moeten betalen. he has that must _{PART} pay “He has had to pay that.”	+ fact
		+/- fact
		- fact
Pluperfect tense	Hij had dat moeten betalen. he had that must _{PART} pay “He should have paid that.”	+ fact
		+/- fact
		- fact

68 4. The interaction of tense, aspect and modality in Dutch

If we analyse the possible form-meaning pairs against our set of constraints, we get the following results:

Tableau 2. Production and interpretation of the tense-deontic paradigm in Dutch

Deontic form	Meaning	FAITH MODAL	FAITH PERFECT	FAITHPTI
Hij moe(s)t dat he must _{PRES(PAST)} that betalen. pay “He ha(d)(s) to pay that.”	+ fact	*	(✓)	(✓)
☞	+/- fact	✓	(✓)	(✓)
	- fact	*	(✓)	(✓)
☞ Hij heeft dat moeten he has that must _{PART} betalen. pay “He has had to pay that	+ fact	*	✓	(✓)
	+/- fact	✓	*	(✓)
	- fact	*	*	(✓)
Hij had dat moeten he had that must _{PART} betalen. pay “He should have paid that.”	+ fact	*	✓	*
	+/- fact	✓	*	*
☞	- fact	*	*	✓

In Tableau 2 we can see how our set of constraints determines the superoptimal form-meaning pairs. For the deontic imperfective forms the pairing with an interpretation that is undetermined for factuality comes out as superoptimal. This pairing satisfies the most important constraint FAITHMODAL, which dictates that the presence of a modal verb in the form should lead to an interpretation that is undetermined for factuality. Pairing up with a positively or negatively factual interpretation leads to a violation of the highest ranked constraint FAITHMODAL, thus these options are ruled out. This result is reflected by reality, because as we saw earlier in this chapter (cf. Section 4.2.1), imperfective forms combine with positive and negative continuation sentences and thus have an undetermined factual status.

Turning to the present perfect modal form *Hij heeft dat moeten betalen* ‘He has had to pay that’ in Tableau 2, we see that combining with a positively factual reading results in a superoptimal form-meaning pair. Even though an undetermined factual status would violate the most important constraint FAITHMODAL the least, this option is ruled out because the undetermined factual interpretation already paired up with the imperfective forms. The positively factual interpretation results in the next best form-meaning combination. The event that is described by the modal form has been completed, satisfying the second most important constraint FAITHPERFECT, leading to a pairing up with a positively factual interpretation. A negatively factual interpretation would violate this constraint, since it would entail that the event described has not taken place and therefore has not been completed either.

The last superoptimal form-meaning pair of *Hij had dat moeten betalen* ‘He should have paid that’ and a negatively factual interpretation is derived by the constraint FAITHPTI. The

implicature that a past tense form leads to a counterfactual interpretation holds, so even though the two highest ranked constraints are violated, the satisfaction of this last constraint means that this pairing is superoptimal.

In this section I have constructed a bidirectional OT model which explains how the undetermined, positively and negatively factual interpretations pair up with the different deontic modal forms in Dutch. In the next chapter I will examine a number of instances of modal verbs in Dutch that I found in actual speech. I will show how these modal forms are produced and interpreted correctly in these contexts.

5. The paradigm exemplified

In this chapter we will look at a number of examples of *moeten* in actual language use. The examples were collected from the Corpus of Spoken Dutch (CGN). I will start off with a short section on the methodology used to collect relevant samples. After that I will analyse a few instances of *moeten* in their context and see how, according to the bidirectional model sketched out in the previous chapter, these instances are produced and interpreted.

5.1 Collecting *moeten*: methodology

All the instances of *moeten* in this chapter are collected from the Corpus of Spoken Dutch version 2.0 (henceforth CGN). The CGN contains about nine million words of spoken Dutch. The data are a balanced sample of contemporary standard Dutch as spoken by adults in the Netherlands and Flanders. The corpus includes the types of speech listed below. The amount of speech (expressed in hours as well as words) is also indicated for each type:

- 225 h (2.626.000 w) Spontaneous conversation (face-to-face)
- 51 h (565.000 w) Interviews with teachers of Dutch
- 92 h (1.209.000 w) Telephone dialogues (recorded by a telephone exchange)
- 64 h (853.000 w) Telephone dialogues (recorded on MiniDisk with local interface)
- 11 h (136.000 w) Simulated business negotiations
- 64 h (790.000 w) Interviews/discussions/debates (broadcast on radio/television)

72 5. The paradigm exemplified

- 36 h (360.000 w) (Political) discussions/debates/meetings (non-broadcast)
- 44 h (405.000 w) Lessons (recorded in the classroom)
- 21 h (208.000 w) Spontaneous (sports) commentaries (broadcast on radio/television)
- 17 h (186.000 w) Current affairs programs/reports (broadcast on radio/television)
- 36 h (368.000w) News bulletins (broadcast on radio/television)
- 15 h (146.000 w) Commentaries/columns (broadcast on radio/television)
- 2 h (18.000 w) Official speeches/masses/lectures
- 16 h (141.000 w) Lectures/readings/classes
- 104 h (903.000 w) Texts read out loud (from books)

All data are orthographically transcribed and provided with lemmas and part of speech tags. About one million words of the corpus are also phonetically transcribed as well as annotated for syntax and prosody.

In order to collect relevant instances of *moeten*, content searches of the entire corpus were performed. Searches for the composite forms (i.e. present perfect and perfect past tense) were carried out by looking for co-occurrences of the first and second part of this composite form. In these searches purely orthographical information was used. Because of this the searches were likely to return irrelevant results, i.e. co-occurrences of the modal verb with unconnected forms of the auxiliary *hebben* ‘to have’ (for example forms belonging to different (sub)clauses). In order to restrict the number of irrelevant co-occurrences as much as possible, the search algorithm was constrained in such a way as to return only co-occurrences of the auxiliary and the modal within a distance of zero to three words. This constraint did not

filter out all irrelevant co-occurrences, but it did diminish their portion greatly.

In the next section I will discuss instances of imperfective, present perfect and perfect past *moeten* in context.

5.2 Applying the bidirectional model on moeten in context

In this section I will look at a number of instances of the Dutch modal *moeten* ‘must’ in spontaneous Dutch discourse. I will apply the bidirectional model that was constructed in Chapter 4 to these instances and I will explain how these forms and their consequent meanings are bidirectionally optimal. As you may recall, the three superoptimal form-meaning pairs were imperfective with an undetermined factual interpretation, present perfect with a positively factual interpretation and perfect past with a negatively factual interpretation. For each instance of *moeten* I have included a large part of the preceding discourse so that the context of the modal utterance is clear. I have highlighted the relevant modal forms in bold face.

Passage 1

- A: “*Wat vond je van mee opbouwen van apparatuur*
 what thought_{IMP} you of with build up of equipment
enzo afgelopen weekend?”
 and such last weekend
 “What did you think of helping to build up the
 equipment and the likes last weekend?”
- B: “*Ja, ‘k heb niet zo veel opgebouwd*”
 yes I_{RED} have not so much build up
 “Yeah, I did not do much building up.”

74 5. The paradigm exemplified

- B: *“Ik heb voornamelijk naar ‘t darten gekeken”*
I have mainly at the_{RED} darting watched
“I mainly watched the darts match”
- A: *“‘t was niks hè?”*
it_{RED} was nothing eh
“It was nothing, eh?”
- B: *“Nee ja, ik kan daar gewoon heel weinig doen.”*
no yes I can there just very little do
“Yeah well, I just cannot do much there.”
- B: *“Ik heb de kar uitgeladen en ik heb kabels
uitgetrokken en ik heb de kisten
pulled out and I have the crates
uitgepakt en dat was het wel zo’n beetje.”*
unpacked and that was it just about bit
“I unloaded the car and I pulled out the cables and I
unpacked the crates and that was about it.”
- A: *“Ja, maar dat kon Jacques ook niet.”*
yes but that could Jacques also not
“Yeah, but that was something that Jacques could not
do.”
- B: *“nee maar”*
no but
“No but.”
- A: *“Dat kon Jacques niet aan.”*
that could Jacques not on
“Jacques was not up to that.”

B: “*nee maar bij de soundcheck dat heeft Jacques*
 no but at the sound check that has Jacques
natuurlijk moeten doen, wa da k heb geen flauw
 ofcourse must do what that I_{RED} have no faint
idee hoe dat moet en zo”
 idea how that must and such
 “No but at the sound check that had to be done by
 Jacques ofcourse, I have not got the faintest idea how
 it works.”

In this context we see a nice contrast between the perfective modal form highlighted in bold and a number of imperfective modal forms in the preceding discourse. In the two preceding utterances by speaker A, it is said that Jacques could not do certain things and that Jacques was not up to certain things (having to do with performing some kind of physical labour here). The imperfective forms in this preceding discourse indicate that with respect to these states of affairs it is not really clear what happened. The use of the past tense implies that they were not the case, but there is no direct evidence for what actually happened in reality. In the final utterance by B, the perfective modal form indicates that Jacques did do the soundcheck.

Looking at the context in Passage 1, the positively factual interpretation is indeed the only fitting option for this modal form. It has to be the case that Jacques did the ‘things that had to be done for the sound check’. From a speaker’s perspective, had she wanted to convey the meaning that Jacques did not do these things, or that she did not know for sure whether Jacques did these things, she would have had to use a modal form with other tense/aspect features. The speaker is aware of the implications that an imperfective or a pluperfect form has on the factuality status of the proposition.

76 5. The paradigm exemplified

As we saw in the previous chapter, there are essentially three possible interpretations for the modal form *dat heeft Jacques natuurlijk moeten doen* ‘that had to be done by Jacques of course’. There is a positively factual interpretation where Jacques actually did it; there is a negatively factual interpretation: Jacques did not do it, and there is an undetermined factual interpretation: we do not know whether Jacques did it or not. Since for expressing an undetermined factual meaning, the speaker has a better form at her disposition, namely a modal imperfective like *dat moest Jacques natuurlijk doen* ‘that had to be done by Jacques of course’. The hearer is aware that this undetermined factual meaning pairs up with the imperfective modal form. The combination with a +/- factual interpretation is excluded because a better form-meaning pair with the +/- interpretation already exists. The next best option for this present perfective form is to pair up with the positively factual meaning: this combination violates the highest ranked constraints less than a combination of this form with a negatively factual interpretation.

In Passage 1 we saw a present perfect instance of *moeten* in context, in the next passage we will see an imperfective instance of *moeten* in context.

Passage 2

A: “Want iemand had, toen zij dat appartement heeft because someone had when she that apartment has *verhuurd met het EK...*”

let with the European Championships

“Because someone had, when she had let that apartment during the European Championships...”

- A: “*Met het EK heeft die kerel die*
with the European Championships has that guy who
daar in zat...”
there in sat...”
“During the European Championships the guy who
occupied it has...”
- A: “*Die hebben toen waarschijnlijk een ruit gebroken*
those have then probably a window broken
van het appartement beneden.”
of the apartment downstairs
“Then, they had broken a window of the apartment
downstairs probably.”
- A: “*Weet je wel?*”
know you PRT
“You know?”
- A: “*Dat dakje wat bij mij... als je bij mij op de*
that roofdim which at me when you at me on the
slaapkamer naar beneden keek?”
bedroom to down looked
“That roof which at my place... when you looked
down from the bedroom at my place.”
- B: “*Uhuh.*”
INTERJECTION
“Uhuh.”
- A: “*Heb je van die bolle ramen en daar is*
have you of those convex windows and there is
iets doorheen gevallen.”
something through fell
“There you have those convex windows and that is
where something fell through.”

78 5. The paradigm exemplified

A: “*Dus dat moest betaald worden want dat was*
so that must_{IMP} paid become because that was
achthonderd piek en die kerel zei dus dat zij het niet
800 pop and that guy said so that they it not
gedaan hadden dus Ilse heeft dat moeten betalen.”
done had so Ilse has that must pay
“So that had to be paid because it was eight hundred
guilders and that guy said that they did not do it so
Ilse had to pay it.”

There are actually two modal forms that are of interest in this passage, in the first place we have the imperfective form *dat moest betaald worden* ‘that had to be paid’, and in the second place we have the present perfective form *Ilse heeft dat moeten betalen* ‘Ilse had to pay that’. This last utterance by A contains a nice contrast between an imperfective instance of *moeten* followed by a perfective instance. In this context there was a certain sum of money that had to be paid. The use of the imperfective form *moest* has an undetermined factual interpretation. This fits this stage of the discourse perfectly, because the speaker leaves open whether this sum was paid or not. The speaker’s choice for a formulation with the present perfective form *heeft moeten* subsequently only makes more sense. She does not want to leave open what happened to that sum of money, she wants to make it absolutely clear that it has been paid by Ilse. As predicted by the bidirectional OT model, for a present perfective form pairing up with a positively factual interpretation is the best option. An undetermined factual interpretation is not available, since it already paired up with the imperfective forms and as we saw in Table 1 in the previous chapter, a positively factual interpretation satisfies more higher ranked constraints than a negatively factual interpretation. In the

third and final passage we will see how a pluperfect modal form is produced and interpreted correctly in context.

Passage 3

- A: “*Ja, ’t vriest een graad of vier als het goed is.*”
yes it freezes a degree or four if it correct is
“Yes it is about four degrees below zero.”
- B: “*Tjesusmina.*”
Jezus
“Jezus.”
- A: “*Moest je krabben?*”
must_{IMP} you scratch
“Did you have to scrape the windows?”
- B: “*Ja. En ik had van de week gespoten met anticondens op die voorruit.*”
yes as i had of this week sprayed with
anti-condensation on that screen
“Yes. And earlier this week I had sprayed some of that anti-condensation stuff on the windscreen”
- A: “*Ja.*”
yes
“Yes.”
- B: “*En dat had ik verkeerd gedaan, want het was niet helemaal droog.*”
and that had I wrongly done because it was not
entirely dry
“And I had made a mistake, because it was not entirely dry.”
- B: “*Ik las pas weer later de gebruiksaanwijzing.*”
I read only again later the manual
“It was only later that I read the manual again”

80 5. The paradigm exemplified

A: “*Ja.*”

yes

“Yes.”

B: “*En toen bleek dus dat ik die ramen eerst droog*

and then turned-out thus that I those screens first dry

had moeten maken.”

had must make

“And then it turned out that I should have dried those windows first.”

The third and final passage that will be discussed gives us the perfect past modal form *ik had droog moeten maken* ‘I should have dried’. In this case the speaker wants to express that something should have been the case in the past, but it was not realised. This situation only allows for a negatively factual interpretation. The only possible modal form in the paradigm of *moeten* that can express this meaning is the pluperfect form. After all, in our bidirectional OT modal the undetermined factual interpretation already paired up with the imperfective form and a positively factual interpretation was tied to the present perfective form. A hearer knows that for expressing an undetermined factual interpretation, the speaker would have used an imperfective form and that for expressing a positively factual interpretation the speaker would have used a present perfective form. The only possible interpretation left for this perfect past modal form is a negatively factual one. This fits the context perfectly, because speaker B in fact has *not* dried his window screens before treating them with the anti-condensation agent.

In this section I have discussed three instances of *moeten* that occurred in spontaneously produced language. We saw that the production and interpretation of these instances were correctly explained and predicted by the bidirectional OT model constructed in the previous chapter.

6. Conclusions

The point of departure for this thesis was formed by two claims made by Boogaart (2007) concerning the interaction of tense, aspect and modality in Dutch. Firstly, Boogaart argues that a Dutch modal verb that displays perfective aspect only allows for deontic interpretations and cannot be interpreted with an epistemic reading. However, Boogaart himself found some counterexamples of epistemic modal verbs which did have perfective aspect. He explained these unexpected form-meaning pairs by analysing their meaning as similar to constructions where an (imperfective) present tense modal has a perfective complement. Boogaart's line of argument thus implies that when people use the one form (an epistemic with perfective aspect), they are making a mistake because they mean to express the meaning of another form (an imperfective present tense epistemic with a perfective complement). This is the second claim by Boogaart that I addressed.

In this thesis I first set out to determine whether the different interpretational possibilities for deontic and epistemic modality that Boogaart found for Dutch were correct. In order to find this out, I first looked to see what formal semantic theories as well as functional semantic theories had to say about possible differences in interpretation between different kinds of modality. I found that, essentially, formal theories said that the basic meaning of modality is the same for all kinds of modality. Functional theories, on the other hand, seemed to focus more on finding out what kinds of modality there actually are instead of determining their exact effect on the proposition.

The formal semantic perspective as well as the functional did provide me with helpful tools to analyse the interpretational possibilities for modal verbs in Dutch. The formal perspective

yielded the notion of actuality entailment. A proposition is said to have an actuality entailment if it is forced to be true in the actual world. Closely related to this notion of actuality entailment is the notion of factuality which I encountered while treating the functional perspective. A proposition is positively factual if it takes or has taken place in the actual world. A proposition is negatively factual if it does not take place or has not taken place in the actual world. A proposition is undetermined for factuality if we do not know whether it takes or has taken place.

If a proposition has actuality entailment, it is only logical that only a positively factual interpretation is possible. If a proposition does not have actuality entailment, this means that it has an undetermined factual interpretation. With this set of tools I analysed deontic as well as epistemic modal forms in present, imperfect past, present perfect and pluperfect tense in Dutch. The results of this analysis are that deontic as well as epistemic modality show exactly the same interpretational possibilities in the various tenses. This finding contradicts the first claim in Boogaart (2007) that epistemic modal readings are not available when the modal verb has perfective aspect. I also showed that Boogaart's explanation for the perfective epistemics that he encountered is not valid, since a present tense epistemic modal verb with a perfective complement shows different interpretational possibilities than a perfective epistemic modal verb.

While laying bare the fallacy of Boogaart's claims, I found a striking pattern of interpretation for the modals in the different tenses. Present and imperfect past modals have readings that are undetermined for factuality. Present perfect modals only allow for positively factual readings and pluperfect modals only allow for negatively factual readings. In the remainder of my thesis I set out to explain this pattern.

I recognized three different factors that influenced the interpretation of the modal forms: tense, aspect and modality. In order to explain how the various interpretations come up for the various modal forms, I first set out to determine for each of these factors separately the effect on the meaning of the proposition. I found that modality has the effect of leading to an undetermined factuality status. It is this characteristic of modality that ensures an undetermined factual interpretation for the imperfective modal forms. A conflicting force on the meaning of the proposition is exerted by perfective aspect. I argue that when the proposition has perfective aspect, this entails that the event described by the proposition has come to an end or has been completed. When an event is completed, this entails that it has taken place in the actual world and has a positively factual interpretation. I argue that it is this characteristic of expressing completeness of the event that leads to a positively factual interpretation for present perfect modals. With respect to the negatively factual interpretation for the pluperfect modals, I posit that it is caused by the past tense in this composite construction. I argued that speakers and hearers make use of the implicature that a proposition described in the past tense does not hold anymore in the actual world, leading to a counterfactual interpretation.

I translated the three conflicting forces of tense, aspect and modality into three constraints: FAITHMODAL, FAITHPERFECT and FAITHPASTTENSEIMPLICATURE (FAITHPTI). I modelled the interaction between these three constraints with the help of bidirectional Optimality Theory in order to show how speakers and hearers deduce what form fits the meaning best and vice versa. I showed in a bidirectional OT tableau how the constraints determined that the first superoptimal modal form-meaning pair was imperfective aspect with an undetermined factual interpretation. The next best modal form-meaning pair was present perfect pairing up with a positively factual interpretation.

84 6. Conclusions

The remaining modal form-meaning pair, pluperfect and a negatively factual interpretation, was also shown to be superoptimal. Finally, I illustrated the production and interpretation of *moeten* ‘must’ in actual language use with a number of examples from the Corpus of Spoken Dutch. The bidirectional Optimality Theoretic model is in accordance with the form-meaning pairs that we encounter in real life.

References

- Bhatt, R. (1999). Obligation and Possession. In H. Harley (ed.), *Papers from the Upenn/MIT Roundtable on Argument Structure and Aspect*, MITWPL 32. Cambridge, MA: MITWPL.
- Blutner, R. (2000). Some aspects of optimality in natural language interpretation. *Journal of Semantics* 17, 189-216.
- Blutner, R., H. de Hoop and P. Hendriks (2006). *Optimal Communication*. Stanford, CA: CSLI Publications.
- Boogaart, R. (2007a). The interaction of aspect and modality (or why the perfect of a modal cannot be epistemic). Presentation in the NCS colloquium at 13-03-2007.
- Boogaart, R. (2007b). The past and perfect of epistemic modals. In L. de Saussure, J. Moeschler & G. Puskas (eds.), *Recent advances in the syntax and semantics of tense, mood and aspect*. Berlin: Mouton de Gruyter.
- Grabski, M. (1974). *Syntax und Semantik der Modalverben in Aussagesätzen des Deutschen*. PhD, Universität Stuttgart.
- Hacquard, V. (2006). On the interaction of aspect and modal auxiliaries. Paper presented at the Michigan Linguistics and Philosophy workshop [current manuscript under submission].
- Hogeweg, L. (to appear). What's so unreal about the past? – Past tense and counterfactuals. In *Proceedings of the third workshop on modality in English*.
- Iatridou, S. (2000). The grammatical ingredients of counterfactuality. *Linguistic Inquiry* 31, 231-270.

86 References

- Ippolito, M. (2004). Imperfect Modality. In J. Gueron and J. Lecarme (eds.), *The Syntax of Time*, 359-387. Cambridge, MA.: MIT Press.
- Janssen, T. (1994). Preterit and perfect in Dutch. In C. Vet and C. Vetters (eds.), *Tense and Aspect in Discourse*, 115-146. Berlin: Mouton de Gruyter.
- Kaufmann, S., C. Condoravdi and V. Haizanov (2006). Formal approaches to modality. In W. Frawley (ed.), *The expression of modality*, 71-105. Berlin/New York: Mouton de Gruyter.
- Kiefer, F. (1987). On Defining Modality. *Folia Linguistica XXI/1*, 67-94.
- Kratzer, A. (1977). What 'must' and 'can' must and can mean. *Linguistics and Philosophy I*, 337-355.
- Kratzer, A. (1991). Modality. In A. von Stechow and D. Wunderlich (eds.), *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, 639-650. Berlin/New York: Mouton de Gruyter.
- Löbner, S. (1988). Ansätze zu einer integralen Theorie von Tempus, Aspekt und Aktionsarten. In V. Ehrlich and H. Vater (eds.), *Temporalsemantik*. Tübingen: Niemeyer.
- Narrog, H. (2005). On defining modality again. *Language Sciences* 27, 165-192.
- Nuyts, J. (2000). *Epistemic Modality, Language, and Conceptualization: A cognitive-pragmatic perspective*. Amsterdam: Benjamins.
- Nuyts, J. (2005). The Modal Confusion. In A. Klinge and H. Müller (eds.) *Modality: studies in form and function*, 5-38. London: Equinox.
- Prince, A. and P. Smolensky. (1993/2004). *Optimality Theory: Constraint interaction in generative grammar*. Technical Report, Rutgers University and University of Colorado at Boulder.

Reichenbach, H. (1947). *Elements of Symbolic Logic*. New York: Dover Publications, Inc.

Van der Auwera, J. and V. Plungian (1998). Modality's semantic map. *Linguistic Typology* 2, 79-124.