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On the Status of ‘Epistemic’ *Must*

1. Introduction¹

One of the biggest problems facing modern linguistic theory on modality is the lack of a standardized framework that allows one to draw cross-linguistic typological conclusions about the category of modality. At the same time, such a framework should also be able to account for the range of variation one finds in individual modal elements. Typically, it is either one or the other. In most cases one starts with a pre-defined category (e.g., ‘epistemic modality’) and then tries to find modal elements that fit the definition(s) of that category. This is the *top-down* approach. The advantage of such an approach is that it is very easy to arrive at a ‘system’ of modality (e.g., the well-trodden distinction between ‘epistemic’ and ‘deontic’ or ‘root’ modality), since all one has to do is to posit these categories and then find elements to fill them. In such a system, a typical question is whether *must* in a sentence like (1) below is epistemic or evidential:

- (1) John must be in his office. The light is on.

The downside of the top-down approach is that such a system consistently disregards the semantic fringes of the individual modal elements. This can lead to a proliferation of terminology as different

1 I am grateful to the editors for inviting me to submit a chapter for this volume and to Sheila Dooley for helpful discussions on Swedish and English modality. All errors are my own. This chapter is dedicated to the memory of Harry Gaylord. He would have appreciated the kind of analysis pursued in this contribution.

sets of terms are used to highlight different sets of modal distinctions (see Nuyts 2006 and De Haan 2006 for discussion).

Another problem with the top-down approach is the fact that the less frequent meanings of a given modal element are usually not taken into account when discussing its categorical status. This can be especially problematic if this minor meaning pattern turns out to actually be very important (for instance, if this ‘minor’ meaning uncovers a diachronic stage of development that falls outside of the deontic-to-epistemic shift). One such case is seen in Section 6 below, on the ‘evidential’ reading of English *will* and its importance for grammaticalization patterns.

Finally, the top-down approach allows for a false sense of security. If, for instance, it is found that the English modal *must* can be epistemic and that its Dutch cognate verb *moeten* can be epistemic as well, it is very tempting to equate the two and consider them to be translational equivalents. As we will see in Sections 3 and 4 below, that would be a fatal mistake.

In this chapter we will try to circumvent these problems by applying a bottom-up approach: we will start with the modal elements themselves, and from a detailed analysis of their semantic range we will build a model of modality. As our test case we will use the modal *must*. From a top-down point-of-view it has long been argued that this modal is epistemic, but recent studies have cast doubt on that analysis, arguing for an evidential status of *must* instead. The question: ‘Is *must* an evidential or an epistemic modal?’ is a question that is typical of a top-down approach, and the answer depends heavily on what criteria one uses. This creates the above mentioned sense of unease.

In a bottom-up method, this question is answered by first analyzing *must* itself (Section 3) and then comparing it to related modals, both in English (Section 5 on *be bound to* and Section 6 on *will*) and in other languages (Dutch *moeten* in Section 4). In doing so we will see that the question of whether *must* is an evidential or an epistemic modal becomes less important. What we have gained is a better understanding of the modals themselves and a more transparent way of discerning diachronic changes.

2. Preliminary notions

Before embarking on a discussion of the status of the verb *must*, it is necessary to define what is meant by the terms 'evidentiality' and 'epistemic modality' in the present chapter and their interrelatedness. Before ultimately dismissing them, we will have a look at what has been proposed. Also, we will see how (epistemic) *must* has been treated in previous works. Given that the literature on modals is vast, we will not be able to deal with every proposal.

2.1. Evidentiality and epistemic modality

Evidentiality is a category which relates to the source of evidence the speaker has for his or her statement. Until quite recently, this category was thought of as an exotic one, but it has received a lot of attention recently, especially in typological circles. Following classic studies like Chafe/Nichols (1986), Palmer (1986), and Willett (1988), there are now more recent studies that address the issue, such as Guentchéva (1996), Floyd (1999), Johanson/Utas (2000), Aikhenvald/Dixon (2003), Aikhenvald (2004) and De Haan (1999; 2001; 2005).

Many scholars follow Palmer (1986: 51-2) in considering evidentiality a kind of epistemic modality.² In this view, different types of evidentiality are accorded different truth values. Much like the difference between epistemic *may* and *must* is a difference between weak and strong confidence respectively on the part of the speaker in the proposition, so is the difference between indirect evidentiality (hearsay and inference) and direct evidentiality (sensory evidence) often viewed in the same way. Indirect evidence is often thought of as representing a lesser commitment to the truth of the proposition compared to direct evidentiality. In this view, there is no problem concerning the categorical status of the modal *must*: given that evidentiality is by definition an epistemic category, problems

2 Though in Palmer (2001) evidentiality and epistemic modality are co-equal partners in a category dubbed 'propositional modality'.

concerning the categorical status of *must* do not arise. It is by definition epistemic and in many studies it is so noted without comments.

Van der Auwera and Plungian (1998: 85-6; see also Palmer 1990: 53) take an intermediate approach in that evidentiality and epistemic modality are considered to be separate, but overlapping domains. In their view, evidential categories such as quotative and visual evidentiality are not part of the epistemic modal domain. In their view inferential evidentiality is a modal category as they consider it to be identical with epistemic necessity. This means that in this view, the modal *must* is evidential and epistemic (both of which have equal status).

In De Haan's (1999; 2001; 2005) view, evidentiality is not primarily a modal category, but rather a deictic one, akin to familiar spatiotemporal deictic categories, such as tense and demonstratives.³ The purpose of evidentials is not so much to express degrees of doubt (which is the function of epistemic modals), but rather to mark the place of the speaker with respect to the event described in the sentence. When an indirect evidential is used the speaker distances him/herself from the action, while with a direct evidential the speaker is placed in the same sphere as the event.

In this type of analysis, there is a principled distinction between evidentiality and epistemic modality. There can be morphemes that are one but not the other. In particular, there can be morphemes that are inferential evidentials but are not epistemic necessity modals (unlike in Van der Auwera and Plungian's analysis). It is equally possible that there are languages that have one linguistic form for both evidentiality and epistemic modality. De Haan (1999) claims that Dutch is such a language, where the modal verb *moeten* is claimed to have both evidential and epistemic modal interpretations.

3 This notion of deixis is not to be confused with the notion of modal deixis, proposed in such works as Frawley (1992). Modal deixis refers to the distance between the modal element and the speaker in terms of possible world semantics. That is, a lower degree of confidence corresponds to a greater distance between the speaker and the possible world. This notion of deixis is not what is meant here.

One way to decide which analysis is correct is to look for morphemes that can be one or the other. It is argued here that *must* is such a morpheme, but we need to refine our level of description to arrive at an adequate description of *must*.

2.2. Evidentiality in Germanic

In order to frame the discussion of the categorical status of *must* it is instructive to look at the ways in which evidentiality can be expressed in the Germanic language family. It is well-known that so-called strong modal verbs in the Germanic languages often denote evidentiality as well as epistemic modality. In (2) – (4) some examples from German, Danish, and Swedish are shown in which the cognate of the English verb *shall* is used to denote evidential readings. In these languages, the cognate of *shall* is used where Dutch would use the verb *moeten* 'must'.

- (2) *German* (Palmer 1986:72)
Peter *soll* steinreich sein.
'Peter is said to be filthy rich.'
- (3) *Danish* (Allan et al. 1995: 295)
De *skal* have købt bil.
'They are said to have bought a car.'
- (4) *Swedish* (Holmes/Hinchcliffe 1993: 293)
Hon *skall* vara vacker.
'She is said to be beautiful.'

Dutch also has an evidential construction with the cognate of *shall*, namely *zullen*. In contrast to the examples above, which use the present tense forms, in Dutch only the past tense (*zou* or *zouden*) has an evidential interpretation:

- (5) *Dutch*
Jan *zou* ziek zijn.
'Jan is said to be ill.'

Despite the fact that the modal verb is formally past tense, the interpretation is one of present tense, that is, the proposition *John is ill* is true at the moment of speech. Although the verb *zullen* in (5) is cognate with the verbs in (2) – (4), the construction shown in (5) is closer in nature to the evidential use of the Subjunctive in German. An example is shown in (6). The verb *sein* ‘to be’ is in the Subjunctive.

- (6) *German*
 Er *sei* krank.
 ‘He is said to be ill.’

Besides strong modal verbs there are other ways of expressing evidentiality in Germanic. In Swedish the impersonal verb *lär* (likely derived from the full verb *lära* ‘to learn’) can be used while in Afrikaans a particle *glo* is found, which comes from the verb *glo* ‘to believe’.

- (7) *Swedish* (Holmes/Hinchcliffe 1993: 295; Dooley/De Haan 2006)
 Hon *lär* skriva dikter.
 ‘She is said to write poetry.’
- (8) *Afrikaans* (De Haan 2001)
 Sy boeke was *glo* baie populêr vroeër.
 ‘His books are said to have been very popular earlier.’

In addition, raising verbs such as English *seem* have also been analyzed as markers of evidentiality (see Diewald 2001 and De Haan 2007). From the comparative Germanic evidence it is not a priori implausible to analyze *must* as evidential given that cognates of this verb appear as evidentials in other languages.

2.3. Previous analyses of *must*

It is usually assumed that epistemic *must* denotes a high probability in the truth of the proposition or a strong judgment (see Coates 1983; Palmer 1986, 2001, 1990:53). In this section we will review some related analyses.

The first analysis of *must* concerns its use as a logical operator of necessity, usually written as \Box or L in the literature (see Hughes and Cresswell (1996) for an extensive discussion). However, the use of the modal *must* in language does not really fit in with formal modal logic theory. For instance, the well-known formula $\Box\Phi \rightarrow \Phi$, which states that if a proposition Φ is necessary to happen ($\Box\Phi$), it will happen, does not necessarily correspond to actual usage of *must*. This was first discussed in Karttunen (1972), who pointed out that (9a) in modal logic is a stronger claim than (9b) but that the linguistic version with *must* (10b) is held to be stronger.

- (9) a. $\Box\Phi$
 b. Φ
- (10) a. John must have left.
 b. John has left.

From (10a) it does not necessarily follow that (10b) is true even though that would be expected if *must* were the linguistic equivalent of the modal operator \Box . Given the fact that (10b) can be defeated even though (10a) is true, *must* is not the equivalent of \Box . In modal logic, given $\Box\Phi$, Φ cannot be defeated.

The fact that *must* can be defeated is illustrated in the following dialog, taken from Westmoreland (1998: 63), originally from Samuel Johnson's *Life of Swift*. Similar data from corpora will be discussed in Section 3 below.

- (11) When the poem of 'Cadmus and Vanessa' was the general topic of conversation, someone said, "Surely that Vanessa *must be* an extraordinary woman that could inspire the Dean to write so finely upon her."

The speaker in (11) takes a premise, namely the fact that Swift has written a lovely poem, and draws from it the conclusion that Vanessa, the subject of the poem, is an extraordinary woman. That this is not the only possible conclusion is seen in the continuation shown in (12):

- (12) Mrs. Johnson smiled, and answered that "she thought that point not quite so clear; for it was well known the Dean could write finely upon a broomstick."

An alternative explanation is provided for the premise, thereby showing that English *must* can be defeated. Hence, it does not fit the formula $\Box\Phi \rightarrow \Phi$. As discussed by Westmoreland (1998, ch. 3), attempts to replace \Box in $\Box\Phi$ with a different operator, written MUST, lead to problems as well. The same goes for restating the problems in terms of *possible world semantics* (cf. Kratzer 1977, 1981).

Westmoreland's solution, one adopted by Drubig (2001), is to view *must* not as epistemic but rather as an evidential, i.e. as an element which marks the source of information for the statement. In this case the source of evidence is deduction, showing that the validity of the statement has been deduced via evidence of some sort. As can be seen from the exchanges in (11) and (12) the same evidence can lead to different conclusions. While it is true that deduction is often viewed as an evidential category (cf. the discussion in Section 2.1 above), there are good reasons for being careful with terminology here. While it is true that *must* can be analyzed as a modal that draws conclusions from evidence (as will be discussed below), this does not automatically mean that *must* is an evidential. It is not clear that evidentials draw conclusions from evidence. Rather, evidentials show that there is evidence for the statement the speaker is making, without drawing any (modal) conclusion from that evidence.

In the present chapter, following De Haan (1999), a distinction is made between two types of morphemes: those that *evaluate* evidence (according to its likelihood of being true) and those that simply *assert* evidence, i.e. morphemes that state that there is evidence, without drawing any kind of conclusion from that evidence. The former type of morpheme can be defined as (13a), while the latter can be defined as (13b), where X represents the proposition in question:

- (13) a. From evaluating evidence I [the Speaker] deduce that X
 b. I [the Speaker] assert that there is evidence that X.

These definitions are tested in the remainder of the chapter. It will be argued that English *must* can be analyzed as (13a), while Dutch *moeten* can be analyzed as both (13a) and (13b). This analysis will be defended in the next two sections, using corpora and other natural data.

3. English *must*

The next step is to examine the English corpora and see if the modal verb *must* is used as an evidential or an epistemic modal. This section is based on the corpus study in De Haan (2008).⁴

It has been argued (De Haan 2005) that one way to distinguish evidentiality from some kind of epistemic modality is to look at the immediate context. Grammaticalized evidentials (of the kind found in non-European languages) typically do not have evidence occurring overtly in the immediate context. On the other hand, epistemic modals of whatever variety typically have some indication of overt evidence in the context. The non-deontic corpus examples of *must* are indeed frequently used with overt evidence in the context, often introduced with the word *because*. Some examples are:

- (14) It sounded like a fair enough invitation, Peter Marshall reflected, and Bang-Jensen *must* have thought so, too, because on the thirteenth, he met the group of three on the thirty-sixth floor of the U.N. [B442]
- (15) - How many inches do you average a year?
-Oh, I don't know, but we're way, we *must* be way above average this year because it's been terrible. [S299]
- (16) ... it was in the late, well I guess it would have been, I will take that back, it *must* have been in the forties, because they had been married, uh, probably fifteen years at the time. [S294]
- (17) Alfred is a bachelor so he *must* be unmarried. (based on Lyons 1977:788-9)

These examples show various ways in which *must* interacts with evidence and how it interprets that evidence. In (14) the speaker tries to get into the mind of the subject of the sentence, something for which he cannot possibly have direct evidence, and is pure speculation. The same is true for (15), from a phone conversation, in which the speaker draws a conclusion from shaky evidence, merely the fact

4 The data mainly come from two corpora, the Brown Corpus of American English and the Switchboard Corpus of Spoken American English.

that the weather has been very bad. The speaker is not very sure, which is also evidence by the fact that he backtracks: he starts off by using a declarative (*we're way...*), and then changes his mind and uses a construction with a modal verb (*we must be way...*). Example (16), which is a nice example as it shows the entire train of thought that went into the final evaluation, is the closest one to an objective conclusion in that the evidence is based on an arithmetic calculation. Nevertheless, the speaker hedges her evaluation of the evidence by using the adverb *probably*. Sentence (17) is a classical example from modal logic (see the discussion in Section 2.3). It involves a deduction from a definition. There is no possible world where the deduction (*he must be unmarried*) is false if the premise (*Alfred is a bachelor*) is true. thus, *must* cannot be defeated here. In sentences (14) – (16) *must* can potentially be defeated.⁵

Additional evidence comes from replacement strategies: *must* cannot be replaced with the adverb *necessarily*, except in (18d), where the evidence is based on a legal definition. If we keep the same context as in (14) – (17), only in (18d) can *must* felicitously be replaced by *necessarily*. As we have seen, this is the only non-corpus example.

- (18) a. *...and Bang-Jensen necessarily thought so, too...
 b. *we are necessarily way above average.
 c. *it was necessarily in the forties.
 d. ... so he is necessarily unmarried.

It would appear that, based on these examples, the modal interpretation of a sentence with (epistemic) *must* does not really depend on the modal verb, but on the *evidence*. The confidence of the speaker increases from a mere assumption in (14) to absolute certainty in (17). This shows that it is likely incorrect to classify *must* as a strong epistemic modal. This does not necessarily mean that *must* is not an

5 Examples such as (17) are held to be prototypical instances of *must* in studies of modal logic and formal modal semantics (see Kratzer 1977 and literature deriving from her work). Given the fact that sentences of the type (14)-(16) are more common in corpus data, this assumption needs to be rethought.

epistemic modal, but it does show that it is not an epistemic modal in the accepted sense of the word.

The evidence on which statements (14)-(17) are based are concrete pieces of information, from appearance in (15) to a formal definition in (17). When there is no overt evidence in the immediate context, the speaker can draw on assumed knowledge or world knowledge. Consider the following two examples:

- (19) The crew of the Caravan never failed to amaze Ann, who during her stay in Salem *must* frequently have overheard strong sailorly language. [B443]
- (20) I, I did my Master's thesis, uh, last year, and I did that on a computer and it seems like, I just can't imagine how people did it before. It *must* have been just so much, so much work. [S499]

The last two examples do not have overt evidence, but the evidence upon which the statement is made is based on information either present in the wider context, or on the speaker's knowledge of the world. The status of *must* is no different, however, from its status in sentences with overt evidence (14)-(17). Thus, in example (19) the act of overhearing is deduced from knowledge outside the discourse, but present in the speaker's knowledge. The subject, Ann, had lived in Salem, which is a port and thus attracts large amounts of sailors, known for their colorful language. It is therefore very likely that Ann on occasion overheard their language. Sentence (20) concerns a juxtaposition of two states, one a situation in which computers are used to accomplish a task (the writing of a thesis), which the speaker obviously found very hard. He contrasts this with a previous situation in which the same task was performed without a computer. Based on the speaker's experience, he believes that the work involved in this setting would have been much harder. The necessary evidence is implicit in the speaker's mind. This does not mean that these sentences are true, as can be shown by the fact that *must* cannot be paraphrased with *necessarily* in these examples, either:

- (21) a. *... who ... necessarily overheard strong sailorly language.
b. *It was necessarily just so much work.

Despite the fact that there is no overt evidence in (19) and (20), the statements are still based on pieces of evidence (knowledge of location in (19) and world knowledge in (20)). Therefore, it can be concluded that it is an integral part of the meaning of *must* that it evaluates evidence. This evidence can be present in the immediate context or can be inferred from other factors.

The basic meaning of *must* in these sentences then is *evaluative*. The presence of *must* indicates that the sentence is based on an evaluation of evidence. The level of confidence in the truth of the evaluation is of secondary importance. As was seen in the discussion of examples (14)-(17), the confidence level can vary from absolute confidence to mere assumption. It is therefore not the case that *must* is a prototypical strong epistemic modal.

It is also not clear that having an evaluative interpretation is enough for *must* to qualify as an evidential verb. In order to get a better insight into the interplay of epistemic modality and evidentiality we will compare *must* to other verbs that are related but show a different semantic range.

4. Dutch *moeten*

This section examines the range of meanings of Dutch *moeten*. It will be shown that this verb has a broader semantic range than English *must*, including a semantic interpretation which could be considered evidential.

Unlike its English cognate verb, *moeten* is a fully inflected verb with present and past tense forms, as well as non-finite forms which are in general use.

The verb *moeten* is the subject of a very early study, Droste (1956). While the discussion focuses mainly on the fine shades of (what we now would call) deontic or root modality, two sentences are discussed that are analyzed as evidential (without using that term):

- (22) a. Hij *moet* erg rijk geweest zijn.
 ‘He {must / is said to} have been very rich.’ (1956: 63)

- b. Hij *moet* erg knap zijn.
 'He {must / is said to} be very handsome.' (1956: 84)

The only difference between the two sentences is that (22a) is an anterior and (22b) a present tense. Although he does not state it explicitly, Droste analyzes these two sentences differently because of this fact. In (22a), the fact that the speaker has not witnessed the situation personally warrants a modal analysis of uncertainty (1956: 63) while the analysis of (22b) is that *moet* can be paraphrased with *redelijkerwijs zijn* 'be reasonable' and that (22b) expresses an objective situation.⁶ Because of the lack of context it is very hard to judge these proposals on their merits but it is clear that Droste considers (22a) to be modal (though barely so) and (22b) objective.

This modal analysis is also adopted by the ANS, the standard reference work of Dutch (Geerts et al. (1984: 545)), which gives the following sentences:

- (23) a. Ze *moet* in haar jeugd heel mooi geweest zijn.
 'She {must / is said to} have been very pretty in her youth.'
 b. Het *moet* een uitstekende film zijn.
 'It {must / is said to} be an excellent film.'
 c. Op grond van die berekeningen kwamen ze tot de conclusie dat de waargenomen radiostraling een heel andere oorzaak *moest* hebben.
 'Based on those calculations they reached the conclusion that the observed radiation must have had a completely different origin.'
 d. Moeder *moet* onderweg oponthoud gehad hebben.
 'Mother {must / is said to} have been detained on her way.'

The verb *moeten* in these sentences is analyzed as modal: the sentences are considered to be likely to be true based on available evidence. Examples (23a-d) are analyzed the same and because of the lack of context it is impossible to confirm or refute this analysis. However, we are dealing with at least two different uses of the verb *moeten*. Sentence (23c) is the only one which uses the Past tense of

6 Interestingly, with (22b) Droste draws a distinction between third person subject on the one hand and first/second subject on the other. If (22b) had had a first or second person, the sentence would have been analyzed as subjective rather than objective.

the verb *moeten*. This may be due to the Sequence of tense Rule as it is used in a subordinate sentence with a matrix verb also in the Past tense (i.e., *kwamen* ‘came’).

The second difference between (23c) and the other examples is the fact that only in (23c) is the source of evidence overtly mentioned (the clause *op grond van die berekeningen* ‘based on those calculations’). The others have no overt source of evidence. This turns out to be an important point as it will be argued that the lack of a source of evidence is a crucial distinction between evaluative and assertive meanings.

The verb *moeten* is used in the logical necessity sense as well, as evidenced by the fact that the translation of (17) above with *moeten* is grammatical:

- (24) Alfred is ongehuwd, dus moet hij een vrijgezel zijn.
‘Alfred is unmarried, so he must be a bachelor.’

We will now turn to an example of *moeten* in context. This example is part of a newspaper account of murders committed in January of 1929 by a craftsman called IJje Wijkstra. The victims were four policemen who came to his house in the woods to arrest him on charges of abduction. This is a historical account and direct evidence does not come into play here. The relevant part of the fragment occurs in the last sentence.

- (25) IJje Wijkstra was timmerman en klompenmaker, hij stroopte, was op zijn vrijheid gesteld en had een hekel aan autoriteit. Maar voor IJje hield de wereld niet op bij de harde strijd om het dagelijkse bestaan. Hij las boeken over spiritisme en occultisme, waagde zich aan Hegel en Nietzsche en *moet* zelf een boek hebben geschreven, ‘Dualisme van het Heelal’, al is het manuscript daarvan nooit gevonden.
‘IJje Wijkstra was a carpenter and maker of wooden shoes, he was a poacher, loved his freedom and hated authority. But for IJje the world did not end with the harsh struggle for daily survival. He read books about spiritualism and the occult, dared to tackle Hegel and Nietzsche and *allegedly* wrote a book himself, called ‘Dualism of the Universe’, but the manuscript has never been found.’
(Dagblad van het Noorden, February 11, 2003)

This fragment of the newspaper article is a descriptive list of the subject, IJje Wijkstra, and his characteristics. Given that the author of the article (written in 2003) has never personally met Wijkstra, the entire passage is based on non-direct evidence. No modal element is present in the passage except for *moet* in the last sentence. This means that the epistemic nature of the passage is not presented as being in doubt and that the verb *moeten* in the final sentence has a special meaning for that sentence alone. The use of *moet* here is not epistemic since this sentence is not any more doubtful than the previous sentences in the passage (as it is entirely based on indirect evidence). Its use signifies that there is evidence for the statement made. The clause in which *moet* occurs can then be analyzed as:

(26) There is evidence that W. wrote a book.

The author of the article does not state what that evidence is on which he bases his statement. It is not present in the context and is also not part of the shared worldview of the author and his readers. The evidence is abstract, it can be hearsay, or based on tangible evidence, but we as readers do not know what that evidence is. All we know is that there is (indirect) evidence. This can also be shown by the fact that (27) below is not a correct translation of the last sentence of (25). In (27) the meaning would be an evaluative one: the speaker is more convinced than not that there actually was a manuscript, because s/he has some kind of evidence for the statement.

(27) He read books about spiritualism and the occult, dared to tackle Hegel and Nietzsche and *must* have written a book himself, called 'Dualism of the Universe', but the manuscript has never been found.

This evaluative reading is not available in (25). Consequently, the purpose of *moeten* in such cases is to assert the evidence, not to evaluate it. In the case of (25) above, the speaker is uncommitted as to the truth value of the sentence with the modal verb. There may have been a manuscript or there may not have been. All the speaker is asserting that there is evidence that there was a manuscript. The assertive use of *moeten* can then be stated as (13b), here repeated as (28):

- (28) I [the Speaker] assert that there is evidence that X.

The assertive sentence in (25) can be paraphrased with the verb *schijnen* 'seem' and retain its evidential nature (note also that the verb *schijnen* is in the present tense, entirely consistent with the paraphrase *there is evidence that ...*):

- (29) Hij las boeken over spiritisme en occultisme, waagde zich aan Hegel en Nietzsche en *schijnt* zelf een boek te hebben geschreven, 'Dualisme van het Heelal', al is het manuscript daarvan nooit gevonden.
'He read books about spiritualism and the occult, dared to tackle Hegel and Nietzsche and *seems* to have written a book himself, called 'Dualism of the Universe', but the manuscript has never been found.'

Using this test of paraphrase, it can be shown that *must* in English is not assertive in nature. If we try to substitute the verb *seem* in examples (14)-(17) above, we get sentences with a different meaning from the ones intended (the * in the following sentences does not denote ungrammaticality but the fact that these sentences have a different meaning than the ones in (14)-(17), respectively):

- (30) a. *... Bang-Jensen seems to have thought so, too...
b. *... we seem to be way above average this year.
c. *... it seems to have been in the forties...
d. *... so he seems to be unmarried.

This discussion shows the crucial importance of a knowledge of the context in which the modal verb appears. Only by examining the sentence containing *moeten* in its proper context can we determine whether we are dealing with one or the other meaning. Sometimes it may not be possible, even with context, to determine whether a given instance of *moeten* is evaluative or assertive. This can happen when there is no overt statement of evidence present in the context and it is uncertain whether the evidence is absent (which would make it an assertive) or covertly present (which would make it evaluative).

Such indeterminacy does not invalidate the analysis above but rather strengthens it. It will be argued below that the assertive interpretation arises out of the epistemic one by the bleaching out of

the epistemic doubt component. In such a scenario it is to be expected that there are gray areas in which it is impossible to determine the correct intended meaning of the modal verb. This situation is analogous to the epistemic/deontic determination. As argued by Coates (1983), among many others, it is not always possible to determine whether a given modal is epistemic or deontic (root), even with extensive context present. This by no means invalidates the very real distinction between the two areas. Rather, it points to a scenario in which one meaning develops from another, which is true based on the historical data (see Traugott (1989), (2006), Traugott/Dasher (2002), and especially Bybee et al. (1994, chapter 6) for extensive discussion on the grammaticalization of modality).

5. English *be bound to*

We will now look at an English verbal construction related to *must*, namely *be bound to*. It has attracted relatively little attention in the literature; it is usually mentioned in passing.

The corpus data are in agreement: Palmer (1990: 55) states that *be bound to* is predominately epistemic. This is confirmed in Coates (1983), who also comments that *be bound to* is much rarer than *must*. This holds for the present study as well: in the Switchboard corpus, all 15 instances are indeed epistemic. Of the 12 occurrences in the Brown corpus, 9 are epistemic, 1 is deontic, 1 is indeterminate and 1 instance is non-modal.

Palmer (1990:55, see also Coates 1983:42-3) notes that *be bound to* and *must* are almost in complementary distribution: *be bound to* usually refers to future events, and *must* refers to past or present ones.⁷ An example from the Brown corpus is (31), where *be bound to* is linked to a future event (an increase in cost):

7 On the other hand, Coates (1983: 43) finds three examples of *must* that refer to future events, as opposed to thirty-seven that do not. All four examples of *be bound to* in her corpus refer to future events.

- (31) Distribution costs are almost *bound to* increase in the sixties -- and you will never know what you can do to control them unless you study each element and experiment with alternative ways of doing the job.

Although Palmer's corpus does not include examples of *be bound to* with present or past tense reference, they do exist. The following example is again from the Brown corpus:

- (32) He handed the bayonet to Dean and kept the pistol. "Stay well back of me", he said. "I'm going to walk up to the horses, bold as brass, pretending I'm one of the guerrillas. There's *bound to* be someone on guard, but the hat might fool them long enough for me to get close."

Even in those cases where *be bound to* and *must* have overlapping distributions the meanings differ. According to Palmer (1990: 55), *be bound to* is 'more certain' than *must* and an appropriate paraphrase of the former is *It is certain that ...*. Also, and important for the present discussion, *be bound to* lacks the 'conclusion from evidence' sense that *must* has. Palmer (1990: 55) contrasts the following two sentences:

- (33) a. John is bound to be in his office.
b. John must be in his office.

In (33a) the emphasis is on the inevitability of the truth of the statement.⁸ while in (33b), as discussed above, the emphasis is on the drawing of a conclusion from evidence.

From this discussion it emerges that *must* and *be bound to* have different basic meanings, which are brought out by an examination of their uses in context. The verb *must* is primarily an evaluative verb (i.e., it evaluates evidence, contextual or otherwise) while *be bound to* is primarily a strong modal verb, i.e., it is used to mark the relative confidence on the part of the speaker in the proposition.⁹ If we consider that *be bound to* does not occur with overt evidence, the difference

8 Palmer feels that *be bound to* can almost be paraphrased with *it is certain that...*. Note that the inevitability sense of (35a) can be qualified by adding the adverb *almost* (1990:56) while *must* cannot be so modified.

9 See also Westney (1995: 150-1) for further thoughts on the matter.

between the two modal constructions is easily explained: *must* focuses on the presence of evidence and *be bound to* on the relative truth of the proposition.

6. The verb *will* as an evidential?

It has often been observed that English *will* can have an interpretation similar to that of an evidential (Coates 1983: 177-9; Palmer 1986: 24-5, 1990:57; Nuyts 2001: 173; Ziegeler 2006, among others). The prototypical example is (34):

(34) The doorbell rings. That *will* be the postman.

The use of the verb *will* is interesting here, as it is not used to signify a future event. In example (34) above, the event BE THE POSTMAN is simultaneous with the Moment of Speech (because the doorbell is ringing or has just rung). What is futurate about the event is that the truth of the statement has not yet been determined and won't be until a moment in the future. This is in line with Coates' analysis of the example (1983: 177) as a marker of predictability.¹⁰

This use of *will* is often linked to *must*. Palmer (2001: 24-5) contrasts the use of *will* in a sentence such as (34) and *must* in a sentence such as *That must be the postman*. He considers *will* in this case to denote a less certain conclusion than *must*. The verb *must* in Palmer's view is used to mark a "firm judgment, on the basis of evidence" (2001: 25), while *will* shows that the judgment is based on general knowledge. The problem with this analysis is that it is very hard to draw a line between 'judgment on the basis of evidence' and 'general knowledge'. Indeed, in a previous section we have seen examples of epistemic *must* that could be classified as being based on

10 Coates contrasts two different readings of *will*: predictability (as in (34) above) and prediction (as in a sentence like *it will be lovely to see you*). We are concerned with the predictability reading only.

‘general knowledge’. It is also not clear that the use of *will* in a sentence such as (34) is not based on concrete evidence, or at least on a combination of concrete evidence and general knowledge. It is also not clear that there is a difference in truth value between *will* and *must* in this example.

Another good reason for considering this use of *will* separate from its use as a marker of futurity is the fact that *will* in this sense can refer to events that are wholly in the past. An example of this is found in Coates (1983:71) and (35), from the WWW, retrieved Oct. 15, 2007:¹¹

- (35) [Context: Person A is stating that “Sophie” had been talking about person B behind his back. Person B is stating that it can’t have been person B Sophie was talking about]
 B: ... and I doubt that Sophie *will have been talking* about me. I’ve not worked on any of the McCoy DVDs.

The normal interpretation of *will have been* as a marker of events that occur between the Moment of Speech and a reference point in the future is not available as the events described take place (and are over) before the Moment of Speech. As is the case with example (34) the truth value of example (35) won’t be known until a time in the future.

In comparing the use of *will* in these sentences with that of *must*, we can see some similarities and some differences. The main similarity between *will* and *must* is the fact that both are typically accompanied by overt evidence (the underlined parts in examples (34) and (35)).

We will call the use of *will* in these examples *predictive* as its main purpose is to give a prediction of an event. It therefore contrasts with *must* which we termed *evaluative*.

The use of a marker of future tense to denote the predictive is not unique to English. It occurs in several other European languages, including Dutch and Italian. In Dutch, as in English, the future is

11 The will have been-construction is not a particularly new construction either. A similar example can be found in Robert Louis Stevenson’s *Weir of Hermiston* (1896), as a quick Google search has shown. No doubt the construction is even older than that.

marked by a modal verb, but in Italian the future is analytic. The latter fact shows that typologically, predictives are primarily a product of futurity, not of modality (although there is of course a strong link between the two). In this respect we must also mention Swedish, where predictives are expressed with the auxiliary verb *lära* which can also be used as an indirect evidential (see Dooley/de Haan 2006 for details). The verb *lära* is usually considered to be a modal verb (see Holmes/Hinchcliffe 1993) but it does not belong to the group of core modals and does not have any other modal meanings, epistemic or deontic. It is significant, however, that this verb once functioned as a marker of futurity, which it still does in certain Swedish dialects.

7. Conclusions

In this chapter we analyzed *must* not as an epistemic modal but as an evaluative element, i.e. an element that evaluates evidence. We arrived at this conclusion by analyzing the contexts in which *must* occurs plus a comparison analysis with other related elements, both in English and in other languages. This allows us to make more precise predictions and hypotheses that are more testable. One obvious application of this bottom-up method is in constructing semantic maps (see Van der Auwera/Plungian 1998).

The question whether *must* is an epistemic modal or an evidential is then not important. Neither is the question whether an evaluative modal is an epistemic or an evidential category: to answer it depends on previous assumptions or a priori definitions and we would be back where we started at the beginning of the chapter. A bottom-up approach allows for a concrete, testable hypothesis.

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