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# (DE)CODING MODALITY

THE CASE OF *MUST*, *MAY*, *MÅSTE*, AND *KAN*

LUND STUDIES IN ENGLISH 113

Editors

*Marianne Thormählen and Beatrice Warren*

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*Anna Wärnsby*



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Lund, September 2006

*Anna Wärnsby*

# List of abbreviations

ACC	Accusative
DEF	Definite article
DM	Data Mining
ESPC	English-Swedish Parallel Corpus
FUT	Future time marker
INF	Infinitive
MOD	Modal element
N	Noun
NEG	Negation
OE	Old English
PART	Participle
PASS	Passive
PAST	Past (tense)
PDE	Present Day English
PDS	Present Day Swedish
PL	Plural
POSS	Genitive
PRES	Present (tense)
PROG	Progressive
REFL	Reflexive
SG	Singular

# 1 Prolegomena

## Abstract

In this chapter, I briefly review some previous work on modality, focusing on modality as a semantic phenomenon, and discuss the different types of modality presented in the literature. I also discuss modal verbs in English and Swedish and propose a systematic way of analysing them using epistemic and deontic scales that represent the range of modal interpretations. I further provide an explanation for why the present study is limited to two pairs of modals: *must* and *måste*, and *may* and *kan*. Moreover, I address some methodological issues related to using corpora in linguistic investigations, since the present study falls within the general field of corpus linguistics. In addition, the English-Swedish Parallel Corpus is introduced as the primary source of data for this study. The last section presents the aims and structure of the present study.

## 1.1 Modality

It has been notoriously difficult to delimit the field of modality, and modal research to just a few topics. As Nuyts (2005) eloquently put it:

‘Modality’ is one of the ‘golden oldies’ among the basic notions in the semantic analysis of language. But, in spite of this, it also remains one of the most problematic and controversial notions: there is no consensus on how to define and characterise it, let alone on how to apply definitions in the empirical analysis of data. (Nuyts 2005: 5)

What follows is an account of some of the issues, controversies, definitions, and approaches to studies of modality within what can be generally described as functionally-oriented theories of language.

Modal logic, a branch of the philosophy of language, which deals with notions such as possibility and necessity, has greatly influenced linguists’

understanding of modality. According to von Wright (1951: 1-2), modal logic is concerned with four modes: alethic (the mode of truth), epistemic (the mode of knowledge), deontic (the mode of obligation), and existential (the mode of existence). von Wright also suggests a fifth mode, dynamic (the mode of ability).

Looking at modality from a semantic point of view, it is obvious that some researchers (e.g. Palmer 1990) follow this modal logical classification closely. Others concentrate on such aspects of modality as speaker/addressee involvement in the situation described by the modally modified proposition (e.g. Bybee and Fleischman 1995, Quirk *et al.* 1985). That is to say, modality is considered to be a semantic phenomenon, and is seen as the addition of a special kind of meaning to the neutral value of a proposition in an utterance. This can be illustrated by examples (1) and (2).

(1) Jane reads (a lot).

(2) Jane **can** read.

In (1), the proposition is expressed by the main predicate *reads*, referring to the factual situation of Jane reading (a lot). In (2), the proposition is modified by the modal *can* so that it no longer simply refers to Jane reading a lot, but to Jane being able to read. Another possible interpretation of (2) is, of course, that Jane is allowed to read.

Additional meanings, such as imposing obligation, giving permission, or expressing judgement about the truth of the proposition, are often conveyed in interactive discourse, i.e. in face-to-face conversation (Bybee and Fleischman 1995: 3-8). Speaker-specific features, as well as the situational context, should, therefore, be taken into consideration when analysing modality, which has been reflected in many modal classifications.

For instance, Quirk *et al.* (1985: 219-220) claim that modality can be defined as “the manner in which the meaning of a clause is qualified so as to reflect the speaker’s judgement of the likelihood of the proposition it expresses being true”. They also distinguish between *intrinsic* and *extrinsic* modality. This distinction involves the notion of control on behalf of the speaker/addressee over the situation described by the proposition. Thus, in intrinsic modalities expressing permission, obligation, and volition, the speaker and the addressee control the situation. In extrinsic modalities, expressing notions such as possibility and prediction, the speaker and the addressee do not normally have control over the situation described in the proposition. This distinction is also incorporated in Hermerén’s (1978) account of modality.

The notion of control is, however, notoriously difficult to define formally. One such attempt is made by Runde (1997), who argues that to account for the subjective dimension of what is described as intrinsic modality in Quirk *et al.*, the researcher has to take into consideration the illocutionary force of a modal utterance, the circumstances, and context of the utterance, including the speaker's and the addressee's intentions, assumptions, expectations, as well as the psychological and social reality in which the speaker and the addressee participate (Runde 1997: 215).

The notion of the speaker's and addressee's involvement is also important in the classification of modality as epistemic, agent-oriented, and speaker-oriented (Bybee, Perkins and Pagliuca 1994). While agent-oriented modality "reports the existence of internal and external conditions on an agent with respect to the completion of the action expressed by the main predicate" (as in ability readings: *Jane can read*), "speaker-oriented modality does not report the existence of conditions on an agent, but rather allows the speaker to impose such conditions on the addressee" (as in deontic readings: *You must read this passage aloud*) (Bybee, Perkins and Pagliuca 1994: 177-188). Moreover, there is a tendency for agent-oriented modality – obligation, necessity, and volition – to be expressed by lexical or free grammatical morphemes. Speaker-oriented modality, as in the grammatical category of mood (for example, the imperative mood), is usually expressed by inflections. Bybee and Fleischman (1995: 7) claim that this represents a "quasi-universal tendency for agent-oriented modality to be expressed by verbs, auxiliaries and non-bound particles, whereas the remaining two types [i.e. speaker-oriented and epistemic modalities] are often expressed inflectionally". A further universal tendency in languages seems to be that agent-oriented modalities develop over time into speaker-oriented and epistemic modalities.

Bybee, Perkins and Pagliuca (1994) also postulate the existence of a cross-linguistic pattern for the diachronic development of modal meanings. Thus, epistemic senses generally develop from lexical verbs that initially denote mental or physical ability. These verbs gradually come to express dynamic modality, and, finally, weak epistemic possibility.<sup>1</sup> What causes these changes is still an open question. Lightfoot (1982) argues that the diachronic development of the (grammatical) class of modal verbs in English is the result of grammatical reanalysis, which, in turn, leads to a series of semantic changes. Bybee and Pagliuca (1985), on the other hand, claim that it is the semantic change in modals that leads to the develop-

---

<sup>1</sup> See detailed definitions in 1.1.1 and 1.1.2.

ment of grammatical meaning. Still others argue that shifts in meaning, at least in the initial stages of grammaticalization, are pragmatically motivated (Hopper and Traugott 1993). This last claim is further developed in Traugott and Dasher (2002) and Krug (2000). Traugott (1982), inspired by Halliday (1970, 1976, 1979, etc.), suggests a functional-semantic model of language change, involving three components: (i) the propositional level, using language to convey meaning; (ii) the textual level, producing a cohesive discourse; and (iii) the expressive level, expressing a speaker's personal attitude towards discourse. Change is considered to proceed from the propositional through the textual to the expressive level, or from "less subjective" to "more subjective", i.e. bound to the context of the speech act (Traugott 1982: 247-248). In her later work, Traugott (1996) also points out that the shift in meaning from less subjective to more subjective is not necessarily tied to the shift from dynamic/deontic to epistemic meanings, but can also occur within these domains.<sup>2</sup> A similar view is expressed in van der Auwera (1999) and van der Auwera and Plungian (1998), who focus on the participants of the modal utterances, and not on the function modal utterances perform in discourse, as Traugott does. In their view, modal meaning develops from lexical meaning through participant-internal possibility and necessity, and from there to participant-external possibility and necessity, and deontic possibility and necessity. The next stage is epistemic meaning, and, finally, postmodal uses: conditional and optative.

A different view of the grammaticalization of modal meanings involves the notion of metaphor. Hopper and Traugott (1993: 79), offering one possible explanation for the semantic change in modals, claim that the development of meanings related to obligation into meanings related to possibility and probability can be considered a metaphorical process. Support for this view can be found in Bybee and Pagliuca (1985: 73), who suggest *inter alia* that "the epistemic sense [of *must*] is the metaphorical extension of obligation to apply to the truth of the proposition". A slightly different approach is presented in Sweetser (1990), where modal meanings are analysed in terms of "sociophysical concepts of forces and barriers". Sweetser claims that epistemic meanings derive "from the tendency to experience the physical, social, and epistemic worlds in partially similar ways". This,

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<sup>2</sup> Note, however, that there is some dispute about this hypothesis on the unidirectionality of grammaticalization. See Dahl (2000a) for a range of empirically supported objections. As Dahl (2000a) points out "[w]hat we have to conclude [...] in order to maintain the unidirectionality thesis, is that it has to be seen as operating on a fairly high level of abstraction. We cannot exclude the courses of events that look exactly like the reversal of some grammaticalization process sometimes takes place. However, we should still be able to do without such reversed processes as independent constructs in our theory" (Dahl 2000a: 12).

in turn, allows metaphorical mapping of sociophysical potentiality to the world of reasoning, or the mapping of potential barriers to the conversational world (Sweetser 1990: 52). In these approaches, the development of meaning in modals is seen as a result of metaphorical processes, not grammatical ones as in Lightfoot (1982).

However, most researchers focus on the semantics of modality rather than on the historical development of modal meanings or the categorization of modal domains. Since modality is not a homogeneous category, different researchers distinguish between different modal meanings, depending partly on their theoretical framework. However, one of the principal divisions is that between epistemic and non-epistemic modality. The following sections present a brief account of the range of interpretations covered by these two types of modality.

### 1.1.1 Epistemic modality

Most researchers agree that epistemic modality can be defined as modality expressing the speaker's attitude towards the truth and the degree of authenticity of what is said. Epistemic modality can also be considered "the modality of propositions" in the sense that it modifies the entire proposition, not only the act denoted by the main verb (Palmer 1990: 50-51). For instance, in (3), the speaker is expressing a judgement about the possibility of the proposition as a whole, and not only Jane's ability to leave. In the paraphrase in (4), the proposition is presented in a *that*-clause, and the speaker's judgement is expressed in the main clause.

(3) Jane **can** be leaving now. Epistemic

(4) It is possible that Jane is leaving now.

Thus, epistemic modality indicates the degree of speaker commitment to the truth of the proposition, and can range from certainty to uncertainty. If the neutral/unmarked case in (1), *Jane reads*, is seen to indicate the speaker's complete commitment to the truth of the proposition, anything marked by epistemic modality indicates something less than complete commitment on the part of the speaker (Bybee and Fleischman 1995: 177-180). Bybee and Fleischman suggest a scale of speaker commitment, consisting of the following notions: (i) expressions of possibility, indicating the lowest commitment on the part of the speaker that the proposition may be true, as in (5); (ii) expressions of probability, indicating greater commit-



ment on the part of the speaker, as in (6); and (iii) expressions of inferred certainty, strongly implying that the speaker has reasons to suggest the proposition is true, as in (7).

- (5) Jane **can** be leaving. [possibility]  
 (6) Jane **may** be leaving. [probability]  
 (7) Jane **must** be leaving. [inferred certainty]

This scale corresponds closely to that of Givón (1982: 42), who distinguishes between the following degrees of epistemic modality: (i) lowest certainty, i.e. the utterances are doubtful hypotheses, and cannot be challenged; (ii) medium certainty, i.e. the utterances are open to challenge, and, thus, require some supporting evidence; and (iii) high certainty, i.e. the utterances are taken for granted, presupposed, and are above challenge.

A somewhat different type of scale is proposed in Leech (1987: 81-82), who also claims that there are different degrees of epistemic possibility. In Leech's terminology, (8) refers to factual possibility, i.e. that the window may in fact be broken, or is in the state of being broken at the time of the utterance, while (9) refers to the theoretical possibility of breaking the window. Factual possibility, usually expressed by *may* in English, is stronger than theoretical possibility, usually expressed by *can*.

- (8) The window **may** be broken. [factual possibility]

'It is possible that the window is broken.'<sup>3</sup>

- (9) The window **can** be broken. [theoretical possibility]

'It is possible for the window to be broken.'

i.e. 'It is possible to break the window.'

In Leech's words, *can* "merely postulates the theoretical possibility" of the window being broken, whereas *may* "envisages the event [the window being broken] actually happening". This is indicated by the different paraphrases for (8) and (9). The use of different modals results in different implicatures of the utterance. In addition to the interpretation indicated in the paraphrase, (8) implies that it is possible to break the window. Thus, if

<sup>3</sup> Unless specified otherwise, what is included in the single quotation marks is the intended interpretation. This applies to the Swedish examples as well, where the *verbatim* translation is provided in the gloss.

it is possible that X performs Y, then it is possible for X to Y, but not vice versa, i.e. factual possibility includes theoretical possibility in its scope.

Support for this view can be found in Hermerén (1978), who considers all instances of possibility to be epistemic in English. He distinguishes between factual and theoretical possibility in a way similar to Leech (1987: 81-82). Factual possibility involves the speaker's judgement "of the likelihood of an event occurring or having occurred". Theoretical possibility, on the other hand, "indicates that there is (ungraded) possibility of the occurrence of the event or the existence of a state", which is "often based on the previous occurrence of the event, i.e. the event has been known to occur at least once before" (Hermerén 1978: 110-111).<sup>4</sup> An interesting consequence of defining factual and theoretical possibility in this way is that utterances with simultaneous or anterior time references for the proposition fall under the scope of factual possibility, whereas utterances with posterior reference for the proposition fall under the scope of theoretical possibility (see also 4.1.3).

Although there seems to be general agreement on the definition of epistemic modality, there is no such agreement regarding its scope in the possibility domain. Coates (1983, 1995), for example, restricts epistemic possibility to instances of the above-mentioned factual possibility, and considers theoretical possibility, as defined in Hermerén (1978), root possibility. Root possibility may be defined, as in Bybee, Perkins and Pagliuca (1994: 190-194), as the "existence of the internal and external conditions on an agent as to the completion of the proposition". This distinction between root and epistemic possibility is embraced by many researchers working within widely different theoretical frameworks: Cinque (1999), and Beijer (2005), who differentiate between epistemic modality and general possibility, and Teleman *et al.* (1999), who distinguish between epistemic possibility, and the so-called potential modality, denoting *inter alia* a latent possibility for something to happen (Teleman *et al.*, 1999: 288).

The claim that we should distinguish between different degrees of epistemic possibility, rather than between different possibilities, i.e. root and

---

<sup>4</sup> A parallel can be drawn to some extent between Hermerén's definition of theoretical possibility and Brennan's (1997) account of *quantificational modals*. The latter claims that sometimes (in combination with indefinite subjects) modals allow quantificational readings. In *An elephant will be small*, for example, such a reading suggests that 'Elephants in general are small, i.e. in all possible worlds,' whereas in *An elephant can be small* the interpretation is 'Some elephants are small, i.e. they are small in some possible worlds,' or 'Being an elephant and being small are compatible properties'. However, Brennan also claims that "quantificational readings of modals, on the one hand, and root and epistemic readings, on the other, are mutually exclusive" (Brennan 1997: 5). For an account of the term *root* see 1.1.2.

epistemic, finds support not only in Leech (1987) and Hermerén (1978), but also in the work of McCallum-Bayliss (1988), who argues that:

It has been suggested (as far back as Aristotle) that there is not just one concept or possibility, but in fact two [...]. I will argue, however, that *can* and *may* both correspond to the same notion of 'possible' and that they differ on another dimension, that of the quality of speaker knowledge. That is, both *can* and *may* contain the same truth condition, '(at least) possible', but *can* has an additional truth condition, 'grounds exist for the possibility of the proposition's being the case'. (McCallum-Bayliss 1988: 11)

In this study, I follow the broad definition of epistemic possibility proposed by Hermerén (1978), Leech (1987), and McCallum-Bayliss (1988). However, the epistemic interpretation of theoretical possibility is sometimes difficult to distinguish from ability readings. Sentence (10), for example, may be regarded as a case of either epistemic possibility, or non-epistemic ability. It is also possible for both interpretations to be present simultaneously (Perkins 1983: 35). Thus, the interpretation of *can* in sentences such as (10) appears to be ambiguous.

(10) Cigarettes **can** seriously damage your health. (Perkins 1983: 35)

In this study, examples analogous to (10) are considered cases of *weak epistemic possibility*. Whereas strong epistemic possibility, which expresses the speaker's judgement about the possibility of the proposition being true, is associated with the notion of probability, weak epistemic possibility appears to be closely associated with ability/potentiality readings. This difference is reflected in the different paraphrases for the interpretations ('It is possible that...' for strong epistemic possibility, and 'It is possible for...' for weak epistemic possibility, cf. the paraphrases in (8) and (9)). Another difference between strong and weak epistemic possibility is that the former indicates the speaker's beliefs, and can be verified at the time of the utterance. The latter, on the other hand, not only indicates the speaker's beliefs, but also makes reference to non-linguistic circumstances that can only be verified after the time of the utterance.

### 1.1.2 Non-epistemic modalities

According to Coates (1995: 148-149), the distinction between epistemic and non-epistemic, or root, modality lies in the subjectivity of the speaker's commitment to the truth of the proposition. However, non-epistemic mo-

dality is not a homogenous category, but it is seen by many as a cover term for a variety of modalities. Cinque (1999), for instance, distinguishes between epistemic modality, and such non-epistemic modalities as necessity, possibility, volition, obligation, and ability/permission. This corresponds to the classification suggested by Palmer (1988, 1990), who distinguishes between one epistemic, and three non-epistemic modalities, according to their semantic-pragmatic functions. Other researchers, such as Bybee, Perkins and Pagliuca (1994), take into account not only the semantic-pragmatic function of the different modalities, but also the universal tendency for different modalities to be expressed by different means (modal verbs or grammatical moods), as well as the universal direction for the development of different modalities.

The definition of non-epistemic modality adopted in this study follows closely von Wrigt's (1951) and Palmer's (1988, 1990) classification into deontic, dynamic, and existential modalities. There is one addition, however: following Eide (2002), a distinction is made between directed and non-directed deontic modality.

### 1.1.2.1 Deontic modality

Deontic modality is described as performative: deontic modals are used to “impos[e] obligation”, “giv[e] permission”, or “mak[e] a promise” or in some other way influence or direct the behaviour of the addressee (Palmer 1988: 96-98 and 1990: 69-72). Thus, the event modified by the modal is immediate to the act of speech. Deontic modality, like epistemic modality, is discourse-oriented. As mentioned above, in epistemic utterances, the speaker expresses her commitment to the truth of the proposition. In deontic utterances, on the other hand, the speaker grants or asks for permission to act out the proposition of the utterance.

(11) Jane **can** leave now. Deontic

(12) ‘I permit Jane to leave now.’

(13) ‘Jane is allowed to leave now.’

In (11), it is the speaker who grants the permission, and the subject of the sentence, *Jane*, is to perform the action expressed by the main predicate *leave*. Sentences (12) and (13) are possible paraphrases for (11).

Some linguists, however, claim that this account of deontic modality is not complete. There are cases where the deontic force of an utterance does

not originate in the speaker, and is not directed at the subject (which is co-referential with the intended agent).

- (14) If the ratepayers should be consulted, so too **must** the council tenants.  
(Palmer 1990: 113)

Palmer (1990) considers the use of *must* in (14) a case of dynamic necessity. Dynamic necessity is often expressed “in assertion, [where] there is little or no indication of the involvement of the speaker” (Palmer 1990: 113). It should be noted that, contrary to the analysis proposed in Palmer’s works, in this study examples such as (14) are not considered dynamic, since these sentences have much more in common with deontic modality than with dynamic modality, discussed in 1.1.2.2. This similarity between deontic modality and the modality expressed in (14) is captured in Feldman (1986), who claims that

Sometimes, instead of saying that a certain person ought to do a certain thing, we may say that a certain state of affairs ought to be, or ought to occur [...]. The ought-to-do involves a relation between an agent and a state of affairs. The ought-to-be involves a property of a state of affairs. (Feldman 1986: 179)

Thus, in the ‘ought-to-be’ statements, the focus is shifted from the Agent who is to carry out the proposition to the general Source (not necessarily the speaker) interested in the carrying out of the proposition. That modality can be seen from different points of view is illustrated in Calbert (1975: 24):

[...] each modality can be expressed from the point of view of the Source [X in [(i)]] or from the point of the Goal [Y in [(ii)]]. These alternatives may be called *Source-oriented* and *Goal-oriented* modalities respectively [...]:

- (i) X wants Y to...
- (ii) Y has to...

Eide (2002) proposes another distinction, that between two kinds of deontic modality: directed and non-directed. She considers the latter non-directed deontic, “since the obligation or permission is not directed towards the subject referent”, i.e. “it is not the subject who has an obligation or permission to do something” (Eide 2002: 20). The opposite condition needs to be fulfilled for the interpretation to be considered directed deontic, i.e. the obligation or permission has to be directed towards the subject refer-

ent.<sup>5</sup> Following Eide, this study distinguishes between directed and non-directed deontic modality. However, unlike Eide, I focus on the Source of modality rather than its Goal (see Calbert above). Thus, my definition of directed deontic modality corresponds closely to Palmer's definition of deontic modality in that the deontic force originates from the speaker, and is directed towards the subject referent. I define non-directed deontic modality as a modality where the deontic force expressed in the utterance is not necessarily directed towards the subject referent. Also, the deontic force in such utterances originates in the relevant circumstances, and not with the speaker. This distinction is consistent with Verstraete's (2001) *subjective* and *objective* functions of deontic modality. Subjective uses of deontic modality "serve to encode the *speaker's* commitment to the necessity/possibility of an action", whereas objective uses of deontic modality "predicate [...] the existence of some necessity without actually committing the speaker to it" (Verstraete 2001: 1525).

### 1.1.2.2 *Dynamic modality*

Dynamic modality has to do with the ability of the (canonically animate) subject to perform the action stated in the proposition of the utterance. It is, therefore, subject-oriented. In this respect, it differs from the discourse-oriented modalities mentioned above, i.e. modalities that involve both the speaker and the addressee (Palmer 1990: 7, 83-88 and 1988: 96-98). In other words, as Huddleston and Pullum (2002) put it, "[d]ynamic modality is less central to modality than deontic permission in that it does not involve the speaker's attitude to the factuality or actualization of situation", which they consider to be central to modal meaning (Huddleston and Pullum 2002: 179). Another concern for them is that dynamic modality "does not apply as generally to the modal auxiliaries as do deontic and epistemic modality" (Huddleston and Pullum 2002: 179).

In (15), the modal *can* refers to Jane's ability to play chess.

(15) Jane **can** play chess.

Dynamic

The paraphrase for this sentence is:

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<sup>5</sup> In defining non-directed deontic modality, Eide relies on Barbiers (1995), who provides the following definitions of directed and non-directed deontic interpretations: "the directed deontic interpretation denotes an obligation or permission which has an external source directed towards the subject (which means that the subject has this obligation or permission); the non-directed deontic interpretation also denotes permission, obligation or requirement, but one that is not directed to the subject of the sentence (i.e. the situation is required or permitted, but independent of the subject's actions or attitudes)" (Barbiers 1995: 145).

- (16) 'Jane is able to play chess.'

The paraphrase in (16) appropriately reflects the salient sense of ability of the subject to perform the action stated in the proposition, namely *to play chess*.

### 1.1.2.3 Existential modality

According to von Wright's model, the existential mode or the mode of existence refers to the phenomena existing in the world under some or any circumstances ('there is a possibility...'). Existential modality, like existential mode in modal logic, is closely associated with dynamic modality (Palmer 1990: 7, 107). Unlike dynamic modality, however, it is not subject-oriented.<sup>6</sup> Indeed, this association is suggested by the paraphrase of (17).

- (17) Lions **can** be dangerous. (Leech 1969: 223) Existential

- (18) 'It is sometimes possible for lions to be dangerous.'

- (19) 'Lions are sometimes dangerous.'

In (18), the paraphrase for existential modality is modified by *sometimes* to indicate that the phenomenon described in the proposition, i.e. 'lions are dangerous', occurs under certain circumstances.<sup>7</sup> The paraphrase in (19) reflects perhaps this special sense of *can* more precisely, since it does not indicate any ability of the subject to perform the action of the proposition.

## 1.2 Modal verbs

At this point, it should be repeated that modality in language can be expressed by various means. Two of the ways of expressing modality, mood and modal verbs, have already been mentioned. Investigations of modality in Western European languages have been dominated by the study of modal verbs, since these languages contain a more or less easily identified group of modal verbs (see, for example, the summaries in Lampert and Lampert (2000) and Nyuts (2000) for comments on this restriction).

<sup>6</sup> Cf. also the discussion of (10), on the relation between weak epistemic and dynamic interpretations.

<sup>7</sup> Although *sometimes* is a temporal or quantificational adverb, it implies reason or, perhaps, condition. Thus, lions are sometimes dangerous, if threatened, for example.

Many other ways to express modality are available, depending on the language under investigation: modal adjectives (*possible, certain*, etc.), adverbs (*perhaps, probably*, etc.), nouns (*need, necessity*, etc.), lexical verbs (*think, believe*, etc.), hedges (*you know, well, like*, etc.), and others. These means of expressing modality tend to be more difficult to identify and classify than the formal category of modal auxiliaries.

Since the two languages investigated here, English and Swedish, lack an elaborate mood system, but have an abundance of modal verbs, the present investigation focuses primarily on modal verbs. Modal verbs can be clearly identified in both languages using a number of syntactic and morphological criteria, as well as by the range of possible interpretations, discussed in the sections to follow.

### 1.2.1 Criteria for identifying modal verbs in English

In English, modal verbs can be distinguished from other auxiliaries and the so-called modal idioms (*had better, would rather*, etc.) on the basis of certain morpho-syntactic criteria suggested in Quirk *et al.* (1985).<sup>8</sup> Firstly, all auxiliaries in English share the so-called NICE properties, namely Negation, Inversion, Code (and Emphasis):

(i) Auxiliaries are followed by the negative particle *not* without the need for *do*-support, whereas main verbs cannot:

(20) John **cannot** play the piano.

(21) \*John plays not the piano.

(ii) Auxiliaries are inverted with the subject in interrogative sentences, and in declarative sentences starting with a negative adverbial taking scope over the whole sentence, whereas main verbs require *do*-support:

(22) **Can** John play the piano?

(23) \*Plays John the piano?

(iii) Auxiliaries, but not main verbs, encode the proposition in various elliptic constructions:

(24) John can play the piano, and so **can** Mary.

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<sup>8</sup> A more detailed summary is offered in Warner (1993: 3-9).



- (25) \*John eats bananas, and so eats Mary.

Modal verbs can further be distinguished from other auxiliary verbs by the following four criteria:

(iv) Unlike other auxiliaries and main verbs, modal verbs can only be followed by bare infinitives:

- (26) John **can** (\*to) play the piano.

(v) Unlike other auxiliaries and main verbs, modal verbs have only finite forms:

- (27) \*John has **musted** play the piano.

(vi) Unlike other auxiliaries and main verbs, modal verbs do not inflect for 3<sup>rd</sup> person singular:

- (28) \*John **cans** play the piano.

(vii) Both the past and present forms of modals,<sup>9</sup> formally preterite and present, can be used in utterances with present, past, and future time reference:

- (29) John **could** give his concert tomorrow, if he is asked.

By using these criteria for modal auxiliarihood proposed in Quirk *et al.* (1985), it is possible to distinguish the following modal verbs in English: *can*, *could*, *may*, *might*, *will*, *would*, *shall*, *should*, *must*. The range of possible interpretations of these modals is discussed in 1.2.3.

### 1.2.2 Criteria for identifying modal verbs in Swedish

In Swedish, the morpho-syntactic distinction between main verbs and auxiliaries is much less clear than in English. Therefore, unlike English auxiliaries, classified primarily on the basis of morpho-syntactic criteria, Swedish auxiliaries are divided into different groups primarily based on meaning (Teleman *et al.* 1999: 536-537).<sup>10</sup> It is possible to distinguish five groups

<sup>9</sup> In this study, I distinguish between the form and the interpretation of modals: the terms *past* and *present* are used to refer to the form, as in (29), whereas *anterior* and *simultaneous* are used to refer to interpretation.

<sup>10</sup> Teleman *et al.* (1999) build their argument on the assumption that modals are polysemous.

of auxiliaries in Swedish: (i) temporal (*ha* ‘have’, *skola* ‘shall, will’, *kommer* ‘shall, will’); (ii) modal (*måste* ‘must, have (got) to’, *kunna* ‘may, be able to, can’, etc.); (iii) passive (*bliva* ‘become’, *vara* ‘be’); (iv) actional (*börja* ‘begin’, *bruka* ‘use, used to’, *tendera* ‘tend’, etc.); and (v) causal (e.g. *låta* ‘let’). Again, there seems to be no systematic way of distinguishing between these groups of auxiliaries other than on the basis of their interpretations.

Nevertheless, Swedish auxiliary verbs are characterized by certain morpho-syntactic behaviours not present in main verbs. According to Teleman *et al.* (1999: 536–537), most typical auxiliaries in Swedish can only be followed by a bound subordinate infinitive verb phrase, as in (30). This subordinate infinitive phrase has only a few (if any) nominal characteristics, i.e. it cannot be replaced by a noun phrase, as shown by the ungrammaticality of (31).

- (30) Peter **lär** *behöva* paraply idag.  
 Peter MOD need-INF umbrella today

‘Peter should need an umbrella today.’

- (31) \*Peter **lär** *behov* av paraply idag.  
 Peter MOD need-N of umbrella today

Secondly, a typical auxiliary in Swedish cannot be an antecedent of *göra* (*det*), ‘do (it)’, as shown in (32).

- (32) **Måste** Peter ta paraply med sig idag? – Ja, det måste/\**gör* han.  
 MOD Peter take-INF umbrella with REFL today Yes it MOD/\*do-PRES he

‘Must Peter take an umbrella with him today? – Yes, he must/\*does.’

A typical auxiliary is also “subject-autonomous”, i.e. the subject referent has no semantic role in the action described by the auxiliary.<sup>11</sup> Lastly, typical auxiliaries have defective or irregular inflectional paradigms.

In this study, I focus on modal auxiliary verbs that comply with all of these morpho-syntactic criteria for Swedish auxiliaries. Thus, the list of modals comprises the following verbs: *skola* ‘shall, should, will, would, be to’, *lär* ‘is known to, should’, *torde* ‘will, will probably’, *bör*, *borde* ‘should’,

<sup>11</sup> This, however, is true mostly of epistemic modals, since they take the whole proposition in their scope. Deontic modals, on the other hand, are often vague with respect to the subject orientation, i.e. it is more or less understood whether the duty, obligation or permission is associated with the subject referent (in directed deontic interpretation) or with the proposition as a whole (in non-directed deontic interpretation). Both potential and intentional modals are almost always subject-oriented (see Teleman *et al.* 1999: 282–284).

*måste* ‘must, have to’, *kunna* ‘can, may, be able to’, *få* ‘be allowed to’, *må* ‘let, may, must’.

1.2.3 Modal verbs and their interpretations

In both English and Swedish, each modal has a range of epistemic and non-epistemic interpretations. These interpretations can be positioned on epistemic and non-epistemic scales according to the strength of the speaker’s commitment to the truth of the proposition or the speaker’s authority over the addressee in the utterance. Such scalar organization of modal interpretations is not only well-attested by data in the two languages under investigation, but it also seems necessary, “if one accepts the position that a linguistic analysis ought to be cognitively (and functionally) plausible” (Nuyts 2005: 11). In the sections that follow, I propose a way of organizing modals on the epistemic and non-epistemic scales, and discuss the range of possible interpretations for each modal.

1.2.3.1 The epistemic scale

Epistemic modals indicate various degrees of speaker commitment to the truth of the proposition expressed in an utterance, from certainty to possibility. English modals can be organized as in Figure 1. The absence of vertical lines in Figure 1 and all the subsequent figures indicates that it may be difficult to clearly distinguish between different interpretations.<sup>12</sup> Each modal is a continuum whose edges are difficult to distinguish from the neighbouring categories. The centre represents the most canonical interpretation.

CONFIDENT INFERENCE	REASONABLE INFERENCE	TENTATIVE INFERENCE	POSSIBLE CONCLUSION		
<i>must</i>	<i>will</i>	<i>should</i>	<i>may</i>	<i>might</i>	<i>can</i> <i>could</i>

Figure 1. The scalar organization of English epistemic modals

*Must* expresses both epistemic and non-epistemic necessity, or, more accurately, epistemic certainty and non-epistemic, deontic obligation.

- (33) The guests all suffer from stomach pains. The food at the reception **must** have been spoiled.
- Epistemic

<sup>12</sup> For a comprehensive discussion of indeterminacy, see Coates (1983), Leech and Coates (1979), and also 3.3 of the present study.

‘On the basis of the available evidence, I (the speaker) confidently infer that the food at the reception was spoilt.’

(34) Roses **must** be watered regularly.

Deontic

‘It is necessary for roses to be watered regularly.’

In (33), *must* is interpreted as indicating a certainty on the part of the speaker that what she is saying is true, and also that this certainty is based on the evidence at hand. In (34), on the other hand, *must* is interpreted as indicating either objective necessity for the roses to be watered regularly (non-directed deontic), or, in some contexts, a directed deontic statement, which can be paraphrased roughly as ‘I, the speaker, order you, the addressee to water roses regularly’. With epistemic, as well as non-directed deontic interpretations, neither the speaker nor the addressee has control over the situation described in the proposition. Despite the similarities regarding speaker control, (33) is interpreted as epistemic, while (34) is not. Thus, it is only the *must* in (33) that is considered in Figure 1.

Quirk *et al.* (1985: 228-229) observe that *will* is similar in its epistemic interpretation to epistemic *must*, and also that it is relatively rare in this sense.

(35) A: Somebody is coming.

B: Oh, that **will** be the postman.

Epistemic

‘On the basis of evidence at hand (e.g. that the postman usually comes at this time), I (the speaker) reasonably predict that it is the postman who is coming.’

According to Coates (1983: 177), however, the difference between *will* and *must* lies in the fact that, in the case of *will*, the speaker’s confidence in the truth of the proposition “is not based on a process of logical inference, [...] it is based on common sense, or on repeated experience”. In (35), it is repeated experience that allows the speaker to make a reasonable inference. Thus, whereas *must* is associated with deductive epistemic modality, *will* is associated with assumptive epistemic modality (Palmer 2001: 24-25).

Tentative inference is expressed in English by *should* (in addition to other means outside of the scope of the present investigation). In its epistemic interpretation, *should* indicates that, on the basis of the evidence at hand, the speaker makes a tentative inference about the truth of the proposition, as in (36).

(36) He **should** be home by now.

Epistemic

‘On the basis of the evidence available to me (the speaker), I tentatively conclude that he is at home now.’

According to Quirk *et al.* (1985: 227), the difference between *should* and *must* lies not only in the strength of the speaker’s conviction in the truth of the proposition, but also in the fact that *should* connotes the desirability of the realization of the proposition expressed in an utterance. Another difference between the two modals is the fact that epistemic *should* “typically refer[s] to the future”, whereas *must* typically refers to the present (Coates 1983: 65).

Epistemic *may* is in the category of speculative epistemic modality, indicating a possible conclusion (Palmer 2001: 24-25). According to Coates (1983: 133-134), *may* allows the speaker to avoid commitment to the truth of the proposition. Thus, *may* is interpreted epistemically in cases where the speaker makes a tentative conclusion regarding the possibility of the proposition being true. This conclusion is based on “defective” or inconclusive evidence, and the inference is much weaker than in cases with epistemic *must* and *should*.

(37) He **may** be home by now.

Epistemic

‘It is possible that he is at home now.’

*May* can also be interpreted as weak epistemic, as in (38).<sup>13</sup>

(38) Although the noise **may** detract from some people’s enjoyment, it certainly seems to do little to upset the birds who carry on feeding regardless. (SUG)<sup>14</sup>

Weak epistemic

‘...On the basis of prior experience, I (the speaker) make a tentative conclusion that it is possible for the noise to detract from some people’s enjoyment.’

In (38), reference is made not only to the epistemic conclusion made by the speaker at the time of the utterance, but also to some additional non-linguistic circumstances such as, for example, experience or general world knowledge of the fact that noise is usually perceived as a nuisance. In this sense, weak epistemic *may* can be related to the epistemic interpretations of *will* and *can*, which are also based on world knowledge and experience.

<sup>13</sup> This is in contrast to Leech (1987), who suggests a “division of labour” between *may* and *can*, such that only *can* allows the interpretation of theoretical possibility, here called weak epistemic possibility.

<sup>14</sup> The example is taken from the English-Swedish parallel corpus, the ESPC. The abbreviation in parenthesis at the end of the example indicates the source text.

*Might* is usually interpreted as expressing epistemic possibility similar to *may*. The general view seems to be that *might* is a more tentative version of *may* (e.g. Quirk *et al.* 1985). This view, however, is not shared by Coates (1983), who finds no support for this claim in her data, and, consequently, suggests that epistemic *may* and *might* are usually interchangeable (Coates 1983: 146-147). *Might* with epistemic interpretation is used more often than *may*, and is considered by many researchers to be the typical token of epistemic possibility (Coates 1983, Quirk *et al.* 1985: 223-224).

With regard to *could*, Coates (1983: 165) argues that it expresses tentative possibility. This is consistent with the later findings in Quirk *et al.* (1985). She further suggests, however, that *could* replaces *might* as “the new exponent of tentative [e]pistemic possibility” (Coates 1983: 167). Thus, (39) should be interpreted as expressing less speaker commitment to the truth of the proposition than (40).

(39) He **could** be at home. Epistemic

(40) He **might** be at home. Epistemic

Palmer (1990) does not include *could* in his account of epistemic modals in English, following the traditional view that *can* and *could* are exponents of dynamic modality, and only rarely appear with epistemic interpretations. I agree with Quirk *et al.* (1985), however, who argue that *could* can be interpreted epistemically. This argument is supported not only by the data, but also by the scalar definition of epistemic modality adopted in this study. Regarding the difference between *could* and *might* in the degree of speaker commitment suggested in Coates (1983), further investigation seems to be in order.

Most researchers analysing modal verbs in English agree that *can* can only be interpreted epistemically (possibility) in non-assertive contexts (negated declaratives and interrogatives) (see, for instance, Quirk *et al.* 1985, Coates 1983, 1995, Palmer 1990). Coates (1995), however, suggests that *can* may in time develop into a fully epistemic modal. In my analysis, *can*, and possibly *could*, in declarative sentences can express at least weak epistemic possibility as in (10), repeated here as (41).

(41) Cigarettes **can** seriously damage your health. (Perkins 1983: 35) Weak epistemic

As is the case with weak epistemic *may*, the interpretation of weak epistemic *can* involves not only the speaker's beliefs about the truth of the proposition and the evidence at hand, but also general world knowledge and ex-

perience. Thus, weak epistemic interpretations seem to be similar to reasonable inference usually expressed by *will*.

The organization of Swedish modals on the epistemic scale<sup>15</sup> is quite different from that of English modals, as Figure 2 shows. Firstly, unlike English, Swedish possesses the grammaticalized means to express evidentiality, as in hear-say and shared beliefs. Secondly, there is no single modal that can be interpreted exclusively as expressing reasonable conclusion, similar to English *will*. Also, the number of modals with different interpretations is different in English and Swedish.

CONFIDENT INFERENCE	REASONABLE INFERENCE	TENTATIVE INFERENCE			POSSIBLE CONCLUSION		HEAR-SAY	SHARED BELIEF
<i>måste</i>	<i>bör</i>	<i>bör</i>	<i>borde</i>	<i>må</i>	<i>kan</i>	<i>kunde</i>	<i>lär</i>	<i>torde</i>
	<i>lär</i>		<i>torde</i>	<i>mätte</i>			<i>ska</i>	

Figure 2. The scalar organization of Swedish epistemic modals<sup>16</sup>

According to Teleman *et al.* (1999: 308-311), epistemic *måste* indicates the strongest speaker commitment, i.e. the proposition expressed in an utterance is necessarily true on the basis of the evidence available to the speaker. Usually, *måste* indicates such commitment in the present, but can also indicate past commitment in indirect speech. In its epistemic interpretation, *måste* is similar to epistemic *must*. In addition, *måste*, similarly to *must*, allows for both directed and non-directed deontic interpretations.

- (42)

Han **måste** vara hemma nu.  
he MOD be-INF home now

Epistemic
- ‘On the basis of the available evidence, I (the speaker) confidently infer that he is at home now.’
- (43)

Han **måste** vara hemma vid 9-tiden.  
he MOD be-INF home at 9-time-DEF

Deontic
- ‘He is obliged to be home by 9 o’clock.’
- (44)

Rosor **måste** vattnas ofta.  
roses MOD water-INF-PASS often

Deontic
- ‘It is necessary for roses to be watered often.’

<sup>15</sup> I assume here, in a general Saussurian and cognitive spirit, that although language systems may differ, they share underlying cognitive structures.

<sup>16</sup> In this and subsequent figures, I place in shaded boxes the modals that arguably should not be included in the epistemic scale proper or that, for reasons discussed later, are not pertinent to the present investigation.

As illustrated in (42), an utterance containing the modal *måste* can express the speaker's certainty about the truth of the proposition. In (43), on the other hand, *måste* lends itself to a deontic interpretation. (44) is interpreted as non-directed deontic. It is possible to conclude that the epistemic and deontic uses of *måste* correspond closely to the epistemic and deontic uses of *must*.

Reasonable inference can be expressed by two modals: epistemic *bör* and evidential *lär*. The difference between reasonable and tentative inference expressed by *bör* is vague for many speakers. Thus, under certain circumstances, (45) can be interpreted as expressing both reasonable and tentative inference. *Lär*, on the other hand, should arguably not be included in the epistemic scale. In general, it is unclear whether *lär*, and other Swedish evidentials such as *ska* and *torde*, should be located on the epistemic scale at all, despite Teleman *et al.*'s claim (1999: 284-286, 305, 312-313) that these modals have epistemic interpretations. Palmer (2001: 24-52), for example, argues that evidential and epistemic modalities are two different kinds of propositional modality, which may suggest that evidentials do not belong on the epistemic scale.

Although excluded from the present investigation, the evidentials in Figure 2 are organized according to the same principle as epistemic modals: from left to right, the commitment on the part of the speaker with respect to the truth of the proposition decreases. Thus, the modals *lär* and *ska* indicate first- or second-hand evidence, i.e. the speaker "claims to have heard of the situation described" either from a direct witness or from a third party (Palmer 2001: 40). *Torde*, on the other hand, indicates that the speaker relies on evidence from folklore, "the speaker claims that the situation described is part of established oral history", or on quotative evidence "the speaker regards what he has said to be something that everyone knows" (Palmer 2001: 40-41).

Epistemic *bör* expresses tentative inference, i.e. based on the evidence at hand, the speaker makes a tentative conclusion about the truth of the proposition, as in (45).

- (45) Persson **bör** vinna valet. Epistemic  
 Persson MOD win-INF election-DEF

'On the basis of the available evidence, I (the speaker) tentatively conclude that Persson will win the elections.'

The relationship between *måste* and *bör* with respect to the strength of the speaker's commitment seems to be the same as that between *must* and



*should*, i.e. the second modal in each pair indicates weaker commitment to the truth of the proposition on the part of the speaker. *Bör* does not directly correspond to English *should*, however, since in Swedish tentative inference is expressed by two modals. The second modal *borde* indicates a more tentative conclusion than *bör*. In addition, it is unclear whether *bör/borde* share connotations of desirability with epistemic *should*.

Tentative conclusion can also be expressed by evidential *torde*, indicating that the speaker distances herself from the proposition to a greater degree than when using *borde*. *Torde*, however, is not considered part of the epistemic scale, because it is stylistically, and, possibly, dialectally marked. Also, as already mentioned, evidentials as such should probably not be included in the scale.

Tentative conclusion can also be expressed by *må* and *måtte*. They indicate that the inference is made on the basis of circumstantial evidence, i.e. by using these modals epistemically, the speaker indicates that there are some circumstances that suggest that the proposition is true. However, these modals are said to be stylistically marked (Teleman *et al.* 1999: 305–309), and it is reasonable to conclude that they appear in atypical contexts. Since this study is concerned with the typical relationship between context and interpretation (see 1.4), these modals are not part of it.

Possible conclusion can be expressed in Swedish by two modals, *kan* and *kunde*, both indicating a tentative conclusion about the possibility of the proposition being true. Although Teleman *et al.* (1999) consider *kunde* more tentative than *kan*, many speakers interpret *kunde* as counterfactual.<sup>17</sup> Usually both modals are said to have present time reference, since epistemic judgements are simultaneous with the time of the utterance, and thus refer to the present. However, *kunde* can also indicate past judgement such as in indirect speech (Teleman *et al.* 1999: 299–300).

- (46) Han **kan** ha ljugit. Epistemic  
he MOD have-INF lie-PART

‘It is possible that he lied.’

- (47) Han **kunde** ha ljugit. Epistemic  
he MOD have-INF lie-PART

‘It is possible that he lied (but he didn’t).’

<sup>17</sup> This is consistent with Verstraete’s (2006) observation that, at least in Australian languages, epistemic and deontic past modal forms trigger an implicature of counterfactuality. Note also that the past forms of the modals in English, and in many cases in Swedish, do not carry anterior time reference, and can be used to express counterfactuality.

According to Teleman *et al.* (1999), the difference between (46) and (47) lies in the degree of speaker commitment to the truth of the proposition. However, (47) is interpreted by some speakers to have the connotation of a hypothetical or unreal statement. This is consistent with the claim that *kunde* can also signal a suggestion on the part of the speaker that the possibility indicated by the modal is dependent on some improbable or non-factual circumstances (Teleman *et al.* 1999: 303-304). The fact that *kunde* seems no longer to express possible conclusion for some speakers, in particular younger ones, may be due to a change in usage.

Since possible conclusion seems to be expressed in Swedish mainly by *kan* (*kunde* should be excluded for the reasons given above), this modal can be assumed to cover the possible interpretations of four English modals: *may*, *might*, *can*, and possibly *could*. Certain parallels may be drawn between *may* and *can*, on the one hand, and *kan*, on the other, since these modals can express both strong and weak epistemic possibility. Likewise, *kunde* can be considered similar to *might* and *could*, since for some speakers these modals express more tentative conclusion than *may* and *can*.

### 1.2.3.2 The deontic scale

Modals allowing for deontic interpretation can express obligation (it is necessary or recommendable that the proposition be carried out), permission (the addressee is allowed to carry out the proposition), and, particularly when it comes to Swedish modals, volition (the speaker or subject sees it as desirable that the proposition be carried out) (Teleman *et al.* 1999: 286-288). Similarly to epistemic modals, deontic modals can be organized on a scale according to the strength of the speaker's authority over the addressee.<sup>18</sup> Figure 3 represents the deontic scale for English modals: from left to right, the speaker's authority decreases. The broken line indicates that it is difficult to clearly distinguish between the different interpretations.

OBLIGATION	RECOMMENDATION	PERMISSION	
<i>must</i>	<i>should</i>	<i>can</i>	<i>could</i>
		<i>may</i>	<i>might</i>

Figure 3. The scalar organization of English deontic modals

<sup>18</sup> Note, however, that Verstraete (2005) argues for the inclusion of another dimension, the willingness of a modal agent to perform the action described in the proposition. This and related notions are discussed in Chapter 4.

*Must*, indicating the strongest authority of the speaker over the addressee, or, as in the case of non-directed deontic modality, the strongest pressure executed by some circumstances on a sometimes unspecified agent, is interpreted deontically as imposing an obligation on the addressee, as in (48).

- (48) You **must** go to the dentist now! Deontic

‘I (the speaker) urge you to go to the dentist.’

In this interpretation, the speaker clearly exerts control over the situation, and exercises authority over the addressee.

As Figures 1 and 3 show, *must* with both deontic and epistemic interpretations is at the extreme left of the scales. On the epistemic scale, *must* expresses certainty or strong inference, on the non-epistemic scale necessity and strong obligation.

The non-epistemic interpretation of *should* is similar to the deontic interpretation of *must*, i.e. that of obligation (Quirk *et al.* 1985: 277). However, the speaker’s authority over the addressee is not exercised to the same degree as in utterances containing deontic *must*. Thus, the obligation the speaker imposes on the addressee is weaker, and can be seen as a (strong) recommendation rather than an order, as illustrated in (49).

- (49) You **should** go to the dentist. Deontic

‘I (the speaker) (strongly) recommend you to go to the dentist.’

Clearly, the speaker of (49) exerts much less pressure on the addressee than the speaker of (48), or finds the action described in the proposition less necessary.

*Can*, *may* and *could* indicate that the speaker is giving permission to the addressee to carry out the proposition expressed in the utterance.

- (50) You **may** go to bed later than usual tonight. Deontic

‘I (the speaker) allow you to go to bed later tonight.’

- (51) You **can** go to bed later than usual tonight. Deontic

- (52) You **could** go to bed later than usual tonight. Deontic

In (50) through (52), the notion expressed is virtually the same. The difference between (50) and (51) lies only in the degree of formality: *may* is

considered in most contexts to be more formal than *can* (cf. Quirk *et al.* 1985, Palmer 1988, 1990, Coates 1983). *Could*, on the other hand, by virtue of being the past, or preterite, form of the modal *can*, is conventionally interpreted as being more polite.

According to Quirk *et al.* (1985: 223-224), *might* can also express permission. This use, however, is rare and archaic, and is thus excluded from the above scale.<sup>19</sup>

Swedish modals can also be positioned on a deontic scale, with virtually the same notions of obligation, recommendation, permission, and, additionally, volition.

OBLIGATION		RECOMMENDATION		PERMISSION		VOLITION
<i>måste</i>	<i>ska</i>	<i>bör</i>	<i>borde</i>	<i>få</i>	<i>kunna</i>	<i>må måtte</i>

Figure 4. The scalar organization of Swedish deontic modals

Obligation can be expressed in Swedish by two modals, *måste* and *ska*. Deontic *måste* indicates that the addressee is subjected to an absolute demand. According to Teleman *et al.* (1999: 308-311), the source of such a demand can be rules, custom, or general practicality. More often than not, *måste* with this interpretation is subject-oriented, i.e. it is the (animate) subject that is usually expected to comply with the demand expressed in an utterance. In other words, the utterance is interpreted as directed deontic.

- (53) Du **måste** gå till tandläkaren en gång om året. Deontic  
you MOD go-INF to dentist-DEF one time about year-DEF  
  
'I (the speaker) urge you to go to the dentist once a year.'

In (53), the speaker has authority over the addressee, and the addressee is in control of the action described in the proposition. This, however, does not rule out non-directed deontic interpretations in certain contexts.

The second modal, *ska*, indicates that the proposition is in accordance with some norm or is willed by someone (Teleman *et al.* 1999: 312-313). This interpretation of *ska* is similar to the modals expressing recommendation, *bör* and *borde*. The only difference is that *ska* indicates a more categorical demand than *bör* and *borde*.

<sup>19</sup> The collocation *might as well* is often used in this sense. However, it is not considered in the present investigation, since, as is the case with other modal idioms, it does not comply with the strict morpho-syntactic criteria used to identify modal verbs in this chapter.

- (54) Du **ska** gå till tandläkaren en gång om året. Deontic  
 you MOD go-INF to dentist-DEF one time about year-DEF
- (55) Du **bör** gå till tandläkaren en gång om året. Deontic  
 you MOD go-INF to dentist-DEF one time about year-DEF
- (56) Du **borde** gå till tandläkaren en gång om året. Deontic  
 you MOD go-INF to dentist-DEF one time about year-DEF

Thus, (54) is more authoritative than either (55) or (56).

The modal of recommendation, *bör*, indicates that the proposition complies with social norms or general practicality. Since norms usually deal with how one is to behave in a situation, the lexical verb is normally agentive, and refers to the future (Teleman *et al.* 1999: 292-294), as in (55) and (56). Also, an utterance containing the present form *bör* is often understood as a rather strict, moralising recommendation, which the speaker expects will be carried out. *Borde*, on the other hand, indicates a softer, less moralising recommendation the speaker does not necessarily believe will be carried out. In addition, *borde* may have a hypothetical, unreal, or non-factual interpretation, i.e. “the speaker is aware of the fact that the reality is contrary to the norm” (Teleman *et al.* 1999: 301), as in (57).

- (57) Rosorna **borde** vattnas oftare. Deontic  
 rose-PL-DEF MOD water-INF-PASS more-often

‘It is (tentatively) recommended that the roses be watered more often (this recommendation, however, is not carried out).’

Another interpretation is available for the present form *bör* (and sometimes *borde*), namely a non-directed deontic interpretation, as in (58).

- (58) Rosor **bör** vattnas ofta. Deontic  
 rose-PL MOD water-INF-PASS often

‘It is recommended that roses be watered often.’

As in epistemic utterances, the speaker in (58) does not control the situation. The utterance, however, is to be interpreted as expressing objective or circumstantial necessity. This non-directed deontic interpretation seems to be available not only for English *must*, as discussed above, but also for Swedish *måste*, especially with inanimate subjects. In that case, non-directed deontic *måste* expresses a more urgent necessity than deontic *bör*.

Permission can be expressed in Swedish by two modals: *få*, and *kunna*. According to Teleman *et al.* (1999: 294-297), the modal *få* ('be allowed') is similar to the lexical verb *få* ('receive'). Like the lexical verb, which indicates that somebody receives something, this modal indicates that somebody receives permission, or is given the option to act on a proposition.

- (59) Du **får** lägga dig senare ikväll.  
you MOD lie-INF you-ACC later tonight

'I (the speaker) allow you to go to bed later tonight.'

As illustrated by (59), the main verb normally describes an action that complies with a certain social or functional norm, and is often something for which a person or an institution can give permission (Teleman *et al.* 1999: 294). Deontic *få* is the only Swedish modal that has no epistemic counterpart.<sup>20</sup>

Deontic *kunna* is used to give permission, as well as to indicate that the utterance should be pragmatically understood as a polite request (Teleman *et al.* 1999: 300-301). Thus, the difference between *få* and *kunna* is said to be that the speaker is less visible in utterances with *kunna*, since these utterances mark that the speaker exerts less authority over the addressee than in utterances containing *få*, as demonstrated in (60).

- (60) Du **kan** lägga dig senare ikväll.  
you MOD lie-INF you-ACC later tonight

'I (the speaker) controlling the situation say that it is possible for you to go to bed later tonight if you want to.'

When utterances with *kunna* are pragmatically understood as polite requests, instead of using an imperative the speaker can use an interrogative sentence with *kunna*, formally asking the addressee whether he is capable of carrying out the proposition.

- (61) **Kan** du öppna fönstret?  
MOD you open-INF window-DEF

'Can you open the window?'

- (62) **Kunde** du öppna fönstret?  
MOD you open-INF window-DEF

<sup>20</sup> It is doubtful that sentences like *Då får det beslutas på nästa möte* ('Then it should be decided on the next meeting') can be interpreted epistemically.

‘Could you open the window?’

Similarly to English past modals, Swedish past modals are interpreted pragmatically as more tentative or polite. Thus, the difference between (61) and (62) is in the degree of politeness: (62) is understood as being a more polite request than (61).

Deontic interpretation is also available for the modals *må* and *måtte*. These modals can be used to express permission in place of *få* and *kan*, respectively. The difference between the deontic and the epistemic interpretations of these modals is somewhat unclear (Teleman *et al.* 1999: 305–308). Additionally, these two modals can be interpreted as expressing the speaker’s will or desire that the proposition be carried out. In those cases, the speaker is even less authoritative than in utterances with *kunna*. However, as mentioned above, these modals are stylistically marked, and even archaic, and are likely to appear in atypical contexts, a fact that may not allow for the generalisations aimed at in this study. They are, therefore, not considered in the present investigation.

### 1.2.3.3 Dynamic modals

Dynamic possibility is expressed primarily by *can* and *could* in English, and *kan* and *kunde* in Swedish. It can be considered a special case of possibility, “one in which the possibility of an action is due to some skill or capability on the part of the subject” (Quirk *et al.* 1985: 221–223).

(63) Tom **can** play the piano.

‘Tom is able to play the piano.’

(64) Tom **could** play the piano (but, since he did not practice for a long time, he lost his ability).

‘Tom was able to play the piano.’

(65) Tom **kan** spela piano.  
Tom MOD play-INF piano

‘Tom is able to play the piano.’

(66) Tom **kunde** spela piano  
Tom MOD play-INF piano

‘Tom was able to play the piano  
(but, since he had not practiced for a long while, he lost his ability).’

The present forms of the modals indicate present ability, and the past ones past ability. All four modals can be interpreted in at least three different ways: epistemically (both weak and strong), deontically, and dynamically. It may be difficult to distinguish between these interpretations. Teleman *et al.* (1999: 298), for example, point out that with *kunna* the distinctions are often unclear.

#### 1.2.3.4 Choosing the modals for this investigation

We can now conclude that *must* and *måste* occupy the leftmost position on both the epistemic and the deontic scales, since they indicate the strongest speaker commitment to the truth of the proposition, and the strongest speaker authority over the addressee. Therefore, these modals can be considered to correspond to each other.

On the opposite end of the scales are: *may*, *might*, *can*, *could* and *kan*, *kunde*. This makes it difficult to decide which modals in English correspond to which ones in Swedish.

Only one of the English modals is considered to have both epistemic and non-epistemic interpretations. Thus, although *can* is used to express permission, it cannot be said to have an epistemic interpretation (it can only be interpreted as weak epistemic in assertive utterances). *Might*, on the other hand, is considered by many to be the typical exponent of epistemic modality. However, it is archaic in its deontic use. Linguists also seem to disagree about whether *could* can be interpreted epistemically. As mentioned earlier, only *may* has both epistemic and deontic interpretations in most contexts, although it is considered formal in its deontic use. However, formality seems to play no role in establishing the possible interpretations of *may*, and can be disregarded for the purposes of the present investigation (see 1.4).

Both *kan* and *kunde* have epistemic and deontic interpretations, according to Teleman *et al.* (1999). *Kunde*, however, has additional unreal and pragmatic connotations which seem to dominate for some speakers. It can thus be considered outside the scope of the present investigation, since it is likely to be restricted to special contexts. Through elimination, *kan* is chosen as the object of the investigation. The multiple available interpretations of *kan* should be carefully considered, however, since they may render the analysis of the data more complicated.

This leaves us with four modals: *must*, *may*, *måste* and *kan*. These four modals are the subject of the present investigation.



## 1.3 Corpus studies in linguistics

Corpora have proven useful in linguistic studies as they provide insight into issues that are difficult or impossible to elucidate by using any other method, such as native speaker intuitions or elicitation techniques. However, many corpus-based studies have been criticised because of their lack of focus, and the presentation of vacuous statistics. The divide between linguists who use corpora and those who criticise their use can, to a certain degree, be ascribed to the theoretical framework chosen by the linguist, and the nature of the problem under investigation. This section addresses some of the issues related to using corpora in linguistic investigations. The focus is on describing the English-Swedish Parallel Corpus, and the design of the corpus investigation that underlies this study.

### 1.3.1 Using corpora

Since their emergence, machine-readable corpora have enabled researchers to study actual language use in different modalities (written or spoken), different genres (fiction or academic prose), different types of discourse, etc. Whatever the focus of investigation, a “corpus-based approach [...] provides a means of handling large amounts of language and keeping track of many contextual factors at the same time” (Biber, Conrad & Reppen 1998: 3). The use of computerized, machine-readable corpora also enables the researcher to handle the collected data with greater accuracy than is possible when doing the same work manually. However, “[c]orpus linguistics is not an end in itself, but is one source of evidence for improving descriptions of the structure and use of language” (Kennedy 1998: 1).

When using corpora, we should keep in mind the distinction between language structure and language use, which is of great relevance to linguistic studies (cf. *langue* vs. *parole*, competence vs. performance). Language structure, seen as the representation of linguistic knowledge in the human mind, can at the present stage only be studied through actual performance, the use of language in production and comprehension. Language use can, of course, never be a mirror representation of the linguistic knowledge in the mind, since it is per definition influenced by such non-linguistic factors as memory span, the physical and emotional condition of the speaker/hearer, noise, etc. For linguists studying certain topics this can pose a problem, since the effort required to reconstruct the mental representations of certain aspects of language with evidence from a corpus can yield little in-

formation. In such cases, it may be more useful to resort to introspection or elicitation techniques. Other linguists, on the other hand, adhere to the view of grammar expressed in Bybee (2005):

While all linguists are likely to agree that grammar is the cognitive organization of language, a usage-based theorist would make the more specific proposal that grammar is the cognitive organization of one's experience with language. [...] certain facets of linguistic experience, such as the frequency of use of particular instances of constructions has an impact on representation that we can see evidenced in various ways, for instance, in speakers' recognition of what is conventionalized and what is not, and even more strikingly in the nature of language change. (Bybee 2005: 2)

In these cases, a corpus investigation is indispensable, since only in the collective use of language is it possible to find information about the frequency of the occurrence of certain constructions, the salience of certain features, and other issues of relevance.

As McEnery and Wilson (1996) point out, however, “[a] corpus and an introspection-based approach to linguistics are not mutually exclusive”, and “[i]n a very real sense they can be gainfully viewed as being complementary” (McEnery and Wilson 1996: 16). The combination of these approaches is not only useful, but also highly desirable, since “[a]ny scientific enterprise must be empirical in the sense that it has to be supported or falsified on evidence and, in the final analysis, statements about language have to stand up to the evidence of language use” (Kennedy 1998: 8).

However great the advantages of using corpora in linguistic research, we should also be aware that the quantitative results obtained in such investigations can sometimes give a false air of scholarliness. Most corpus linguists are unanimous in their belief that quantitative investigations should be based on or lead to qualitative research. For example, Kennedy claims that “[t]he most important skill [...] is to be able to ask insightful questions which address real issues and problems in theoretical, descriptive and applied language studies” (Kennedy 1998: 3). This view finds support in Biber, Conrad and Reppen, who suggest that “[t]he goal of corpus-based studies is not simply to report quantitative findings, but to explore the importance of these findings for learning about the patterns of language use” (Biber, Conrad & Reppen 1996: 5).<sup>21</sup>

Corpora can, of course, be used in a variety of ways. This section also provides examples of using corpora in semantic research. *Concordance tests*, for instance, enable researchers to establish typical contexts for an item.

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<sup>21</sup> Note here that Biber, Conrad & Reppen focus on language use, not language structure.

Studies using different theoretical frameworks, from general semantic to cognitive, and seeking answers to different questions have benefited a great deal from this approach: Aijmer (1986), Altenberg (1991), Paradis (2003), Warren (1984), Wårnsby (1999).

Corpora can also be used as sources of data in studies of idioms or fixed collocations. Two such studies, Granger (1996) and Wiktorsson (2003), searched through learner corpora to find out how successful learners are in producing the so-called prefabricated items in comparison to native speakers. Both studies employed methods other than concordance tests to retrieve the data.

Corpora can also aid the researcher in broader semantic investigations where the focus is not on a particular item and its immediate lexical context, or on the frequency of a certain item in a corpus, but on what elements constitute the *semantic* context for a chosen item. McEnery and Wilson, citing Mindt (1991), point out that “semantic distinctions are associated in texts with characteristic observable contexts – syntactic, morphological, and prosodic – and thus by considering the environments of the linguistic entities an empirical objective indicator for a particular semantic distinction can be arrived at” (McEnery & Wilson 1996: 96). Similar observations form the basis for Coates’s (1983) investigation of the semantics of modal auxiliaries in English, and Wårnsby’s (2004) search for contextual regularities with respect to the different modal interpretations in English and Swedish. Corpus data were considered significant as they provided the statistical foundation for a discussion of the correlation of different features with certain interpretations. This approach is also used in the present study.

### 1.3.2 The English-Swedish Parallel Corpus

Parallel corpora have been praised for allowing researchers to address a variety of questions. Some of the more obvious research areas where parallel corpora can be used are translation and contrastive studies. The present investigation falls under the general category of contrastive studies, since it contrasts the use and interpretation of four modals in English and Swedish. Therefore, it benefits from a reliable source of contrastive data. The primary source of data is the English-Swedish Parallel Corpus (henceforth the ESPC).

The ESPC is a bi-directional translation corpus of a considerable size (approximately 2.8 million words).<sup>22</sup> It is a collection of comparable writ-

ten texts in English and Swedish, as well as their translations. The texts belong to a number of genres, fiction and non-fiction, and match closely in terms of subject matter, type of intended audience, and register. Most text samples contain between 10,000 and 15,000 words. More details on the composition of the corpus can be found in Table 1.

Table 1. Size and composition of the ESPC

		English originals	Swedish transl.	Swedish originals	English transl.	Total
Fiction	Text samples	25	25	25	25	100
	No. of words	340,745	346,649	308,160	333,375	1,328,929
Non-fiction	Text samples	39	39	47	47	172
	No. of words	364,648	344,131	353,303	413,500	1,475,582
Total	Text samples	64	64	72	72	272
	No. of words	705,393	690,780	661,463	746,875	2,804,511

The design of the corpus encourages flexibility of use, as can be seen in Figure 5. The ESPC consists of two corpora of originals (one in each language), and two corpora of translations. The translations and the originals are aligned sentence by sentence. This allows the researcher to compare data from different parts of the corpus, as indicated by the bi-directional arrows in the figure. Thus, the ESPC can be used as a translation corpus, comparing the originals with their translations, as illustrated by the horizontal arrows. The researcher can also compare the originals with the translations in the same language, as indicated by the diagonal arrows. Translations in the two languages can be compared as well, as indicated by the vertical arrow on the right-hand. Alternatively, the corpus can simply be used, as in the present study, as a corpus of comparable texts, as indicated by the vertical arrow on the left hand side.

The ESPC is particularly appropriate for the present study. Firstly, since it is computerized, it allows a variety of searches: the amount of co-text retrieved can be modified, and data from certain texts can be excluded. Secondly, the ESPC was compiled with the intention of generating a collection of comparable texts, which allows the researcher to control for many of the factors discussed in 1.3.1. Also, since the ESPC is a collection of *written* texts, it is possible to search for different features that may be of rel-

<sup>22</sup> The information about the design of the corpus is taken from the following sites: <http://www.englund.lu.se/research/corpus/index.html> and <http://www.englund.lu.se/research/corpus/corpus/esp.html>.

evance, i.e. direct speech vs. the main narrative, or the author's comments vs. quotes from other sources.

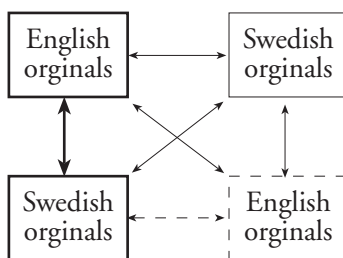


Figure 5. The design of the ESPC

This study uses examples of *must*, *may*, *måste*, and *kan* taken from the English and Swedish originals, since the research questions do not concern translation-related issues (see 1.4). This is indicated by the bold frames surrounding two of the boxes on the left-hand side of Figure 5. The English translation corpus was also used to provide literary translations of the Swedish examples (in addition to the word-for-word glosses). This is indicated by the broken line in the figure.

The examples were extracted from both fiction and non-fiction texts. The co-text of five sentences preceding and following each example was included to ensure a reliable interpretation. Approximately 3,000 examples were extracted and analysed. Table 2 provides details on the distribution of the examples used.<sup>23</sup>

Table 2. The composition of the excerpted sub-corpora for the four modals

	The number of excerpted modals		Total number of excerpted individual modals
	Fiction	Non-fiction	
<i>must</i>	215	246	461
<i>may</i>	86	220	306
<i>måste</i>	531	482	1,013
<i>kan</i>	302	699	1,001
<b>TOTAL</b>	<b>1134</b>	<b>1647</b>	<b>2,781</b>

All occurrences of the English modals *must* and *may* were excerpted from the corpus, but only about 1,000 randomly selected examples of each of

<sup>23</sup> Many thanks to Mats Eeg-Olofsson for helping me to collect the data from the ESPC.

the Swedish modals were used. The Swedish modals appear more often in the ESPC than the English ones, even though the texts in the two languages are comparable in size, contents, style, etc. One possible explanation for this discrepancy is the fact that the English modals are not used to express past modality other than, possibly, in the sequence of tenses or indirect speech, while for the Swedish modals this option is often available (see, for example, the discussion of *måste* in section 1.2.3.2).

All of the examples were initially evaluated for the modality expressed: epistemic, deontic, dynamic or indeterminate. Each example was subsequently analysed for the presence of a number of contextual features. The information obtained was stored in a database, and used for the manual analysis (Chapter 3), as well as for the Data Mining investigation (Chapter 5).

## 1.4 The aims and structure of the study

When listeners encounter modal utterances in their native language, especially utterances that contain a modal verb, they are usually able to interpret these expressions immediately as being either epistemic or non-epistemic.<sup>24</sup> What is it that enables listeners to interpret modal utterances correctly? As Klinge (1996) points out, “[i]n actual communication the meanings traditionally assigned to the modals are arrived at on the basis of the whole complex of the modals, their sentential environment, and a context of utterance, and yet the impact of context of modal meaning is rarely explicitly and systematically pursued in the literature on modality” (Klinge 1996: 35). To account for the fact that different modal meanings are readily recognized as such, one should consider a variety of factors important for the interpretation: the syntactic environment, the semantic contribution of the parts in the propositional context of the utterance, and the pragmatic, or situational, context of the utterance. In this study, I am mostly interested in what allows us to express and interpret modally modified utterances so that the communicative goals are achieved. Therefore, I investigate what semantic, syntactic or pragmatic features in the context of a modally modified utterance promote or demote epistemic or non-epistemic interpretations.

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<sup>24</sup> This is of course a simplification, since many of the occurrences of modals are indeterminate (see Leech and Coates (1979), and 3.3 of this study for a discussion of this phenomenon).

To achieve this goal, I begin by replicating Coates's (1983) study on the data extracted from the ESPC. To anticipate the discussion in Chapter 2, Coates (1983), after analysing a large amount of corpus data containing all of the English modals, concluded that certain contextual features are associated with certain types of modality. I focus on two pairs of modals, one English and one Swedish, and study the contexts in which they appear in great detail. The data sample used for this investigation is considerably larger than that of Coates, and allows for contrastive observations. I begin by investigating the English modals, and then test the results of this analysis on the Swedish data. This methodological decision is motivated firstly by the fact that I initially modelled my investigation on that of Coates (1983), who tested the influence of context in modally modified utterances in English. Also, this is primarily an English linguistics study.

Chapter 2 presents a general discussion of Coates's (1983) findings regarding the modal contexts associated with epistemic and non-epistemic modalities. I also address some of the recent criticism of Coates and others who consider the syntactic or semantic features present in the context critical for the interpretation (Papafragou 1998a, 2000). I maintain that regardless of the theoretical framework one adheres to, it is important to pay attention to different contextual features such as the ones discussed in Coates (1983).

In Chapter 3, I discuss the data used in the study. With Coates's study as my point of departure, I demonstrate how the features she discussed are distributed in utterances containing each of the selected modals. I also show that the features in Chapter 2 are not sufficient to determine the correct interpretation of an utterance. I also take up indeterminate cases, and analyse them in terms of the inconclusive arrangement of contextual features.

In Chapter 4, I argue that also features other than those mentioned in Coates play an important role in the interpretation of modal utterances in the two languages, and that those features are related to each other through the notion of Controllability. I also suggest that these features are involved in the overall organization of discourse.

In the second part of the study, I test my findings for *inter alia* statistical relevance with the help of a relatively new method in linguistics, namely Data Mining. The results are presented in Chapter 5.

In Chapter 6 I offer final remarks about the nature and consequences of the present investigation and the general summary of the findings.

## Summary

In this chapter, I briefly reviewed a number of mostly functionally-oriented approaches to the study of modality. I also discussed the definitions of epistemic and non-epistemic modality. The focus of the chapter was the description of the system of modal verbs in English and Swedish. Moreover, I chose four modals as the subject of the present investigation, introduced the data and the general methodology of this study, formulated the research question, and briefly presented the structure of the study.



# 2 Modal contexts

## Abstract

In this chapter, I first discuss the seminal work of Coates (1983), who established that certain contextual features are associated with either epistemic or non-epistemic interpretations. Recently, her claims about the influence of context on the interpretation have become somewhat controversial, and I thus address some of the criticism, focusing on Papafragou (1998a, 2000). This criticism notwithstanding, I claim that it is possible, and even necessary, to rely on contextual clues to arrive at the intended interpretation.

## 2.1 Coates (1983)

Coates's investigation of the meanings of English modals and the contexts in which those meanings appear tried to “interpret the data, not to impose some neat, preconceived system upon it” (Coates 1985: 247). The study is based on data from the Lancaster corpus and the Survey of English Language. Approximately 200 examples containing each of the modals *must*, *should*, *ought (to)*, *may*, *might*, *can*, *could*, *would*, *will*, *shall* were selected from 109 texts or 545,000 words (Coates 1983: 2). The analysis was complemented by a discussion of the “quasi-modals” *have to*, *be going to*, *be able to*, and *be bound to*. Informant tests were used “to check problematic areas, in particular cases of indeterminacy, and, on a more general level, to investigate the patterns of similarity and dissimilarities which native speakers perceive in the modals” (Coates 1983: 2).

Based on her initial findings, Coates modifies the traditional polysemic approach to modal meaning by postulating, rather convincingly, that the meaning of modals is indeterminate. This leads to an innovative theoretical model of modal meaning – the fuzzy set model (see Zadeh 1972).

Coates points out that this model accounts best for the indeterminacy found in her data: the most typical meanings, those acquired first by a child, constitute the core, and the less typical meanings are found on the periphery, or the skirt (Coates 1983: 11-13). She then proceeds to discuss the different types of indeterminacy attested in her data: gradience, ambiguity, and merger (see 3.3 of the present study for a detailed discussion of these issues).

Coates also draws a map of the modal meanings found in her data, and concludes that there are four distinct clusters which “can be associated with semantic concepts such as Obligation/Necessity, Intention/Prediction/Futurity, Possibility<sup>1</sup>/Ability/Permission and Epistemic Possibility” (Coates 1983: 27). She provides a systematic analysis of the contexts in which these meanings appear in order to prove that the clusters, in addition to semantic content, also share syntactic and prosodic characteristics (Coates 1983: 27). Her overall aim is to prove, on the basis of her data, the existence of the Epistemic/Root distinction so often assumed in modals studies. In the sections that follow, I discuss her findings, focusing on the modals under investigation in the present study – *must* and *may*.<sup>2</sup>

### 2.1.1 Features associated with epistemic modality

There are six features, considered syntactic by Coates,<sup>3</sup> associated with epistemic modality in her data:

- (i) Perfect aspect (as a past time marker),
- (ii) Progressive aspect,
- (iii) Existential subject,
- (iv) State verb,
- (v) Co-occurrence with a quasi-modal,<sup>4</sup> and
- (vi) Inanimate subject (Coates 1983: 244-245)

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<sup>1</sup> Note that Coates distinguishes between two different types of possibility, epistemic and non-epistemic, whereas in the present study I distinguish between degrees of epistemic possibility – strong vs. weak (see 1.1.1 for definitions).

<sup>2</sup> For a more general review, see Hermerén (1984).

<sup>3</sup> In this study, these features are not considered syntactic. The focus in this and the subsequent chapters is instead on their semantic and pragmatic content.

<sup>4</sup> In my analysis of the modal contexts in Chapters 3 and 5, this feature is not considered on its own but is subsumed under the analysis of the other five features. Further, I do not discuss its syntactic import on the interpretation, but the semantic one.

Coates uses the terms ‘association’ and ‘associated’ when there is a statistical correlation between the occurrence of a certain feature and an epistemic or deontic interpretation.

All the examples containing *must* and *perfect aspect* are epistemic: there is a 100 per cent correlation between this feature and an epistemic interpretation in Coates’s data.

- (1) Ooh Jesus – well how would the people of the other faith have received Germans from the sea – you **must** have thought about that (S.1.14B.7)<sup>5</sup> (Coates 1983: 45)

There is also a 100 per cent correlation between *progressive aspect* and an epistemic interpretation of *must*. Coates (1983: 44) provides two examples that illustrate that.

- (2) You **must** be running your brain in neutral. (S.2.11B.13)
- (3) He **must** have been dishing up the same lectures for 30 years at a gradually slower and slower speed. (S.1.6.117)<sup>6</sup>

*Existential subject*<sup>7</sup> co-occurs with an epistemic interpretation of *must* in 86 per cent of the utterances, as illustrated in (4).

- (4) I mean there **must** have been an awful lot of hit and misses, *mustn’t* there? (S.2.10-182)

In this example, two contextual features, *existential subject* and *perfect aspect*, co-occur. Coates, however, does not address the fact that the features co-occur in many of her examples.

Epistemic interpretation is also shown to be prevalent in utterances containing a *state verb* and *must*: 86 per cent of the utterances with this contextual make-up were epistemic. Consider, for instance, (5) in which a state verb co-occurs with the modal.

- (5) His teeth were still chattering but his forehead, when I felt it, was hot and clammy. He said, “I **must** have a temperature.” (Lanc1-1675) (Coates 1983: 41)

<sup>5</sup> The notation indicates the location of the example in Coates’s corpus data.

<sup>6</sup> In the present study, examples such as (3) are not analysed under ‘Progressive aspect’, but under ‘Perfect aspect’. The combination of these two features in similar examples is duly noted, however.

<sup>7</sup> I use the term ‘introductory subject’ to cover both *there*- and *it*-subjects, since in my data these two types of subjects influenced the interpretation in the same way. Also, in Swedish, it was impossible to differentiate between the two types on formal grounds, since both are expressed by the impersonal *det* ‘it’.

In 73 per cent of the cases, an *inanimate subject* co-occurred with an epistemic interpretation: (6), from Coates (1983: 44), illustrates this pattern.

- (6) This **must** be one of the finest views on the whole processional route (T.10.5.49)

*May* exhibits very similar patterns of co-occurrence with the above features (see Coates 1983: 137): there is a 100 per cent correlation between both *perfect* and *progressive aspect* and an epistemic interpretation of *may*.

- (7) I **may** have put it there out of the way (S.7.1A.10) <sup>8</sup>

- (8) They **may** be reading something by Shakespeare. (S.5.10.38)

There is also a 100 per cent correlation between the epistemic interpretation of *may* and the feature *existential subject*, as in (9).

- (9) January I suppose, there **may** be an interview round about January. (S.1.1.16)

Also, all the cases where *may* appeared with a *quasi-modal* were interpreted as epistemic, as in (10).

- (10) I **may** be able to leave here and still owe them my notice. (S.7.3F.10) (Coates 1983: 137)

There is also an absolute correlation between an epistemic interpretation of *may* and the feature *negation*, a feature which on Coates's analysis subsumes both sentences containing sentence negation and those containing negative adverbs.

- (11) They say he **may** never work again because he's got schizophrenia. (S.1.13.20)

The feature *state verb*, on the other hand, co-occurs with an epistemic interpretation of *may* in 95 per cent of the cases.

- (12) I think he **may** be a very violent man. (V.5.1B.12)

Thus, in Coates's data, both *must* and *may* exhibit strong, statistically attested correlation patterns between the contextual features identified and epistemic interpretations.

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<sup>8</sup> The original prosodic notation is omitted in all spoken examples.

### 2.1.2 Features associated with non-epistemic modalities

Coates also found that non-epistemic, Root meaning is typically associated with the following syntactic features:

- (i) Negation,<sup>9</sup>
- (ii) Agentive verb, and
- (iii) Passive voice (Coates 1983: 245)

Coates claims that “Root modals can also be negatively defined” (Coates 1983:246), i.e. utterances that do not contain the features typically associated with epistemic modality are non-epistemic.<sup>10</sup>

With Root *must*, a correlation between Root meaning and *negation* was found in 100 per cent of all examples.

- (13) You **mustn't** put words into my mouth, Mr Williams. (T.5.3.49)

*Must* was also interpreted as Root in all the utterances containing *passive voice*.

- (14) “If you commit murder, Charlotte, you **must** be punished.” (Lanc1-1851)

Root *must* also appears in 91 per cent of the utterances with an *agentive verb*.

- (15) “You **must** play this ten times over”, Miss Jarrova would say, pointing with relentless fingers to a jumble of crotchets and quavers. (Lanc1-G332)

In 87 per cent of the cases, the feature *2<sup>nd</sup> person subject* co-occurred with Root *must*, as in (15). Note again that Coates does not address the fact that the features she investigates combine with each other. In many cases, Root *must* also combines with the feature *1<sup>st</sup> person subject*, as in (16).

- (16) We **must** take no risk. (Lanc1-51)

Thus, Root *must* exhibits strong statistical patterns of co-occurrence with a number of readily definable features.

<sup>9</sup> In Coates's data, however, *may* never appears in negated utterances with non-epistemic interpretation (see (11)).

<sup>10</sup> Since Coates's definition of epistemic modality on these terms is seen as being primary, I start my investigation of the contexts of modal utterances in Chapter 3 by discussing the typical epistemic contexts as described in 2.1.1.

Root *may* was found to be strongly associated with the feature *interrogative*: there is a 100 per cent correlation between the Root meaning of *may*, expressing permission, and its appearance in interrogative sentences (Coates 1983: 139-143). Other syntactic features co-occurred with Root meanings of *may*, but not to a degree where a statistical association could be established. Coates explains the fact that *may* does not exhibit association patterns as strong as *must* by claiming that it is considered formal and is rarely used in the Root sense, in which sense it is often replaced by *can*.<sup>11</sup>

## 2.2 Papafragou's criticism of Coates

One of the most influential criticisms of Coates's treatment of modality can be found in recent works by Papafragou (1998a, 2000). The first objection to the indeterminacy thesis formulated by Coates (1983) is that in this view "the English modals come out as a set of multiply ambiguous items; what is more, their candidate meanings seem to proliferate almost freely towards increasingly fine-grained categories" (Papafragou 1998a: 238). To account for the diversity of meanings found in the natural language data, Coates is forced to postulate the existence of different meaning clusters to which modals tend to belong. She also claims that all these meanings are gradient in terms of the relative strength of the modality expressed and the degree of subjectivity. One of the drawbacks of this approach, according to Papafragou, is that it can be difficult in some cases to justify the existence of some categories of meaning. Also, as Papafragou (2000: 25) points out, experimental psycholinguistic studies have found no support for Coates's analysis of gradience and merger.

Papafragou's second objection is that, although statistically well attested in the data, the difference in the contextual make-up of epistemic and non-epistemic utterances is nothing more than a tendency. In her 1998 article, Papafragou systematically shows that there are counterexamples to almost every claim about the correlation of certain features with epistemic or root interpretations. She then suggests that "we are dealing with a pragmatic, rather than a semantic phenomenon" (Papafragou 1998a: 260). She also points out that "although the fundamental point of ambiguity-based approach is the rigid distinction between the epistemic and various non-epistemic 'meanings' of the modals, [...] Coates [is] forced to recognise a wide

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<sup>11</sup> See 1.2.3.2 for similar observations.

range of intermediate cases, where for a variety of reasons the proposed semantic distinctions prove inert, indistinguishable or insufficient” (Papafragou 2000: 25).

Papafragou’s own claims about English modal verbs are rooted in Relevance theory (see Sperber & Wilson 1995). The main goal of her study is to “separate the contribution made by linguistically encoded information and inferential processes in the derivation of contextually attested interpretations of lexical forms” (Papafragou 2000: 8). She therefore adopts the relevance-theoretic view that “pragmatics uses as a basis the information provided by the grammar to arrive at the endpoint of the interpretation process (retrieving in the process a variety of communicated assumptions other than ‘what the speaker said’, e.g. intended implications)” (Papafragou 2000: 13). This view of pragmatics seems similar to that of Stalnaker (1999). Consider the two tasks he posits to be solved by pragmatic research:

There are two major types of problems to be solved within pragmatics: first, to define interesting types of speech acts and speech products; second, to characterize the features of the speech content which help determine which proposition is expressed by a given utterance. (Stalnaker 1999: 34)

It is the second problem that Papafragou aims to address by suggesting an alternative treatment of modals. Firstly, in her proposal, modals are monosemous.<sup>12</sup> One of the reasons this approach is appealing is that “it captures our intuitions relating to various interpretations of modal verbs by attributing them to the existence of an underlying basic meaning” (Papafragou 1998a: 244). Elaborating on Kratzer (1977, 1991) and Groefsema (1995), Papafragou suggests that modal meaning can be captured by the general tripartite structure in (17).

(17)  $R(D,p)$

(17) is then a schematic representation of a statement that a certain proposition  $p$  bears a certain logical relation  $R$  to a set of propositions in a do-

<sup>12</sup> See also Atlas (1989), who advocates a similar view on monosemy:

*My question has been:* In interpreting utterances are we *selecting* from the linguistically given readings of a syntactically or lexically *ambiguous* sentence, or are we *constructing* from a meaningful but radically *sense-general* sentence a contextually determined interpretation of an utterance, an interpretation whose content is far more specific than the literal meaning of the sentence?

*My answer has been:* In interpreting utterances we are, more often than philosophers and even linguists have recognized, doing the latter. (Atlas 1989: 28-29)

main  $D$  (Papafragou 2000: 40). With modals,  $R$  is “the logical relation of entailment or compatibility,” and  $D$  plays the role of a restrictor “responsible for the different types of modal concepts which a modal expression is capable of expressing in different contexts” (Papafragou 2000: 40). The restrictor can be either linguistically indicated, as in (18), or pragmatically inferred, as in (19).

(18) If you want to get good grades, you **must** study hard.

(19) You **must** study hard.

Following the relevance-theoretical framework, an important assumption about the nature of the domains that serve as restrictors in modal utterances is that human memory is organised in terms of domains, i.e. propositions are stored in memory as belonging to different domains. Papafragou names a few examples: the factual domain to which all factual propositions belong, the regulatory domain which includes rules and regulations, etc. (Papafragou 2000: 42).

The semantics of *may* and *must*, proposed by Papafragou (2000: 43) is presented in (20).

(20) **Must:**  $p$  is entailed by  $D_{\text{unspecified}}$

**May:**  $p$  is compatible with  $D_{\text{unspecified}}$

A proposition  $p$  is either entailed or compatible with a set of propositions belonging to an unspecified domain  $D$ . The fact that the restrictor in these modals is unspecified indicates that they are quite general in meaning and therefore require elaborate pragmatic mechanisms to arrive at their interpretation. As Papafragou (2000: 49) points out “[t]he exact content and recovery of the modal restrictor pose the most interesting problems for the pragmatics of modality.” She describes this process as follows:

Generally, the intended (sub)domain for the comprehension of the modal has to contribute to an interpretation of the utterance which is accessible enough for the hearer, and capable of achieving adequate cognitive effects in a way compatible with the speaker’s abilities and preferences (i.e. an optimally relevant interpretation); furthermore the resulting interpretation should be one that the speaker could reasonably have intended to be optimally relevant for the addressee. In recovering the restrictor for a modal expression, the hearer, therefore, typically makes use of assumptions which are easily accessible from the encyclopaedic entries of the concepts in the complement proposition and other assumptions which are contextually available. Moreover,



since communication raises specific expectations of relevance, the hearer aims at reconstructing the type of background propositions the speaker has in mind. (Papafragou 2000: 49)

This applies to both root and epistemic interpretations of modals, the only difference being that with epistemic utterances *p* is a “representation of an abstract hypothesis, which is considered to be compatible with/entailed by the speaker’s set of beliefs” (Papafragou 2000: 70). In epistemic utterances, the relevant domain, which serves as the modal restrictor, consists of a set of propositions representing the speaker’s beliefs.

Although generally recognised as innovative and original,<sup>13</sup> Papafragou’s treatment of modality has been criticised on a number of points. One of the principal objections was raised by Traugott (2003), who argues *inter alia* that Papafragou’s synchronic treatment of English modals as monosemous is “unexplanatory because it does not account for the retention of aspects of older meanings as newer ones arise” (Traugott 2003: 664). However, it is not necessarily the case that a theory that concerns itself mainly with the synchronic system of modality should be attacked on these grounds. As de Saussure, who argued for a strict division between synchronic and diachronic linguistics, eloquently put it, “[s]ynchronic truth seems to be in denial of diachronic truth, and one who has a superficial view of things imagines that a choice must be made; this is really unnecessary; one truth does not exclude the other” (de Saussure 1966: 96). If a polysemy account illuminates the historical development of English modals, and a monosemy account better relates the story of the synchronic system of the modals in English, there is no reason to discard the latter only because it may be inadequate for diachronic observations. These two approaches, according to de Saussure, do not have to compete.<sup>14</sup>

Another objection concerns an issue of a more theory-specific kind – the assumptions about how human memory storage is organized. Klinge (2002) points out that “if we accept the supposition that we organise our mental inventory of propositions in domains, the number of potential domains, sub-domains and cross-domains is no doubt going to be quite substantial, far exceeding the domains vaguely proposed by [Papafragou], who is of course biased towards the few domains relevant in her context of

<sup>13</sup> See Klinge (2002) and Salkie (2002), for example.

<sup>14</sup> Support for this claim can also be found in Paradis (2005, 2006) who, although she does not adhere to the monosemy view, discusses lexical meaning in terms of the use potential of lexical items, i.e. “[m]eanings are [...] not inherent in the lexical items as such, but they are evoked by lexical items” (Paradis 2005: 544). She further distinguishes between what she terms “synchronic flexibility” and diachronic change.

inquiry” (Klinge 2002: 802). This is an important observation, since, according to Papafragou, complex modal notions are expressed by items with very general semantics. This shifts the burden, carried in polysemous approaches by the assumed elaborate semantic mechanisms, to some elaborate, albeit abstract pragmatic operation of recovering the so-called restrictor, a relevant domain to which the proposition in question is to be related. No suggestions are made about the possible constraints on the number and kind of potentially relevant domains, which may render the proposal as a whole not psychologically viable.

Traugott also mentions that “in essence Relevance Theory is a theory of processing” and that “[s]peaker’s choices are assumed, and hearer’s work is privileged” (Traugott 2003: 658–660). This is unfortunate since the coding of modal expressions, and the particular contextual features with which the speaker chooses to relate her message, is exactly what allows the hearer to decode modal utterances in the intended way, or in Papafragou’s view “to make use of assumptions which are easily accessible from the encyclopaedic entries of the concepts in the complement proposition and other assumptions which are contextually available” (Papafragou 2000: 49). Despite the fact that throughout her work Papafragou argues that modals are context-dependent expressions, she does not provide a satisfactory account of how the context of a modal utterance contributes to the interpretation of the modal. This detracts a great deal from her analysis, since the process of decoding modal utterances remains something of an abstract mystery. In her eagerness to promote her own thesis, Papafragou reduces the evidence from previous research about what choices speakers tend to make when coding modal utterances to mere “grammatical reflexes” (Papafragou 2000: 8), when in fact, it is exactly those “grammatical reflexes” that can provide further support to her argument. This also seems to oppose Stalnaker (1999), who draws our attention to *inter alia* “the features of the speech content which help determine which proposition is expressed by a given utterance” (Stalnaker 1999: 34). These features are not only to be understood in terms of pragmatic context, as in Papafragou’s account, but also in terms of the linguistic features encoding the utterance. Further, in my interpretation, Papafragou’s (2000) “grammatical reflexes” are referred to, among other things, as “collateral information” in Atlas’s account: “In interpreting the utterances of sense-general sentences, we are not selecting from the readings of an ambiguous sentence; we are CONSTRUCTING from the definite but general sense and from collateral information a specific content” (Atlas 1989: 31). If we accept Papafragou’s claims about the meaning of English modals, these come out as sense-general expressions.

Thus, in interpreting modals, we cannot afford to disregard the contextual information available.<sup>15</sup>

Regardless of what theoretical basis one chooses for one's research, be it a polysemy or a monosemy approach to modality, a thorough investigation of the contexts of modal utterances – wide in Papafragou's sense and narrow in Coates's sense – is necessary. It is through these contexts that we may discover how the speaker's choices for coding modal utterances affect the way an utterance is decoded by the addressee. I tend to agree with Klinge (1996), who claims that "the epistemic vs. non-epistemic opposition does not reside in the modal, [...] it is to be described as a result of contextualization" (37). Accordingly, in the chapters that follow, I argue that the role of narrow context disregarded by Papafragou is crucial for the interpretation of modal expressions.

Many researchers, including Coates (1983), have tried to explain how contextual features influence our understanding of an utterance or a modal as epistemic or non-epistemic. As I just mentioned, the significance of context should not be underestimated irrespective of the theoretical framework within which the researcher works. The working definition of context that I adopt in this study follows closely that of Klinge (1996), who also explains its importance in the process of decoding:

Context is understood as the set of assumptions available to and employed by an addressee to interpret an utterance of a sentence. Context is utterance specific. One sub-part of context is the meaning encoded in the propositional content of a sentence, which is distinct from, but in the scope of, a modal. The propositional content of a sentence is independent of a given utterance, but in an utterance of the sentence it triggers some of the assumptions employed by the addressee to make sense of the utterance, and it follows that the propositional content of a sentence plays an important role in interpreting meaning. (Klinge 1996: 37-38)

In the following chapters I will try to illuminate the role of propositional context in the interpretation of the modals *must*, *may*, *måste* and *kan* in my data, starting with the features assumed by Coates (1983) to be associated with epistemic modality.

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<sup>15</sup> See also Gumperz (1992) who argues that "[c]ontextualization relies on cues", and that these can be found "at different levels of speech production: (i) prosody, (ii) paralinguistic signs, (iii) code choice, and (iv) *choice of lexical forms or formulaic expressions*" [my emphasis] (Gumperz 1992: 231).

## Summary

In this chapter, I first presented the findings of Coates (1983), who demonstrated that certain contextual features are associated with epistemic and non-epistemic modalities. I acknowledge, however, that in doing so Coates does not offer an explanation of why these features are of importance for modal interpretations, whether they are related in any way, and whether their co-occurrence in modal utterances further affects the interpretation.

Secondly, I address some of the criticism of Coates presented in Papafragou (1998a) and (2000), whose own explanation of the mechanics of interpretation is based in Relevance theory. Although claiming that modals are context-dependent expressions, Papafragou does not offer a comprehensive account of the contribution of propositional context to modal interpretation. I consider this one of the major drawbacks of her approach. I further argue that it is not only possible but necessary to explicitly investigate the effect of context on the interpretation of a modal utterance.

# 3 Modals in context

## Abstract

This chapter presents the analysis of the data extracted from the ESPC. One of the aims of this chapter is to test the validity of Coates's (1983) claims as to the association of certain features with different modalities on a more extensive set of data for the selected modals in English and Swedish. Thus, initially, I focus on the features discussed by Coates and their association with modal interpretations in my data. However, it soon becomes apparent that this list of features is incomplete for both the English and the Swedish data. Thus, a secondary goal of this chapter is to introduce other features that influence modal interpretations. Also, I argue that the difficulty of interpreting indeterminate utterances arises due to the inconclusive or conflicting arrangement of the contextual features discussed in the chapter.

In 3.1, I describe the contexts in which the English modals are found in the ESPC, and 3.2 provides the same information about the Swedish modals. In 3.3, a number of indeterminate examples are examined with respect to the presence of the relevant contextual features.

## 3.1 English modals

In the sections that follow, I discuss the English modals under investigation, *must* and *may*, and the contexts in which they appear in the corpus, focusing on the features mentioned in 2.1.1.

### 3.1.1 *Must*

As Table 1 shows, the study of *must* paints an intriguing picture. Firstly, the association between Coates's features and epistemic interpretations is not absolute. Secondly, in the case of *inanimate subject*, an association barely

exists. Thirdly, since the total number of epistemic examples in the corpus is smaller than the number of epistemic examples involving each of the features, we can conclude that often in epistemic utterances more than one feature is present in the propositional context (the features appear 191 times in the 162 epistemic examples).

Table 1. *Must* and the contexts in which it appears in the ESPC

	Frequency (N of examples=461)	Frequency (epistemic examples only) (N of epistemic examples=162)
Perfect aspect	91	91
Progressive aspect	7	7
Introductory subject	36	25
State verb	180	111
Inanimate subject	151	57
<b>TOTAL:</b>	<b>465</b>	<b>191</b>

In the sections that follow, I will discuss each of the features in detail.

### 3.1.1.1 *Perfect and progressive aspect*

As Table 1 demonstrates, all of the utterances with perfect aspect are also interpreted epistemically. Consider the following:

- (1) “Simon, that **must** have been an awfully strong drink”, said Maria. (RDA)<sup>1</sup>  
Epistemic
- (2) He even said to her that they **must** have read the same book. (RR) Epistemic

Sentences (1) and (2) contain different types of predicates: (1) contains the copula *be*, and (2) an event verb, *read*. This difference, however, does not seem to influence the epistemic interpretation in any way. It is the presence of the aspectual modification in combination with an anterior time reference for the proposition that promotes an epistemic interpretation (see 4.1.3 for a discussion of this phenomenon).

The absence of non-epistemic utterances modified by the perfect aspect can be explained by the nature of the non-epistemic modality expressed by *must* (in the sense of obligation): it is performative (cf. the description of

<sup>1</sup> Here, and in the subsequent examples the abbreviation in parenthesis is the notation used in the ESPC to indicate the source text. For a list of texts in the ESPC see <http://www.englund.lu.se/corpus/corpus/webtexts.html>.

directed deontic modality in 1.1.2.1), and thus immediate to the time of the utterance. Furthermore, in such utterances the action described by the main verb is not actualised until the addressee chooses to act in accordance with, or in defiance of, the permission, prohibition, or command given by the speaker; this makes it quite impossible to express these notions in an aspectually modified utterance with anterior or even simultaneous time reference for the proposition.

- |     |  |   |                       |
|-----|--|---|-----------------------|
| (3) | You <b>must</b> go to the party.               | → | Command               |
| (4) | You <b>must</b> <u>have gone</u> to the party. | → | *Command              |
| (5) | You <b>must</b> <u>be going</u> to the party.  | → | *Command <sup>2</sup> |

In (3), the speaker orders the addressee to go to the party. The speaker is perceived to have some authority over the addressee, and the proposition is to be carried out subsequent to the time of the utterance. These features allow us to interpret (3) as a typical command. In (4) and (5), the time reference for the proposition is anterior or simultaneous to the time of modality,<sup>3</sup> respectively,<sup>4</sup> and the action cannot be controlled by the agent. Consequently, posterior time reference for the proposition seems to be crucial for the utterance to be interpreted as a command.<sup>5</sup>

That posterior reference is crucial for non-epistemic interpretation is demonstrated by (6) and (7).

- |     |   |           |
|-----|---|-----------|
| (6) | You <b>must</b> have finished your paper, since you are busy watching football. | Epistemic |
| (7) | You <b>must</b> have finished your paper by tomorrow.<br>(Papafragou 2000: 102) | Deontic   |

<sup>2</sup> See however, the discussion of (11), where an utterance modified by the progressive aspect can, in certain circumstances, receive a non-epistemic interpretation, albeit not as a direct command.

<sup>3</sup> It is, of course, possible to interpret (5) as having posterior time reference for the proposition. This interpretation is not taken into account in the present discussion. See, however, the discussion of (7).

<sup>4</sup> It is sometimes possible, however, to find non-epistemic utterances modified by the progressive aspect in, for example, recipes (e.g. *The water must be boiling when you add sugar*) (Eide, pc). Firstly, it is debatable whether the time reference for the proposition is posterior in these cases. Secondly, there is always an implicit or explicit condition present in the propositional or situational context of such utterances, i.e. 'the fulfilment of the instruction expressed in the utterance is necessary for the successful completion of the dish'. The presence of an implicit or explicit condition in the context is crucial for non-epistemic interpretations of utterances containing *must*, as argued in 4.1.4.

<sup>5</sup> Cf. Lyons's (1977: 843) remark on this point: "*John may come yesterday* construed as a permission-granting utterance is semantically anomalous for the same reason that *Come yesterday, John!* is anomalous".

As predicted, (6) is interpreted as epistemic, while (7) is not.<sup>6</sup> The only difference between (6) and (7) is the time adverbial *by tomorrow*, which coerces a posterior reference for the proposition in (7). Since the action described by the proposition is situated in the immediate future, and all the features, except the perfect form, are consistent with our understanding of directed deontic modality, (7) is interpreted as deontic. Thus, it is possible to paraphrase (7) as ‘It is necessary that the action described in the proposition (writing a paper) is completed by tomorrow’.

All examples found in the corpus modified by the progressive aspect are interpreted as epistemic.

- (8) “You **must** be missing your country in this weather, no? – you always have sunshine don’t you?” (BR) Epistemic
- (9) You only have to drive through the West Midlands to see that if we are in the Super-League of top industrial nations, somebody **must** be moving the goalposts. (DL) Epistemic

The fact that the progressive aspect often promotes an epistemic interpretation does not necessarily prove the initial hypothesis that aspectual modification *per se* is associated with epistemic modality. Consider, for example, the utterance in (10).

- (10) We **must** be leaving soon. (Papafragou 2000: 102)

Papafragou claims that this example is non-epistemic. However, in certain contexts, it can be interpreted as either epistemic or deontic: (11) is epistemic, and (12) deontic.

- (11) I see that my husband has started packing, so we **must** be leaving soon. Epistemic
- (12) We **must** be leaving soon, if we are to catch the 9 o’clock train. Deontic

Both (11) and (12) have posterior time reference for the proposition. This indicates the impossibility of distinguishing between epistemic and non-epistemic utterances modified by progressive aspect on the basis of posterior time reference alone. In (11), for example, the speaker expresses a confident judgement on the basis of the evidence at hand. (12), on the other hand, is a conditional statement (see 4.1.4 for a detailed discussion). It

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<sup>6</sup> Although examples such as (7) are not found in the ESPC, they are perfectly grammatical, albeit infrequent, utterances in English.



contains an explicit condition. However, such a condition does not have to be expressed explicitly. It can also be left implicit, and be inferred from the situational context.

### 3.1.1.2 Introductory subject

Introductory subject is a feature strongly associated with epistemic interpretations in the ESPC, which supports Coates's findings. However, some of the examples containing an introductory subject are interpreted as non-epistemic.

- (13) There **must** have been something much more personal in it. (BR)                      Epistemic
- (14) I mean, there **must** be dozens of ways out. (RR)    Epistemic
- (15) There **must** be a wider approach to fisheries which includes transparency, cooperation and harmonization of data and administrative documents. (EHUD)                      Deontic

The utterance in (13) is aspectually modified utterance, and contains an introductory subject. Since the proposition involves a stative situation (see 3.1.1.3) with an anterior time reference, the utterance is interpreted as epistemic, analogous to other perfect utterances. The presence of an introductory subject does not seem to be the primary cause for the epistemic interpretation, but may be a supporting feature in this case.

In (14), there is an introductory subject, and the time reference for the proposition is simultaneous with the modality expressed in the utterance, i.e. the proposition is situated in the present. This is consistent with an epistemic interpretation. The presence of the hedge *I mean* also supports an epistemic interpretation in this case.

Example (15), on the other hand, is interpreted as non-epistemic, despite the fact that it contains an introductory subject. The context of this utterance is that the European Union should strive for the normalization of the fishing standards for its members. To begin with, the proposition is situated in the (immediate) future, i.e. a wider approach to fisheries was not a reality at the time the speech was written. Also, such an approach to fisheries is needed to fulfil the overall implicit condition, namely the successful achievement of common fishing standards for the member states. It is these two features, the posterior time reference and the presence of an implicit condition, that indicate *inter alia* that there is some source in-

interested in the proposition being carried out. This promotes a non-epistemic interpretation.

### 3.1.1.3 *State verb*

A strong association exists between the occurrence of a state verb in an utterance and an epistemic interpretation.

- (16) Even so, it<sup>7</sup> **must** be all balls, a mirage massaged from statistics. (DL)      Epistemic
- (17) Well, it all goes to show that I **must** have been mad to try to pretend that the sexes were much the same. (MD)      Epistemic
- (18) And to make it work, we **must** both be fulfilled people. (AH)      Deontic

The utterance in (16), containing a state verb (the copula *be*) and a proposition with simultaneous time reference, is interpreted as epistemic. (17), on the other hand, has anterior time reference. Nevertheless, it is also interpreted epistemically, similarly to other aspectually modified examples with past time reference for the proposition. In (18), the time reference for the proposition is posterior. The utterance also contains an explicit condition. These two features promote a non-epistemic interpretation.

It is, of course, necessary to consider here the semantic implications of the occurrence of a state verb in an utterance (see 4.1.2). It is not state verbs themselves that promote epistemic interpretation, but the fact that they denote states, as opposed to event verbs, which denote events or processes. A state is normally not controlled by the subject or the speaker, whereas events and processes can often be directed. Thus, in this study, the discussion of state verbs focuses primarily on their semantic implications, i.e. the fact that normally a state cannot be controlled (see 4.1.2).

### 3.1.1.4 *Inanimate subject*

It is reasonable to assume that inanimate subjects usually do not constitute suitable agents in deontic utterances, since at least directed deontic modality usually involves notions such as speaker authority, volitionality, and intent, normally associated with animate, conscious subjects (cf. Coates 1995). This prediction is borne out in Coates's (1983) study. In my data, however, a much weaker association exists between this feature and epis-

<sup>7</sup> *It* is referential here, referring to the claim that Britain has become an industrial super-power again.

temic interpretation. In Chapter 4, I offer an explanation for this discrepancy, based on different combinations of contextual features.

A large number of utterances with inanimate subjects in the data are interpreted as deontic. In (19), the inanimate subject *every position* is combined with a passive form of an event verb (*held*).<sup>8</sup>

- (19) He told his troops, in the famous order of the day, on 11 April, “Every position **must** be held to the last man: there must be no retirement. With our backs to the wall, and believing in the justice of our cause, each one of us **must** fight to the end”. (CAOG)  
Deontic

- (20) The final package **must** perforce reflect Parliament’s priorities. (EMCC) Deontic

The deontic interpretation arises partly from the fact that the British commander-in-chief, Field-Marshal Haig, to whom this quote is attributed, is assumed to have the authority to give such an order. A deontic interpretation is also promoted by the fact that an implicit condition can be derived from the context, i.e. the fulfilment of this order was necessary for the Allied victory over the Germans in the First World War. An implicit condition can also be derived from the context in (20), i.e. in order to achieve a democratic legitimacy for a certain European programme, Agenda 2000, the final version of this document must reflect the priorities of the European Parliament. The presence of these conditions promotes a deontic interpretation in the above utterances.

There are also a number of epistemic utterances containing an inanimate subject. In the epistemic (21), the inanimate subject *Greville’s affairs* is combined with a state verb, the copula *be*. In (22), also interpreted epistemically, the inanimate subject *those thick lenses* is combined with the perfect form of an event verb *distort*.

- (21) Greville’s affairs, I thought with a smile, **must** be amazingly healthy. (DF)  
Epistemic

- (22) Imagine how those thick lenses **must** have distorted the world. (BR) Epistemic

It seems that it is the combination of an inanimate subject and a state verb that promotes the epistemic interpretation of (21). If we replace the state

<sup>8</sup> Note that in the same context a different modal leads to an ambiguous utterance (e.g. *Every position may be held to the last man*), where the interpretation is either epistemic or deontic (permission). This corresponds to the semantics of modals discussed in Papafragou (2000: 40) in terms of the entailment and compatibility relations between the propositions containing these modals and the restrictor domain (see also 2.2), and, thus, reflects the individual contributions of modals to the interpretation.

verb with an event one, the utterance becomes ambiguous between an epistemic and a non-directed deontic interpretation (*Greville's affairs must become healthier*). The substitution of the inanimate subject with an animate one does not seem to have the same impact: the utterance is still interpreted as epistemic (*He must be amazingly healthy*). Another feature contributing to the epistemic interpretation of (21) is, of course, the presence of an amplifying adverb *amazingly*,<sup>9</sup> which serves to make the speaker's involvement evident. If we manipulate the utterance by excluding the adverb from the immediate context, the utterance *Greville's affairs must be healthy* may, in some environments, be ambiguous between epistemic and deontic interpretations. Thus, the presence of an inanimate subject cannot be considered the only feature promoting an epistemic interpretation in this case.

In (22), on the other hand, the presence of the inanimate subject seems to provide a strong motivation for the epistemic interpretation: if we exclude the aspectual modification from the propositional context of this utterance, the epistemic interpretation still stands (*Imagine how those thick lenses must distort the world*). The effect of the inanimate subject on the interpretation is greatly reduced, however, if we rewrite the exclamation into an ordinary declarative sentence (*These thick lenses must distort the world*). This results in a sentence like the modified (21), ambiguous between epistemic and deontic interpretations. Again, it seems that the combination of anterior time reference for the proposition (implied by the use of perfect aspect), the exclamation, and the inanimate subject promotes epistemic interpretation.

### 3.1.2 *May*

As can be seen in Table 2, *may* seems to be a much more 'typical' epistemic modal than *must*, since it has an epistemic interpretation in the majority of examples (275 epistemic examples out of a total of 306).

Note also that the features discussed in Coates (1983) are an almost perfect match for the environments in which *may* is found in the corpus. As with *must*, the features under investigation combine with each other (all of the features appear 396 times in the 275 epistemic examples).

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<sup>9</sup> Quirk *et al.* (1985: 445–446) suggest that an adverb modifying (gradable) adjectives is usually “a scaling device called intensifier”. *Amazingly* is in the category of intensifiers, which have amplifying function: “amplifiers scale upwards from an assumed norm”.

Table 2. *May* and the contexts in which it appears in the ESPC

	Frequency (N of examples=306)	Frequency (epistemic examples only) (N of epistemic examples=275 <sup>10</sup> )
Perfect aspect	34	34
Progressive aspect	12	12
Introductory subject	21	21
State verb	175	171
Inanimate subject	162	158
<b>TOTAL:</b>	<b>404</b>	<b>396</b>

The distribution of these features is discussed in detail in the following sections.

### 3.1.2.1 *Perfect and progressive aspect*

There is an absolute correlation between the occurrence of perfect aspect and epistemic interpretation. Consider the following examples:

- (23) It was not, Kate recalls, a very pleasant community anyway, and her mother **may** have had good reasons for spurning it, but that did not make life any more agreeable.  
(MD) Epistemic
- (24) It is unlikely that Stalin was ever, as has been suggested, an Okhrana agent, though the Okhrana **may** well have tried to recruit him. (CAOG) Epistemic

Examples (23) and (24) are both interpreted as epistemic, since the time reference for the proposition is anterior. The fact that there is a state verb in (23), whereas the main predicate in (24) is an event, does not seem to make a difference in these examples.

All instances modified by the perfect aspect in the ESPC have anterior time reference for the proposition with respect to the time of the modality expressed. This is not an indication, however, that aspectually modified utterances with *may* cannot have posterior reference. Consider the following:

- (25) Your students **may** have handed in their assignments by next Friday  
(they are all so diligent). Epistemic

<sup>10</sup> Examples with both epistemic and weak epistemic interpretations are included in this column (for definitions of these terms see 1.1.1).

In (25), the time reference for the proposition is posterior. However, unlike *must*, *may* does not normally allow a non-epistemic interpretation in these cases. According to Huddleston and Pullum (2002: 182), “[e]pistemic *may*, [...], occurs freely in future situations where its deontic use is much less frequent than that of *must*”. There is no deontic force in such an utterance, and it is interpreted as any other epistemic statement about the future. The difference may lie in the fact that *must* expressing confident inference/obligation/necessity is somewhat odd in epistemic utterances with posterior reference; normally, we cannot felicitously make statements about the future that will necessarily hold true. On the other hand, all things being equal, *must* easily allows deontic interpretation in utterances with posterior reference for the proposition, thus demoting epistemic interpretation.<sup>11</sup> Being located on the opposite end of the epistemic scale, *may* allows a possibility interpretation, and is therefore suitable in epistemic utterances with posterior time references, i.e. utterances denoting some future state of affairs, even when they are aspectually modified. This is consistent with the semantic input of the individual modals discussed in Papafragou (2000) (see 2.2).

An interesting discrepancy arises if we consider utterances with posterior reference that are not aspectually modified, as (26) through (31) show.

- (26) We were at mass and the Donnellys were behind us and Father Moloney said, - You **may** be seated. (RDO) Deontic
- (27) “**May** we open the windows, Mr Baker?” asked the Queen. (ST) Deontic
- (28) “Don’t take nothin’ from the likes of him. That’s your first mistake. Comin’ round this place **may** be the next”. (SG) Epistemic
- (29) When his collections have been examined, it **may** emerge that he was a more significant figure in the art world than is at present understood. (RDA) Epistemic
- (30) One thing I can do is write a book which some people **may** enjoy. (BR) Epistemic

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<sup>11</sup> Admittedly, there are epistemic utterances with this particular contextual make-up: *John didn’t show up today, I guess he must be arriving tomorrow*. In such utterances, the epistemic interpretation is triggered by a combination of features: the presence of a hedge, aspectual modification, etc. Indeed, the epistemic interpretation of an utterance containing *must* in combination with posterior reference for the proposition is possible in some specific contexts. Huddleston and Pullum (2002: 182) cite one such context, where *must* appears in an utterance with posterior time reference for the proposition in conjunction with a modal adverbial *surely*: *It must surely rain soon*. Note that here the subject, the non-referential *it*, also contributes to an epistemic interpretation.

- (31) “I already like it”, he said on their first day; “I **may** even get to love it”. (AH)  
Epistemic

Sentences (26) and (27) are examples of assertive and non-assertive directed deontic utterances, respectively. In (26), the speaker, having authority over his audience, gives them permission to sit down, an action which is to be carried out after receiving the permission. In (27), the speaker asks for permission to carry out the action of the main predicate, i.e. opening the windows. This action is supposed to take place after receiving the permission. In both cases, there is a responsible agent to carry out the action in question, as well as someone interested in the proposition being carried out. Moreover, there is an asymmetric relationship between Father Moloney and his audience in (26) and Mr Baker and the Queen<sup>12</sup> in (28), i.e. the former has authority over the latter, and thus is able to give the permission to the latter to carry out the action described in the proposition.

This is not the case in (28) through (31), which (despite having posterior reference) are all interpreted as epistemic. (28) and (29) both have inanimate subjects, *comin’ round this place* and introductory *it*, neither of which is suitable for the role of a responsible agent, or the role of a person authorized to give permission.<sup>13</sup> Moreover, in both utterances the main predicates are state verbs. In (30) and (31), on the other hand, we do have potentially responsible agents. Here, the epistemic interpretation is promoted by the semantics of the main predicates. In (30), the main predicate is a state verb *enjoy*, which normally denotes an involuntary state. Note that this verb does not assign the role of Agent to its subject but that of Experiencer. In (31), the main predicate is a catenative event verb indicating an involuntary change of state, *get to love it*. Thus, both predicates denote something the subjects, although in principle being responsible agents, have no control over, and can therefore not be ordered to carry out. Thus, posterior reference alone cannot be considered a crucial feature for the deontic interpretation of *may*, as was the case with *must*. Other features, such as animacy of the subject, and, in particular, that the subject has some control over the action described in the proposition, promote a deontic interpretation of *may*.

All examples in the corpus modified by progressive aspect are epistemic. That no deontic examples were found is possibly due to the fact that pro-

<sup>12</sup> From the context we learn that Mr Baker is the Queen’s keeper.

<sup>13</sup> Naturally, it is not often the case that the person authorized to give permission in some specific case is also the subject of a deontic utterance. This, however, is possible in utterances containing 1<sup>st</sup> person subjects, in which the speaker is at the same time the one who urges for a certain course of actions, and the one who is to carry out these actions: *I have to go to the dentist to have my teeth polished*.

gressive aspect usually indicates that the action or state described in the proposition is on-going. This effectively demotes the deontic interpretation, since it is infelicitous to permit or order something that is already happening, i.e. such situations are removed from the agent's control. However, as we observed in (11), utterances modified by the progressive aspect can obtain a posterior time reference for the proposition.

All the relevant progressive utterances found in the corpus seem to have at least one thing in common besides the epistemic interpretation.

- (32) Whatever happens at any given moment **may** have been lying dormant in the blood for years. (BR) Epistemic
- (33) But nobody seems to suspect that I **may** be losing confidence in myself. (BR) Epistemic
- (34) There is a growing fear among development planners, both North and South, that development is not only not happening, but that many of our official development aid organizations and policies **may** be doing more harm than good, both to humans and to the land. (LT) Epistemic
- (35) He had replied, "Deforestation **may** be being financed with our money, but it is very much against our philosophy". (LT) Epistemic

In (32), there is an inanimate subject, the proposition has anterior time reference, and the main predicate is stative. In (33), the time reference is simultaneous, the subject is animate, and the main predicate is an event verb. In (34), we have a metonymic subject in combination with an event verb, and in (35) there is an inanimate subject and a state verb. Despite these surface differences, the one thing these examples have in common is that all of the propositions denote an action or state that is involuntary, and that the subject is not in control of the situations described in these propositions. The subject of (32) has no control over its 'actions'. In (33), even if the subject is perfectly capable of controlling his actions, the predicate denotes a psychological change over which few have control. Likewise, it is hard to imagine that doing harm is a conscious choice for development aid organizations in (34), and that the situation is undesirable is clearly indicated by the use of the concessive in (35). It is therefore difficult to evaluate the exact contribution of the progressive aspect for the interpretation in these examples, since other features are present in these utterances that may contribute to an epistemic interpretation.



### 3.1.2.2 Introductory subject

All of the examples in the corpus with introductory subjects and the modal *may* are interpreted as epistemic, corroborating Coates's assumptions.

- (36) When his collections have been examined it **may** emerge that he was a more significant figure in the art world of his time than is at present understood. (RDA)  
Epistemic
- (37) There **may** be an appearance of order and reason at the Intercontinental, where the bell captain still appears while there is rioting and rebellion round the corner, but the real truths lie beyond the hotel lobby. (AS)  
Epistemic
- (38) It **may** well have been that Thera's elders felt that here at last was a straightforward job for this somewhat troublesome cleric, far off the main roads, where he would settle down and avoid controversy and where his eccentricities would go unnoticed. (LT)  
Epistemic

The presence of an introductory subject in an utterance indicates not only that the utterance necessarily describes a stative situation, and is thus removed from the agent's control, but also that there is no suitable agent in the context of the utterance. Other features shown to be of importance for the interpretation elsewhere contribute to the impact of the introductory subject.<sup>14</sup> For instance, in (36), first mentioned as (29), the time reference is posterior to the time of the utterance. In (37), it is simultaneous with the time of the utterance, and in (38) it is anterior to the time of the utterance. This, however, does not seem to influence the interpretation of these examples, despite the fact that time reference may influence the interpretation in contexts that do not contain an introductory subject.

### 3.1.2.3 State verb

As can be seen in Table 2, there is also a strong correlation between epistemic interpretation and the presence of a state verb. The utterances containing state predicates in my data vary in terms of the time reference for the propositions they express.

- (39) She **may** be at the nursing station. (AH)  
Epistemic
- (40) What we share, Jon and I, **may** be a lot like a traffic accident, but we do share it. (MA)  
Epistemic

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<sup>14</sup> See, however, the discussion of (57) and (58).

Sentences (39) and (40) both have simultaneous time references. However, while (39) has an animate subject *she*, (40) has an inanimate subject *what we share*. This does not seem to affect the interpretation: the subject, regardless of type, is not an intended agent as there is no deontic force expressed in these utterances. The fact that the time reference for the proposition is simultaneous with the time of the modality expressed is also consistent with an epistemic interpretation.

In (41) and (42), which also contain an introductory subject, the time reference for the proposition is anterior to the time of the modality expressed. Both utterances are also modified by perfect aspect. One of the differences between these utterances is that the subject in (41) is animate (*they*), whereas in (42) the notional subject is inanimate (*that I had grown tired of coming and going*). Once again, the difference in the type of subject does not seem to affect the interpretation.

- (41) They at first assumed that his oddities sprang from an excess of intelligence, as most such parents might fondly assume, and of course they **may** have been right, though by now it is too late to say. (MD) Epistemic
- (42) It **may** simply have been that I had grown tired of coming and going. (BO) Epistemic

Examples (43) and (44) both have a posterior time reference for the proposition, but different subjects: animate *future generations*, and inanimate *what seems a coincidence at the time*. In (44), an epistemic interpretation is also supported by the epistemic adverbial *well* (see further 4.2.1).

- (43) On the contrary, this stability will involve the rational use of renewable resources, keeping options open for future generations who **may** have a clearer understanding and appreciation than we do today of the value of such resources. (LT) Epistemic
- (44) But what seems a coincidence at the time **may** well look different later, link upon link. (BR) Epistemic

It is thus possible to conclude that state verbs in utterances with posterior reference for the proposition demote deontic interpretation, since, all things being equal, states cannot be controlled by an external agent. The other two features, time reference and subject type, do not seem in my data to be able to 'override' the interpretation imposed by the presence of a state verb. There are two special examples in the corpus that contain a state verb and that are interpreted epistemically: both are the so-called formulaic sub-

junctives or concessives (see Quirk *et al.* 1985: 157-158 and Palmer 1990: 52, 111), as in (45).

- (45) Be that as it **may**, he was dead by fifty-five and his wife died of throat cancer soon after. (FW1) Epistemic

According to Quirk *et al.* (1985: 157-158), formulaic subjunctives are used in set expressions, are formal, and convey expressions of will. However, (45) expresses admission or concession on the part of the speaker. Also, there is no deontic force expressed in this utterance. Palmer (1990: 52) seems to agree with this interpretation, claiming that concessives are “concerned with the consideration of possible propositions”.

### 3.1.2.4 Inanimate subject

The last feature mentioned by Coates as associated with epistemic modality is the type of subject. Whether the subject is animate or inanimate, however, can have different consequences depending on what other features are present in the context. In utterances with posterior reference that are not aspectually modified, the presence of an inanimate subject contributes to an epistemic interpretation, as in (28) and (29). In both of these sentences the main predicate is a state verb, which is also important for the interpretation (cf. discussion of (39-44)). In the utterances modified by progressive aspect in my data, the presence of an inanimate subject strengthens the impression that the action described by the proposition is involuntary or out of the subject's control. It is possible to argue that, all things being equal, the presence of an inanimate subject in an utterance may contribute to its epistemic interpretation, since a subject of this kind is obviously unable to carry out a command or fulfil an obligation usually expressed in deontic utterances. It is only in this sense that we can claim that inanimate subjects are associated with epistemic interpretations. In certain contexts, however, inanimate subjects do not demote a deontic interpretation (cf. (12) in 4.1.1).

### 3.2 Swedish modals

In the sections that follow, I investigate the Swedish modals *måste* and *kan* in the environments mentioned in Coates as being associated with epistemic modality in English.

#### 3.2.1 *Måste*

As can be seen from Table 3, *måste*, like *must*, is not used primarily to express epistemic modality: only 151 out of the 1013 examples in the corpus are epistemic.

Table 3. *Måste* and the contexts in which it appears in the ESPC

	Frequency (N of examples=1013)	Frequency (epistemic examples only) (N of epistemic examples=151)
Perfect aspect <sup>i</sup>	68	68
Introductory subject	65	40
State verb	234	90
Inanimate subject	474	55
TOTAL:	841	253

i) Since Swedish has no grammaticalised progressive aspect, this feature was omitted in the analysis.

The features under investigation also combine with each other in epistemic examples: the relevant features occur 253 times in the 151 epistemic examples.

##### 3.2.1.1 *Perfect aspect*

There is an absolute correlation between perfect aspect and epistemic interpretation: all 68 aspectually modified examples are interpreted as epistemic.

- (46) Med hans kunskaper om    hav **måste** han ha        haft        något  
with his    knowledge about sea    MOD    he    have-INF have-PART something
- med sjön        att göra. (BL) Epistemic  
with sea-DEF to    do-INF
- ‘As he seemed to know so much about sailing, he must surely have had something to do with the sea and ships.’<sup>15</sup>

- (47) Klockan **måste** ha varit närmare ett på natten när jag  
 clock-DEF MOD have-INF be-PART nearer one on night-DEF when I  
 hörde ljudet från en knattrande utombordsmotor. (BL) Epistemic  
 hear-PAST sound-DEF from a clattering outboard-motor

‘It must have been nearly one o’clock when I heard the sound from a clattering outboard-motor.’

- (48) Han tänkte hastigt att hon **måste** ha burit den med sig  
 he think-PAST fast that she MOD have-INF carry-PART it with REFL  
 hela tiden. (HM) Epistemic  
 all time-DEF

‘He had a fleeting thought that she must have been carrying it the whole time.’

- (49) Den **måste** ha ramlat ur bokhyllan av sig själv. (MG) Epistemic  
 It MOD have-INF fall-PART out bookshelf of REFL self

‘It must have tumbled from the bookcase by itself.’

All these utterances are interpreted epistemically. Besides the aspectual modification (and in the absence of a temporal adverbial specifying that the time reference for the proposition is posterior to the time reference of the modality expressed), there are other features present in these utterances. In (46) and (47), state verbs (*ha(va)* ‘have’ and *vara* ‘be’) are combined with an animate (*han* ‘he’) and an inanimate subject (*klockan* ‘clock’), respectively. In (48) and (49), event verbs (*bära* ‘carry’ and *ramla* ‘fall’) are combined with an animate (*hon* ‘she’) and an inanimate subject (*den* ‘it’), respectively. Combining state and event verbs with different subject does not seem to ‘override’ the impact of the perfect in combination with an anterior time reference in these utterances.

As with the English modals, the feature that often co-occurs with the perfect is anterior time reference for the proposition. All of the Swedish examples modified by the perfect aspect found in the corpus have anterior time reference for the proposition. However, as was the case with *must*, this should not be considered an absolute association. As with *must*, examples with posterior reference for the proposition modified by the perfect aspect can easily be constructed.

<sup>15</sup> All Swedish data found in the corpus are accompanied by translations from the ESPC (see also 1.3), whereas translations for constructed examples are provided by me. This is true also for the cases where the translation is missing.

- (50) Du **måste** ha avslutat dina uppgifter imorgon. Deontic  
 you MOD have-INF finish-PART your assignments tomorrow

‘You must have finished your assignments by tomorrow (since it is the date of the deadline).’

With *måste*, similarly to *must*, for the proposition in aspectually modified utterances promotes a deontic interpretation by cancelling the assumption that the situation described by the proposition is immutable, and as such cannot be controlled by an agent.

In (51), where the time reference for the proposition is anterior to the modality expressed, the interpretation is epistemic.

- (51) Du **måste** ha avslutat dina uppgifter vid det här laget. Epistemic  
 you MOD have-INF finish-PART your assignments at this time

‘You must have finished your assignments by now (since you have worked with them for such a long time).’

There were no examples in the corpus that were not aspectually modified, and where the time reference for the proposition was simultaneous to the time of the utterance. However, of the 468 examples with posterior time reference for the proposition, only 10 are interpreted as epistemic. This shows that although posterior reference for the proposition is a rather strong indication that the interpretation of utterances containing *måste* is deontic, there are examples where, despite the posterior reference, the deontic interpretation is demoted by the presence of other contextual features, as in (52) through (55). In these examples, the features are combined in such a way as to neutralize the effects of the posterior time reference and promote an epistemic interpretation (see also fn. 11 for a similar phenomenon in English).

- (52) Snart **måste** väl förklaringen komma. (BL) Epistemic  
 soon MOD MOD explanation-DEF come-INF

‘The explanation must come soon.’

- (53) Även med perfekt skötsel **måste** det någon gång inträffa en kalamitet. (PCJ)  
 even with perfect care MOD it some time happen-INF a calamity

‘Even with perfect care a calamity must occur someday.’ Epistemic

- (54) Den saken var något Torsten **måste** nog finna ut på  
 this thing-DEF be-PAST something Torsten MOD MOD find-INF out on

egen hand. (LG)  
own hand

Epistemic

‘That was something Torsten would obviously have to find out for himself.’

- (55) Om hon inte finns där så **måste** nån förr eller senare  
if she not exist-PRES there then MOD somebody before or later

börja sakna henne. (HM)  
start-INF miss-INF her

Epistemic

‘If she’s not on that list, someone is going to miss her sooner or later.’

In (52), an inanimate subject (*förklaringen* ‘the explanation’) and the epistemic particle *nog* ‘probably’ combine with an event verb (*komma* ‘come’). The situation is out of the subject’s control, since the subject is inanimate. It is understood that someone else is to provide an explanation in order to fulfil the speaker’s prediction, which normally will not preclude deontic interpretation (see e.g. (12) in 4.1.1 and (93) in the present chapter). Epistemic adverbials or particles affect the interpretation of an utterance containing a modal verb, as will be discussed in greater detail in 4.2.1. Indeed, the presence of an epistemic adverbial or particle in an utterance (both in harmonic and non-harmonic combinations) takes precedence over all other features: these adverbials are sentential, and thus take scope over the utterance as a whole. If the particle *nog* ‘probably’ were omitted, (52) would be ambiguous between a deontic and an epistemic interpretation, at least without additional contextual information. That such an adverbial or particle is crucial for the interpretation can be seen in (54): the utterance would be interpreted as deontic if not for the epistemic particle *nog* ‘probably’, since in this case the animate subject *Torsten* is in control of his actions. There seem to be no other features, such as, for example, a state verb, that would demote a deontic interpretation.<sup>16</sup>

In (53), there is no particle present. The subject of (53), however, is introductory, and combines with an event verb (*inträffa* ‘happen’). According to this verb’s semantics, nobody controls the change of state indicated by it. Additionally, the choice of the notional subject *kalamitet* ‘calamity’ indicates that nobody is interested in the proposition being carried out. The fact that the proposition describes an involuntary event that is not

<sup>16</sup> Note, however, that (54) may be interpreted by some speakers as ambiguous. In these cases, the speakers do not perceive the particle as necessarily epistemic, but see it as a face-saving device used in order to diminish the deontic force of an utterance (see Jucker 1993).

controlled by an agent is considered the reason for the epistemic interpretation.

Example (55) also contains a catenative verb indicating a change of state (*börja sakna* ‘start missing’), something we normally do not have control over. Even if the subject of this sentence, being animate, is a potentially responsible agent, the change of state described in the proposition is involuntary due to the semantics of the verb. In accordance with the arguments that will be put forward in Chapter 4, and the data analysis presented so far in this chapter, I claim that this particular combination of features demotes a deontic interpretation and promotes an epistemic one instead. That ‘involuntariness of an action’ and ‘absence of subject control’ are features to consider was also an important point in the discussion of (32) through (35).

In all of the above examples, the presence of epistemic adverbials, or adverbial clauses indicating the speaker's assumptions and expectations about the nature of the relevant state of affairs is important: *väl* in (52), *Även med perfekt skötsel* in (53), *nog* in (54), and *Om hon inte finns där* in (55).

#### 3.2.1.2 Introductory subject

There is a strong correlation between the presence of an introductory subject in an utterance and epistemic interpretation.

- (56) Det **måste** finnas ett Uganda också för mig. (HM) Epistemic  
it MOD exist-PRES an Uganda also for me

'There must be a Uganda for me somewhere.'

In (56), the influence of the introductory subject is quite clear. The time reference for the proposition is simultaneous with the time of the utterance, and, as is usually the case in utterances containing an introductory subject, the situation described by the proposition is stative. This combination of features promotes epistemic interpretation.<sup>17</sup>

<sup>17</sup> Admittedly, it is marginally possible to construe contexts in which this statement does not apply. Consider, for example, *Det måste finnas filt och kuddar i alla sängar* 'There must be a blanket and a pillow in every bed'. This example is ambiguous: given the appropriate context, this sentence can be interpreted as either epistemic ('I am certain this is the case since most beds I have seen before are like that') or deontic ('It must necessarily be the case, if we are to be comfortable', or even 'I (implicitly) order you to put blankets and pillows in every bed'). See also the discussion of (57)–(58) in this chapter, and (12) in 4.1.1.



However, not all of the examples containing an introductory subject were interpreted as epistemic: of 65 examples containing an introductory subject, 25 were interpreted as non-directed deontic.

- (57) För att miljökriser skall kunna förebyggas, **måste** det finnas  
for that environment-crises FUT be-able-INF prevent-PASS MOD there exist

infrastruktur, organisation och ökade resurser. (ETHE) Deontic  
infrastructure organization and increased resources

‘Prevention of environmental crises requires infrastructure, organization and increased resources.’

- (58) Nu **måste** det vara stora enheter. (SC) Deontic  
now MOD there be-INF big units

‘Now you have to have large units.’

In (57), an introductory subject is combined with a state verb (*finnas* ‘exist’). This example is therefore structurally similar to the epistemic (56). The only – and in my opinion crucial – difference is the presence of an explicit condition in (57). It is this feature that without exception promotes deontic interpretations in both the Swedish and the English data with *must* and *måste*. Such a condition does not have to be explicit but can be inferred from the situational context, as in (58), where the author discusses the financial difficulties that farmers with small-scale establishments experience. It is thus implied that to achieve economic success, farmers should work with large-scale establishments. In both utterances, the writer indicates that the necessity to act in a certain way arises from specific circumstances presented in the conditions stated. Thus, the presence of either an explicit or an implicit condition in the propositional or situational contexts of an utterance promotes a non-epistemic interpretation in both languages.

### 3.2.1.3 State verb

The data in Table 3 show that the presence of a state predicate alone does not promote an epistemic interpretation: of the 234 utterances containing a state verb, only 90 are interpreted as epistemic. This is contrary to the findings in the English data.

- (59) Så är det hemma hos oss, man **måste** vara uppmärksam på det,  
so be-PRES it at-home with us one MOD be-INF attentive on it

annars kan förfärliga saker inträffa. (AP) Deontic  
 otherwise MOD terrible things happen

‘That’s what it’s like at home and you have to pay attention to it, otherwise terrible things may happen.’

- (60) Han som tar emot samtal **måste** veta hur det ser ut. (HM)  
 he who take-PRES against calls MOD know-INF how it look-PRES out

‘The person taking the calls has to know what it looks like.’ Deontic

- (61) Men ändå **måste** paketet innehålla något som inte fick  
 but still MOD package-DEF contain-INF something that not be-allowed-PAST

bli tillgängligt för myndigheterna eftersom jag hade fått  
 become-INF available for authority-PL-DEF because I have-PAST get-PART

det när de visade sig på kajen. (BL) Epistemic  
 it when they show-PAST REFL on quay-DEF

‘On the other hand, the package must contain something that was not to fall in the hands of the authorities since it was handed to me when they appeared on the quay.’

In the deontic examples containing state verbs there is invariably either an explicit or an implicit condition present. In (59), there is an explicit condition: if one is not attentive, terrible things will happen. In (60), on the other hand, the condition is implicit, i.e. the policeman who will be in charge of the incoming calls should know what the necklace belonging to the deceased looks like, in order to be able to identify the most valuable tips.<sup>18</sup> Because of these conditions, both examples receive deontic interpretations. In (61), there is no such condition, but a state verb combined with an inanimate subject. The presence of these two features demotes a deontic interpretation and promotes an epistemic one instead. Thus, although examples containing state verbs are predominantly non-epistemic in the Swedish data, this is not due to the fact that there is only a weak association between this feature and epistemic interpretation, as was the case in the English data. Another feature, explicit or implicit condition, overrides its influence. That this is more apparent in the Swedish data could be a statistical coincidence, since it is also the case that the presence of explicit or im-

<sup>18</sup> In this case, the subject is also non-referential. This can be a feature contributing to the interpretation, since it has been observed that non-referential subjects favour deontic interpretation (cf. Barbiers 1995). For example, in *The applicant must be a fluent speaker of Swedish*, the most plausible interpretation is deontic, whereas in *John must be a fluent speaker of Swedish* both deontic and epistemic interpretations are possible if no other contextual features are present to disambiguate this example.

PLICIT condition in the English examples containing *must* is as crucial for promoting non-epistemic interpretations as it is in Swedish in utterances containing *måste*.

### 3.2.1.4 Inanimate subject

Inanimate subjects do not seem to be crucial for an epistemic interpretation, as can be deduced from the data in Table 3: only 55 of the 474 examples containing an inanimate subject are epistemic. However, as mentioned earlier, inanimate subjects should be considered in combination with other features.

- (62) Det jag har upplevt i den riktningen **måste** vara som  
it I have-PRES experience-PART in that direction-DEF MOD be-INF as

en vindfläkt i jämförelse med en stark bläst. (AP) Epistemic  
a breeze in comparison with a strong wind

‘What I’ve experienced in that direction must be like a tiny breeze in comparison with a howling wind.’

- (63) Klockan **måste** ha varit närmare ett på natten när jag  
clock-DEF MOD have-INF be-PART nearer one on night-DEF when I

hörde ljudet från en knattrande utombordsmotor. (BL) Epistemic  
hear-PAST sound-DEF from a clattering outboard-motor

‘It must have been nearly one o’clock when I heard a clattering outboard-motor.’

- (64) Det hade aldrig tidigare inträffat att jag varit ensam, men jag  
it have-PAST never earlier happen-PART that I be-PART alone but I

hade flera gånger tänkt att det med mina restider **måste**  
have-PAST many times think-PART that it with my travel-times MOD

hända förr eller senare. (BL) Epistemic  
happen-INF before or later

‘It had never happened before that I have been alone, but it had sometimes occurred to me that sooner or later I would be, considering the hours at which I travelled.’

In (62), the epistemic interpretation stems from the combination of an inanimate subject (*det jag har upplevt i den riktningen* ‘what I have experienced in this direction’) and a state verb (*vara* ‘be’). Neither an explicit nor an implicit condition is found in the context of this utterance, which, as

we saw earlier, would have overridden the influence of these features and promoted a deontic interpretation. In (63), originally presented as (47), the inanimate subject *klockan* ‘the clock’ is also combined with the state verb *vara* ‘be’. The utterance is further modified by perfect aspect, indicating that the time reference for the proposition is anterior, and the situation described is stative. As mentioned earlier, the presence of aspectual modification in an utterance with anterior time reference effectively demotes deontic interpretations (promoting epistemic ones). In this particular case, however, it could be argued that there are multiple contributing factors, such as the type of subject. Thus, in (63) the features that can demote deontic interpretation by bringing about the assumption of the lack of agentive control are combined in an optimal way to create this effect. In (64), the inanimate subject *det* ‘it’ is combined with a change of state verb (*hända* ‘happen’), and posterior time reference for the proposition with respect to the modality expressed. In all these examples, irrespective of the time reference for the proposition, the lack of control over the situation on the part of the subjects, and the fact that no condition can be found in the situational contexts demote a deontic interpretation.

In the non-epistemic examples found in the data, deontic interpretation is promoted by an explicit or implicit condition, and the lack of control on the part of the intended agent, in addition to the presence of other features, such as inanimate subject or passive verbs, as in (65) and (66).

- (65) I detsamma tutade ett signalhorn bortom kröken, och runt en ekdunge  
 in the-same hoot-PAST a horn beyond curve-DEF and round a oak-grove

som hösten redan slagit brun kom Henrys  
 that autumn-DEF already beat-PART brown come-PAST Henry-POSS

Heldenleben-Hutschkrummler blank och gul – i alldeles för hög fart  
 H-H shiny and yellow in utterly too high speed

som vanligt – och **måste** gira tvärt för en ekorre som just sprang  
 as usual and MOD turn-INF steeply for a squirrel that just run-PAST

över vägen. (ARP)  
 over way-DEF

Deontic

‘At that moment a horn tooted and round a clump of autumn-brown oaks came Henry’s Heldenleben-Hutschkrummler, all shiny and yellow – and far too fast as usual – so it had to brake hard and swerve to avoid a squirrel running across the road.’

- (66) Men för att få visshet **måste** berättelsen berättas. (BL) Deontic  
 but for to get-INF certainty MOD story-DEF tell-INF-PASS

‘But to gain certainty, there is no other way but to tell the story.’

In (65) and (66), the inanimate subjects (*Henry's Heldenleben-Hutschkrummler* ‘Henry’s Heldenleben-Hutschkrummler’ and *berättelsen* ‘the story’) are combined with implicit or explicit conditions, respectively. Again, the presence of either type of condition in the propositional or situational context of an utterance promotes deontic interpretations. In (66), the main predicate is also passivized. That the presence of this feature is important for the non-epistemic interpretation is more evident in (67).

- (67) Efter stor vända och samtal med Gud, beslöt min mormor att  
 after big anguish and talks with God decide-PAST my grandmother that  
 indianen **måste** gravsättas i trädgården. (RJ) Deontic  
 indian-DEF MOD bury-INF-PASS in garden-DEF

‘After great pangs of anguish and a private chat with God, my gran decided that the Indian must be buried in her garden.’

There is no condition present in the propositional or situational context of (67). The interpretation is nevertheless deontic, more precisely non-directed deontic. The subject (*indianen* ‘the Indian’) is inanimate, since it refers to what is presumed to be the mummified head of a dead Indian. This inanimate subject is combined with a passivized event verb (*gravsätta* ‘bury’). It is the combination of these two features, the necessity for the Indian to be buried (it is customary to bury the dead in general) and that, naturally, he has to be buried by somebody other than himself (he lacks control over the event denoted in the proposition), that promotes the non-directed deontic interpretation. As discussed in 4.1.3, for a passive utterance to be interpreted deontically two conditions must be met. Firstly, the speaker must have a specific agent in mind to carry out the proposition, and secondly – and possibly more importantly – the time reference for the proposition must be posterior to the time reference for the modality in order to leave the option to act open to this agent. Both conditions are met in (67).

Another feature important for deontic interpretation, whether in combination with an inanimate subject or not, is the past time reference for the

modality expressed in an utterance. Of the four modals investigated here, only Swedish *måste* can be used in this way, as demonstrated in (68).<sup>19</sup>

- (68) Men när man kom fram till spåret **måste** ekipaget hålla så  
 but when one come-PAST forward to track-DEF MOD equipage hold-INF so  
 att kusken fick lyssna efter annalkande tåg. (KE) Deontic  
 that driver-DEF be-allowed-PAST listen-INF after approaching train  
 ‘But when they got to the tracks the coach had to stop for the driver to listen for approaching trains.’

Here, the time reference for the modality expressed is past, i.e. some kind of past necessity is indicated in (68), resulting in a non-directed deontic interpretation. Note that even in this case the realization of the proposition comes after the necessity arises.

The fourth type of deontic example with an inanimate subject is similar to (69).

- (69) Hans kontaktnät **måste** förbli intakt och det fick inte utsättas  
 his contact-net MOD remain intact and it be-allowed-PAST NEG expose-PASS  
 för påfrestningar. (KOB) Deontic  
 for strains  
 ‘His network of contacts had to remain intact, and it must not be put under strain.’

Here, no condition can be found in the context. The utterance simply introduces the two principles by which the spy in question works. The time reference for the proposition is posterior. As mentioned earlier, all things being equal, posterior reference for the proposition, even in combination with an inanimate subject, may promote deontic interpretation in the case of both *måste* and *must*.

### 3.2.2 *Kan*

As can be seen from Table 4, almost 50 percent of the examples involving *kan* are epistemic. In addition, *kan* is interpreted as dynamic in 449 cases, which leaves only 61 examples with deontic interpretation, and 17 inde-

<sup>19</sup> Admittedly, in indirect speech, the English modals *must* and *may* can also occur in utterances with past time reference for the modality expressed (both with epistemic and non-epistemic interpretations): *He thought he must be mad*. However, these cases are different from utterances as in (68).

terminate ones. Thus, although *kan* is said to express three kinds of modality, the present study suggests that it is primarily used to express epistemic and dynamic modalities.

Table 4. *Kan* and the contexts in which it appears in the ESPC

	Frequency (N of examples=1001)	Frequency (epistemic examples only) (N of epistemic examples=468 <sup>i</sup> )
Perfect aspect <sup>ii</sup>	15	15
Introductory subject	47	47
State verb	167	131
Inanimate subject	401	320
<b>TOTAL:</b>	<b>630</b>	<b>513</b>

i) Most of the examples considered epistemic are actually weak epistemic: of the 468 epistemic examples 369 are weak epistemic.

ii) Since Swedish has no grammaticalised progressive aspect, this feature was omitted in the analysis.

Many of the examples classified here as epistemic are actually weak epistemic, and as such close to dynamic modality.<sup>20</sup> It can therefore be predicted that the boundary between epistemic and dynamic examples containing *kan* is not clear-cut, unlike the boundaries between the epistemic and deontic interpretations of the other modals under discussion. Another difference between *kan* and the other modals is that in the case of *kan* the features under discussion do not ‘cooperate’ to the same degree; the features occur only 512 times in the 468 examples. However, in the 99 strong epistemic examples found in the data, the features occur 149 times, while in the 369 weak epistemic examples they occur only 363 times. Thus, strong epistemic utterances containing *kan* exhibit similarity with other epistemic utterances.

### 3.2.2.1 Perfect aspect

As expected, all of the examples modified by perfect aspect are epistemic. In addition, all of them have anterior time reference, which, as we saw earlier, effectively demotes deontic interpretation.

- (70) Pyramiderna **kan** inte ha varit märkvärdigare när de  
pyramids-DEF MOD NEG have-INF be-PART more-amazing when they

<sup>20</sup> Cf. the discussion in section 1.1.1.1.

hittades i Egyptens sand. (AP) Epistemic  
 find-PAST-PASS in Egypt-POSS sand

‘The Pyramids can’t have been more amazing when they were found in the sands of Egypt.’

- (71) Hon **kan** såvitt jag förstår ha landat i den här åkern  
 she MOD as-far I understand-PRES have-INF land-PART in this here field-DEF

med fallskärm. (HM) Epistemic  
 with parachute

‘As far as I can tell, she landed in this field by parachute.’

In (70) and (71), modified by perfect aspect, the propositions have anterior time reference. That this should always be the case cannot, however, be concluded on the basis of the examples found, since examples with different time reference for the proposition can easily be constructed.

- (72) Han **kan** ha avslutat sitt arbete imorgon. Epistemic  
 he MOD have-INF finish-PART REFL work tomorrow

‘He may have finished his work by tomorrow.’

- (73) Han **kan** ha avslutat sitt arbete vid det här laget.  
 he MOD have-INF finish-PART REFL work at DEF here point-DEF

‘He may have finished his work by this time.’ Epistemic

In (72), the time reference for the proposition is posterior. *Kan* in this case is similar to *may*, which, as shown in (25), does not allow a deontic interpretation in this context. As in (25), there is no deontic force in (72), and it is interpreted as any other epistemic statement about the future. Thus, *kan*, like *may*, being situated on the opposite end of the epistemic scale from epistemic *måste*, allows for ‘possibility’ interpretations, and is suitable in utterances with posterior reference also when aspectually modified. This is consistent with the semantic distinction between *must* and *may* discussed in Papafragou (2000) (see also 2.2.).

In (73), on the other hand, the time reference for the modality expressed is simultaneous with the time of the utterance due to the temporal adverbial *vid det här laget* ‘at this point’. The time reference for the proposition is, however, anterior, and the implicature the aspectual modification sometimes brings about, i.e. that the situation described in the proposition has occurred, is not cancelled. In accordance with our earlier observations



about utterances modified by perfect aspect, anterior time reference for the proposition in these cases effectively demotes deontic interpretation, promoting epistemic interpretation instead, i.e. the situation thus described is immutable, and cannot be controlled by an agent.

While the above is true of modals that allow only deontic and epistemic interpretations, a complication arises regarding an additional interpretation available for *kan* in Swedish, namely dynamic interpretation, as in (74). Aspectually modified utterances such as (75), however, do not allow a dynamic interpretation.

- (74) Han **kan** spela piano.<sup>21</sup> Dynamic  
 he MOD play-INF piano

‘He can play the piano.’

- (75) a. Han **kan** ha spelat piano.<sup>22</sup> \*Dynamic  
 he MOD have-INF play-PART piano

‘He could have played the piano.’

- b. \*Han höll på att **kunna** spela piano.<sup>23</sup> \*Dynamic  
 he PROG MOD-INF play-INF piano

‘He was being able to play the piano.’

On a dynamic reading, the subject is described as having either an innate ability or one that has been acquired. In either case, the ability is a long-term quality of the subject (cf. Teleman *et al.* 1999: 302). Palmer (2001: 8) claims that “dynamic modality refer[s] to events that are not actualised, events that have not taken place, but are merely potential”. Thus, if someone has the ability to play the piano, it is not necessarily the case that this person is actually going to play the piano. Similarly, if someone had the ability to play the piano in the past, it is not necessarily the case that the person in question exercised his/her ability at any time in the past. Perfect

<sup>21</sup> Of course, (74) can also be interpreted as deontic, provided that there is some deontic source interested in the completion of the event.

<sup>22</sup> Swedish, unlike English, allows sequences like the following: *Han har **kunnat** spela piano* ‘He had been able to play the piano’, since many of the Swedish modals also have non-finite forms. In such cases, however, the modal tends not to be interpreted epistemically (cf. e.g. Cinque’s (1999) hierarchy of functional projections).

<sup>23</sup> Some speakers may in informal contexts use the construction presented in (75b) in the sense of ‘almost’, i.e. ‘He could almost play the piano’. Since examples such as (75b) are ungrammatical in Swedish in the indicated sense, this example was constructed for illustrative purposes.

aspect, on the other hand, indicates that the event described by the main predicate has been actualised. It is exactly because one cannot combine the notion of potentiality with the notion of actualization that the ability reading is impossible in (75a). (75b) is simply ungrammatical in Swedish. The non-grammaticalized progressive aspect, indicating that the event described by the main predicate is a present state and is thus actualised, clashes with the notion of potentiality in the dynamic interpretation.

That posterior time reference, and not merely aspectual modification, is important for epistemic interpretation can also be concluded on the basis of the Swedish *kommer att* V‘going to V’ construction, as in (76).

- (76) Det lugnar mig under denna tid då jag anar att mycket  
 it calms-PRES I-ACC during this time when I suspect-PRES that much
- oönskat **kan** komma att inträffa. (AP) Epistemic  
 unwanted MOD come INF happen-INF
- ‘It calms me during this time when I suspect that many undesirable things may happen.’

This kind of construction is possible in Swedish due to the nature of *komma att*, which can be used both as a finite auxiliary on its own and as an auxiliary infinitive in combination with a modal, as in (76). It may be argued that *komma att* has not achieved a full auxiliary status yet,<sup>24</sup> and has retained some of its original lexical meaning and syntactic behaviour, which allows it to enter into constructions such as (76). The infinitive *komma att* is used only when the time of the event is not specified by the context of the utterance. It is also mostly used as a complement to a discourse-oriented verb (e.g. epistemic *kan*) (see Telemann *et al.* 1999: 252).

Thus I argue that the future marker *komma att* can be considered more subjective<sup>25</sup> than its variant, the future marker *ska*, in that it indicates more speaker involvement or speaker intention.

- (77) Han **ska** åka till Stockholm på söndag.  
 he FUT go-INF to Stockholm on Sunday

<sup>24</sup> The recent development of *komma att* involves the loss of the infinitive marker *att*, so that constructions such as *komma göra* ‘will do’ instead of *komma att göra* have become more and more frequent in both formal and informal Swedish discourse (see Telemann *et al.* 1999: 244). When this development is completed, and *komma att* achieves full auxiliary status, constructions such as (76) may disappear (cf. *\*may will do*, *\*kan skall göra* ‘may will do’).

<sup>25</sup> The term ‘subjective’ is related here to the degree of speaker involvement (cf. Lyons (1977) on subjective (epistemic) modality).

‘He is to go to Stockholm on Sunday.’

- (78) Han **kommer att** åka till Stockholm på söndag.  
he *kommer att* go-INF to Stockholm on Sunday

‘He will go to Stockholm on Sunday.’

According to Teleman *et al.*, *ska* is a temporal verb indicating that the event described by the main predicate is subsequent to the time of the utterance. *Ska* also implies that this future event is planned, either by the subject or by somebody else who has the authority to impose her will on the subject (Teleman *et al.* 1999: 246). Thus, *ska* is not only more objective, in the sense that there is no speaker involvement as such, but a parallel may be drawn between the future and the deontic interpretation of *ska*. *Komma att*, on the other hand, does not imply that the event described by the main predicate is planned or intended; it does, however, indicate a more or less competent prognosis on the part of the speaker. It also indicates that the speaker relies on some external circumstances in her prognosis (Teleman *et al.* 1999: 244). Thus, *komma att* may be seen as more subjective, and as such related to epistemic modality. The subjectivity of *komma att* allows it to combine with another subjective element, namely epistemic *kan* in (76). This combination, however, is not well-formed with the objective and fully grammaticalised *ska* (cf. \*?... *då jag anar att mycket öönskat kan skola inträffa* ‘when I guess that a lot unwanted MOD MOD-INF happen’). This claim is also supported by the fact that occurrences of *kan komma att V* are always epistemic.

### 3.2.2.2 Introductory subject

There is an absolute correlation in my data between introductory subjects and epistemic interpretation.

- (79) Det **kan** också vara chocken att upptäcka att hon lever. (BL) Epistemic  
it MOD also be-INF shock-DEF INF realize-INF that she live-PRES

‘It can be the shock of discovering that she is alive.’

- (80) Det **kan** väl hända att jag följer med till Stockholm i alla fall.  
it MOD MOD happen-INF that I follow-PRES with to Stockholm in all cases

‘I may well come along in any case.’ (MG) Epistemic

- (81) Det **kan** förstås också ha varit som med havet. (AP) Epistemic

it MOD MOD also have-INF be-PART as with sea-DEF

‘Of course it could have been as it was with the sea.’

As can be seen from the above examples, the time reference for the proposition does not seem to influence the interpretation of a modal utterance containing an introductory subject. In (79), the time reference is simultaneous, in (80) it is posterior, and in (81) anterior. Nevertheless, all these examples are interpreted as epistemic. The most important contribution of the feature *introductory subject*, however, is an implication that the involvement of the subject as a possible agent in these utterances is explicitly invalidated. The situation described in the proposition is also presented as stative, which, as mentioned earlier, can promote epistemic interpretation. A supporting feature for the interpretation of (79) through (81) is also the presence of an epistemic adverbial in (80) (*väl* ‘well’) and (81) (*förstås* ‘of course’).

### 3.2.2.3 State verb

Most of the examples with a state verb, 131 of 167, are interpreted as epistemic.

- (82) Barn har svårt att förstå att deras mödrar **kan**  
children have-PRES difficult INF understand-INF that their mothers MOD

ha nåt viktigare för sig än att åka direkt hem  
have-INF something more-important for REFL than INF go-INF directly home

och laga den. (HM)  
and cook-INF it

Epistemic

‘Kids have a hard time understanding that their mothers might have something more important to do than come straight home and fix it.’

- (83) Det **kan** vara möjligt redan. (JMY)  
it MOD be-INF moldy already

Epistemic

‘It can already be moldy.’

- (84) Redan en påringning **kan** vara nog för att säkerhetstjänsten  
already one phone-call MOD be-INF enough for that security-service

skall reagera. (KOB)  
FUT react-INF

Epistemic

‘The mere fact of ringing a number can be enough to alert the security forces.’

- (85) Flickan **kan** inte ha varit en vacker syn. (HM) Epistemic  
 girl-DEF MOD NEG have-INF be-PART a beautiful sight

‘The girl could not have been a pretty sight.’<sup>26</sup>

In addition to containing state verbs, (82) through (85) also share the interpretation, i.e. they are all epistemic. The other features in these utterances vary somewhat. Thus, (82) and (83) differ with respect to the type of subject: (82) contains an animate and generic subject *mödrar* ‘mothers’, whereas (83) contains an inanimate referential subject *det* ‘it’. Neither of these subjects can normally be considered suitable agents by the speaker, i.e. the speaker is unlikely to give permission to a generic or inanimate agent to carry out the proposition. In both cases, the time reference for the proposition is simultaneous with the time of the modality expressed. Also, although the time reference for the proposition is posterior to the time of modality in (84) and anterior in (85), neither has a subject that can be considered a potential agent.

The presence of a state verb in an utterance alone does not, however, guarantee an epistemic interpretation. Some of the examples containing a state verb in the corpus, for example, (86) and (87), are non-epistemic or, more precisely, dynamic.

- (86) Fortfarande undrar jag varför jag inte **kan** känna lugn och odelad  
 still wonder-PRES I why I NEG MOD feel-INF calm and undivided  
 glädje över att han sagt att mina ögon är rena. (MS) Dynamic  
 happiness over that he say-PART that my eyes be-PRES clean

‘And I’m still wondering why I can’t feel a quiet, unqualified pleasure in the fact that he has said my eyes look clear.’

- (87) **Kan** man inte älska, **kan** man i varje fall hata. (PCJ) Dynamic  
 MOD one NEG love-INF MOD one in every case hate-INF

‘If one cannot love, at least one can hate.’

All the dynamic examples containing state verbs have one thing in common: they have animate human subjects, and there is no indication of any deontic source interested in the actualisation of the proposition. These examples are interpreted in such a way that the subjects have the ability to be

<sup>26</sup> My translation.

in a state or experience it, since state verbs assign the role of Experiencer to their subjects, not that of Agent.

### 3.2.2.4 Inanimate subject

The data in Table 4 strongly suggest that inanimate subjects are important for the interpretation in utterances containing the modal *kan*. Although in some cases the presence of an inanimate subject contributes to an epistemic interpretation, its influence can be cancelled by other features typical of deontic utterances. Based on (70), we may conclude that the presence of an inanimate subject in an utterance supports epistemic interpretation, provided the time reference for the proposition is anterior. Also, in (83) and (84), the presence of an inanimate subject in combination with a state verb contributes to an epistemic interpretation. However, based on the fact that all of the non-epistemic examples in the corpus containing a state verb have an animate subject, we can conclude that the presence of an inanimate subject in utterances like (83) and (84) can at least demote a dynamic interpretation.

## 3.3 Indeterminate examples

Leech and Coates (1979) and Coates (1983) distinguish three types of indeterminacy: ambiguity, gradience, and merger. Their view of indeterminacy is based on the notion of polysemy, i.e. they assume that modals have a number of predefined discrete meanings. The role of the context is to signal which of the meanings is intended. Sometimes, however, it is difficult or impossible to distinguish between the different meanings in a given context, which gives rise to indeterminacy. In this study, it is not assumed that the modal interpretation of an utterance derives solely from the meaning of the modal verb in the above-mentioned way (see Chapter 4 for more details). A particular interpretation is determined instead by an array of contextual clues. Sometimes, the contextual clues do not allow for a confident and discrete interpretation of the modality expressed in an utterance, resulting in indeterminacy. I thus adopt Atlas's (1989: 28-29) view that in interpreting utterances we are not “*selecting* from the linguistically given readings of a syntactically or lexically *ambiguous* sentence”, but rather “*constructing* from a meaningful but radically *sense-general* sentence a contextually determined interpretation of an utterance”. Despite this difference in

approaches, I find it helpful to use the definitions of the three types of indeterminacy in this study with one modification. I assume that the concept of indeterminacy applies not to the modal itself but to the whole utterance. Thus, we are dealing with indeterminate utterances, not indeterminate modals. Also, indeterminacy arises when the addressee is presented with conflicting or insufficient clues to arrive at the correct interpretation. For the speaker, there is no indeterminacy as to what interpretation is intended. However, in some cases, the speaker may choose to encode her message in such a way as to give rise to indeterminacy with the addressee.

As mentioned above, Leech and Coates (1979: 81-82) and Coates (1983: 14-17) distinguish three types of indeterminacy: ambiguity, merger and gradience.<sup>27</sup> Ambiguity is allegedly the easiest type of indeterminacy to spot in a text. Ambiguous cases are characterized by the following four properties: (a) a given utterance can be interpreted in a number of ways, and it is not clear from the context which of the interpretations is intended; (b) only one of the potential interpretations is possible at a time; (c) the potential interpretations belong to different categories, i.e. epistemic and non-epistemic; and (d) these categories are discrete.

- (88) John **may** come to the lecture tomorrow. Ambiguous  
 a. John is allowed to come to the lecture tomorrow.  
 b. There is a possibility that John comes to the lecture tomorrow.

In writing, (88) is ambiguous, since in a given context (or the absence of it), it can be interpreted as either deontic or epistemic, as in (88a) and (88b); these interpretations, belonging to different scales, are obviously discrete. Thus, ambiguity can be represented as in Figure 1: an utterance  $U$  receives two discrete interpretations,  $I_1$  and  $I_2$ . These interpretations lead to different pragmatic implicatures,  $P_1$  and  $P_2$ , i.e. the addressee may choose different courses of action depending on his interpretation of the utterance.

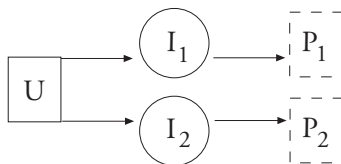


Figure 1. Ambiguity

<sup>27</sup> The following definitions are adapted from the sources to fit the present framework.

In (88), the addressee may choose to object to the permission in (88a), since, for example, in his opinion John is too rowdy to be allowed to attend the lecture. Another possible course of actions for the addressee, if he accepts the interpretation in (88b), would be not to go to the lecture himself in order to avoid meeting John.

Merger is sometimes considered a special case of ambiguity in which properties (b) and (c) above do not apply. Contrary to standard ambiguous cases, in merger the two potential interpretations are mutually compatible, and it is not necessary to decide in favour of one or the other in a given context. Cases of merger are difficult to identify in a text precisely because of this. Leech and Coates suggest that paraphrases should be used as a diagnostic. Paraphrases that may be criterial for one or the other interpretation can be used to arrive at the interpretation. If both possible paraphrases ‘fit’ an utterance, we have a case of merger. If, on the other hand, neither of the possible paraphrases is satisfactory, we have a case of gradience: (89) demonstrates this phenomenon.

- (89) Man **kan** inte smita. (JMY)  
man MOD NEG run-away

Merger

‘You can’t run away.’

The context is as follows: an adult is talking to a child about civic duty and morality and the fact that, given its social position, the child is not allowed to disregard these notions and is unable to do so. Two mutually exclusive interpretations are neutralized in this context so that it is not relevant for our understanding of the utterance which of the possible interpretations we prefer. This is represented in Figure 2.

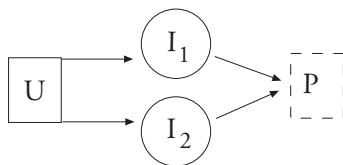


Figure 2. Merger

An utterance *U* can receive two different interpretations: *I*<sub>1</sub> and *I*<sub>2</sub>. However, there is only one possible pragmatic implicature, *P*. Thus, in (89), regardless of how the utterance is interpreted, the child will realise that it cannot escape civic duties.



The definition of gradience is based on the notion of core and peripheral meanings of modals: it can be exemplified by the gradience between the core ability meaning of the English modal *can* and its peripheral meaning of possibility (Coates 1983: 14-16). Since the primary object of the present investigation is the range of possible interpretations of modals, I find it difficult to use concepts such as *core* or *peripheral*, i.e. it is virtually impossible to claim one interpretation to be more peripheral than the other unless perhaps one appeals to statistics. Instead, I consider utterances containing the Swedish *kan*, where it is difficult to decide whether the interpretation is weak epistemic or dynamic, to be examples of gradience, since these interpretations are per definition related to each other (cf. 1.1.1). The paraphrase test suggested by Leech and Coates is not helpful in such cases. Thus, the only difference between merger and gradience supported by my data is that the former involves interpretations stemming from different scales, i.e. deontic and epistemic, and the latter involves interpretations that are related to each other, i.e. weak epistemic and dynamic.

- (90) Där **kan** vi hejda dem med stora bullerstenar. (AL) Gradience  
 there MOD we hold-INF them with big noise-stones

‘We can hold them there by rolling rocks at them.’

The possible interpretations of (90) are that it is theoretically possible for the domestic band of robbers to stop the intruders by rolling stones at them, and that they will actually be able to do so. Thus, the utterance is indeterminate between the weak epistemic and dynamic interpretations. This is represented in Figure 3.

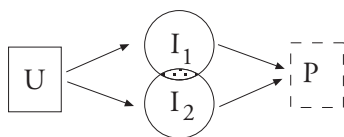


Figure 3. Gradience

An utterance *U* receives an interpretation somewhere between two related interpretations: *I*<sub>1</sub> and *I*<sub>2</sub>. As in merger, however, there is only one pragmatic implicature, *P*. The dynamic interpretation of (90) also implies the weak epistemic interpretation, i.e. since the robbers are able to stop the intruders, it is possible for them to do so. In addition, rolling stones at the

intruders is the course of actions the robbers are likely to resort to in order to achieve the desired result, i.e. stopping them.

As shown in Table 5, a number of examples found in the ESPC are consistent with the above description of indeterminate utterances.

Table 5. The types of indeterminate examples in the ESPC

	Must	May	Måste	Kan	TOTAL:
Ambiguity	0	1	1	3	5
Merger	3	3	1	7	14
Gradience	0	1	0	7	8
TOTAL:	3	5	2	17	27

The sections that follow discuss the indeterminate examples found in the corpus.

### 3.3.1 Ambiguity

As suggested by Leech and Coates (1979), the five ambiguous examples found in the corpus are easily recognized. In all these utterances, two different interpretations, epistemic and deontic, are possible, and neither propositional nor situational context provide sufficient clues as to which interpretation is preferable. Furthermore, the possible interpretations are in an either/or relationship, i.e. only one of them is possible at a time.

- (91) We find the text is confused and badly drafted and consequently it looks as if a European Union directive **may** suddenly apply from high to quite minor plans and programmes. (EJAC)

In (91), which contains the modal *may*, the two possible interpretations are epistemic and deontic. The most important features are the presence of the inanimate subject *a European Union directive*, the state verb *apply*, and the posterior reference for the proposition. The combination of inanimate subject and state verb usually promotes an epistemic interpretation. In this case, the utterance may be interpreted as a tentative statement about a future state of affairs, since posterior reference allows epistemic interpretations with the modal *may*. Posterior reference is also consistent with a directed deontic interpretation. The presence of an inanimate subject and a state verb will normally discourage this interpretation. However, it is understood from the context that the actual action of the application of the

directives will be taken by someone else, i.e. by civil servants who will possibly apply the directives too extensively. These hypothetical civil servants will act as responsible agents, which promotes a directed deontic interpretation. In this case, (91) may be paraphrased as follows: ‘A European Union directive will be allowed to apply ...’. It is impossible to deduce from the situational context of this utterance which of the two possible interpretations is intended by the speaker.

- (92) I denna debatt handlar det ju om vad vi i Europa kan göra för att  
in this debate deal-PRES it MOD about what we in Europe can do for INF

underlätta den utvidgning som **måste** vara en hjärtefråga för oss alla. (EVIR)  
facilitate-INF DEF expansion that MOD be a heart-issue for us all

‘[...] this debate is about what we in Europe can do to facilitate the enlargement process, which must be a burning issue for us all.’

Example (92) exhibits a similar set of features: an inanimate subject (*den utvidgning* ‘the expansion’), and a state verb (*vara* ‘be’). The time reference for the proposition is, however, ambiguous between simultaneous and posterior, since *vara* ‘be’ can be interpreted both as a state predicate and as a change-of-state verb. These features allow both epistemic and non-directed deontic interpretations (for example, recommendations, where the speaker chooses not to expose herself as a source of deontic force). Thus, if (92) is interpreted deontically, the necessity of the proposition being carried out is not only simultaneous with the time of the utterance, but also applies in the near future. The situational context does not disambiguate this utterance either.

- (93) Om de vill något **kan** de ju komma hit och snacka. (SW)  
if they want-PRES something MOD they MOD come-INF here and talk-INF

‘If they want anything, they can come over here and talk.’

- (94) -Det **kan** jag inte säga, sade han. (JMY)  
this MOD I NEG say-INF say-PAST he

‘“I can’t tell you that”, he said.’

Both (93) and (94) contain the modal *kan*. The utterances also have similar sets of features: an animate subject (*de* ‘they’ and *jag* ‘I’), and an event verb (*komma* ‘come’ and *säga* ‘tell’). The time reference for the proposition is posterior in both utterances. Such combinations are typical of directed

deontic interpretations, i.e. the subject is a responsible agent, the action described by the main verb is to take place subsequent to the time of the utterance, and there is someone interested in the proposition being carried out. The situational context does not provide us with any information on the last issue: there is no one in the context that can be identified as such an interested party, or, more precisely, as a source of deontic force. In (94), the speaker can, of course, be the source of the deontic force, but this is not clarified by the context. As we saw earlier, posterior time reference does not demote epistemic interpretation with modals of possibility *may* and *kan*. Thus, the utterances in (93) and (94) are ambiguous between weak epistemic and directed deontic interpretations.<sup>28</sup> The presence of an epistemic particle in (93) contributes to this ambiguity. Should the utterance be interpreted as epistemic, the modal particle reinforces this reading. If the utterance is interpreted as deontic, on the other hand, the modal particle acts as a face-saving device used by the speaker to tone down her authority (see Jucker 1993).

### 3.3.2 Merger

As Leech and Coates (1979) suggested, merger, unlike ambiguity, is rather difficult to spot in a text. I located fourteen examples in the corpus. In many cases, there are more than two possible interpretations, and the context is such that these are ‘neutralized’, i.e. all of them fit the context and are compatible, contrary to what we observed in the ambiguous examples.

Two of the examples containing the modal *must*, (95) and (96), offer a rather typical range of interpretations, whereas the third, (97), displays more unusual interpretations.

(95) Everyone knew that the Whistler **must** have a car. (PDJ)

In (95), the two possible interpretations are epistemic and non-directed deontic. The Whistler, a murderer who has been terrorizing the neighbourhood lately, commits his murders in different places and is able to avoid detection. Thus, the people involved base their conclusion (that the Whistler necessarily has a car) on the basis of the fact that he moves rapidly from place to place. This epistemic interpretation can be paraphrased as ‘It is certain that he has a car, since he is able to move so rapidly’. The second available interpretation is deontic, and can be paraphrased as ‘It is neces-

<sup>28</sup> It is clear from the context of (94) that a dynamic interpretation would be infelicitous here.

sary for the Whistler to have a car in order to be able to move rapidly from place to place'. The indeterminacy arises from the fact that the utterance contains an animate subject and a state verb, combined with simultaneous time reference for the proposition. As we saw earlier, animate subjects, being responsible agents, are normally in control of their actions. The presence of a state verb in an utterance, on the other hand, suggests that the subject is subjected to, or experiences, some state over which he has no control. In addition, simultaneous time reference for the proposition usually indicates that the situation described in the proposition is immutable. This is not resolved by the presence of any other clarifying clues in the situational context.

(96) But you **must**. I mean there are verifiable facts. (RDA)

Similar circumstances apply in (96). This utterance is part of a conversation between three people, where the first two deny any knowledge of a person who made the down payment, while the speaker insists that this is not the case. The utterance lends itself to both epistemic and non-directed deontic interpretations.<sup>29</sup> In the first case, a possible paraphrase could be 'I am certain that you know who the person in question was, since one normally knows from where one receives the money'. In the second case, the paraphrase could be 'It is necessary for you to know him, since it is possible to verify where you got the money from'. The indeterminacy arises because of the presence of an animate subject and a state verb in combination with simultaneous time reference for the proposition.

(97) But if humans can make new varieties of plants and animals, **must** not nature do so also? (CSA)

The utterance in (97) can be interpreted as a recommendation of some sort, where *must* is interpreted close to *should* ('Should not nature do so also?'). It is also possible to recognize some sense of ability or weak epistemic possibility to parallel the ability expressed by *can* in the previous clause (*Cannot nature do so also?* with the possible paraphrase 'Is it not possible for nature to do so also?'). This ability or weak epistemic possibility reading is, however, not easily available for *must*. An inanimate subject (*nature*) is combined with an event verb, possibly giving rise to the personification of *nature* in this context. Further, the time reference for the proposition is un-

<sup>29</sup> Since the main verb that can be recovered from the context of (92) is *know*, it is difficult to arrive at a directed deontic interpretation.

clear: it can be simultaneous with the time of the modality expressed in the utterance, or posterior to it, i.e. ‘...must not nature start doing so also’. This is consistent with both dynamic and weak epistemic interpretations, as well as with a (non-directed) deontic interpretation.

Interpretation is further obstructed by the presence of negation, and the fact that it is a non-assertive rhetorical question. Usually, negated *must* is understood in deontic utterances as indicating that there is obligation not to act on the proposition, or that no permission has been given to the subject (Palmer 1990: 75-76). Also, *must not* normally negates the proposition, and not the modality, as seems to be the case in this example (Palmer 1990: 38-39). On the other hand, according to Palmer (1990: 41), in negated interrogative sentences, it is the modality that is negated, not the proposition, which is consistent with our understanding of (97).

There are three examples involving the modal *may* that were interpreted as cases of merger. In all three, the time reference for the proposition is posterior to the time of the utterance. This is consistent with both epistemic and deontic interpretations when *may* is involved.

- (98) He is sufficient, yet his means are in supposition: he hath Argosy bound to Tripoli, another to the Indies, I understand moreover upon the Rialto he hath a third at Mexico, a fourth for England, and other ventures he hath squandered abroad... the man is notwithstanding sufficient, three thousand ducats, I think I **may** take his bond. (AS)

In (98), an animate subject (*I*) is combined with an event verb (*take*). This utterance may be interpreted as partly an epistemic statement about the speaker's possible future course of actions, and partly a deontic statement, where the speaker gives permission or indicates a recommendable course of actions for himself. The context of this utterance is such that both interpretations share the pragmatic implicature. Thus, the reader is not forced to choose between the interpretations, as in ambiguous examples.

- (99) Tell us what it is to be a woman so that we **may** know what it is to be a man. (TM)

In (99), an animate subject (*we*) is combined with a state verb (*know*). Given the posterior reference, the utterance may be interpreted as an epistemic statement about some future state of affairs (‘So that it will be possible for us to know...’), or as a deontic request (the speaker requests a missing piece of information from somebody else and is thus the source of the deontic force in the utterance).

- (100) Participants have been granted seven-year options, which **may** be exercised from 15 July 2002. (STO)

In (100), an inanimate subject (*options*) is combined with a passive form of an event verb (*exercise*). This allows for two interpretations: (i) 'The participants are permitted to exercise their options from 15 July 2002'; and (ii) 'It is possible that the participants will exercise their options from 15 July 2002'. There is nothing in the context of this utterance that provides a clue about which of the interpretations is intended, and also nothing that forces us to choose one of them. If we consider the strong cross-linguistic pattern for the diachronic development of modal meanings suggested in Bybee, Perkins and Pagliuca (1994), who claim that epistemic meaning generally develops from the ability senses of modals, the fact that these interpretations co-exist in the above example is not surprising.

In (101), *måste* is combined with an animate subject (*Adele*), and the passive form of an event verb (*räkna* 'count'). Furthermore, the time reference for the proposition is simultaneous with the time of the modality expressed.

- (101) Jag har            svårt    att förstå            mig på de    vuxna, och Adele  
       I    have-PRES difficult INF understand-INF me    on DEF adults and Adele

**måste** räknas            till dem. (AP)  
 MOD   count-PASS-PRES to    them

'I find it difficult to understand adults, and Adele had (*sic*) to be reckoned as one.'<sup>30</sup>

The fact that the passive form of the verb *räkna* 'count' is used in this case indicates the stative nature of the proposition. Given the time reference, the utterance may be interpreted in two ways: (i) 'I am certain that Adele is reckoned as an adult due to e.g. Adele's appearance'; and (ii) 'I have to consider Adele as an adult, because I am unable to understand her as I am unable to understand other adults'. Thus, both an epistemic and a non-directed deontic interpretation are available. The reader is, however, not forced to choose between the interpretations, since they are compatible.

Examples of merger involving the modal *kan* can be divided into two groups: those with posterior reference for the proposition, and those with simultaneous reference. In (102) through (105), the time reference is posterior. In (106) through (108) it is simultaneous. In (102) through (105),

<sup>30</sup> The indeterminacy in the Swedish original is lost in the translation due to the translator's choice of the time reference for the proposition.

the subjects are responsible agents and are in control of their actions. Also, all these examples contain an event verb.

- (102) De **kan** väl åka ut till Marsvinsholm när de får tid? (HM)  
they MOD MOD drive-INF out to Marsvinsholm when they get-PRES time

‘They can drive out to Marsvinsholm when they have time, can’t they?’

In (102), the speaker comments not only on the ability of the police officers to drive out to the scene of the crime, but also on whether they will actually do that when they have time. The third possible interpretation, that of suggestion or mild order, arises from the fact that the speaker, being the chief inspector, is authorized to send the police officers to the scene of a crime to investigate.<sup>31</sup> This is also supported by the fact that formally (102) is not an interrogative but a declarative sentence. A further contextual feature to consider in this example is the presence of an epistemic particle *väl* (rendered by a tag question in the translation), which seems to be in conflict with an otherwise typically non-epistemic arrangement of the contextual features. In case the preferred interpretation is deontic, however, *väl* can be interpreted as a device employed by the speaker to soften the order, and seemingly not use his authority over the addressee to the full. Thus, in this case, *kan* shows the whole range of interpretations available.

- (103) Vi **kan** lägga in kombinationen och se om vi får nåt svar. (HM)  
we MOD lay in combination-DEF and see-INF if we get-PRES some answer

‘We can put in the combination and see if we get a match.’

In (103), the speaker is an investigating officer with special knowledge of computers and computerized databases. Being an expert, the speaker partly makes a suggestion to search for a certain combination of letters on the internet, and partly comments on the fact that this is one of the possible courses of action available to the investigation team.

- (104) Jag är rädd men nu **kan** jag inte vända tillbaka. (BL)  
I be-PRES afraid but nu MOD I NEG turn back

‘I am afraid, but now I cannot turn back.’

In (104), the speaker and the subject are co-referential (the subject is expressed by a 1<sup>st</sup> person pronoun *jag* ‘I’). This gives rise to a range of possible

<sup>31</sup> See also (61) and (62) in 1.2.3.2 for similar examples.



interpretations: (i) the speaker may report on the order he received previously; (ii) the speaker prevents himself from turning back; (iii) the speaker is at this point unable to turn back; and, if the time reference for the proposition is simultaneous with the time of modality expressed, (iv) it is not possible for the speaker to turn back (weak epistemic possibility). From the context, we learn that we can eliminate the first interpretation, since the speaker acts of his free will. The context, however, gives no clues as to which of the other possible interpretations is intended.

- (105) Jag heter Victor Udde och ni **kan** gratulera er som  
I be-called-PRES Victor Udde and you MOD congratulate you-ACC that

fått mig som dirigent. (GT)  
get-PAST me as conductor

'My name is Victor Udde and you may congratulate yourselves on having me as your conductor.'<sup>32</sup>

The last example with posterior time reference for the proposition, (105), is somewhat odd. The utterance can be interpreted as (i) stating a possible reaction on the part of the choir, since the conductor had previously exhibited some extraordinary qualities; (ii) expressing the speaker's opinion as to the proper reaction that should be experienced by the members of the choir, i.e. they should be happy about him being their conductor; or (iii) the speaker (graciously) granting permission to the choir to feel happy about him being appointed conductor. Again, the context does not offer any additional information as to which of the interpretations is intended. Interpretation (i) is epistemic, whereas (ii) and (iii) are deontic. This utterance can therefore be considered both a case of merger, where it is impossible or unnecessary to distinguish between two interpretations belonging to different categories, and a case of gradience, where the indeterminacy arises from the impossibility to pinpoint the exact location of the interpretation on the deontic scale.

As for utterances with simultaneous time reference for the proposition, they vary with regard to the type of the subject: (106) and (107), previously mentioned as (89), have animate subjects, and (108) and (109) have inanimate subjects.

- (106) Nu möter vi en andra reformation genom att medborgarna **kan**  
now meet-PRES we a second reformation through that citizens MOD

<sup>32</sup> My translation.

ta del av kunskap och information samt bli mer och mer  
 take part of knowledge and information and become-INF more and more

oberoende av myndigheter och stat. (ECED)  
 independent of authorities and states

'Now we are facing the second reformation in that citizens are able to obtain knowledge and information and become more and more independent of authorities and states.'<sup>33</sup>

In (106), the paraphrases could be (i) 'It is possible for the citizens to obtain knowledge and information and become more independent' (weak epistemic or dynamic); or (ii) 'The citizens are allowed to obtain knowledge and information and become more independent' (directed deontic). The time reference for the proposition is also unclear, depending on which interpretation is preferred: it is simultaneous with the time of modality on interpretation (i), but posterior to it on interpretation (ii). The fact that the subject is generic further obscures which of the interpretations is intended, or preferred. The context does not provide any additional clues as to which of the interpretations is intended. Furthermore, it is not important for the understanding of this utterance which of the interpretations the reader prefers.

(107) Man **kan** inte smita. (JMY)  
 one MOD NEG get-away-PRES

'You can't run away'

The context of (107) is discussed earlier in relation to (89). The subject is potentially generic, implying that the possible deontic interpretation has some kind of universal coverage, i.e. people in similar situations are not allowed to disregard notions such as civic duty and morality. In the case of a dynamic interpretation, on the other hand, *man* 'one' is interpreted as also including the addressee.

(108) Det anses vara en situation som inte **kan** nonchaleras och  
 it seen-PASS-PRES be-INF a situation that NEG MOD ignored-PASS-PRES and

som det inte är självklart eller omedelbart givet hur man ska  
 that it NEG be-PRES self-evident or immediately give-PART how one FUT

<sup>33</sup> The indeterminacy of this example is not reflected in the translation.

ta sig ur. (BB)  
take-INF REFL out

‘It is seen as a situation which cannot be ignored, and in which it is not obvious or immediately given how to get out.’

The two possible interpretations of (108) are: deontic (‘It is not permitted to ignore the situation’, or ‘The situation should not be ignored’), or (weak) epistemic (‘It is not possible to ignore the situation’). The presence of an inanimate subject and the use of the passive form of the event verb *nonchalera* ‘ignore’ contribute to the confusion. In addition, it is not clear whether the time reference for the proposition is simultaneous with the time reference for the modality expressed or posterior to it. Note that deontic interpretations may arise in passive utterances only when the proposition has posterior time reference.<sup>34</sup>

(109) I Boverkets nybyggnadsregler  
in National-Board-of-Housing-Building-and-Planning-DEF new-building-rules

är det föreskrivet att uteluftsflödet i kontor där rökning **kan**  
be-PRES it provide-PART that out-air-flow-DEF in offices where smoking MOD

förekomma skall vara minst 10 l/s och person. (BJ)  
occur-INF MOD be-INF at-least 10 l/s and person

‘The 1998 Regulations for New Construction laid down by the Swedish National Board of Housing prescribe that the flow of outdoor air in offices in which smoking is permitted must be at least 10 l/s and person.’<sup>35</sup>

In (109), we can observe merger between deontic and epistemic interpretations: (i) ‘...in offices where it is permitted to smoke’ and (ii) ‘...in offices where it is possible to smoke’. The combination of an inanimate subject (*rökning* ‘smoking’) and a state verb (*förekomma* ‘occur’) could be seen as causing the merger of the two interpretations. Furthermore, the context of this utterance indicates that what is discussed can be found in a text comprising regulations, which makes the deontic interpretation plausible. The fact that *rökning* is a deverbal noun also strengthens this assumption. Thus, a logical relation between the two possible interpretations can be claimed to exist: what is permitted is also possible.

<sup>34</sup> See 4.1.3 for a detailed discussion.

<sup>35</sup> The indeterminacy is lost in the translation through the translator’s choice of wording (*is permitted*), which clearly indicates that the utterance is interpreted as deontic by the translator.

### 3.3.3 Gradience

Not surprisingly, most of the gradient examples involve the modal *kan*. However, there is one example of a gradient utterance with *may*. In all cases, the interpretation is gradient between weak epistemic and dynamic. The gradient examples found in the corpus form two distinct groups: those with posterior reference, and those with simultaneous reference. Examples (111) through (113) all have posterior time reference for the proposition. They also combine an animate subject (*they*, *vi* ‘we’, and *vi* ‘we’ respectively), and an event verb (*do*, *hejda* ‘hold’, and *klara* ‘pull through’ respectively). The only difference between these examples lies in the fact that in (110) the modal *may* is present, whereas in the other two examples the modal *kan* is used.

- (110) Yet even in this enlightened age, when so many parents are aware of the psychological damage they **may** do to their children, surely there was one parent in Castle Rock – or perhaps one grandmother – who quieted the kids by telling them that Frank Dodd would get them if they didn’t watch out, if they weren’t good. (SK)

The utterance in (110) can be paraphrased as (i) ‘Many parents are aware of the psychological damage that it is possible for them to do to their children’; (ii) ‘Many parents are aware of the psychological damage it is possible for them to do to their children’; or even (iii) ‘Many parents are aware of the psychological damage that they are able to do to their children’. Although the last interpretation is not easily available for *may*, in this case the interpretation is placed somewhere along the continuum between weak epistemic and dynamic (possibly closer to the epistemic reading than to the dynamic one). It is not necessary for the reader to pinpoint the exact location to understand the utterance. Palmer (1990: 109–111) mentions examples where utterances containing *may* are interpreted dynamically as well as epistemically.<sup>36</sup> In these cases, *may* can easily be replaced by a dynamic *can* or *could* with no observable change of meaning. One of the solutions suggested by Palmer (1990: 111) is to consider *may* “the most neutral modal” to be used to express “non-factivity”.

- (111) Där **kan** vi hejda dem med stora bullerstenar. (AL)  
there MOD we hold-INF them with big noise-stones

<sup>36</sup> Palmer (1990: 109–110) gives the following example: *Where, in a secluded valley in the west, you may find the neat little Norman church of Pennant Melangell* (W.11.3.80–4) [my emphasis]. In this study, however, such cases of “dynamic” *may* are usually interpreted as weak epistemic (see 1.1.1).

‘We can hold them there by rolling rocks at them.’

Also (111), formerly (90), is indeterminate between the related weak epistemic and dynamic interpretations.

- (112) Inte ens han tror att vi **kan** klara oss. (BL)  
 NEG even he think-PRES that we MOD pull-through-INF REFL

‘Not even he thinks that we may pull through.’<sup>37</sup>

The context of (112) provides us with some information. There is a storm, and two ships are trying to reach their destination. One of the ships, led by a more experienced captain, gives up and turns back. The other is still trying to reach shore safely. (112) is uttered by the captain of the second ship, and the pessimistic person he refers to is the captain of the first ship. This utterance may also be paraphrased in two ways: ‘... that it is possible for us to pull through’, or ‘... that we will/are able to pull through’. In this context, the possible interpretation lies somewhere between these two paraphrases. The utterance is, therefore, gradient between weak epistemic and dynamic interpretations.

When the time reference is simultaneous with the time of the utterance, we can distinguish between assertive and negated statements.

- (113) “Den där vildoxen”, sa han, “den som ni skulle ta vid hornen  
 DEF there wild-bull-DEF say-PAST he DEF that you MOD take-INF at antlers

och vräka i Helvetesgapet, det blev väl en duns, **kan** jag  
 and throw in hell’s-gap it become-PAST MOD a thud MOD I

tro, så det dånade i hela Mattisborgen?” (AL)  
 think-INF so it rumble-PAST in whole Mattis-castle

“‘That wild bull”, he said, “the one you were going to take by the horns and heave into Hell’s Gap – I suppose that was a crash that rumbled all around Matt’s fort?”

- (114) Men, sa Henry, jag har upprättat en lista över hans påhitt  
 but say-PAST Henry I have-PRES establish-PART a list over his tricks

och ... tja, jag **kan** väl medge att det finns visst fog för  
 and well I MOD MOD admit-INF that it exist-PRES certain reason for

klagomålen. (APR)  
 complaints

<sup>37</sup> My translation.

“But”, said Henry, “I’ve drawn up a list of his pranks and... well, I must admit some of the complaints are, to some extent, justified”.

In (113), the modal is part of an idiomatic parenthetical insertion. The combination of an animate subject (*jag* ‘I’) and an event verb (*tro* ‘believe’) can promote a dynamic interpretation, if the main predicate were not a psychological verb, since it is normally hard to describe belief in terms of ability. Thus, the interpretation lies somewhere between (weak) epistemic and dynamic.

In (114), the modal is part of the utterance proper. In this case, an animate subject (*jag* ‘I’) is combined with an event verb (*medge* ‘admit’). The utterance also contains a hedge (*tja* ‘well’), an epistemic modal particle (*väl*), and a modal adjective (*visst* ‘certain, some’). This suggests that although the speaker’s admission lies within the scope of his abilities, it is made reluctantly. The possible paraphrases are: ‘It is possible for me to admit that...’, and ‘I am able to admit that...’, neither of which fully captures the meaning of the utterance.

The negated examples in (115) through (117) all combine an animate subject with an event verb (*påstå* ‘assert’ or *säga* ‘say’). Only in special circumstances can we assume that the subjects lack the physical ability to perform the action denoted by the main predicate, i.e. when the subjects are, for instance, dumb or dumb stricken. The contexts of these utterances do not indicate the presence of such circumstances.

- (115) Jag **kan** inte påstå att jag tyckte om att höra Siiri vräka  
I MOD NEG claim-INF that I like-PAST about INF hear-INF Siiri blurt-INF

ur sig detta, men man får komma ihåg att hon var  
out REFL this but one be-allowed-PRES remember-INF that she be-PAST

upprörd. (AP)  
upset

‘I can’t say I liked hearing Siiri pouring all this out, but you must remember that she was upset.’

- (116) Jag **kan** inte säga att jag talar av egen kunskap. (AP)  
I MOD NEG tell-INF that I speak-INF of own knowledge

‘I can’t say I speak from my own knowledge.’

- (117) Man **kan** inte påstå att hon direkt pratade med någon. (AP)  
one MOD NEG claim-INF that she directly speak-INF with someone

‘One can’t say that she really talked with anyone.’<sup>38</sup>

In all examples, the subjects have the physical ability to articulate what they have to say. Also, being human, they are able to lie if necessary as well as make false claims. The presence of negation in these cases seems to serve the same purpose as the presence of so many modal elements in (114): to indicate the reluctance on the part of the speaker to make a claim. The paraphrase ‘It is not possible for me to say/claim that...’ does not capture all the nuances of meaning. It is more plausible to assume that these examples are gradient between (weak) epistemic and dynamic interpretations.

## Summary

The main focus of this chapter is the array of features associated with epistemic modality in the corpus data. One of the questions this chapter aimed to address was whether Coates’s claims about such associations can be verified on the basis of a larger sample of corpus data involving two English modals, *must* and *may*. The second question was whether it is possible to claim that similar associations exist for the Swedish modals *måste* and *kan*. Since (i) the investigation involved the two pairs of modals, belonging to the opposite ends of epistemic and deontic scales, (ii) more data was put under scrutiny, and (iii) the analysis compared modal interpretation mechanisms in the two languages, I provided a more nuanced picture.

The first, and not surprising, observation based on the analysis of the data is that the association between many of the features and epistemic interpretation is not absolute for all the modals. In my data, there is an absolute association between *aspectual modification* and epistemic interpretation, although it is possible to construct non-epistemic aspectually modified examples. With *introductory subjects*, the association is strong but not absolute. Features such as *state verb* and *inanimate subject* seem neither to be associated with epistemic modality directly, nor to influence the interpretation to an appreciable degree when not supported by other contextual features.

Secondly, the features combine with each other in most examples in a way that precludes indeterminacy as to whether the event described in the proposition is controlled by the intended agent or not. For instance, in the 275 epistemic examples involving *may*, the features appear 396 times. With weak epistemic examples, however, the features under investigation do not interact to the same degree: in the 369 weak epistemic examples containing *kan*, the features appear only 363 times.

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<sup>38</sup> My translation.

Thirdly, the modals under investigation – *must* and *måste*, and *may* and *kan* – do not behave in the same way with respect to the features in question. A parallel may be drawn between the modals located on the left-most end of the scales, *must* and *måste*, and those located on the right-most end of the scales, *may* and *kan*. Not all four modals exhibit the association between the features and the interpretation to the same degree. The contexts in which *must* and *måste* appear support my observations about the weak association of certain features, such as *inanimate subject* and *state verb*, with epistemic interpretation. The contexts for *may* and *kan*, on the other hand, support Coates's findings to a higher degree. Also, aspectually modified utterances with posterior time reference for the proposition containing *must* and *måste* may be interpreted deontically, whereas this interpretation is not available for the corresponding utterances containing *may* and *kan* (except in indeterminate examples).

Finally, additional features such as the presence of an *implicit* or *explicit condition*, the *time reference for the proposition* and *for the modality* expressed in the utterance, the presence of an *epistemic adverbial* or *particle*, *situation type*, as well as the issue of *agent control* must be appealed to in order to account for the interpretations. Anterior time reference for the proposition generally correlates with epistemic interpretation, whereas posterior time reference is associated with deontic interpretation. The presence of an explicit or implicit condition in an utterance seems to invariably promote deontic interpretation in utterances containing *must* and *måste*, irrespective of other features that may be present in the context. Time reference for the modality expressed simultaneous to the time of the utterance is consistent with both epistemic and deontic interpretations. Past time reference for the modality expressed is possible in Swedish in utterances containing *måste*, which are usually interpreted deontically. Future time reference for the modality occurs normally only in deontic utterances. Also of crucial importance is whether the subject is a responsible agent, and whether it is in control of the situation described in the proposition. Utterances where these conditions are not fulfilled tend to have an epistemic interpretation. As mentioned above, however, there are differences between the modals consistent with the differences in meaning suggested in Papafragou (2000) (see 2.2).

All the features discussed affect the interpretation of modal utterances in a systematic way. However, they must be considered in relation to other contextual features, since some influence the interpretation directly, while others do so only in combination with other features.

A number of indeterminate examples were found in the corpus. These were analysed according to a modified version of the tripartite system presented in Leech and Coates (1979). Three types of indeterminacy were distinguished: ambiguity, merger, and gradience. Neither the propositional context (in terms of the combination of the features under investigation), nor the situational context of the utterances provides enough clues as to whether the situations described can be controlled by an agent for the reader to be able to decide on one of the possible inter-



pretations with confidence. In some cases, this may be a conscious choice on the part of the speaker. Contrary to what was observed in the epistemic and deontic examples, in the indeterminate examples there was no apparent systematicity in the co-occurrence patterns of the features discussed.

# 4 Context revisited

## Abstract

As Klinge (1993: 318) points out, “[t]he recurring problem for linguistic analyses of the modals has been the lack of a principled account of *how* we arrive at an explicit interpretation of a sentence containing a modal”. Since this as a well-founded observation true of many modal studies, this chapter focuses on explicating how and why the contextual features discussed in the previous chapter influence the interpretation of modally modified utterances.

I argue that not only should different contextual features be accounted for when interpreting modal expressions, but also that these features are in many cases related to each other through the compositional notion of Controllability. Finally, I link the features discussed here to the universal notion of Transitivity following Hopper and Thompson (1980).

## 4.1 Controllability

In this section, I discuss the nature of the related notions of *agentivity*, *control* and *power* and also introduce the notion of Controllability, crucial to our understanding of modal utterances.

Cruse (1973) reviews the research on *agentivity* in the 1960s. Discussing Fillmore (1968), Gruber (1967), Lyons (1968), and Halliday (1967), he concludes that there is no agreement on what agentivity is. Some define agentivity in terms of agentive verbs, others in terms of agentive nouns, yet others argue that agentivity is “a feature of clauses” (see Cruse 1973: 11). Cruse (1973) considers agentivity to be a complex phenomenon defined in terms of at least four features: (i) volitive, (ii) effective, (iii) initiative, and (iv) agentive (Cruse 1973: 18).<sup>1</sup> The first feature, volitive, is present “when an act of will is stated or implied”. Thus, willing is regarded as “a kind of doing, whether what is willed is a state, process, or action” (Cruse

1973: 18). In (1), for example, the proposition in the main clause refers to an action not typically considered agentive. The interpretation of (1) as a non-agentive sentence is, however, cancelled by the information provided in the sub-clause, i.e. that the action described in the proposition was willed by the subject of the main clause.

- (1) John drifted two miles further down the river, so as to avoid landing in enemy territory.  
(adapted from Cruse 1973: 18)

The second feature, effective, is present in a sentence referring to “something which exerts a force (literary or metaphorically), not by virtue of an internal energy source, but because of its position, motion, etc.” (Cruse 1973: 19).

- (2) These columns support the weight of the pediment. (Cruse 1973: 19)

The third feature, initiative, “can be roughly glossed as ‘initiation of action by giving a command’” (Cruse 1973: 20). Cruse also points out that this feature is not coded by any lexical item, but is recovered from the context, as in (3).

- (3) John galloped the horse around the field. (Cruse 1973: 20)

The fourth feature, agentive, is said to be present in an utterance “referring to an action performed by an object which is regarded as using its own energy in carrying out the action” (Cruse 1973: 21). In (4), for example, this feature is present, while in (5), where the subject *the stone* cannot be said to have used its own energy to perform the action denoted by the proposition, it is absent.

- (4) John moved (himself) to avoid the falling stones. (Cruse 1973: 21)

- (5) The stone flew through the air. (Cruse 1973: 21)

According to Cruse, this definition of agentivity need not be complete. What is worth noticing, however, is the fact that he regards agentivity as a complex notion expressed by a combination of features, some of which may not be linguistically coded, but are instead retrieved from the context.

A more recent account, that of Runde (1997), investigates the notion of control in utterances containing a sample of *control verbs* and their relation

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<sup>1</sup> The fact that the inclusion of the feature *agentive* in the account of *agentivity* may arguably give rise to circular reasoning does not affect the present discussion.

to deontic modality. Runde's definition of control is restricted to the context of control verbs. Thus, in her account control is "a referential relation between two elements in a sentence" (Runde 1997: 211). She links her sample of Norwegian control verbs – *tvinge* 'force', *påby* 'impose, command', *be* 'ask', and *love* 'promise' – to deontic modality by claiming that "deontic aspect" is central to the meaning of these verbs. When uttering sentences containing these verbs, the speaker creates a "deontic situation" for the addressee, who is to react in a relevant way. She argues, clearly influenced by Searle, that in order to be able to describe "the subjective dimension of modality, we must [...] map out the illocutionary force of the utterance, and in order to map out the illocutionary force, we must find out what the *conditions* are that specify the rules for how this utterance is to be used"<sup>2</sup> (Runde 1997: 215). What she means by these conditions becomes evident when we consider her example of background conditions relevant for the verb *be* 'ask'.

- (6) A asks B to carry out X<sup>3</sup>
- a. A says something (to B)
  - b. A thinks that B (perhaps) does not wish to carry out X
  - c. A's utterance has a purpose of making B to carry out X
  - d. B has the ability to carry out X
  - e. B enjoys the freedom to choose to comply with the request or not

What is presented in (6) is a set of background assumptions the speaker and the addressee may share upon the utterance of a request. It is doubtful whether all of these assumptions are relevant, especially (b). It is equally unclear on how these assumptions arise and whether they form part of the meaning of the verb or are retrieved from contextual information. Even in the limited context of control verbs, however, control is perceived as a complex concept, involving both speaker's and agent's perspectives.

A more promising approach is outlined in Klinge (1996), who investigates the impact of context on modal meanings in English and Danish. In his analysis, context provides clues as to how an utterance should be interpreted. One of the central notions in his account of the interpretation of modal utterances is *agent control*, defined as "the ability of an agent to choose to bring about the referential situation represented by the propositions of the sentences" (Klinge 1996: 43). Consider the following examples from Klinge (1996: 38):

<sup>2</sup> My translation.

<sup>3</sup> Participant A is the subject referent (speaker/sender), participant B is the object referent (receiver), X is the action or situation described by the infinitive (Runde 1997: 216).

- |     |  |           |
|-----|--|-----------|
| (7) | You may lose all your money on the stock exchange.   | Epistemic |
| (8) | You may invest all your money on the stock exchange. | Deontic   |
| (9) | You may gamble all your money on the stock exchange. | Ambiguous |

The sentences in (7) through (9), although very similar in their contextual make-up, give rise to different interpretations: (7) is clearly epistemic, whereas (8) is understood in terms of deontic permission. If no further context is provided, (9) is ambiguous between these two interpretations. According to Klinge, one of the available contextual clues here is “the inferential assignment of the feature ‘agent control’” (Klinge 1996: 39). In (7), there is no agent control involved. Also, it is difficult to envision how the action of losing one’s money on the stock exchange can be desired by the subject referent.<sup>4</sup> In (8), the agent is in control of his actions, i.e. after receiving permission from the speaker, he is free to invest his money on the stock exchange or refrain from doing so. The sentence in (9), however, is ambiguous with respect to agent control. Contexts in which permission is given to act on the proposition (deontic interpretation) are as possible as ones where the speaker expresses her judgement of the likelihood of the event described in the proposition (epistemic interpretation). Klinge further argues that there are a number of contextual features that may be related to agent control. Indeed, he claims that “[i]f we have difficulty inferring agent control, heavy contextualization is required before deontic modality becomes the preferred reading” (Klinge 1996: 44).

A different perspective is offered by Winter (1998), who argues that “the power structure of a speech situation may be productively studied as being coded by a fairly limited set of linguistic expressions” (Winter 1998: 89). He reanalyses the notions of agentivity and control in terms of social power relations. Seeking to establish a cognitively real production model, Winter distinguishes between four components:

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<sup>4</sup> Of course, it is possible to construct contexts in which the loss of money on the stock exchange is not only a desired course of events, but a controlled and even planned one. I will, however, not consider this type of context here. On the other hand, the feature agentivity clearly involves not only volitionality on the part of the speaker (see next section), but also intentionality: the subject, which is co-referential with the agent, must be interested in the proposition being carried out. Consider, for instance, the following sentences, from Klinge (1993: 316-317):

- (i) You **must** be very careful.
- (ii) You **must** be very careless.

The first example receives a deontic interpretation, since it is in the interest of the intended agent, the referent of *you*, to carry out the proposition (cf. discussion of implicit and explicit conditions in 4.1.4). In the second example, however, such intention is not likely on any natural interpretation of this utterance, which promotes an epistemic interpretation.

The central elements of the speaker's and the listener's mental representations are the social power relations that hold between various agents. The objects of power are actions [...]. Another important factor of a speech situation is the agents' *attitudes*<sup>5</sup> to the relevant actions. [...] Apart from power relations, actions, and attitudes to actions, our semantic model also contains as fundamental notions different kinds of *expectations*. For an analysis of modals, the most important expectations are those that concern the attitudes of other agents towards the actions that are relevant in a speech situation. (Winter 1998: 94)

These components are further formalised in order to account for the core meanings of Swedish modals. Winter makes an important contribution by introducing what he calls a third person, or a third power, which can be "either a real person or an impersonal power" (Winter 1998: 99).<sup>6</sup> Further, in his analysis, "epistemic use of the modals involves a special case of such an impersonal power, namely, the power of *evidence*" (Winter 1998: 99). Thus, Winter provides important insights into the nature of power asymmetries in the context of modality, recognising both the importance of the speaker's and the addressee's perspectives, and formalising the input of circumstantial evidence for both deontic and epistemic interpretations. Basing his assumptions on Gricean implicatures, relabelled as expectations in his account, he does not, however, explicitly focus on the role of the linguistic context of a modal utterance.

The question to pose at this time is why there is no agreement on what *agentivity* and *control* designate. A possible answer, and the one advocated here, is that the phenomenon under investigation is a compositional notion, in which different presumably unrelated features convey different aspects of this very notion, much like Transitivity (Hopper and Thompson 1980).<sup>7</sup> This is why researchers who concentrate only on certain aspects related to what I call Controllability may not be able to illuminate this notion in a comprehensive manner. Consequently, the different approaches are seemingly incongruent. On my proposal, the compositional nature of Controllability is best accounted for if we consider all the relevant contextual features the speaker may choose to encode in an utterance. Controllability is also considered a primarily pragmatic notion: many of the relevant aspects are linguistically encoded, but some are inferred from the wider context.

<sup>5</sup> Note that Winter (1998) describes agents' attitudes in terms of agents' preferences.

<sup>6</sup> Cf. the discussion of non-directed deontic modality in 1.1.2.1.

<sup>7</sup> See 4.3 for a detailed account of Hopper and Thompson (1980) and the possible link between Transitivity and Controllability.

The idea that modal utterances are to be considered holistically in order to arrive at the intended interpretation has already been considered by a number of linguists. Heine (1995), for example, suggested a number of semantic criteria for distinguishing between epistemic and non-epistemic modals in German. In a typical deontic utterance, there is (i) some force interested in the proposition being carried out, (ii) some agent who is to carry out the proposition, which (iii) denotes an event, and (iv) which will be realised, if at all, later than the time of the utterance, and, finally, (v) there is a certain degree of probability that the event denoted by the proposition will occur. Coates (1995), investigating English modals, suggests an additional pragmatic criterion for subjectivity, an addition that is said to better distinguish epistemic utterances in English from non-epistemic ones. These linguists, however, have not provided any underlying motivation for why these criteria are of importance for the interpretation. On my proposal, the notion of Controllability is central to the interpretation of modal utterances, since utterances in which propositions are encoded in such a way as to indicate lack of agent control are interpreted epistemically. In utterances where the relevant features indicate that the intended agent is in control of the situation denoted by the proposition, on the other hand, the preferred interpretation is deontic. For the purposes of this study, I will adopt Klinge's (1996) definition of agent control to roughly cover what I mean by Controllability: "the ability of an agent to choose to bring about the referential situation represented by the propositions of the sentences" (Klinge 1996: 38).

The fact that different features may cluster is not unfamiliar in linguistics. The linguists investigating agentivity and control cited here, for instance, all agree that these are multi-faceted notions, best regarded in terms of a number of component features. Transitivity, discussed in 4.3, is also a compositional phenomenon, the coding of which involves an array of semantic features. As de Saussure (1966) argued,

As a rule we do not communicate through signs but rather through groups of signs, through organized masses that are themselves signs. In language everything boils down to differences but also to groupings. The mechanism of language, which consists of the interplay of successive terms, resembles the operation of a machine in which the parts have a reciprocating function even though they are arranged in a single dimension (de Saussure 1966: 128).

Support for relationships between the categories discussed in the present study can also be found in Wallace (1982), who argues that "the traditional conceptualization of verbal semantics into categories of tense, mode, as-

pect, voice, and transitivity fails to capture certain recurrent and apparently widespread interrelationships among the semantic domains to which these categories refer: time, aspectuality, modality, and noun-verb relations” (Wallace 1982: 207).<sup>8</sup>

In what follows, I will focus on some of the features that express Controllability in English and Swedish.<sup>9</sup> The list of features presented here is probably not complete (either in the two relevant languages or from a more general typological perspective). Moreover, some of the features discussed are central to the notion of Controllability, whereas others are more peripheral. The aim of the following sections is, therefore, merely to outline the possibility of the existence of a universal notion of Controllability, which plays an important role in the (de)coding of modality.

### 4.1.1 Subject

As we saw in 2.1.1, the feature *type of subject* was found to be associated with epistemic interpretations in Coates (1983), which indicates its significance for the interpretation. Let us now consider some of the properties of the subject that can be explicitly (i.e. linguistically) or implicitly (i.e. inferentially) encoded in a sentence. Firstly, subjects are always categorised as animate or inanimate. Secondly, subjects necessarily belong to one of the three categories of person: 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup>. It is also possible to make a distinction between specific and non-specific, and generic and non-generic subjects. I suggest that these properties of subjects play a role in the interpretation of modal utterances. I find support for this in Durst-Andersen (2005), who suggests that “[o]ne could in fact argue that not only should verbal categories such as tense, aspect and voice be included in a holistic analysis [of mood and modality systems in a language], but also nominal categories such as case and definiteness because due to isomorphism nominal categories may reproduce the grammatical function of verbal categories” (Durst-Andersen 2005: 215), and I would add, *vice versa*.

One of the more obvious consequences of the presence of an inanimate subject in an utterance is that it normally precludes a directed deontic in-

<sup>8</sup> See also Schlenker (2006), who, trying to explain what he terms “ontological symmetry” in language, puts forward a hypothesis that although “the systems that underlie reference to individuals, and to times/possible worlds/events/states are in fact synchronically distinct”, they “have a common evolutionary origin” (Schlenker 2006: 527).

<sup>9</sup> Unless deemed necessary from a contrastive point of view, the discussion of these features is based on the English examples.



terpretation. The speaker will not issue an order, give permission, or recommend that an inanimate subject should perform the action specified by the proposition. Inanimate subjects are not suitable agents, in that they normally cannot act of their own accord, and thus do not exhibit any control over the situation. Consider, for example, (10).

(10) The stone **may** hit the window.

Epistemic

It is not possible to imagine a situation in which the speaker would felicitously give the subject of (10), *the stone*, permission to carry out the proposition. First of all, because its motion is caused by some external source, the subject of (10) has to be set in motion by someone else in order to hit the window, and thus has no freedom to choose its course of actions, i.e. whether to act on the permission to carry out the proposition or not. These are but a few inferences connected with the fact that the subject of (10) is inanimate, and which promote an epistemic interpretation.

Some inanimate subjects, however, allow a directed deontic interpretation. Consider, for example, (11) and (12).

(11) You **must** come to the party.

Deontic

(12) The engine **must** function properly.

Ambiguous

As with other directed deontic utterances, the speaker in (11) expects the addressee referred to by the animate subject, 2<sup>nd</sup> person *you*, to act on the proposition. The expectation for the subject to act on the proposition is also valid to some degree in (12). However, in this example, it is hardly plausible that the inanimate subject is co-referential with the addressee, as is the case in (11). Moreover, the subject of (12), the inanimate *the engine*, lacks most of the properties of a typical agent. If we are to consider Dowty (1991: 572), the properties of what he calls Proto-Agent are:

- (13) (i) volitional involvement in the event or state  
 (ii) sentience (and/or perception)  
 (iii) causing an event or change of state in another participant  
 (iv) movement (relative to the position of another participant)  
 (v) exists independently of the event named by the verb

The subject of (11) exhibits all of the above properties, whereas the subject of (12), *the engine*, strictly speaking exhibits none of them. Being inanimate, it cannot be volitionally involved in the action described by the proposition. It is, of course, non-sentient. Since *the engine* in itself cannot

cause the event of its functioning properly, it must be assumed that a third, animate party will see to it that the engine is switched on and functions properly. There is also no other explicit participant in which the subject of (12) may cause a change of state, or relative to which it may display movement (if we do not consider the movement of the engine's component parts while it works as the relevant type of movement). Some linguists may even question whether *the engine* exists independently of the event denoted in the proposition in case it does not function properly, or does not function at all. The subject of (12) can thus not be considered a suitable agent, which is reflected in the range of possible interpretations for this utterance. It can be interpreted as an epistemic statement based on some evidence available to the speaker (for instance, the fact that the addressee has arrived on time despite previous problems with his car engine). It may also receive a non-directed deontic interpretation, where the deontic force stems from some external circumstances ('It is necessary that the engine functions properly if we are to drive to Spain'). A directed deontic interpretation is also possible. On this interpretation, the speaker herself is the source of the deontic force expressed in the utterance, which is directed towards the addressee who is not co-referential with the subject, but is held responsible for bringing the proposition into existence. The fact that in this case the speaker chooses not to explicitly direct the deontic force of the utterance towards the addressee may be dictated, for instance, by issues of politeness, or speaker authority.

What makes the 2<sup>nd</sup> person *you* in (11) a suitable agent, on the other hand, is the fact that it exhibits all the typical properties of a Proto-Agent, from being volitionally involved in the action described in the proposition to existing independently from the event named by the verb. Furthermore, according to Klinge (1996: 45) "[p]art of our communicative competence is that we grant permission to and impose obligation on the addressee, i.e. on the referent of 'you', more prototypically than we do to and on third persons." This claim finds further support in Dahl (2000b: 71), who observes that in conversational data "positions that are restricted to animate reference – arguments representing agents, experiencers, and recipients – also have a high incidence of egophoric reference." By egophoric reference he means "reference to speech act participants and generic reference" (Dahl 2000b: 39). The presence of this type of subject in (11) is what promotes the directed deontic interpretation. Depending on the degree of asymmetry in the relationship between the speaker and the addressee, the utterance in (11) is interpreted as an order, recommendation, or request.

The asymmetry in the relationship between the speaker and the addressee is often defined in terms of speaker authority, some power relation, or differences in social status. Consider, for example, McCallum-Bayliss's (1988: 70) argument on how the deontic interpretations of permission and command may arise:

A difference in social status offers the opportunity to the person with a higher status to make comments about another's life and actually to create the shape of another's world. In doing so, a speaker (with higher status) chooses from among various possibilities and chooses an appropriate course for the hearer. This essentially means that no other possibilities are available to the hearer – the complements have been eliminated. Since this is the only reasonable avenue available to him, the hearer, by virtue of the power relation, will follow that course. If it is something the hearer wanted to do, it can be interpreted as 'permission'. If it is something the hearer did not particularly want to do, the 'created possibility' may be interpreted as something stronger, like an order.

Thus, the notion of speaker authority or higher status is an additional extra-linguistic feature for the interpreter to take into account in order to arrive at the intended message. In the present study, however, one of the essential components of agent control is assumed to be the element of free will, or, in Dowty's (1991) terms, volitionality. This allows the agent, who is taken to be co-referential with the addressee, to choose to carry out the proposition or decline to do so, and does not merely refer to his mechanical ability to perform the action specified in the proposition. Thus, I do not agree with McCallum-Bayliss (1988) that receiving permission or an order eliminates the addressee's option of choosing not to act in accordance with it.

As mentioned earlier, for an utterance to be interpreted deontically, there must be some deontic source interested in the completion of the event described in the proposition (cf. 1.1.2.1 and Heine's (1995) semantic criteria in this section). The deontic force may originate from the speaker on the directed deontic reading, or in the relevant circumstances on the non-directed deontic interpretation. Yet another prerequisite of deontic interpretation is that in giving an order or a permission to act out the proposition, the speaker has some possible agent in mind, i.e. the deontic force is directed towards an agent. This may be linguistically coded by the use of a 2<sup>nd</sup> person subject or a proper noun. The contemplated agent, on the other hand, can also be coded by a common noun phrase. Consider (14) through (19).

- |      |                                     |           |
|------|-------------------------------------|-----------|
| (14) | Somebody <b>may</b> enter the room. | Epistemic |
| (15) | A girl <b>may</b> enter the room.   | Ambiguous |
| (16) | The girl <b>may</b> enter the room. | Deontic   |
| (17) | Lions <b>may</b> hunt.              | Epistemic |
| (18) | The lions <b>may</b> hunt.          | Deontic   |
| (19) | The lion <b>may</b> hunt.           | Ambiguous |

In the epistemic (14), the subject is indefinite and non-specific. The speaker is unlikely to direct an order to such an agent, even if this somebody happens to be perfectly capable of controlling his actions. The example in (15) is ambiguous between an epistemic and a deontic interpretation. On the epistemic reading, the speaker does not envisage a specific agent to whom she might give the permission to enter the room: *a girl* refers generically to ‘any girl that exists’. The subject is coded by an indefinite, non-specific noun phrase to indicate that it is not the type of subject towards which deontic force is normally directed. This diminishes the possibility that the example would be felicitously meant or interpreted as permission. On a deontic interpretation, on the other hand, (15) can be interpreted as ‘A girl is permitted to enter a room, but a boy is not’, where the subject referent is clearly restricted to a limited set of entities, and thus constitutes not only a more suitable agent, but also the type of agent towards which deontic force may easily be directed. In (16), the subject is the intended agent of the action described in the proposition, and as such receives permission to act on the proposition. It is coded by a definite, specific noun phrase. Although a context can be constructed that would force an epistemic interpretation of this utterance, the natural interpretation, or in Klinge’s terms, the “preferred” interpretation, is deontic. Also, on the deontic interpretation of these examples, the subject referent is always egophoric: it is already established as a speech act participant in previous discourse, which further strengthens the assumptions about the influence of specificity on the interpretation of deontic utterances.<sup>10</sup>

In (17), the use of an indefinite noun phrase in subject position gives rise to a generic interpretation of the subject and promotes an epistemic interpretation of the utterance: ‘It is possible that lions hunt’. As, for in-

<sup>10</sup> See also Eide (2005) on specificity and particularly on the impact of what she calls “Source of modality” on the semantics of the modals.

stance, Huddleston and Pullum (2002: 406-407) point out, generic interpretations denote “unlimited states,” states that “potentially hold for all time (at least for as long as the entities which take part in them exist)”. If the situation holds for all time, this means not only that it is stative, but also that the time reference for the proposition is simultaneous, anterior *and* posterior to the time of modality expressed. The significance of these features, stative situation and time reference for the proposition, for the modal interpretation will be discussed in 4.1.2 and 4.1.3, respectively. The subject of (18), unlike the subject of (17), is coded by a definite noun phrase, which is also interpreted as specific, promoting deontic interpretation: ‘The lions (at the nature reserve) are allowed to hunt’. Without further context, (19) is ambiguous between the deontic and the epistemic interpretations on the same grounds as (15). Although the subject in (19) is coded by a definite noun phrase, it may have either a specific or a generic referent, which leads to ‘limited’ and ‘unlimited state’ interpretations, respectively. Here, I have demonstrated how definiteness and specificity influence modal interpretations. Although these notions coincide to a great degree in the examples analysed, they are certainly not identical.

As seen from (14) through (19), English, unlike some other languages,<sup>11</sup> does not allow linguistic means for coding specificity, other than with adjectives such as *certain* (see Enç 1991: 4). It cannot be claimed, for example, that definite noun phrases are specific, whereas indefinite noun phrases are non-specific, since the use of these expressions is limited to the fact that “indefinites cannot have antecedents in the discourse, whereas definites must” (Enç 1991: 7). However, these are clearly related notions, in view of the fact that “[b]oth definites and specifics require that their discourse referents be linked to previously established discourse referents, and both indefinites and non-specifics require that their discourse referents not be linked to previously established discourse referents” (Enç 1991: 9). In my analysis of the data, these features are considered individually, as well as in relation to each other.

<sup>11</sup> Specificity can be coded in Norwegian. Consider the following examples from Julien (2002: 283):

(i) Den kvit-e mann-(en) har alltid undertrykkt andre kultur-ar.

DEF.SG white-W man-DEF.SG has always oppressed other culture-PL

‘The white man has always oppressed other cultures.’

(ii) Den kvit-e mann-\*(en) ât ein is.

DEF.SG white-W man-DEF.SG ate an ice

‘The white man ate an ice-cream.’

In (i), the suffixed article is optional, which may signal that the intended interpretation is generic. In (ii), where the only possible interpretation is specific, the omission of the article suffix results in an ungrammatical sentence (see also Julien 2005).

### 4.1.2 States vs. events

The definition of states and events adopted here follows that of Michaelis (1998), who argues that “[w]hile an event qualifies as an *individual*, a state does not” (Michaelis 1998: 6). The notion of individuality is defined by two other concepts: boundedness and indivisibility. Events are bounded, i.e. occur over a defined period of time, and indivisible: an event is not fully instantiated at any particular point of this defined time, except at the endpoint. States, on the other hand, are non-bounded, i.e. there is no specification for time over which a state holds, since it is not necessary to indicate the beginning or endpoint of a state. States are also divisible, i.e. at any particular point of time a state is equally fully instantiated.

Comrie (1976: 49) makes similar observations, arguing that “[w]ith a state, unless something happens to that state, then the state will continue”. States are not normally controlled, whereas “[w]ith a dynamic situation, on the other hand, the situation will only continue if it is continually subject to a new input of energy”, i.e. controlled by some agent.<sup>12</sup>

In my analysis, I follow Comrie’s (1976) distinction between stative and dynamic situations, in that I consider ‘change-of-state’ verbs to be event verbs (cf. “[t]he start or end of a state is dynamic, since for a state to be started or stopped something must come about to bring about the change into or out of this state” (Comrie 1976: 50)).

That stative vs. eventive distinction plays a role in the interpretation of modality can be easily demonstrated by (19) and (20).

(20) You **must** hate him. Epistemic

(21) You **must** leave. Deontic

In (20), the presence of the state verb *hate* demotes the non-epistemic interpretation: it is impossible to order somebody to hate somebody or something, since this emotion cannot normally be controlled by the addressee. Frawley (1992) argues, for example, that states, contrary to events, are normally not controlled by some external agent: “[a]cts have internal structure and may be executed; states are continuous and attributed rather than executed” (Frawley 1992: 152). In contrast, (21), which contains an event verb *leave*, receives a deontic interpretation (‘You are ordered to leave’), provided that the addressee is in control of the situation, i.e. can choose or refuse to bring about the situation described in the proposition,

<sup>12</sup> See, however, the discussion in 4.1.3 for the modification of this view.

and possesses a physical ability to perform the action denoted by the main verb.

### 4.1.3 Time reference

Discussing time reference in modal utterances in Danish and English, Klinge (1996: 40) points out that “there are three main systems that can provide semantic clues to temporal indexing: the closed systems of tense (present vs. past) and phase (perfective vs. non-perfective), and the open system of adverbials”. He also argues that “[i]n English the closed system of aspect (progressive vs. non-progressive) can also provide clues”. These features are considered important not only for determining the time reference of the utterance, but also for modal interpretations in English and Swedish.

In this study, I differentiate between two types of time reference: time reference for the modality expressed in the utterance, and time reference for the proposition. Theoretically, the time reference for the modality expressed in the utterance can be past, present, and future. This feature does not correspond to the morphological tense affixes on modals in the two languages under investigation, but is recovered from the context of the utterance.

Non-present time reference for modality is rarely found with deontic and epistemic interpretations of the modals under investigation, since they are usually simultaneous with the time of the utterance. Thus, this feature may deviate from the default value, ‘simultaneous with the time of the utterance’, to a very limited degree, and is often not decisive for the interpretation. Indeed, all of the few epistemic English examples in the ESPC with past time reference for the modality expressed were found only in sequence of tenses, as in (22), or in sentences containing indirect speech.

- (22) He kept his distance from me because he thought that he **must** smell of her arm and shoulder pressed against his. (NG) Epistemic

In deontic utterances with past time reference for modality, the English modals *may* and *must* are usually replaced by such modal expressions as *be allowed to* and *have to*. However, as Palmer (2001: 76) suggests “[t]he restrictions on the past tense are [...] essentially a feature of English.” Past time reference for modality is much more frequent with Swedish *måste* than with the English modals. *Måste* with past time reference can sometimes also be found in the limited context of indirect speech sequences with epis-

temic interpretation. Unlike *must*, *måste* can also be used as a past form to indicate some past necessity, as in (23). Usually, but not necessarily, in these cases the interpretation is non-directed deontic, indicating that the necessity to act out the proposition arose through the force of some, often external, circumstances.

- (23) Första gången var det svårt, då var hon rädd så att hon  
first time be-PAST it difficult then be-PAST she afraid so that she

**måste** blunda. (AL)

Deontic

MOD shut-her-eyes-INF

‘The first time it was difficult she was so frightened that she had to shut her eyes.’

The time reference for the modality in (24) is present: the speaker gives an order to, or puts an obligation on the addressees to carry out the proposition at the time of the utterance. In (25), on the other hand, the time reference for the modality is not specified, which causes the utterance to be ambiguous between an epistemic and a deontic interpretation. The speaker, who is a writer, contemplates the fate of his characters. If the utterance is understood as an epistemic judgement about the likelihood of the proposition becoming true, the time reference is present. If, on the other hand, the speaker intends to convey the thought that, in some specified situation that has not been realised yet, he may allow himself to let the characters participate in his plot again, the time reference for the modality expressed is future. Thus, in cases such as (25), the time reference for modality may be important for the interpretation, despite the fact that at least in English there is not much variation of this feature with utterances containing modal verbs (they tend to be replaced by other modal forms).

- (24) “All of you **must** pay for the damages!” he screeched. (BO)

Deontic

- (25) If I am in the generous mood, or if I feel the characters deserve something better, I  
**may** allow them out again. (BR)

Ambiguous

The time reference for the proposition expressed in an utterance is a much more influential feature than the time reference for modality. It can also have three values: anterior, posterior, and simultaneous with the time of the modality expressed. Generally, simultaneous and anterior time references for the proposition coincide with epistemic interpretations, whereas posterior time reference is typical in deontic utterances. This is reflected in Figure 1 adopted from Eide (2003: 129). Note that Eide assumes in this



figure that the time reference for modality coincides with the time of the utterance (S for the speech time in her terms).

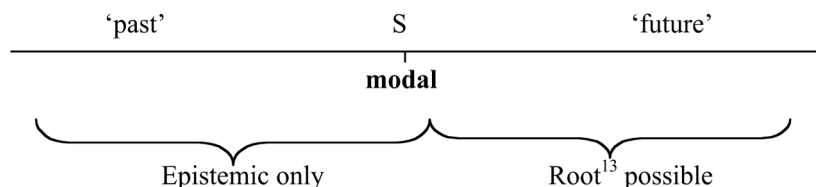


Figure 1. Correlations of different interpretations and time reference for the proposition

The time reference for the proposition can be linguistically coded, as suggested in Klinge (1996), either through aspectual modification<sup>13</sup> or by temporal adverbials.

- (26) You **must** have drunk yourself under the table. Epistemic
- (27) You **must** be joking. Epistemic
- (28) You **must** leave tomorrow. Deontic

On this analysis, in (26), the aspectual modification<sup>14</sup> signals that the proposition is anterior to the time of the modality expressed. An interesting proposal on the nature of the perfect aspect in English is presented in ter Meulen (1995):

The perfect *Jane has sighed* describes th[e] state caused by the end of [Jane's] sighing. Such perfect states are atemporal in the sense that once they have begun, they never end. [...] The difference between the simple past and the perfect is hence aspectual in nature: The former describes events in a context-

<sup>13</sup> I adhere to the standard definition in Comrie (1985) that a strict division between temporal and aspectual modification should be maintained. Consider the following: "in many linguistic works, especially traditional grammars, the term tense is rather misleadingly used to cover both tense and aspect", and also "it is crucial to maintain the conceptual distinction between tense and aspect, and to have a terminology that is capable of maintaining this distinction" (Comrie 1985: 6-7). The definition of tense adopted here follows that of Comrie (1985: 9): "tense is grammaticalised expression of location in time". Aspectual modification (including the perfect and the progressive aspect) is then taken to be "different ways of viewing the internal temporal constituency of a situation" (Comrie 1976: 3).

<sup>14</sup> Controversy notwithstanding, in this study I follow the classification of Quirk *et al.* (1986), who distinguish between the perfect(ive) and the progressive aspect. Support for this view can be found in Michaelis (1998: xv), who defines what she calls 'phasal aspect' (and what is here discussed as perfect and progressive aspect) as "[a] set of aspectual distinctions involving relations between a background situation (the reference situation) and a situation located relative to the reference situation (the denoted situation)".

dependent way, whereas the latter gives only stative information. (ter Meulen 1995: 5-6)

In this analysis, the perfect is strongly associated with state predicates, as discussed in 4.1.2. Further, Eide (2002) argues that on ter Meulen's analysis "unlike most states, the perfect denotes not only a state, but the event whose culmination *caused* the given state as well"<sup>15</sup> (Eide 2002: 247). This entails that "[t]he 'relative past' reading comes from a straightforward inference, since if there exists a state described as commencing at the exact time of culmination of the very event that caused the state, and the culmination of this event is an essential part of the description of the state, then it follows that this event must already have taken place in order for the state to hold at the time of the utterance" (Eide 2002: 247-248).<sup>16</sup>

In (27), the progressive aspect signals that the action described in the proposition is simultaneous with the time of the modality.<sup>17</sup> Following Klinge (1996), it is possible to conclude that "situations that are located in past time, [...] and situations that are located at the time of the utterance, [...] are immutable, and thus beyond agent control" (Klinge 1996: 40-41). This is why both (26) and (27) receive epistemic interpretations: in (26), the speaker expresses her judgement as to the likelihood of the proposition having occurred, and in (27) she expresses her judgement about the likelihood of a present situation. In both cases, a deontic interpretation is infelicitous, since the propositions do not denote actions that may be controlled by the intended agent. This is so not only because of their temporal indexing, but also, if we accept Eide's (2002) and ter Muelen's (1995) analyses, because they are states.<sup>18</sup>

In (28), on the other hand, the time reference for the proposition is taken to be posterior to the time of the modality expressed. That deontic modality is connected with posterior reference was noted as early as in Lyons (1977) (cf. "there is an intrinsic connexion between deontic modality and

<sup>15</sup> Cf. the "resultative" use of the perfect in Comrie (1976).

<sup>16</sup> This analysis is consistent with the grammaticalization patterns suggested in Maslov (1988), who maintains that in Indo-European languages the cyclic development of the perfect "can be summed up in the formula: from denoting a state – to denoting an action that causes the state, and then – to simply denoting an action, that is, to a degeneration of features peculiar to the perfect and, in some cases, to their complete loss" (Maslov 1988: 70).

<sup>17</sup> Contrary to Klinge (1996: 48), who claims that "the progressive indicates coincidence of the referential situation with the time of the utterance", progressive forms may also indicate posterior time reference. This phenomenon and its implications for modal interpretations were discussed in some detail in 3.1.1.1.

<sup>18</sup> See also Paradis (2005: 551), who discussing nominal meaning, maintains that processes and activities are to be viewed as "*state[s]* of change" [my emphasis].

futurity” (Lyons 1977: 824)). This claim is echoed in Klinge (1996), who argues that:

Future time situations can either be viewed as products of the ways of the world, or as the ways of agents intentionally bringing situations about. The subset of future time situations that lies within human ability is within possible agent control. [...] So with propositions taken to describe a future time situation we can have indeterminacy between epistemic and non-epistemic where there is possible agent control. (Klinge 1996: 41)

Such indeterminacy can be observed, for example, in (29).

(29) They **may** start drilling tomorrow.

Ambiguous

Since it must be assumed that the action denoted by the proposition is not beyond the control of the intended agents, and given that the time reference for the proposition is posterior to the time of the modality expressed, one of the possible interpretations is deontic. In certain contexts, however, (29) may also be interpreted epistemically, as the speaker’s judgement of the likelihood of the proposition occurring in the future.

This has also been noted by Coates, who summarises her findings as follows:

It is acknowledged in most studies of the modals that tense and modality overlap where there is reference to the future, since the future, unlike the past, is unknown. Reference to future events and states is a crucial aspect of the meaning of the modals. [...] In other words, commands, recommendations and permission-granting utterances all refer to an action which will be carried out at a time subsequent to the utterance. (Coates 1983: 233)

She also discusses the relationship between posterior time reference and epistemic modality:

The relationship between Epistemic modality and futurity is less clear. The Epistemic modals which express the speaker’s confidence in the proposition normally have present reference. [...] the Epistemic modals which express the speaker’s lack of confidence in the event or state referred to in the proposition, however, normally have future reference. (Coates 1983: 234)

Although it is plausible that the speaker is more inclined to express confidence in a proposition that can be verified at the time of the utterance than in a proposition that has not yet occurred, the future reference can hardly be claimed to stem from the modals in these cases. Coates herself argues that “[e]pistemic MAY, MIGHT, and COULD can usually be paraphrased

‘it is possible that x will [...]’ (Coates 1983: 234). However, I find this difficult to accept as proof of future time reference for the modality in these utterances. The time reference for the proposition is within the scope of the modality as is the case in the paraphrases provided by Coates herself for the modals *may*, *might*, and *could*. In general, the time reference for modality in epistemic utterances is present: the speaker expresses her judgement at the time of the utterance. The presence or absence of confidence in a proposition will then be coded by the simultaneous or posterior time reference for the proposition in the cases discussed by Coates (1983), and also by different modals. Thus, it is important to consider the time reference for the proposition and the time reference for the modality expressed as two separate features contributing to modal interpretation.

A note is due on the passive, as it was one of the features found to be associated with deontic modality in utterances containing the modal *must* in Coates (1983) (see 2.1.2). Let us consider the implications of the presence of this feature in an utterance. Normally, the subject of a passive utterance is not expected to act on the proposition, but is instead subjected to the action described in the proposition. Thus, at first glance, there is no apparent reason why this association ought to exist as in Coates (1983), at least in directed deontic utterances. Consider, however, (30) and (31).

- |      |   |           |
|------|---|-----------|
| (30) | These issues <b>must</b> be resolved as soon as possible. (EELL)  | Deontic   |
| (31) | She went through the same internal questioning as I had, but assumed that butter <b>must</b> be rationed! (JPM) | Epistemic |

These examples exhibit two possible interpretations for passive utterances. In (30), the interpretation is either directed or non-directed deontic. The former interpretation will arise if there is a specific person in the context of this utterance whom the speaker intends to carry out the action described in the proposition. The choice of passive voice in this case may be dictated by a number of reasons: the speaker may not want to give an explicit order to the addressee, or it is not important to specify which of the possible agents is to carry out the order. In (31), on the other hand, the interpretation is epistemic. There is no intended agent in the context of this utterance to whom an order to ration the butter may be addressed. What the speaker wants to emphasize is the allegedly rationed state of the butter, not that this state is to be actualised by a third party. This interpretation is explicitly triggered by the presence of *assume* in the main clause. Note also that the time reference for the proposition is simultaneous with the modality expressed in (31) and posterior to the time of modality in (30). This is



tion, on the other hand, is not linguistically coded, but is recovered from the situational context of an utterance, as in (35), in which the speaker is a prisoner and has to be brave in order to retain his dignity.

- (34) To climb the tower you **must** be in a group, be aged over 11 and have a letter of permission from your MP or embassy. (SUG1) Deontic

- (35) I **must** be brave, I **must** maintain my own high standards. (ST1) Deontic

If there is a condition of this kind present in the context, utterances are interpreted as non-epistemic: they are understood as ‘if-then’ statements, where the interpretation is ‘if X, then necessarily Y’ (‘If you are to climb the tower, then it is necessary that you be in a group, etc.’). The interpretation ‘if X, then possibly Y’ is infelicitous. Only the modals of necessity, *must* and *måste*, are used in these contexts, since, according to Papafragou (2000), there is a relation of entailment between a proposition containing one of these modals and the set of propositions belonging to the relevant domain (see 2.2.).

This feature is important not only for the interpretation of modal utterances in English and Swedish, but also in Norwegian (see Eide 2002, 2005). Consider, for example, the following sentences from Eide (2002: 238):

- (36) Pasienten **må** ha blitt feilbehandlet. Epistemic  
patient-DEF MOD have-INF be-PART wrong-treated

‘The patient must have been subject to malpractice.’

- (37) Pasienten **må** ha blitt feilbehandlet for å få erstatning.  
patient-DEF MOD have-INF be-PART wrong-treated for to get-INF compensation

‘The patient must have been subject to malpractice in order to get compensation.’

Deontic

Eide claims that the presence of an adverbial clause of purpose coerces temporal difference between (36) and (37). Thus, (36) is interpreted epistemically due to the fact that the time reference for the proposition is anterior to the time reference of the modality expressed, and can therefore no longer be controlled by any agent. As in this study, epistemic interpretation in such cases is considered default in Eide (2002), but is overridden when an adverbial clause of purpose is present:

In this sentence [37], ‘receiving a compensation’ is temporally subsequent to the action described as ‘being subject to malpractice’; i.e. the reading is that ‘being subject to malpractice’ must already have taken place by the point in time when a compensation is received. The purposes described by the purpose clauses [are] seen as a (potential) consequence of the action encoded by the complement of the modal, hence the purpose must be subsequent in time to this action. Knowing that causes must precede their consequences, this is an effect of our knowledge of how the physical world actually works. Thus, it is possible to argue that purpose clauses denote a point in future. (Eide 2002: 253)

As we saw earlier, posterior time reference for the proposition is consistent with deontic interpretation. However, time reference alone is not critical, since it is possible to find epistemic utterances, such as (38), with posterior time reference for the proposition.

- (38) He knows, she knows, it is not evasion, but the only answer possible; announcing, perhaps, the beginning of a conversation which **must** inevitably continue through months and years, leading to an inevitable conclusion (BR). Epistemic

What is important, is the fact that in these utterances some deontic source is implied that is interested in the proposition being carried out, or as Huddleston and Pullum (2002: 726) put it: “[t]he central cases of purpose imply intention and design – usually on the part of the agent of the matrix clause”. This does not exclude the possibility that a condition of this kind may code speaker intentions instead. Therefore, the features implicit and explicit conditions are considered to be related to Controllability.

#### 4.1.5 Situation type

The type of situation is taken here to be instantiated as either telic or atelic. Following standard definitions, a telic situation is taken to be bounded (it has an endpoint), whereas an atelic situation is unbounded (it has no endpoint).<sup>20</sup> In this study, the whole verb phrase is considered when deciding whether a situation is telic or atelic. This is in accordance with Comrie’s observation that “although aspect, and tense, and mood, are usually indicated in the verbal morphology, they do not so much characterise the verb itself as the whole of the sentence, including subjects and objects” (Comrie

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<sup>20</sup> Cf. Comrie’s definition: “a telic situation is one that involves a process that leads up to a well defined terminal point, beyond which the process cannot continue” (Comrie 1976: 45). Note also that telic/atelic opposition is taken to be aspectual on his account.

1976: 45 fn. 2). This seems to be common practice, since direct objects are included in the classification of the situation types as early as in Vendler (1967).<sup>21</sup> Also, Verkyul (1972) suggests that the verb phrase in its entirety should be investigated when deciding on the *Aktionsart* of the utterance. Michaelis (1998) defines situation type, in her study referred to as *situational aspect* or *Aktionsart*, as “[t]he canonical categorization of a situation as a state or event, independent of any particular presentation of that situation” (Michaelis 1998: xvi). We already established in 4.1.2 that the distinction between states and events is of importance for the interpretation of modal utterances. Michaelis further argues that “aspectual categorization [is] a product of the manner in which people, as producers and processors of texts, construe scenes, rather than a reflection of the properties which situations have ‘in the world’” (Michaelis 1998: 5). Thus, on her analysis “[p]hasal aspects are [...] seen as operators which map event propositions onto state propositions and vice versa” (Michaelis 1998: 4). Therefore, type of situation is to be considered when analysing the aspectual modifications and time references of modal utterances.

Of particular interest to the present study is Frawley’s (1992) cross-linguistic observation on the correlation between telic situations, and perfect aspect<sup>22</sup> and passive voice (see also the discussion of these features in 4.1.3). He illustrates with various examples that the presence of perfect aspect or passive voice in an utterance imposes telic interpretations. He argues that “the perfect induces telic aspect because of its dual temporal nature”, since it relates “two times – and, by implication, two events – the perfect is functionally equivalent to the telic, which as we know, requires a dual event structure” (Frawley 1992: 304). The correlation with the passive is explained by the fact that “passive forms convey telicity because of their intrinsic dual structure of both process and result”, or

The logic of the passive is to promote the recipient of the action to subject position. In doing so, the passive focuses on the result of the process encoded by the verb insofar as the recipient is the result of the action. [...] The presence of and focus on the recipient provided by the passive produce the telic interpretation. (Frawley 1992: 305)

Thus, we can establish a connection between telicity and state/event distinction on the one hand, and aspectual modification and passive voice on the other. All these features are considered of major importance for modal

<sup>21</sup> Vendler (1967) distinguishes between four situation types: (i) states (*live, hate*); (ii) activities (*swim, play*); (iii) accomplishments (*grow up, run a race*); and (iv) achievements (*arrive, die, win a race*).

<sup>22</sup> Frawley uses the term *perfect tense*.



interpretations, and are also related to the compositional notion of Controllability.

#### **4.1.6 Summary**

To sum up, in English, Swedish, and – one might at this point speculate with some confidence – in other languages, there is an array of contextual features related to the notion of Controllability in modal utterances. In deontic utterances, these features pattern so as to indicate that the intended agent is in control of the situation described in the proposition. Typically, in deontic utterances the subject is animate and thus capable of either carrying out the proposition or refusing to do so. The time reference for the proposition is often posterior to the time of the utterance, allowing the agent the possibility of action. The main predicate is usually an event verb denoting an action that can be controlled by the agent. Furthermore, in deontic utterances the presence of an explicit or implicit condition indicates the source of the deontic force, i.e. the party interested in the proposition being carried out, and also coerces posterior time reference for the proposition.

In epistemic utterances, on the other hand, these features typically pattern in such a way as to indicate lack of control on the part of an intended agent over the situation. The subject may be inanimate, which usually disqualifies it from being a suitable agent. Further, the main predicate is often expressed by a state verb, which also tends to indicate lack of control on the part of the agent. The proposition may also refer to an anterior or simultaneous situation, which is immutable and thus cannot be changed by an agent.

My point here is that the ‘assumptions’ that in Papafragou’s treatment allow the addressee to interpret modal utterances in the intended way are triggered in particular by the manner the speaker chooses to encode Controllability, i.e. the way the features discussed above are combined in an utterance. Appealing to Controllability also explains the systematic association of the features discussed with either epistemic or deontic interpretations.

## 4.2 Additional features

In this section, I consider some other features that are of importance for the interpretation of modal utterances. They can be related to Controllability but are not central to this notion.

### 4.2.1 Epistemic adverbials and modal particles

In his extensive account of modality, Lyons (1977) hinted at the relationship between modals and modal adverbials:

In most dialects of English not more than one modal verb can occur within the same clause. But both a modal verb and a modal adverb may be combined. When this happens a distinction is to be drawn between modally harmonic and modally non-harmonic combinations. For example ‘possibly’ and ‘may’, if each is being used epistemically, are harmonic, in that they both express the same degree of modality, whereas ‘certainly’ and ‘may’ are, in this sense, modally non-harmonic. It has been pointed out [...] that the adverb and the modal may, and normally do, “reinforce each other” in a modally harmonic combination. [...] [In cases when] the adverb and the modal verb are non-harmonic they cannot but be independent; and one must be within the scope of the other. (Lyons 1977: 807-808)

Later, the effect of an epistemic adverbial on the interpretation of an utterance containing a modal verb is discussed by Quirk *et al.* (1985: 583-586), Hoyer (1997: 149-152), and Wårnsby (1999), who all argue that the presence of an epistemic modal adverbial such as *possibly*, *perhaps*, *surely*, etc., may neutralize, disambiguate, or reinforce the interpretation of the modal in an utterance. Neutralization occurs when the utterance would be interpreted as non-epistemic had it not been for the adverbial, as in (39). Disambiguation takes place when the utterance would be ambiguous without the modal adverbial (consider, for example, *He may (probably) go there tomorrow*, which out of context and without the presence of an epistemic adverbial would be ambiguous between epistemic and directed deontic interpretations). Reinforcement of the modal meaning occurs in harmonic combinations where the modal and the adverbial express the same kind of modality (*John may perhaps be ill*). The presence of an epistemic adverbial in an utterance (both in harmonic and non-harmonic combinations) is considered to take precedence over other features, since these adverbials are sentential and thus take scope over the utterance as a whole. Note also that, according to Huddleston and Pullum (2002: 767), “[m]odal adjuncts,

[...] are predominately used for epistemic modality, where it is a matter of the speaker's assessment of the truth of the proposition expressed in the residue or the nature of the speaker's commitment to its truth", and also, "[m]odal adjuncts are not used to express deontic modality (obligation, permission, etc.)".

Wårnsby (2004: 175) mentions that in epistemic utterances, *must*, *may*, *måste*, and *kan* appearing in otherwise typically deontic contexts, in combination with event verbs without aspectual modification, exhibit a strong tendency to co-occur with another epistemic element (modal adverbials or modal particles).

- (39) If an export manager sent out by his company cannot communicate on the business and social level with the foreign customer, and has no respect for the different ways of conducting business and behaving socially, the customer **may** well choose another partner. (JPM1) Epistemic
- (40) This **must** surely come under unanimity rule. (EJAC) Epistemic

The presence of an epistemic adverbial or particle, however, has no influence on the capacity of the agent to control the situation described in the proposition. Thus, in (39) the subject, and the intended agent (*the customer*), obviously controls the situation insofar as being able to choose another business partner. Without the presence of the epistemic adverbial *well*, there is nothing in the context of this utterance that precludes the deontic interpretation of permission: the subject has control of the situation, the main predicate is coded by an event verb, the time reference for the modality is simultaneous with the time of the utterance, and the time reference for the proposition is posterior. Thus, (39) could be interpreted to mean that the subject is free to choose to act upon the speaker's permission or decline to do so in some future situation specified in the *if*-clause. By choosing to use *well* in the propositional context of this utterance, the author explicitly signals that the intended interpretation of (39) is epistemic.

Similar reasoning can be applied to (40). If the adverbial *surely* is omitted from the context of (40), the utterance may become ambiguous between the deontic and the epistemic interpretations. It is possible to interpret (40) as either the speaker's reference to some set of regulations specifying the necessity of the proposition being carried out, or as the expression of her judgement about the likelihood of the proposition. The epistemic adverbial *surely* disambiguates the speaker's intentions. Thus, although not part of Controllability on par, for instance, with time reference, epistemic

adverbials and particles are features that clearly facilitate intended interpretations.

### 4.2.2 Utterance type

As will become apparent in what follows, I consider it of importance to investigate whether there is a systematic correlation between certain types of utterances and modal interpretations. In this study, I distinguish between assertive and non-assertive utterances, or statements, and interrogatives and sentences containing negation (the latter are discussed in 4.2.3.1). Assertive utterances are further classified depending on whether they are exclamative or not. In distinguishing assertions from non-assertions, I consider primarily the function of these utterances. In deciding whether the utterance is exclamative, on the other hand, I rely on the presence of the exclamation mark in the data, since this, in addition to the special grammatical structure of some exclamatives, is the only means available in writing to indicate “the speaker’s strong emotional reaction or attitude to some situation” (Huddleston and Pullum 2002: 922).<sup>23</sup>

Searle (1969) mentions that illocutionary force is context-dependent: “[i]t is possible to perform the act without invoking an explicit illocutionary force-indicating device where the context and the utterance make it clear that the essential condition<sup>24</sup> is satisfied” (Searle 1969: 68). In written texts, however, a natural assumption is that the authors strive to convey their message so it is interpreted in the intended way. On this assumption, there may be associations between direct and indirect speech acts and the features important for the interpretation of modal utterances. Consider, for example, how these features cooperate in (41) and (42).

(41) “Everyone **must** stay here!” the landlord said, screaming in the dark. (BO) Deontic

(42) How embarrassing it **must** be for Britain’s Labour Government to read the McMahon report! (EJAC) Epistemic

<sup>23</sup> Whereas I accept that the difference between assertive and non-assertive utterances usually corresponds to that between declarative and interrogative utterances (see, for example, Huddleston and Pullum (2002) for definitions), I do not follow their strict definition of exclamatives, namely that these exhibit special grammatical structure. Also, imperative utterances are not considered here, since they do not contain modals.

<sup>24</sup> Essential conditions for requests and assertions are that they “[c]ount for an attempt to get H[earer] to do A[ct]” and “[c]ount as an undertaking to the effect that p[roposition] represents an actual state of affairs,” respectively (Searle 1969: 66).

Examples (41) and (42) are both exclamations on my analysis. In (41), the exclamation can be seen as boosting the illocutionary force of the utterance so it is understood not as a non-directed deontic statement, but as a direct order emanating from the speaker and directed towards the addressees. A similar effect is achieved by using an exclamative sentence structure in (42): the epistemic interpretation is reinforced by the indication of the speaker's strong, subjective involvement in the situation.

(43) May I get you a glass of water? (SG) Deontic

(44) Det måste ju vara något som inte stämmer? (HM) Epistemic  
it MOD MOD be-INF something that NEG match-PRES

'There is got to be something odd about that.'

The fact that (43) and (44) are non-assertive possibly adds some gradation to the interpretation. In (43), by choosing to express the proposal in question form and with a formal *may*, the speaker indicates a high degree of politeness. In (44), the speaker chooses to express his epistemic judgement not as a statement but as a question (note though that structurally this is not a question). By doing so, he further signals the uncertainty in his statement, and, at the same time, asks for confirmation from the addressee. Thus, although it is not central to the concept of Controllability, utterance type can influence modal interpretations.

#### 4.2.2.1 Negation

The type of negation considered here is sentential in scope. Two types of scopal relations are generally observed between modality and negation: either the modality or the proposition falls under the scope of negation in an utterance. In English and Swedish, there is no structural way of distinguishing between these two types of negation involving *not* and *inte* 'not', respectively. In English, however, different modals are used to express the difference in the scope of negation, as in (45).

- (45) John **may** be at the office.  
a. John **may** not be at the office.  
b. John **can**'t be at the office.

In (45a), it is the proposition that is negated ('It is possible that John is not at his office'), while in (45b) it is the modality that is negated ('It is not possible that John is at his office'). Palmer (2001) argues that "[t]he most

important relationship between modality and negation is the one that involves possibility and necessity” (Palmer 2001: 106). Furthermore, universally, necessity tends to take scope over negation, whereas negation usually takes scope over possibility (see also Cinque’s (1999) hierarchy of functional projections). In this study, it is important for the overall interpretation of the utterance whether the speaker chooses to negate the modality or the proposition.<sup>25</sup>

An additional point of relatedness between modals and negation can be found in Frawley (1992), who claims that propositional negation in particular should be considered modality in its own right, since it signals irrealis. Proposing a scalar organisation of propositional negation, Frawley suggests the following:

From the standpoint of modality as epistemic deixis, negation is the mismatch of the expressed world and the reference world, so the strongest propositional negation should be induced by forms that encode the total mismatch. Conversely, those forms that encode less mismatch between the reference world and the expressed world should display fuzzy behaviour for propositional negation. (Frawley 1992: 396)

He also argues that, in its capacity of being a scopal relation, negation will necessarily influence and be influenced by other scopal elements, such as modal verbs: “insofar as negation has scope, it necessarily comes into contact with other scope-bearing items and thus has to compete for effect” (Frawley 1992: 399). Consider, for instance, (46), discussed in more detail in 3.3.2 as (97).

- (46) But if humans can make new varieties of plants and animals, **must** not nature do so also? (CSA)

Here, negation interacts both with the modality expressed and with the interrogative utterance type. With *must*, negation usually scopes over the proposition, indicating that there is necessity to carry out the proposition. This does not seem to be the case in (46), however, which can be paraphrased as ‘..., is it not necessary for nature to do so also?’, and not as ‘..., is it necessary for nature not to do so also?’. This is consistent with Palmer’s (1990: 41) observation that in negated interrogative sentences it is the modality that is negated, not the proposition.

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<sup>25</sup> See also Palmer (2003: 9–13) for further remarks on the relationship between possibility, necessity and negation.

### 4.3 Controllability and Transitivity

As suggested in Wårnsby (2004), many of the features involved in the interpretation of modal utterances, are also relevant in (de)coding what Hopper and Thompson (1980) call Transitivity. Hopper and Thompson's analysis "has spawned intensive research on cross-linguistic manifestations of the transitivity prototypes and the search for other grammatical prototypes" (Croft 1990: 131). It certainly has influenced my arguments about the nature of Controllability.

Hopper and Thompson define Transitivity as a composite notion only partly concerned with the presence of an object in an utterance. Traditionally, the notion of Transitivity is understood in terms of "an activity [...] 'carried-over' or 'transferred' from an agent to a patient, and thus involves an action which is typically EFFECTIVE in some way" (Hopper and Thompson 1980: 251). This view is modified by the authors, who identify several component parts of Transitivity, each of which implies a scale of Low to High Transitivity for utterances in a language. Each of these components is said to "involve [...] a different facet of the effectiveness or intensity with which the action is transferred from one participant to another" (Hopper and Thompson 1980: 252). No component is sufficient on its own but has to be combined with others for maximum effect. Croft (1990) makes this stand even clearer:

No single property is a *necessary* characteristic of transitivity, but every property *contributes* to the transitivity of the clause. This is true typologically, of course: within a particular language, the grammar has conventionalized the prototype so that some grammatical properties affect transitivity of a clause and others do not. (Croft 1990: 134)

The components of Transitivity presented in Figure 1 are based on Hopper and Thompson (1980: 252-255).<sup>26</sup>

Component A refers to the number of participants in the clause. Since an action can only be said to have been transferred if there are at least two participants, clauses containing an A(gent) and an O(bject) are generally considered more transitive than those containing only an A.<sup>27</sup>

<sup>26</sup> See Ryan (2004) for further details.

<sup>27</sup> Note, however, that since the notion of Transitivity is regarded as compositional and scalar, in some cases a clause with no O can be considered higher in Transitivity than one containing both an A and an O, as in (i) and (ii):

- (i) Susan left. (+action, +telic, +punctual, +volitional)
- (ii) Jerry likes beer. (+ two participants, -volitional)

For more details, see Hopper and Thompson (1980: 254).

Component B, Kinesis, reflects the fact that actions can be transferred from A to O, whereas states cannot. Thus, in *The boy kicked the ball*, the ball is likely to undergo some transition, for example, from being immobile to being set in motion. In *The boy hates ice-cream*, on the other hand, no change is imposed on the ice-cream.

	HIGH	LOW
A. PARTICIPANTS	2 or more participants, A and O	1 participant
B. KINESIS	action	non-action
C. ASPECT	telic	atelic
D. PUNCTUALITY	punctual	non-punctual
E. VOLITIONALITY	volitional	non-volitional
F. AFFIRMATION	affirmative	negative
G. MODE	realis	irrealis
H. AGENCY	A high in potency	A low in potency
I. AFFECTEDNESS OF O	O totally affected	O not affected
J. INDIVIDUATION OF O	O highly individuated, i.e. O is: proper, human, animate, concrete, singular, count, referential, definite	O non-individuated, i.e. O is: common, inanimate, abstract, plural, mass, non-referential

Figure 1. Components of Transitivity (adopted from Hopper and Thompson 1980)

By making use of component C, Aspect, Hopper and Thompson are able to consider an action in terms of telicity.<sup>28</sup> Telic actions, which are high on the Transitivity scale, are marked by past tense or perfect aspect, whereas present tense and progressive aspect mark atelic actions, which are low in Transitivity. In *John ate the cake*, the transfer of the action is completed, while in *John is eating the cake*, it is not. Thus, the latter utterance is seen as being lower in Transitivity than the former.

The inclusion of component D, Punctuality, reflects the fact that “actions carried out with no obvious transitional phase between inception and completion have a more marked effect on their patients than actions which are inherently on-going” (Hopper and Thompson 1980: 252). Thus, clauses containing punctual verbs (*break*) are considered more transitive than clauses incorporating non-punctual verbs (*play*).

<sup>28</sup> This account of aspect and telicity refers to the external or grammatical phenomenon and should not be confused with the internal or lexical telicity, a component of situational aspect (see Michaelis 1998). Situational aspect can be said to be roughly reflected by component D, Punctuality, in Hopper and Thompson’s model (cf. Hopper and Thompson 1980: 271).



Component E, Volitionality, illustrates the fact that A can act purposefully. *I wrote your name* (volitional) is therefore considered to be higher in transitivity than *I forgot your name* (non-volitional) (Hopper and Thompson 1980: 252).

Component F, Affirmation, indicates whether a clause is affirmative or negative, the former being higher in Transitivity. The reason for this is that in an affirmative statement it may be reported that an action was transferred onto O, whereas a negative statement would be used to report that no such transfer took place.

Component G, Mode, indicates the mood of the clause: *realis* or *irrealis*. Actions described by clauses in *irrealis* mood are considered less effective than actions described by clauses in *realis* mood. The latter are higher in Transitivity than the former.

Component H, Agency, indicates that As high in agency/potency<sup>29</sup> are able to transfer the action more effectively than those low in agency/potency. Thus, “the normal interpretation of *George startled me* is that of a perceptible event with perceptible consequences; but that of *The picture startled me* could be completely a matter of an internal state” (Hopper and Thompson 1980: 252).

Component I, Affectedness of O, deals with the degree to which O is affected by the action; component J, Individuation of O, deals with the degree to which O is distinct from A, and the degree to which O is distinct from its own background. In *John peeled potatoes for two hours*, O is less individuated (since *potatoes* is common, plural and inanimate) and not totally affected (since there may be some potatoes left to peel). In *John peeled the potatoes in two hours*, on the other hand, O is more individuated (since *the potatoes* is concrete, count and definite), and it is also fully affected (because of the implicature that all of the relevant potatoes were peeled).

Hopper and Thompson provide extensive typological evidence that Transitivity, as a compositional notion, is a central relationship in human language. They ask why the morpho-semantic correlations they found relevant to their notion of Transitivity are so regular cross-linguistically, which moves them into the area of linguistic universals. Hopper and

<sup>29</sup> The notion of agents high in potency is compatible with the properties of the Proto-Agent discussed by Dowty (1991: 572). Also consider the so called Agency Hierarchy (Silverstein 1976):

1<sup>st</sup> Person > 2<sup>nd</sup> Person > 3<sup>rd</sup> Person > Proper name > Human > Animate > Inanimate

This hierarchy is arranged so that As located at the left of the hierarchy are considered to be higher in agency/potency than those located at the right of the hierarchy. Note, however, that some researchers do not conceive of the Agency Hierarchy in this way. Dahl (2000b), for example, maintains that the above hierarchy includes two types of scale: (i) an animacy scale (Human > Animate > Inanimate); and (ii) an egophoricity scale (1<sup>st</sup> Person > 2<sup>nd</sup> Person > 3<sup>rd</sup> Person > Proper name) (Dahl 2000b: 40-41).

Thompson suggest that linguistic universals “originate in a general pragmatic function, and that the universal is not explained until this function has been isolated and related to the universal” (Hopper and Thompson 1980: 280). It appears that one major function Transitivity performs in discourse is to distinguish between backgrounded and foregrounded information: clauses high in Transitivity tend to be foregrounded, while clauses low in Transitivity tend to provide background information. Hopper and Thompson provide the following definition of backgrounded and foregrounded information:

That part of discourse which does not immediately and crucially contribute to the speaker’s [communicative] goal, but merely assists, amplifies or comments on it, is referred to as BACKGROUND. By contrast, the material which supplies the main points of the discourse is known as FOREGROUND. (Hopper and Thompson 1980: 280)

The foregrounded/backgrounded distinction fundamental to the organisation of discourse is also said to be “a universal – having its origins in central communicative and perhaps psychological functions” (Hopper and Thompson 1980: 283). Whether information is foregrounded or backgrounded is not marked by a single morphosyntactic feature. In English and Swedish, for example, foregrounding is not marked in absolute terms. Instead, it is indicated by encoding the foregrounded clause so it is high in Transitivity, i.e. such a clause will typically have more high Transitivity features, as defined above, than a backgrounded clause. Hopper and Thompson’s investigation focuses on narrative texts, since “[n]arrative is a cultural universal, and hence readily accessible in a variety of languages”. Other studies, however, conducted on different discourse genres, conversation and procedural discourse, have reportedly produced similar results (see Hopper and Thompson 1980: 282).

There is a striking similarity between the features constituting Transitivity in Hopper and Thompson’s account, and the features claimed to constitute Controllability, indicating that Transitivity and Controllability are overlapping notions. The distinction between action and non-action in the Kinesis component of Transitivity reflects the distinction between state and event predicates, for example. Furthermore, grammaticalized telicity in the Aspect component is related to what has been called ‘aspectual modification’ in previous discussions. In addition, Punctuality, as well as Affectiveness and Individuation of O, are some of the features of *Aktionsart* mentioned here in the discussion of situation type. Finally, Volitionality and Agency relate to the distinction between types of subjects, issues of agent

control, desirability of an action, etc. Recall that Transitivity is defined by Hopper and Thompson as the transfer of energy from an agent to a patient. Controllability, on the other hand, involves the ability of the agent to choose to transfer the energy to a patient in order to carry out the action specified in the proposition (of a modal utterance). Controllability is encoded in a way similar to Transitivity: no single feature discussed here is sufficient to express Controllability, but each feature contributes to expressing Controllability in a modal utterance. The significance of this overlap is two-fold.

Firstly, the features discussed in 4.1 are important to the discourse distinction between foregrounding and backgrounding as well as to the notion of Transitivity, which is unrelated to modality as such. The primary function of Transitivity, according to Hopper and Thompson, is to mark the distinction between foregrounded and backgrounded information in discourse, distinction argued to be a universal. If we accept this argument, it is possible to conclude that the features of Transitivity are cognitively salient, i.e. since the features constituting Hopper and Thompson’s Transitivity, as well as the notion of Transitivity itself, are argued to be universal in languages, it is natural to assume that speakers’ awareness of these features is high.

Secondly, it is possible to analyse my data in terms of Transitivity, maintaining the distinction between epistemic and non-epistemic interpretations as far as the degree of Transitivity and the discourse function are concerned (see also Wärnsby 2004). One may assume that deontic utterances are generally higher in Transitivity than epistemic ones. Fifty occurrences of each modal (*may*, *must*, *kan* and *måste*) in epistemic utterances and fifty occurrences of the modals in non-epistemic (deontic and dynamic) utterances in main clauses<sup>30</sup> were assessed in terms of the degree of Transitivity. The results of this mini-investigation are presented in Table 1.

Table 1. Degree of Transitivity of epistemic and non-epistemic clauses

	Degree of Transitivity in epistemic utterances	Degree of Transitivity in non-epistemic utterances
<i>may</i>	1.36	4.53
<i>kan</i>	0.87	3.77
<i>must</i>	2.42	3.54
<i>måste</i>	1.74	3.25
Average	1.6	3.8

<sup>30</sup> The choice of main clauses as subjects of this investigation was dictated by the fact that only main clauses have the potential to be foregrounded.

As expected, there is a strong statistical tendency for epistemic utterances to have a lower degree of Transitivity than non-epistemic utterances. In many corpus- and cognitively-oriented linguistic theories, frequency is claimed to be a factor to which language speakers are sensitive. Leech and Coates, for example, maintained the notion of quantitative prototype, “a particular stereotype which is quantitatively and hence psychologically predominant” (Leech and Coates 1979: 88). A more recent claim to this point can be found in Warner (1993), who states that “in some circumstances an increase in frequency and salience of items or attributes may make a category more coherent and distinct” (Warner 1993: 238).<sup>31</sup> Bybee and Hopper (2001) also point out that “[t]he frequency with which certain items and strings of items are used has a profound influence on the way the language is broken up into chunks in memory storage, the way such chunks are related to other stored material and the ease with which they are related” (Bybee and Hopper 2001: 3).<sup>32</sup> Accordingly, we may assume that speakers of English and Swedish are sensitive to the difference in the degree of Transitivity between epistemic and non-epistemic modalities, i.e. the speakers are able to recognise the statistical difference in the degree of Transitivity between the two modalities. We may argue that modally modified utterances displaying a low degree of Transitivity will be first interpreted as epistemic on a probabilistic basis. This implies that Transitivity effects may be important even in (de)coding modal utterances.

Surprisingly, however, epistemic utterances were not the only ones found to be relatively low in Transitivity;<sup>33</sup> non-epistemic utterances were also low in Transitivity. This may be because both modalities express irrealis,<sup>34</sup> i.e. modal verbs scope over propositions that have not yet been realised, or exist in some possible world different from the actual world. Epistemic and non-epistemic utterances provide some background information in that they comment on the discourse (epistemic) or potentially modify it (deontic). This is consistent with our understanding of epistemic

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<sup>31</sup> Cf. also Giora (1996), who, studying the interpretation mechanisms for metaphoric expressions from a psycholinguistic perspective, suggests that “meanings are made salient through, e.g. conventionality, frequency, familiarity or context” (Giora 1996: 200).

<sup>32</sup> See also Bybee (2005) for an elaboration of this view.

<sup>33</sup> Consider, for example, the results of Hopper and Thompson’s findings that foregrounded clauses average 8.0 points in the degree of Transitivity, whereas backgrounded clauses average 4.1 points (Hopper and Thompson 1980: 284).

<sup>34</sup> The basic distinction between realis and irrealis is that “[t]he realis portrays situations as actualized, as having occurred or actually occurring, knowable through direct perception”, whereas “[t]he irrealis portrays situations as purely within the realm of thought, knowable only through imagination” (Mithun 1999: 173).

modality as propositional, expressing notions such as speakers' attitudes towards the proposition and their degree of commitment to it, and non-epistemic modalities as dynamic, referring to events that are merely potential (see Palmer 1990, 2001).

In their more recent article dealing with spoken data, Thompson and Hopper point out that “[c]lauses of low Transitivity are far more useful in the intersubjective interpersonal contexts that make up most of our talking life” (Thompson and Hopper 2001: 52). This echoes the conclusions in Scheibman (2001) and Krug (2001) that subjectifying elements are frequent in discourse, particularly in spoken discourse. Modally modified utterances can thus be seen as not only modifying one's environment and creating common ground in a typically 'modal' way, but also participating in the overall organization of discourse.

## Summary

Using Coates's study as my point of departure, I argued that the list of features associated with different modal interpretations in her study is not exhaustive. I suggested that a number of features affect the interpretation, and that these features are related to each other through the concept of *Controllability*. Controllability is here taken to reflect the ability of an agent to choose to carry out the proposition. It is argued that Controllability is a compositional concept, and can be coded by a number of contextual features.

The first feature discussed here is *subject type*. Since the grammatical subject is often also the agent who acts out the proposition, this feature is linked to Proto-Agent and other related concepts. The fundamental distinction between events and states is also considered to be involved in expressing Controllability: states are often beyond an agent's control, whereas events are not. Furthermore, features such as *aspectual modification*, *passive voice*, and *situation type* (telic or atelic) are all argued to facilitate the distinction between states and events. The *time reference for the modality* expressed in the utterance and the *time reference for the proposition* are also considered of relevance to Controllability. Anterior time reference for the proposition, for instance, effectively places the proposition out of the agent's control. Finally, the presence of an *explicit* or *implicit condition* in an utterance suggests prominence of the deontic source, and also that the proposition can be controlled by an intended agent, since it coerces posterior time reference for the proposition.

A number of additional features, such as presence of a *modal adverbial* or *particle*, *utterance type*, and *negation* were also discussed. Although not central to the

notion of Controllability, they were shown to be of importance for the interpretation of modal utterances.

Thus, since Controllability is not encoded by a single feature in the discourse but is a complex and compositional notion, we have to consider all of its constituent features in order to arrive at the intended interpretation. Coates's (1983) associations between certain features and the different interpretations are therefore not direct, but are related to the notion of Controllability, which is in turn associated with the different interpretations. In other words, if an utterance is encoded so as to indicate that the situation described in the proposition can be controlled by an intended agent, it is likely to receive a deontic interpretation. Epistemic interpretation, on the other hand, often arises in utterances indicating lack of control on the part of the agent.

Finally, I pointed out that Controllability is linked to the universal notion of *Transitivity*, since there is considerable overlap of the features relevant for the notion of Controllability and the features constituting Transitivity. This suggests that Controllability, and the features related to it, are salient and easily recognised. Furthermore, modal utterances were shown to be generally low in Transitivity, thus conveying background information which is particularly important in intersubjective contexts. Finally, Transitivity and Controllability have overlapping functions: encoding the effectiveness of transfer of energy from an agent to a patient, and encoding the suitability of an agent to perform this transfer of energy, respectively. Both notions are also encoded in a similar way: every feature discussed contributes to expressing these notions, but no feature alone is defining.

# 5 Mining the modals

## Abstract

In the previous chapters, I demonstrated that the presence of certain features influences the interpretation of modal utterances in a systematic way: some contextual features demote deontic interpretations, while others promote epistemic interpretations. I also related these features to the notion of Controllability, which is arguably crucial for the interpretation. A Data Mining analysis was undertaken in order to uncover the exact, statistically significant patterning of features with respect to interpretation, and to confirm the results obtained through qualitative analysis in Chapter 3. The Data Mining analysis also served to establish in what way the features related to Controllability combine with each other to ascertain the intended interpretation.

The first section of this chapter is a short introduction to Data Mining. I further demonstrate how this method can be used, and how it was used in this study. In 5.1.2.1, I discuss how the results of the Data Mining analysis should be interpreted. The results take the form of decision trees, and are discussed in detail in 5.2, 5.3, and 5.4. *Must* and *māste*, which exhibit similar patterns of interpretation, i.e. whose decision trees are similar with respect to the co-occurrence and the ranking of the relevant features, are discussed together. The other two modals, *may* and *kan*, are discussed separately, since they are distinct both from *must* and *māste* and from each other with respect to the patterning of the features.

## 5.1 Data Mining

This section offers a brief introduction to Data Mining (henceforth DM) and the Weka software<sup>1</sup> used in this study. It draws heavily on Witten and Frank (2000) and the extra material kindly provided by the authors. The section also includes a demonstration of how DM works with a simple

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<sup>1</sup> The software can be downloaded free of charge from [www.cs.waikato.ac.nz/ml/weka](http://www.cs.waikato.ac.nz/ml/weka).

non-linguistic example, and provides details about the parts of the present investigation where DM analysis was applied.

### 5.1.1 What is Data Mining?

One of the most general definitions of Data Mining is that it is “the extraction of implicit, previously unknown, and potentially useful information from data” (Witten and Frank 2000: xix). This extraction is automated, i.e. it is achieved with special computer programs and algorithms. DM produces structural descriptions that explicitly represent the patterns that have emerged. These structural descriptions, in the form of diagrams and decision trees, can be used to gain insight into how the patterns were arrived at and to predict the outcome in new situations.

The DM method used by the Weka software combines traditional statistical methods with machine learning methods. This enables not only illustration and explanation, but also prediction in a way beneficial for the researcher. Statistical tests are employed in machine learning algorithms and in the evaluation of learning models (Witten and Frank 2000: 27).

As mentioned above, DM is based on machine learning techniques. Witten and Frank provide an operational definition of machine learning: “things learn when they change their behaviour in a way that makes them perform better in the future” (Witten and Frank 2000: 6). In the present context, this means that when put to the task of discovering patterns in the data, the Weka software is able to improve on its performance, and produce a better description that can then be used for predictions about new data.

This is achieved partly by means of tenfold cross-validation, illustrated in Figure 1. Thus, the data is divided into ten equal parts, each of which is further divided into ten parts. The computer program takes the first tenth of the data (shaded portion of the left-hand column in Figure 1) and uses nine tenths of it to learn (white portion of the right-hand column in Figure 1). After that, it tests its analysis on the remaining one tenth (shaded portion of the right-hand column in Figure 1). The same procedure is repeated for the remaining nine tenths of the data (left-hand column). The computer adjusts its analysis for each portion of the data it sifts through until it cannot improve on its analysis any more. This guarantees accuracy of analysis even with relatively small data sets.



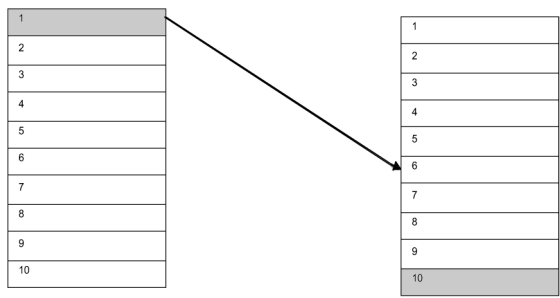


Figure 1. Tenfold cross-validation

The data sets to be analysed by Weka should be coded in a special format, the ARFF format. One of the advantages of this format is its universality and flexibility: one does not need to make different ARFF files for the same data to solve different research problems. The output is the actual description of the patterns found in the data. The type of outcome description, whether classification rules, association rules, or decision trees, is specified by the researcher depending on the problem. The next section demonstrates this principle on a simple non-linguistic example.

5.1.1.1 What can Data Mining do?

A classic example that illustrates what can be achieved with DM techniques is the weather problem, a small, fictitious data set concerning conditions for playing some underspecified outdoor game such as tennis or football. The data set is represented in Table 1. Each row represents the conditions present on a specific occasion, or instance, when the game in question was or was not played. Each instance is characterized by a set of features, or attributes: *outlook*, *temperature*, *humidity*, *windy*, and *play*. These attributes have different values: *outlook* can be *sunny*, *rainy*, or *overcast*, for example. The outcome of every combination of attribute values is whether to play or not. Any attribute or attribute value, however, can be specified as an outcome by the researcher, depending on the focus of the investigation. In this data set, all the attributes and their values are symbolic, or nominal. DM algorithms can, of course, handle data with numeric and mixed sets of attributes. Such attributes, however, will not be considered here, since the linguistic attributes of relevance to the present study are nominal.

Table 1. The weather data set (adapted from Witten and Frank 2000: 9)

Outlook	Temperature	Humidity	Windy	Play
Sunny	Hot	High	False	No
Sunny	Hot	High	True	No
Overcast	Hot	High	False	Yes
Rainy	Mild	High	False	Yes
...	...	...	...	...

If one is interested in classifying instances on the basis of one attribute, such as whether to play or not, the computer can provide lists of classification rules. With classification rules “[t]he *antecedent*, or precondition, of a rule is a series of tests [...], while the *consequent*, or conclusion, gives the class that applies to instances covered by this rule, or perhaps a probability distribution over the classes” (Witten and Frank 2000: 59). The set of classification rules that apply to the weather data may look like the list in Table 2.

Table 2. Classification rules for weather data (adapted from Witten and Frank 2000: 9)

If outlook = sunny and humidity = high, then play = no
If outlook = rainy and windy = true, then play = no
If outlook = overcast, then play = yes
If humidity = normal, then play = yes
If none of the above, then play = yes

These rules are meant to be interpreted as an ordered set: the first one first, and if it does not apply, the second, and so on. In isolation some rules may provide a false classification. Nevertheless, since the structural description provided by the computer is explicit, it can be used to predict the outcome in new situations. It can also be used to explain how the decision in question was reached.

Another possibility is to ask for the association rules, rules that specify the associations and connections between any of the attributes and attribute values. Unlike classification rules, association rules are not meant to be interpreted as a set. They “express different regularities that underlie the data set, and they generally predict different things” (Witten and Frank 2000: 63). The list of association rules for the weather data is illustrated in Table 3.

Table 3. Association rules for the weather data  
(adapted from Witten and Frank 2000: 10-11)

If temperature = cool, then humidity = normal  
 If humidity = normal and windy = false, then play = yes  
 If outlook = sunny and play = no, then humidity = high  
 If windy = false and play = no, then outlook = sunny and humidity = high

The Weka software also allows for cluster analysis of a more traditional type. When the computer learns clustering patterns in the data, “the outcome takes form of a diagram that shows how the instances fall into clusters” (Witten and Frank 2000: 75). Unfortunately, the weather data set is too small to demonstrate clustering satisfactorily.

The underlying patterns in the data can also be demonstrated by means of decision trees. Decision trees are similar to classification rules: they demonstrate the series of subsequent tests that the data undergo for the computer to arrive at a classification. The decision tree for the weather data set is given in Figure 2.

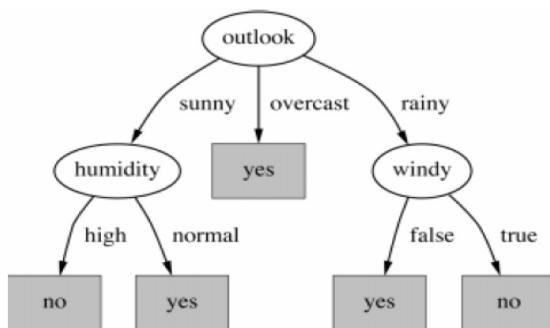


Figure 2. The decision tree for the weather data set  
(adapted from Witten and Frank 2000: 92)

The tree in Figure 2 should be read as follows: if *outlook* is *sunny* and *humidity* is *high*, the game is not played; if *outlook* is *sunny* and *humidity* is *normal*, the game is played; if *outlook* is *overcast*, the game is played, etc.

In many cases, decision trees are a concise and illustrative way of representation. Each node in a tree represents the test of a particular attribute or attribute value. Leaves assign classification to the instances that comply with the tests that lead to this classification. Any unknown instance is routed down the tree and goes through the series of tests specified in the layout

of the tree. Usually, when attributes have nominal values, as in the case of the weather data, the number of branches that spring from a particular node, testing a particular attribute, equals the number of possible values for the attribute.

### 5.1.2 The use of DM techniques in the present investigation<sup>2</sup>

The main question this study strives to answer is what enables interlocutors to (de)code a modal utterance so as to recover the intended interpretation. In Chapter 4, I argued that the features related to the compositional notion of Controllability provide reliable clues for interpretation. Combinations of these features direct the interpreters to certain assumptions about the nature of the agent, the source of the deontic force, the potential immutability of the situation described. This, in turn, leads to the recovery of the intended interpretation of a modal utterance. The exact nature of these assumptions may be difficult to retrieve. This could be the reason for the shortcomings of Papafragou's (1998, 2000) analysis (see 2.2). As Gumperz (1992) points out, "inferences are subconsciously made so that [...] they are not readily accessible to recall. It is therefore difficult to elicit information about the grounds upon which particular inferences are made through direct questioning" (Gumperz 1992: 232). The use of DM is one way of recovering the statistically significant patterns of interpretation. In addition, the way the results are presented in this study may also reflect the way Controllability is coded in English and Swedish, i.e. the decision chains represent the possible combinations of the relevant features.

The use of DM does not preclude the use of traditional linguistic methods. In fact, to compile the ARFF files necessary for conducting a DM analysis of the collected corpus data, a great deal of linguistic work had to be done first. In this study, excerpted examples containing *must*, *may*, *måste*, and *kan* were analysed in context as epistemic, weak epistemic, non-epistemic (deontic, dynamic), or indeterminate. A database containing all the examples and their contexts was compiled. This involved establishing the occurrence of certain semantic features in each example (starting with the ones presented in Coates 1983) and correlating these occurrences with

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<sup>2</sup> My sincere thanks to Jennifer Spenader, who first pointed out to me the potential usefulness of the Weka software, and to Lars Jönsson, *Outpost Design*, Växjö, who kindly and patiently helped me with the technical side of the DM analysis presented here.

the interpretation of each example in the corpus (see Wårnsby 2004 and Chapter 3 of this study). The list of the relevant features is as follows:<sup>3</sup>

- Interpretation: epistemic, weak epistemic, deontic, indeterminate
- Adverbial particle: yes, no
- Subject: animate, specific, generic, introductory
- Person: 1st, 2nd, 3rd
- Verb: event, state
- Aspect: simple, perfect, progressive
- Time reference for modality (with respect to the time of the utterance): past, present, future
- Time reference for proposition (with respect to the modality expressed): anterior, simultaneous, posterior
- Situation: telic, atelic
- Negation: of modality, of proposition
- Voice: passive
- Condition: explicit, implicit
- Type of utterance: assertive, non-assertive, exclamation
- Controllability

These features constituted the 20 nominal attributes encoded in the ARFF files providing the basis for the DM analysis of the data.

One way of ensuring the correctness of the results of the DM analysis was to go back to the data and try to find examples for each classification made by the computer. Thus, in the discussion that follows, I only address the attested classifications. To ensure that the results are not skewed by any preconceived notions on my part, the attributes in the ARFF file were not linked in any way. This is why some decision chains display not only combinations of features not attested in the data, but also combinations impossible in normal language use. For instance, the feature *no subject*, which indicates the presence of an introductory subject, sometimes appeared in the same decision chain as the feature *animate subject*, since the computer failed to realise that these features are mutually exclusive. Another recurring error is the analysis of some utterances with no aspectual modification as having anterior time reference for the proposition, an option not available for infinitival constructions in English and Swedish. These types of faulty links are disregarded in the discussion. This should not be seen as a weakness of the study, however, but as a result of trying to produce a model as statistically accurate as possible. In an effort to achieve this goal, *Controllability* was considered a feature on par with its constituent features, all of which were attributed a value.

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<sup>3</sup> The reasons for the inclusion of these particular features are given in Chapter 4.

The sections that follow describe how this investigation was conducted and explain the statistical terms used by Weka.

#### 5.1.2.1 J48 learning algorithm

One of the learning algorithms available in Weka, the J48 learning algorithm, was chosen for the analysis of the data. The outcome of this algorithm is a decision tree, an increasingly popular DM technique considered particularly suitable for the present study.

A decision tree is a simple, easily visualized representation of the patterns in the data. It combines a description of the elicited patterns and a potential prediction of the outcome on new data. Decision trees also indicate the associations and combinations of attributes through the decision chains leading to terminal leaves.

One of the great advantages of the decision tree model is that it provides a ranking of the attributes used in a test. The attributes that by themselves contribute to the statistical accuracy of the model are located close to the root of the tree, while those that do so in combination with other attributes appear further away; the distance depends on the length of the decision tree.

Decision trees are the most common model used for classification, also the task of the present investigation, which assigns a class, or an interpretation, to examples exhibiting similar properties in terms of particular combinations of pre-defined features. The resulting decision trees were pruned, i.e. all the branches that did not improve on the statistical accuracy of the model were automatically removed. Furthermore, the data files produced by the J48 learning algorithm were converted by the program Graphviz into graphic representations of the decision trees (Figures 3-7).

#### 5.1.2.2 Interpreting results

In addition to the decision trees, the computer also reported a number of statistical measurements reflecting the success rate of the learning process: *Kappa statistic*, *True Positive (TP) rate*, *False Positive (FP) rate*, *Precision*, and *F-measure*.<sup>4</sup> Short definitions of these terms are provided below based on the results of the investigation of *must*.

The summary provided by the computer after the analysis was concluded (see Table 4) contains information that can be used to validate the re-

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<sup>4</sup> Many thanks to Joost van de Weijer for the enlightening discussion on these and other statistical matters.

sults. The computer reports how many instances were correctly and incorrectly classified, both in numerical form and in percentages, as well as how many instances were tested. There is other statistical information of which the *Kappa statistic* is the most important one for classification tasks such as the one undertaken here. The other measures displayed in Table 4 are used mainly for numeric prediction and are not discussed here.

Table 4. Statistical measurements for *must* test, summary

=== Summary ===		
Correctly Classified Instances	445	96.5293 %
Incorrectly Classified Instances	16	3.4707 %
<b>Kappa statistic</b>	<b>0.9253</b>	
Mean absolute error	0.0329	
Root mean squared error	0.1312	
Relative absolute error	13.9446 %	
Root relative squared error	38.2823 %	
Total Number of Instances	461	

A different way to display the results obtained by the computer is a *confusion matrix*.

Table 5. Statistical measurements for *must* test, confusion matrix

=== Confusion Matrix ===				
a	b	c	d	<-- classified as
157	0	5	0	a = epistemic
1	0	1	0	b = epistemicW
6	0	288	0	c = deontic
1	0	2	0	d = indeterminate

A confusion matrix illustrates how accurate the computer was in assigning the instances to different classes relative to their true status, i.e. the class previously assigned to them by the researcher. In a confusion matrix, each class is assigned a row and a column: “each matrix element shows the number of test examples for which the *actual* class is a row and the *predicted* class is a column; good results correspond to large numbers down the main diagonal<sup>5</sup> and small, ideally zero, off-diagonal elements” (Witten and Frank 2000: 138). The confusion matrix for the *must* data tells us that 157 instances of ‘a’ (epistemic) were correctly classified as ‘a’ (epistemic). Five instances of ‘a’ (epistemic) were incorrectly classified as ‘c’ (deontic) and one was analysed as ‘b’ (weak epistemic). One instance of ‘c’ (deontic) was analysed as ‘b’ (weak epistemic). Also, 288 instances of ‘c’ (deontic) were correctly classified as ‘c’ (deontic), while six were incorrectly classified as ‘a’ (epistemic). One instance of ‘a’ (epistemic) was analysed as ‘d’ (indeterminate) as were two instances of ‘c’ (deontic). This should be interpreted as a sign of successful analysis, according to Witten and Frank’s (2000) description of how confusion matrixes should be read. Other statistical measures, the so-called agreement measures, of the computer’s success or failure can also be derived from a confusion matrix: *Kappa statistic* measure, *TP rate*, *FP rate*, *Precision*, *Recall*, and *F-measure*.

The *Kappa statistic* measure reports the agreement of the computer analysis with that of the researcher with respect to class (here the interpretation).<sup>6</sup> There is agreement between the computer’s analysis and the researcher in 445 instances (see the main diagonal in bold in Table 5). The *expected* degree of agreement is calculated from the *expected* frequencies on the diagonal, which are equal to the sum of the products of the row and the column totals divided by the grand total. For instance, the expected agreement for the first cell on the diagonal is  $(162 \times 165) / 461 = 57.983$ . The expected number for the second and forth cells is zero. For the third cell on the diagonal, it is  $(296 \times 294) / 461 = 188.772$ . The Kappa statistic is then calculated as follows:

$$k = (\text{sum observed} - \text{sum expected}) / (\text{grand total} - \text{sum expected})$$

$$k = (445 - 246.753) / (461 - 246.753) = 0.9253$$

An agreement measure of 1.0 indicates a perfect correlation between the model and the actual values, whereas a measure of 0.0 indicates that the model does not correlate to the actual values. Any measure above 0.7 is

<sup>5</sup> In Table 5 the main diagonal is in bold.

<sup>6</sup> More information is found in <http://web.uccs.edu/lbeckser/SPSS/ctabk.html>.



considered a good statistical correlation between the model and the actual values. In the case of the *must* data, the Kappa statistic measures 0.9253. This indicates that the model produced by the DM analysis is accurate to a large extent.

Table 6. Statistical measurements for *must* test, detailed accuracy by class

=== Detailed Accuracy By Class ===					
TP Rate	FP Rate	Precision	Recall	F-Measure	Class
0.969	0.027	0.952	0.969	0.96	epistemic
0	0	0	0	0	epistemicW
0.98	0.048	0.973	0.98	0.976	deontic
0	0	0	0	0	indeterminate

The computer also provides details about the accuracy of the analysis with respect to each class, as demonstrated in Table 6. *True Positive (TP) rate* indicates the proportion of the instances analysed as belonging to class x and all the instances that truly belong to class x. TP rate is equivalent to Recall measure and is calculated as follows:

TP rate = the number of correctly classified instances / the total number of instances within this class  
TP rate = 157/162 = 0.969

In the *must* data, the proportion of the instances analysed as epistemic and the instances that are truly epistemic is approximately 0.97. This indicates that the computer is successful in its analysis of epistemic examples in my data.

*False Positive (FP) rate* is a mirror measurement of TP rate: it indicates the proportion of the instances falsely analysed as belonging to class x with respect to all the instances that do not belong to class x.

FP rate = the number of incorrectly classified instances as x/the total number of instances that are not x  
FP rate = 9/291 = 0.027

The proportion of non-epistemic examples analysed by Weka as being epistemic in relation to all the non-epistemic examples in the *must* data is 0.027. This indicates that the computer generally did not make mistakes in identifying non-epistemic examples in my data.

Further information may be gathered from a *Precision* measure, which indicates the number of instances that truly belong to class *x* relative to all the instances classified as class *x*. This is a measure of how well the computer performed the task of classification. In the confusion matrix, for example, the computer classified 165 instances as epistemic and 157 of those were truly epistemic. Precision is calculated as follows:

$$\begin{aligned}\text{Precision} &= \text{the number of correctly classified instances of class } x / \text{the total} \\ &\text{number of instances classified as } x \\ \text{Precision} &= 157/165 = 0.952\end{aligned}$$

In the *must* data, Precision for epistemic examples measures 0.952: over 95 per cent of all epistemic examples were identified by the computer as such.

*F-measure* is a combined measure of Precision and Recall, and is useful for specialists who wish to evaluate the performance of the computer program or the algorithm used for the analysis. It is more or less an average<sup>7</sup> of the Precision and Recall measures. It is calculated according to the following formula:

$$\begin{aligned}\text{F-measure} &= (2 \times \text{Precision} \times \text{Recall}) / (\text{Precision} + \text{Recall}) \\ \text{F-measure} &= (2 \times 0.952 \times 0.959) / (0.952 + 0.969) = 1.844 / 1.921 = 0.960\end{aligned}$$

## 5.2 (De)coding confident inference and obligation

As argued in 1.2.3, both *must* and *måste* are located on the far left of the epistemic and deontic scales. Consequently, epistemic utterances containing these modals reflect confident inference on the part of the speaker that a certain state of affairs holds. Deontic utterances, on the other hand, indicate that the speaker recommends or imposes an obligation on the addressee to carry out the action specified in the proposition. Non-directed deontic utterances indicate that the state of affairs specified in the propo-

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<sup>7</sup> This is a harmonic mean, a way of calculating mean values less sensitive to the value variations of its components than the arithmetic mean  $((x+y)/2)$ .

sition necessarily holds true under certain circumstances. The similarities between the possible range of interpretations of the two modals are seen as a prerequisite for further investigation of the contexts in which they appear. Chapter 3 established a certain systematicity regarding the correlation of epistemic and deontic interpretations and context. This section seeks to reveal further correlation between certain features and the interpretation of an utterance. It also seeks to illuminate the co-occurrence patterns for the features in my data.

### 5.2.1 The *must* file

The *must* file run through Weka in order to produce the decision tree in Figure 3, which contains the patterns underlying the data set, contains 461 examples. The decision tree produced by the computer is a good structural representation of the patterns in the data: it accurately analyses 445 instances, or 96.5 per cent of the data, and incorrectly predicts only 16 examples, or 3.5 per cent of the data.

Further, the Kappa statistic value is 0.9253,<sup>8</sup> which indicates that the model compiled with the help of the J48 learning algorithm is statistically accurate, i.e. it corresponds to a high degree to the actual values initially assigned to the data. The computer was equally successful in learning to identify both deontic and epistemic utterances. The TP rate and the Precision measures for the epistemic examples are 0.969 and 0.952, respectively, which indicates that over 90 per cent of all epistemic examples were identified as such. For deontic examples, the TP rate measures 0.98 and Precision is assessed at 0.973. Again, this indicates that over 90 per cent of all deontic examples were analysed as such.

Of the 16 examples incorrectly analysed by Weka,<sup>9</sup> two are weak epistemic and three are indeterminate: the computer completely failed to identify the few weak epistemic and indeterminate examples in my data. These errors may indicate that the computer failed to learn how to analyse these examples, since they are poorly attested in the data. This hypothesis is supported by the fact that of the 162 epistemic examples in my data, only five were falsely identified as deontic. Also, of the 294 deontic examples, only six were falsely identified as epistemic. Not surprisingly, in cases where the computer had a relatively large set of examples to learn from, the success rate is much higher.

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<sup>8</sup> The actual source of these figures is in Appendix I.

<sup>9</sup> See confusion matrix in Appendix I for further detail.

5.2.1.1 The decision tree for *must*

As mentioned above, the decision tree for *must* is an accurate model of the patterns underlying the data set. The features crucial for the computer’s classification of an example as epistemic or deontic are: *aspectual modification*, *time reference for the proposition*, *type of main verb*, *presence of an explicit condition*, *presence of an implicit condition*, and *generic subject* (see Figure 3). Note that the features central to the notion of Controllability appear closest to the root of the tree.<sup>10</sup>

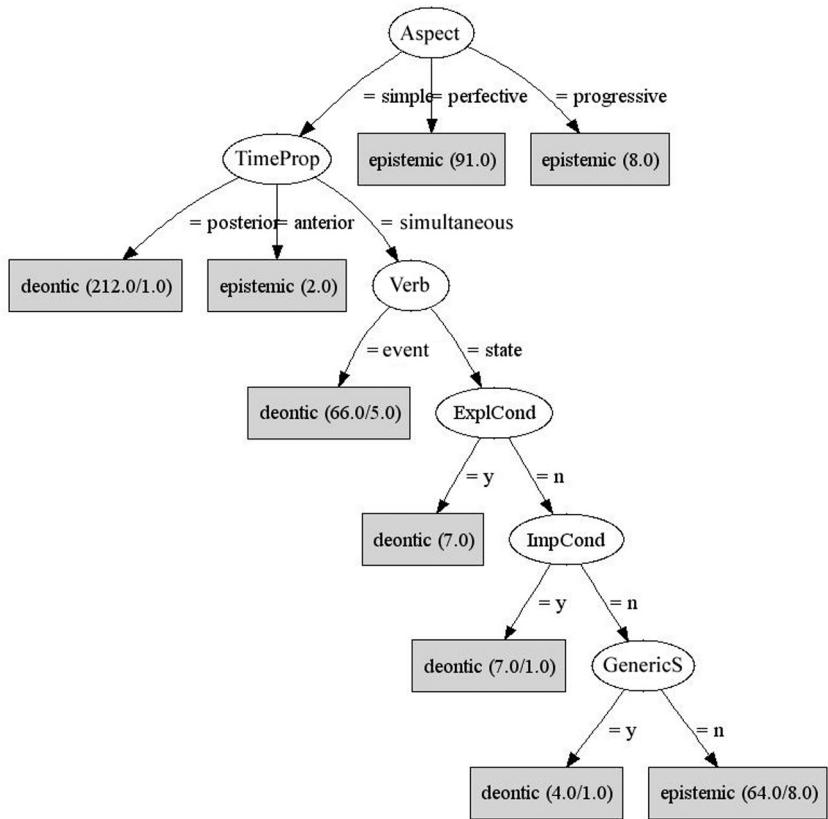


Figure 3. The decision tree for *must*

The order of the appearance of the features in the decision tree reflects their ranking in terms of statistical importance for the interpretation. The fea-

<sup>10</sup> Note that the tree is upside-down, i.e. the root node is the topmost in the tree.

tures close to the root are decisive for the interpretation by themselves. The features close to the top of the tree, on the other hand, are decisive only in combination with other features. This is reflected in the varying length of the decision chains prior to classification. The decision chains are formed by the non-final nodes in the tree leading to the final classification. One of the decision chains in the *must* tree is *aspectual modification – time reference – type of verb*: the computer probes for aspectual modification and finds the utterance not aspectually modified; next it examines the time reference for the proposition and finds that it is simultaneous with the time of the utterance; it then proceeds to study the type of main verb in the utterance and finds it is an event verb. This chain of tests or decisions leads to the classification of an utterance as deontic. In what follows, these decision chains are discussed in more detail, and the reader is referred the decision tree in Figure 3.

Aspectual modification seems to be decisive for interpretation. The computer made no mistakes in assigning epistemic interpretation to the examples modified by perfect and progressive aspect: 91 and 8 examples, respectively, were correctly analysed as epistemic. However, as discussed in Chapter 3, it is possible to construct aspectually modified utterances that are not interpreted epistemically. The decisive feature in these cases is the time reference for the proposition. Utterances modified by perfect aspect with posterior time reference are not interpreted epistemically, unlike utterances with anterior time reference, as illustrated by (1) and (2), respectively.

- (1) You **must** have cooked the stew by tonight, otherwise there will be no supper.  
Deontic
- (2) They **must** have been flesh and blood, even though they lived God knows how long ago. (BR)  
Epistemic

Time reference for the proposition is also relevant in utterances with progressive aspect: simultaneous time reference normally demotes a deontic interpretation and promotes an epistemic one.

- (3) You **must** be making cookies for tonight, (you have flour all over your face).  
Epistemic

This means that the model produced by the computer does not accurately reflect the actual possible relationships between the interpretation, the time reference for the proposition, and aspectual modification. This is the

result of the chosen method of investigation, the fact that the corpus data reflect only language in use (see the discussion in 1.3.1). The model may be skewed, because it is based on a relatively small language sample, which happens not to contain examples of the relevant kind: there were no examples in the data modified by perfect aspect that also refer to a point in time posterior to the time of modality. There are also no examples of sentences containing *must* and progressive aspect that refer to a point in time not simultaneous with the time of modality.

The model should, therefore, be revised to consider the time reference for the proposition a decisive feature, one that should be placed at the root of the tree. This would better reflect language structure instead of simply a language sample. Aspectual modification may not be considered of crucial importance for the interpretation, or it may be shown to influence the interpretation in combination with other features such as anterior time reference for the proposition. Further tests on other samples of language, in which the examples are more proportionally distributed, are probably needed to determine the exact positioning of these features in the decision tree. The relevance of aspectual modification to the notion of Controllability cannot be disputed, however, since it relates both to the stativity of the situation described by the proposition and the time reference for the proposition so as to indicate lack of control on the part of an intended agent.

Bearing this in mind, let us consider the results of the DM analysis regarding time reference. The majority of the examples with posterior time reference for the proposition (and no aspectual modification), namely 212, were correctly identified as deontic.

- (4) First, I **must** stop thinking like a salesman and not do any kind of pushy selling. (AH)  
Deontic
- (5) “All of you **must** pay for the damages!” he screeched. (BO) Deontic
- (6) She **must** reassemble herself in her own head as an ordinary, faithful wife to which  
untoward events did not occur. (FW) Deontic

The deontic examples in (4) through (6) all exhibit posterior time reference in relation to the modality expressed, although they vary with respect to the presence of other features. In (4), the subject/speaker is 1<sup>st</sup> person singular and the time for modality is present, i.e. simultaneous with the time of the utterance. The obligation not to act in a certain way stems from the speaker himself, probably as a result of the pressure of external circum-

stances. In (5), on the other hand, it is the speaker who, during the moment of speech, imposes an obligation on the addressees to pay for the damages. In (6), the source of the obligation is not made explicit, and the subject is 3<sup>rd</sup> person singular. The time reference for modality, however, is shifted towards the past in this example, since the whole narration is situated in the past and the events described by the author have already happened.<sup>11</sup> Despite these differences in their contextual layout, (4)-(6) all have deontic interpretations. As discussed earlier, I attribute this fact to the combination of the posterior time reference and the modal force of *must*: one is unlikely to make confident inferences about the future, or, in Papafragou's (2000) terms, it can be difficult to establish a relationship of entailment between the proposition and the relevant domain.

Examples with anterior time reference for the proposition are identified as epistemic.

- (7) He told [Campsall] that I **must** be mistaken. (RL) Epistemic

In English, contrary to what we will later observe in the Swedish examples, anterior time reference for the proposition without aspectual modification is rare and appears mostly in fragments of indirect speech, as in (7): the narrator was mistaken for some time before he was reported mistaken (and was possibly not taken out of his delusion until some time after the report). In this example, the lexical meaning of *be mistaken* demotes the deontic interpretation regardless of all other contextual features, i.e. it is impossible to force somebody to be mistaken. Moreover, logically, anterior time reference for the proposition demotes (directed) deontic interpretation, since it is not felicitous to give an order about something that has already happened.

The same should be true of utterances that have simultaneous time reference for the proposition with respect to the modality expressed: it is infelicitous to give orders to carry out an action that is already in progress.<sup>12</sup> However, this is not supported by the data.

<sup>11</sup> Normally, *must*, unlike Swedish *måste*, is not used to express past necessity and is usually replaced by *had to*. Example (6) is to be understood in such a way that the necessity *to reassemble herself* [...] *as a faithful wife* [...] may have existed also some time after the utterance. A similar reading is available for (7).

<sup>12</sup> It is, of course, possible to imagine a situation where the speaker wishes to save face and gives an order for the addressee to carry out an action already in progress. Such utterances, however, cannot be considered genuine orders or commands.

- (8) They **must** take from the soil and the forest in order to live, but their taking does not improve their lives; in areas such as the Ethiopian highlands it may not even keep them alive. (LT) Deontic

In (8), the time reference for the proposition is simultaneous with the time of modality. The utterance is interpreted deontically despite the fact that the proposition is recurring at the point in time indicated by the utterance: the indigenous people (*they*, the subject of this clause) continuously “take from the soil and the forest”, which is also indicated by the second main clause which describes the consequences of their taking. On closer examination, however, this utterance is non-directed deontic: no one gave an order for this habitual action to take place. Instead, the action was actualized under the pressure of external circumstances, indicated by the presence of an explicit condition *in order to live*. Further, the main predicate is the event verb *take*. It is the presence of an event predicate that, together with the explicit condition in (8), promotes a deontic interpretation in utterances with propositions that are simultaneous with the time of modality and contain no aspectual modification. This is possible, since the presence of an event verb does not prevent (even if it does not directly encourage) the interpretation of the proposition as applicable both now, at the time of the utterance and in the near future. If this is the case, such utterances are similar to the ones with posterior time reference for the proposition discussed above.

For utterances with (i) simultaneous time reference for the proposition, (ii) no aspectual modification, and (iii) a state verb, the computer indicated that further tests are needed to establish the interpretation. The next feature the computer tests for is the presence of an explicit or implicit condition in the immediate or near context of the utterance. The importance of this feature for the interpretation is discussed at length in 4.1.4.

- (9) The most obvious clue to its presence is its movement, so in order for its camouflage to work it **must** be prepared to remain very still for long periods of time, or at least to alter its position very slowly and gently. (DM) Deontic
- (10) The farmers concerned **must** have the skill and resources necessary for the management of land and cattle. (LT) Deontic

Both (9) and (10) correspond to the description above: the time reference is simultaneous, the main predicate is stative, and there is no aspectual modification. Both also contain a condition. In (9), the condition is explicit: if the animal’s camouflage is to work, it must necessarily be still. In (10), the condition is implicit: the farmers must have certain skills and re-



sources to be able to run their farms in an environmentally friendly way. It is the presence of the explicit and implicit conditions in (9) and (10), respectively, that promotes deontic interpretation. These examples are both non-directed deontic, i.e. the pressure of some external circumstances is indicated in the consequent of the conditional statement. Note that, as discussed in 4.1.4, the time reference for the proposition in these examples can also be considered posterior, since the conditions apply both at the time of modality and in the future. The appearance of this feature in the decision tree is therefore not surprising.

When a condition is not present in the propositional or situational context of an utterance, the presence of a generic subject becomes important.

- (11) A man **must** be able to hold his drink because drunkenness is sometimes necessary in this difficult life. (BO) Deontic

All examples such as (11) contain a non-specific generic subject. The deontic interpretation in such cases stems from a combination of the following features: (i) simultaneous time reference for the proposition, (ii) no aspectual modification, (iii) state predicate, (iv) non-specific generic subject, and (v) the modal force of *must* (see Papafragou's (2000) account of the meanings of *must* and *may* in 2.2). Although, for technical reasons, generic examples have been analysed as having simultaneous time reference for the proposition, this is not completely accurate (see the discussion in 4.1.1). Utterances with a simultaneous time reference for the proposition and a state predicate, as in (11), indicate an ongoing state of affairs. In this example, however, a man's ability to hold his drink is necessary both at the time of the utterance and in some possible future situations. Because of the generic reference, the utterance denotes what Huddleston and Pullum (2002: 406-407) refer to as "unlimited state", i.e. not only is the situation described in the proposition considered stative, but it also has unlimited duration. We also have to consider the possible interpretations of *must*: either confident inference or obligation. The presence of a non-specific generic subject demotes epistemic interpretation in these cases simply because one is not likely to make a confident inference about this kind of subject. In combination with *must*, such generic statements are interpreted as rules or regulations or simply states of affairs that necessarily exist. Also, the modal force of *must* in combination with a non-specific generic subject indicates that the state of affairs described in the proposition holds not only at the time of the utterance, but also in future situations. This makes these

utterances similar to utterances with posterior time reference for the proposition.

### 5.2.2 The *måste* file

The *måste* file run through Weka contains 1,017 examples. The decision tree produced by the computer after running the J48 learning algorithm is a good structural representation of the patterns underlying the data set: it correctly analyses 958 examples, or 94.2 per cent of the data, and incorrectly predicts only 59 examples, or 5.8 per cent of the data (see Appendix II).

Moreover, the Kappa statistic value, although slightly lower than for the *must* file, still measures a satisfactory 0.7802. This indicates that the model is statistically accurate: it corresponds to a high degree to the actual values initially assigned to the data. The computer was also successful in identifying deontic examples, with TP rate and Precision at 0.968 and 0.965, respectively: over 90 per cent of all deontic examples in the data were correctly analysed. Epistemic examples were identified correctly in over 80 per cent of the instances with TP rate and Precision measuring 0.826 and 0.8215, respectively. The relatively lower accuracy with epistemic examples may relate to the fact that such examples are not well represented in the data set (there are only 155 epistemic examples in the data and 857 deontic ones). The accuracy of the analysis of epistemic examples may increase in a data set where the interpretations are distributed more evenly.

Of the 59 examples incorrectly analysed by Weka, 27 are epistemic (out of 155 epistemic instances), 27 are deontic (out of 857 deontic instances), and five are indeterminate, i.e. none of the indeterminate examples in the data were identified as such. The computer may have failed in its analysis of the indeterminate examples because they are statistically poorly attested in the data. As just mentioned, the relatively high number of incorrectly identified epistemic examples may also be attributed to their statistical underrepresentation in the data set.

#### 5.2.2.1 *The decision tree for måste*

The features crucial for the computer's classification of the examples as being epistemic or deontic are: *aspectual modification*, *type of main verb*, *time reference for the proposition*, *presence of an implicit condition*, *presence of an explicit condition*, *specificity of the subject*, *time reference for modality*, *generic*

*subject, animacy of the subject and situation type* (telic or atelic) (see Figure 4). As discussed in connection to *must*, not only are most features in the tree central to Controllability, but the order of these features reflects their ranking in terms of statistical importance for the interpretation. The features close to the root are more important for the interpretation while the features appearing further down in the tree influence the interpretation only in combination with other features, which is reflected in the varying length of the decision chains.



Figure 4. The decision tree for *måste*

In the discussion that follows, the reader is referred to the decision tree in Figure 4.

Not surprisingly, aspectual modification is considered to be a decisive feature in the decision tree for *måste*. However, as discussed in Chapter 3, the fact that no examples of deontic utterances modified by perfect aspect were found in the corpus is a coincidence, and no far-reaching conclusions can be drawn on the basis of it. Utterances modified by the perfect aspect with non-epistemic interpretation are fully grammatical. The difference between these two types of utterances lies, as demonstrated in Chapter 3, in the time reference for the proposition.

- (12) Du **måste** ha           lagat           mat innan nio, annars blir           vi hungriga.  
       you MOD have-INF cook-PART food before nine or       become-PRES we hungry-PL

‘You must have cooked the food before nine, or we will be hungry.’       Deontic

- (13) I så fall **måste** det ha           varit vapen till IRA. (BL)  
       in so case MOD it have-INF be-PART weapon to IRA

‘In that case the weapons must have been meant for the IRA.’       Epistemic

In the non-epistemic (12), the time reference for the proposition is shifted towards the future due to the presence of the time adverbial *innan nio* (‘before nine’). In the epistemic (13), on the other hand, the time reference for the proposition is anterior to the time of the utterance. Thus, the time reference for the proposition is a feature of great importance in these utterances. As we saw in 4.1, there are various ways to code time reference for the proposition, from aspectual modification to explicit and implicit conditions. The fact that the computer was unable to reflect this in its analysis must be attributed to the fact that it was presented with a relatively small data sample. No examples modified by perfect aspect in the data have a time reference other than anterior. Once again, the exact positioning of these features in relation to each other in a decision tree requires further tests.

Type of main predicate is a feature to consider in utterances not modified by perfect aspect in Swedish. Of the 719 utterances containing an event verb only 20 were (falsely) analysed as epistemic.

- (14) Själv **måste** jag gå ut i vedboden       och utfodra dvärgarna. (APR) Deontic  
       self MOD I go out in woodshed-DEF and feed-INF dwarfs-DEF

‘I must go out to the woodshed and feed the dwarfs.’

- (15) Om hon inte finns       där så **måste** nån       förr eller senare börja  
       If she NEG exist-PRES there so MOD somebody before or later begin-INF

sakna henne. (HM)  
miss-INF her

Epistemic

'If she is not on that list, someone is going to miss her sooner or later.'

Example (14) is a typical deontic utterance. The subject is animate and specific, in full control of his actions. The time reference for the proposition is posterior to the time of the utterance, whereas the time reference for modality is simultaneous with the time of the utterance. The only ambiguity (due to the lack of context) is who or what constitutes the deontic source in this utterance: whether it is the subject himself who finds it necessary to go and feed the dwarfs, whether he reports on the request or order received from a third party, or whether the necessity is circumstantial and arises from the subject's general knowledge that dwarfs are, for example, difficult to handle when hungry.

Example (15), on the other hand, although similar to (14) with respect to the features present, is interpreted as epistemic. The contextual difference that prompts this is the fact that the subject of (15), *nån* 'somebody', is non-specific. This effectively demotes the deontic interpretation, since one is unlikely to give an order without somebody specific to give the order to.<sup>13</sup> Another contributing factor is that the main predicate *börja sakna* 'start missing' denotes an involuntary action of which no subject, whether specific or not, has control. When a person is missing, there is usually somebody (a friend, a family member, or a neighbour) who will sooner or later notice it. Therefore, the police officer in (15) makes a confident prediction based on previous experience and general world knowledge. This results in the utterance being interpreted epistemically. In all 20 epistemic examples containing an event predicate, the context, whether linguistic or situational, provides clues for the interpretation, clearly indicating lack of agent control.

The second group of examples analysed as deontic are those in which the verb is omitted. These utterances seem to be characteristic of Germanic languages. Constructions of this type can be found in the Scandinavian languages, contemporary German, and Dutch (Eide 2002: 27). Although not available in Present Day English (PDE), utterances like these were frequent in the Early Modern English and Modern English periods, and can be found as early as the 14<sup>th</sup> century.

<sup>13</sup> See also the discussion of the influence of this type of subjects on the interpretation in 4.1.1.

- (16) Allas vnto the Barbre nacion I **moste** anon. (Chaucer *Man of Law's tale* 282)<sup>14</sup>  
 alas into the Barbaric nation I MOD immediately

‘Alas, to the Barbaric nation I must depart immediately.’<sup>15</sup>

In Norwegian, these examples are invariably deontic. Eide (2002: 308) suggests that examples like (17) are deontic because the bracketed non-verbal complement is a mere proposition, not an assertion, since it lacks a tense element. Further, she claims that only assertions have truth value and can thus be qualified by an epistemic modal.

- (17) Marit; skal [t; hjem]. Eide (2002: 308)  
 Marit shall home

‘Marit intends to go home.’

Examples like (17), containing either a directional adverbial or a particle without a main verb, are also frequent in Swedish. The main verb is easily recovered from the context and is usually a basic motion verb such as *gå* (‘walk’), *komma* (‘come’), *åka* (‘ride, travel, go’), etc. Germanic languages in general seem to have an elaborate system of encoding directionality by using particles. In line with Slobin’s (1996) suggestion of “thinking for speaking”, i.e. the way in which speakers are prompted to express linguistically those aspects of events or states that are grammatically coded in their native languages, I suggest that it is because of the salience of such directionality expressions that speakers are able to process utterances like (17) and (18) without the verb being explicitly present.

- (18) Nu **måste** hon hem, annars skulle Mattis bli från vettet, det  
 now MOD she home otherwise MOD Mattis become-INF from sense-DEF it  
 visste hon. (AL) Deontic  
 know-PAST she

‘Now she must go home, otherwise, she knew Matt would be out of his mind.’

Except for the formally missing verb, all these utterances exhibit an array of features typical of deontic interpretation: (i) a specific, animate and responsible subject; (ii) posterior time reference for the proposition; (iii) a predicate, easily recoverable from the context, denoting an action or event

<sup>14</sup> Example is taken from The Oxford English Dictionary (<http://dictionary.oed.com>).

<sup>15</sup> My translation.

that can be controlled; and (iv) simultaneous time reference for modality with regard to the time of the utterance.

In utterances where the predicate denotes a state, the difference in time reference for the proposition may result in different interpretations.

- (19) Hon ville        leva        med deras sånger, om hon så **måste** leva        i  
 she want-PAST live-INF with their songs if she so MOD live-INF in

underjorden livet        ut. (AL)  
 underground life-DEF out

Deontic

‘She wanted to live with their songs, even if it meant spending the rest of her life underground.’

- (20) Men han **måste** veta        vem hon menade        för        han frågade        inte om. (KE)  
 but he MOD know-INF who she mean-PAST because he ask-PAST NEG again

‘He said nothing, but the must have known whom she meant because he didn’t ask again.’

Epistemic

The utterance in (19) is deontic: the subject is (typically) animate, specific, and in control of her actions, and the time reference for the proposition is posterior to the time of the utterance. These two features seem to override the fact that the predicate denotes a state (and as such is unlikely in a deontic utterance) and promote a deontic interpretation of (19).

Simultaneous time reference for the proposition promotes epistemic interpretation in utterances with a state predicate and no aspectual modification, such as (20). A contributing factor here is that the main predicate *veta* ‘know’ denotes an involuntary state, which as such is not subjected to orders.<sup>16</sup> The subject is specific, animate, and responsible, but this seems to be of no consequence to the interpretation. There is no condition present in the propositional or situational context of this utterance. Moreover, the situation described in the proposition is atelic. As in the case of other utterances with simultaneous time reference, deontic interpretation is demoted by the fact that it is impossible to felicitously give an order to act on a proposition that has already been realised.<sup>17</sup> The only possible interpretation for these utterances is epistemic: the speaker expresses her judgement about the existence of some past event or state.

<sup>16</sup> See, however, the discussion of (92) in 3.3.2.

<sup>17</sup> An apparent contradiction to this observation can be found in Swedish examples with past time reference for modality. For further discussion see (67).

Generally, however, in utterances with simultaneous time reference for the proposition a series of further tests must be conducted to determine the interpretation. Two of these tests search for the presence of an implicit or explicit condition in an utterance: if such a condition is found, the utterance is classified as non-epistemic. As we saw in Chapter 3 and also in the discussion of the decision tree for *must*, the presence of an implicit or explicit condition in an utterance promotes deontic interpretation.

When no condition is found in the context, the specificity of the subject becomes an important factor. As argued above, in the discussion of (9)-(11), non-specific generic subjects in combination with the modal force of *must* and the modal force of *måste*, tend to promote deontic interpretations: the utterances are understood as all-applicable rules or recommendations. This is supported empirically, since all eight examples in the data with this particular combination of features<sup>18</sup> are interpreted deontically, as in (21).

- (21) Därför **måste** konsumenter ha      möjlighet att göra val, få  
 therefore MOD consumers have-INF possibility to do-INF choices get-INF  
 information, få veta vilka produkter som finns och vilka krav  
 information get-INF know-INF what products that exist and what demands  
 som kan ställas. (LI) Deontic  
 that MOD put-INF-PASS  
 ‘Therefore, consumers must have the opportunity to make choices, to get information and find out what products exist and what demands can be made.’

A generic subject expressed by a definite noun phrase will have the same impact on the interpretation as the non-specific generic subjects. The utterance will be interpreted as a rule or recommendation, hence deontically, as in (22), which exhibits the same combination of features as (21) except for the type of subject.

- (22) Svenskarna **måste** också få vara med och bestämma. (HL) Deontic  
 swedes-DEF MOD also get-INF be-INF with and decide-INF  
 ‘Swedes should also have a say in matters in their own town.’

<sup>18</sup> All these examples are utterances with no aspectual modification but a state predicate, simultaneous time reference for the proposition, no implicit or explicit condition, and a non-specific subject.



In (14) and (15), the specificity of the subject seems to play a role in determining the interpretation: a non-specific subject promotes epistemic interpretation in utterances without aspectual modification containing an event predicate. This is also the case in utterances containing a (i) state predicate; (ii) simultaneous time reference for the proposition; (iii) no implicit or explicit condition; and a (iv) non-specific and (v) non-generic subject. In my data, these utterances all contain introductory subjects, as in (23), which indirectly supports Coates's (1983) claim that there is an association between the feature introductory subject and epistemic interpretation (see also Chapter 3).

- (23) Det **måste** vara femton år mellan er. (KE) Epistemic  
 it MOD be-INF fifteen years between you

'There must be fifteen years between you.'

With specific subjects, on the other hand, the time reference for modality comes into play. Present time reference does not seem to preclude either deontic or epistemic interpretations, since, as we saw earlier, both modalities are usually immediate to the time of the utterance. The speaker either imposes an obligation or expresses her judgement about the proposition at the time the utterance is articulated. To resolve this, the computer tested for the presence of another feature, situation type, which can be telic or atelic. It is logical that telic utterances tend to be interpreted as deontic. Indeed, a telic action is the type of situation you can easily give an order about. The telic utterances in question contain state predicates, but they are such that one can give an order to carry them out (see (24)). Atelic utterances, on the other hand, tend to be interpreted epistemically. Usually the speaker expresses her opinion about a state, rather than giving an order to carry it out.

- (24) Detta **måste** komma in i diskussionen om en europeisk  
 this MOD come-INF in in discussion-DEF about a European  
 försvarsindustri. (ETHE) Deontic  
 defence-industry

'This should be an element in any discussion on the European defence industry.'

- (25) Du **måste** vara ny. (LG) Epistemic  
 you MOD be-INF new

'You must be new.'

The deontic utterance in (24) (i) is not aspectually modified; (ii) contains a state predicate;<sup>19</sup> (iii) has a time reference for the proposition simultaneous with the time of the utterance; (iv) has an implicit condition present in the context *in order for the discussion to be comprehensive*; (v) has a specific subject; (vi) has a present time reference for the modality expressed; and (vii) describes a telic situation. This combination of features led the computer to its interpretation. The source of the deontic force is either in the general circumstances that elevate the importance of a certain issue, or in the desire of a third party to always bring that issue into the discussion.

Example (25) has the same features as (24), except for the type of situation: as typical of states, the situation is atelic. The speaker utters a confident conclusion (based on some circumstances unknown to us) that the addressee is a new person in the situation. There is nothing in this utterance that precludes the computer from interpreting it as epistemic.

Epistemic and deontic utterances with past time reference for the modality expressed exist both in English and Swedish in fragments of indirect speech. However, only in Swedish are deontic utterances containing *måste* with past time reference for modality found in direct speech. The feature that is important for the interpretation of these utterances is type of subject: animate or inanimate.

- (26) Biskoparna, som alla var svenskar, **måste** vara godkända av påven i  
bishops-DEF that all be-PAST Swedish MOD be-INF approve-PART by pope in

Rom. (HL)  
Rome

Deontic

‘The bishops, all of whom were Swedish, had to be accredited by Rome.’

- (27) Samtidigt **måste** meddelandet innebära att han inte stod i  
simultaneously MOD message-DEF mean-INF that he NEG stand-PAST in

någon omedelbar fara. (KOB)  
some immediate danger

Epistemic

<sup>19</sup> The particle verb *komma in* (‘come in’) is an event verb. However, here it is not the case that something will actually move into a physical space (note that the subject is inanimate). Instead, there are several metaphors present in this utterance that prompt us to view the predicate as stative and the entire utterance as deontic. Firstly, the discussion of the European defence industry is presented as a metaphorical space in which the contributions of different participants are situated. Secondly, this space is seen as a dynamic construction site, since different views and opinions are constantly added. Finally, some issues are so important as to be actively entered by the participants in this discussion (i.e. *komma in*). This results in a rather odd combination of an event verb understood as a state predicate from a formal point of view (‘This should be a part of discussion’) in a telic situation.

‘At the same time, the message implied that he was in no immediate danger.’

In (26), the utterance describes a past state of affairs, when the Pope in Catholic Rome could influence the appointment of bishops in Sweden. The necessity indicated by *måste* does not exist any longer and was dictated by political circumstances in the past, i.e. it is a ‘past’ necessity. English does not allow this option and the translator was forced to use the semi-modal expression *had to* to convey the same meaning.<sup>20</sup>

Example (27) exhibits the same set of contextual features as (26), except that it has an inanimate subject. There is no one who is interested in interpreting the message in a certain way. Thus, no deontic source is indicated. The utterance reports on a conclusion made in the past (since the whole narrative is situated in the past) based on some past circumstances that may no longer be relevant. There is nothing in the contextual make-up of this utterance that prevents an epistemic interpretation.

### 5.2.3 *Must* and *måste* combined

The decision trees produced by the computer for *must* and *måste* are good representations of the patterns in the data, as demonstrated in the previous sections. There are, however, differences in the two trees with respect to the order of the relevant features, the length of certain decision chains, and the fact that additional features appear in the decision tree for *måste*. Although the feature *aspectual modification* appears at the root in both trees, the feature *type of verb* is juxtaposed in the *måste* tree with the feature *time reference for the proposition*, as are the features *explicit* and *implicit condition*. At the top of the *måste* tree, new features appear: *specificity of the subject*, *time reference for modality*, *animacy of the subject*, and *telicity of the situation*. The presence of these additional features at the top of the *måste* tree, as well as the slight difference in the ranking of the features at the bottom of the trees, may reflect language-specific variations in coding Controllability. To test the significance of these differences, a unified analysis of the data for both *must* and *måste*, was conducted. Figure 5 displays the resulting decision tree.

The set of data for both modals contains 1,461 examples. The decision tree produced by the computer is a good structural representation of the patterns underlying the data: it accurately analyses 1,388 instances, or 95

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<sup>20</sup> See, however, examples (6) and (7).

per cent of the data, and incorrectly predicts only 73 examples, or 4.9 per cent of the data (see Appendix III).

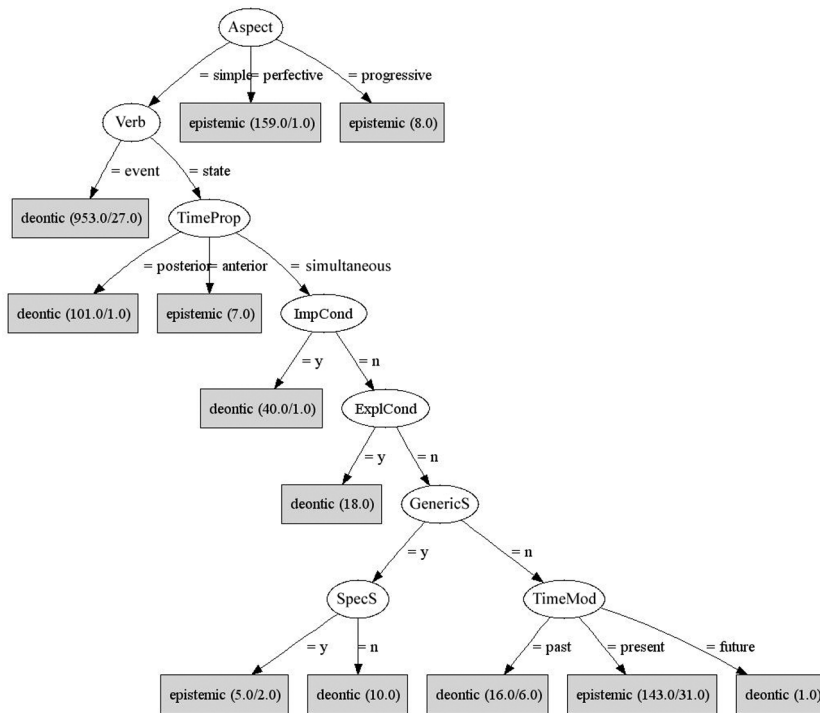


Figure 5. The decision tree for *must* and *m  ste*, combined

The Kappa statistic value is 0.856, which indicates a good statistical correlation between the computer analysis and the actual values assigned to the data. Also, the computer was successful in identifying both epistemic and deontic utterances correctly. The TP rate and the Precision measures for the epistemic examples are 0.902 and 0.888, respectively: about 90 per cent of the epistemic examples were analysed as such. The TP rate and the Precision measures for the deontic examples are 0.972 and 0.968, respectively: over 90 per cent of the deontic utterances in the data were analysed as deontic by the computer.

Of the 317 epistemic examples in the data set, 31 were incorrectly analysed as deontic. However, in its analysis of the 1,134 deontic examples, the computer was incorrect only 32 times. This indicates that it was more successful in classifying deontic examples than epistemic ones, possibly be-

cause the latter were not as well exemplified in the data, so the computer had fewer instances to learn from. This hypothesis is also supported by the fact that, of the eight indeterminate examples, three were analysed as epistemic and the rest were considered deontic. This is also true of the two weak epistemic examples: one was analysed as epistemic and the other as deontic. Clearly, the computer is more successful when presented with large sets of data to learn from.

## 5.3 (De)coding possible conclusion and permission: *may*

I argued in 1.2.3 that epistemic utterances containing *may* express possible conclusions drawn by the speaker on the basis of some evidence that the actions or states conveyed in the proposition are, were, or will be realised. Deontic utterances with this modal express the speaker's permission to carry out the proposition, indicating also that there are no obstacles to doing so.

### 5.3.1 The *may* file

The *may* file run through Weka contains 361 examples. The decision tree produced by the computer is a fairly good structural representation of the patterns found in the data: it correctly predicts 280 examples, or 77.6 per cent, and incorrectly analyses 81 examples, or 22.4 per cent (see Appendix IV). The success rate with the *may* data is lower than with *must* and *måste*. As discussed below, this can be attributed to the fact that the data is not extensive enough with respect to the distribution of the possible interpretations for the modal.

The Kappa statistic value, measuring 0.2699, indicates that the model is not statistically valid and does not correspond to the actual values initially assigned to the data. Moreover, only epistemic utterances were correctly identified in more than 95 per cent of the cases, with TP rate and Precision values at 0.967 and 0.813. The program was much less successful in analysing deontic examples: only about 60 per cent were correctly predicted (with the TP rate and Precision measuring 0.6 and 0.625, respectively). Al-

so, none of the weak epistemic and indeterminate examples were correctly identified as such.

Of the 81 instances that were incorrectly predicted by the computer, nine were epistemic examples (out of the total of 274 epistemic utterances in the data set) analysed as deontic (three cases), indeterminate (five cases), and weak epistemic (one case). Of the 25 deontic utterances, ten were incorrectly identified as epistemic (six cases), weak epistemic (three cases), and indeterminate (one case). None of the weak epistemic and ambiguous examples were identified as such. The inferior results obtained for these examples may be due to the fact that these types of examples are poorly attested in the data, so the computer had no chance to learn to classify them properly. Also, as argued in Chapter 3, in some weak epistemic and indeterminate examples, contextual clues may provide inconclusive evidence for interpretation, and the interpretation of these examples is dependent on the co-text to a large degree. Thus, the computer was highly successful in identifying epistemic examples containing *may* and highly unsuccessful in predicting the examples poorly attested in the data, namely deontic, weak epistemic, and indeterminate. Further research on a larger sample of data may resolve this problem. In order to amend this misrepresentation in the most efficient way, I will disregard the faulty classifications in the *may* tree in my discussion and address only the classifications attested in the data.

#### 5.3.1.1 *The decision tree for may*

The features that were identified by the computer as central for the interpretation of *may* are: *Controllability*, *aspectual modification*, *type of main predicate*, *type of person*, *time reference for the proposition*, the presence of an *epistemic adverbial or particle*, and *subject type*, i.e. *generic* and *animate* (see Figure 6). Not only is *controllability* a decisive feature for interpreting *may*, but all the other features implicated in the decision tree are features that also encode Controllability. The order of the features and their position with respect to the root of the tree reflect their ranking in terms of the impact on the interpretation. In the discussion that follows, the decision chains leading to final interpretation are illustrated with examples from the corpus data. The reader is referred to Figure 6.

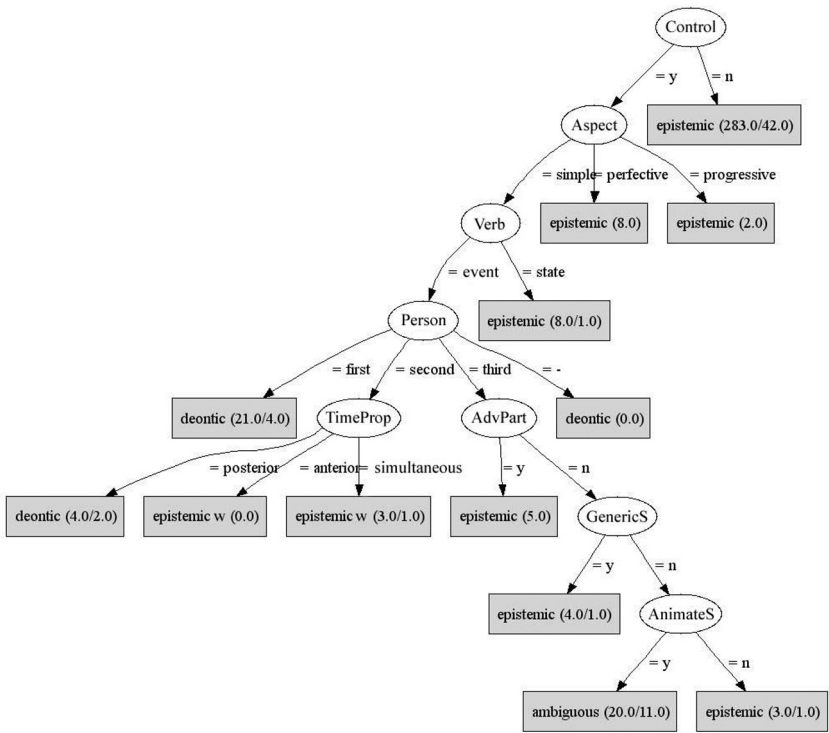


Figure 6. The decision tree for *may*

Controllability is the one feature crucial for interpretation. Utterances where the subject is in no control of its actions, as in (28), tend to be interpreted epistemically. More tests are needed to arrive at the interpretation when the subject exercises control over the situation. Indeed, it is impossible to felicitously give an order to somebody who clearly lacks the ability to carry out that order. In this category, even inanimate subjects, as in (29), are included, which normally will not be acting on their own.

- (28)

You **may** be closer to the mark than you think. (BR)

Epistemic
- (29)

This could be a crippling burden on the poorest countries, because food imports **may** drain away precious foreign exchange that should be used to build up long-term economic strength. (CS)

Epistemic

In (28), the subject is an animate, responsible agent. The predicate, however, is stative, denoting an either/or state over which the subject has no control. In (29), on the other hand, there is an inanimate subject that does not control the situation.

In the case of *may*, aspectual modification is also seen as important for the interpretation. However, as demonstrated in Chapter 3, unlike *must* and *måste*, aspectual modification will automatically promote epistemic interpretation in utterances containing *may*, irrespective of the time reference for the proposition.

(30) “Someone **may** have heard”, Wexford said. (RR) Epistemic

(31) But nobody seems to suspect that I **may** be losing confidence in myself. (BR) Epistemic

In (30), the time reference for the proposition is anterior to the time of the modality expressed. This normally demotes deontic and promotes epistemic interpretation. The time reference for the proposition is simultaneous with the time of the utterance in (31). Again, this usually demotes (directed) deontic interpretation. The present data set appears, however, to paint a somewhat misleading picture of the relationship between aspectual modification and the time reference for the proposition: in all examples, the time reference for the proposition is either simultaneous with the time of the utterance (as in 31) or anterior (as in 30). This may not be of importance for the ranking, since aspectually modified utterances with posterior time reference containing *may* are interpreted epistemically as well (see the discussion of (26) in Chapter 3 for more details).

With utterances that are not aspectually modified, the type of predicate becomes a feature of importance. Thus, utterances containing a state predicate are interpreted epistemically, as in (32). As for utterances containing event verbs, further tests are required for the interpretation to take place.

(32) I am giving an advance notice that this is a matter subject to query and that we **may** have to object to this item on the agenda. (ECHI) Epistemic

In (32), the main predicate denotes the state of necessity or obligation to object to a certain issue being part of the agenda. The presence of this predicate is considered decisive, despite the fact that this example contains both an animate, responsible subject and posterior time reference for the proposition, a combination that usually appears in deontic utterances.



In the case of utterances containing event predicates, the type of person has to be considered as well. With 1<sup>st</sup> person subjects, the interpretation is usually deontic. In fact, in non-aspectually modified utterances containing an event verb and an animate 1<sup>st</sup> person subject in control of his actions, deontic interpretation is normally promoted, i.e. the subject will ask for a permission to act as in (33) and (34).

- (33) “**May** I examine it?” he asked, and, taking it from me, he proceeded to examine it as he had examined the geometrical shapes. (OS) Deontic
- (34) Mr President, **may** I first of all welcome the Secretary of State and thank her for her excellent overview and also, of course, thank Mr Rocard for his report. (EKIN) Deontic

Many of the utterances containing event predicates are of the same type as (34): both the modality and the time reference for the proposition are simultaneous to the time of the utterance. In (34), the speaker is not actually awaiting permission from the President to welcome the Secretary of State, or thank Mr Rocard for his report, although he formally indicates that these are his intentions. The asking for permission and the realization of the proposition are carried out almost at the same time. Such utterances are generally known as indirect speech acts (Levinson 1983) or short-circuited implicatures (Papafragou 2002a). They can be exemplified by polite forms such as *Can you pass me the salt?* or hedged performatives, as in (34). Papafragou, following the general discussion in Levinson (1983), suggests that short-circuited implicatures are triggered by “[m]ultiple probabilistic cues which take into account (i) local environments in which turn-taking routines are standard [...]; (ii) social relations between interlocutors [...]; (iii) speaker’s intentions and goals” (Papafragou 2002a: 12). She also finds that modals are appropriate triggers for short-circuited implicatures due to their “frequency, simplicity and versatility” (Papafragou 2002a: 9). It can be argued that the act of asking for permission is merely symbolic in (34): the speaker does not expect to be forbidden to carry out the proposition, but still feels that a formal demonstration of respect for authority is in order.

In utterances with 2<sup>nd</sup> person subjects, the time reference for the proposition becomes relevant: utterances with posterior time reference to the time of modality are interpreted deontically, as in (35).

- (35) I must be mad, Ms Phelps told herself, but to Matilda she said, “Of course you **may** try it”. (RD) Deontic

The utterance in (35) is a typical directed deontic utterance, where the speaker gives permission, or in this case suggests, that the addressee should try something. There is nothing in the context of this utterance that points to lack of agent control, which would demote deontic interpretation.

Utterances containing *may* with no aspectual modification, simultaneous time reference to the time of the utterance, and an event predicate tend to be interpreted epistemically, although no conclusive evidence can be provided at this point. Consider example (36).

- (36) And I am not going to argue for my sake, as you **may** think, but for yours, that you may not sin against God by condemning me. (JH) Epistemic

The choice of the mental verb *think* as the main predicate may add to the impact of the feature simultaneous time reference for the proposition in that it is not possible to actually control people's thoughts. Also, *think* can possibly be interpreted here as 'believe', and is therefore not a good example of an event predicate denoting an action. All of the other examples with this contextual make-up also contain main predicates that are formally event verbs but may be interpreted as state.

With 3<sup>rd</sup> person subjects, the presence of a modal adverbial or particle becomes important for the interpretation. As argued in 4.2.1, the presence of a modal adverbial or particle may reinforce, neutralize, or disambiguate the interpretation of modality in an utterance. Not surprisingly, all five examples with this contextual make-up – a subject in control of his actions, no aspectual modification, dynamic predicate, 3<sup>rd</sup> person subject, and a modal adverbial or particle – are epistemic, as in (37).

- (37) Except of course God **may** send his punishments retrospectively. (FW) Epistemic

Here, the adverbial merely reinforces the epistemic reading of the utterance: if the adverbial is omitted, the epistemic interpretation still stands.

In utterances with 3<sup>rd</sup> person subjects and no modal adverbial or particle, one should consider whether the subject is generic or not. Unlike with *must* and *måste*, generic subjects with *may* demote deontic and promote epistemic interpretation. Consider (38).

- (38) One **may**, of course, see Korsakov's syndrome with other pathologies, as in Luria's patients with tumours. (OS) Epistemic

It is difficult to interpret this utterance as permission, even if the presence of the epistemic adverbial is disregarded. Instead, the utterance is interpreted

ed as an assertion of the general possibility of the proposition being realised. This interpretation arises due to the fact that *must* and *may* do not have the same meaning. If we consider Papafragou's (2000) claim about the meaning of these modals, they enter into different relations with the relevant domains of interpretation, entailment and compatibility, respectively. Thus, combinations of generic subjects with *must* result in an interpretation of the unlimited state<sup>21</sup> being all-applicable or entailed. With *may*, such interpretation is not possible. Utterances containing a generic subject and *may* are interpreted so the unlimited state of affairs described is one of the possible alternatives, compatible with the relevant domain of interpretation.

To summarise, the principal distinction between the epistemic and non-epistemic examples with *may* relates strongly to the issue of Controllability. In fact, 241 of the 274 epistemic examples were correctly identified as epistemic on the basis of this feature alone. Classifications involving other features (*aspectual modification, type of the main predicate, person, time reference for the proposition, presence of modal adverbials or particles, generic and animate subjects*) cover a much smaller portion of the data with a much lower success rate. What is important here, however, is not the actual analysis provided by the computer, but the fact that the features related to Controllability are repeatedly found to be associated with epistemic and deontic interpretations in the data.

## 5.4 (De)coding possible conclusion and permission: *kan*

As argued in Chapter 1, utterances containing *kan* in Swedish can be interpreted epistemically, expressing possible conclusion, and deontically, expressing permission, much like *may* in English. This similarity of interpretation was deemed important and prompted further investigation of the contexts in which *kan* and *may* appear. However, there are differences between the two modals with respect to the degree of formality and the range of possible interpretations (see Chapter 1). This, among other things, renders the modals less appropriate candidates for comparison than *must* and *måste*.

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<sup>21</sup> See Huddleston and Pullum (2002: 406–407) and 4.1.1.

### 5.4.1 The *kan* file

The *kan* file contains 1,001 instances. The decision tree produced by the computer is a somewhat less accurate representation of the patterns underlying the data than in the case of *may*: it correctly identifies only 662 examples, or 66.1 per cent of the data, and incorrectly predicts 339 examples, or 33.9 per cent of the data (see Appendix V).

The Kappa statistic value, measuring 0.455, indicates that the analysis provided by the computer corresponds to the actual values assigned to the data slightly better than in the case of *may*. Additionally, the computer was not equally successful in identifying the different interpretations available for the modal. Weak epistemic examples were correctly predicted in approximately 70 per cent of the cases, with TP rate and Precision values at 0.727 and 0.616, respectively. The same success rate applies to dynamic examples, with TP rate and Precision at 0.768 and 0.721, respectively. Epistemic and deontic utterances were, on the other hand, identified correctly in only about 30 per cent of the cases (TP rate and Precision at 0.267 and 0.54, and 0.371 and 0.59, respectively). Moreover, only about 8 per cent of indeterminate examples were recognised as such, with TP rate and Precision measuring 0.083 and 0.667. Once again, there is a correlation between the correct analysis of an interpretation and its frequency in the data set. Thus, weak epistemic interpretation is well attested (366 examples). The same is true of dynamic examples of which there are 448 in this subcorpus. Epistemic examples, on the other hand, are relatively poorly attested: there are only 101 such examples in the data set. Also, there are only 62 deontic and 24 indeterminate examples. Clearly, the computer was much more successful in learning to identify the interpretations statistically well attested in the data.

This is also reflected in the confusion matrix (see Appendix V). Of the 101 epistemic instances, only 27 were correctly identified; 61 instances were incorrectly classified as weak epistemic and 13 were considered indeterminate. Of the 448 dynamic examples, 344 were classified as such by the computer, while the rest were incorrectly identified as epistemic (one case), weak epistemic (89 cases), deontic (13 cases), and indeterminate (one case). The same tendency can be observed with the other examples.

In the discussion that follows, I focus on the types of classifications actually attested in the data and disregard the incorrect classifications present in the decision tree for *kan*.

### 5.4.1.1 The decision tree for *kan*

The decision tree for *kan* differs considerably from those for the other modals, both with respect to the length of the decision chains and with respect to the additional features appearing in different positions in the tree structure (see Figure 7). Another point of difference is that several of the features reappear in different decision chains, while in all the other trees each feature was only considered once by the program. The features that were considered important for the interpretation in the *kan* tree are: (i) *animacy of the subject*, (ii) *aspectual modification*, (iii) *the presence of a modal adverbial or particle*, (iv) *passive voice*, (v) *introductory subject*, (vi) *type of situation*, (vii) *type of main predicate*, (viii) *negation of modality*, (ix) *type of person*, (x) *time reference for the proposition*, (xi) *whether the utterance is assertive or not*, (xii) *Controllability*, (xiii) *time reference for the modality expressed in an utterance*, and (xiv) *specificity of the subject*. At this point, it is impossible to claim that these features are ranked in any particular way, since many of them appear several times in different positions in the tree. However, we can conclude that most of the features are those that arguably code Controllability.

The principal distinction the computer makes seems to lie in the type of subject. Utterances with an inanimate subject are epistemic or weak epistemic in the data set. Utterances containing an animate subject, on the other hand, are mainly dynamic, although weak epistemic, deontic, and indeterminate classifications were also made by the computer with various degrees of success. The animacy of the subject is not a decisive feature on its own, however. The computer tests further for aspectual modification. Utterances containing an inanimate subject and modified by perfect aspect were classified as epistemic.

- (39) Det **kan** inte ha varit en slump. (PCJ) Epistemic  
 it MOD NEG have-INF be-PART a coincidence

‘That could not have been a coincidence.’

This classification is not surprising: even in the *kan* data set, all the aspectually modified examples also have anterior time reference for the proposition, as in (39), a combination that promotes epistemic interpretation. Time reference is not of high importance in combination with aspectual modification in modals expressing possible conclusion and permission, unlike with modals expressing confident inference and obligation. Thus, aspectually modified utterances (with posterior time reference) are epis-

temic with the modals *may* and *kan*, but not with *must* and *müste* (see the discussion of (1)–(3) in this chapter and (25), (72), and (73) in Chapter 3).

In utterances with an inanimate subject that are not aspectually modified, the computer tested further for the presence of a modal adverbial or particle. When this feature was not present in the context, the utterance was classified as weak epistemic, as in (40).

- (40) Tänk på parkettgolvet - det **kan** bli märken om du faller  
 think on parquet-floor it MOD become-INF marks-DEF if you fall-PRES

omkull! (ARP)  
over

Epistemic

‘Think of the parquet floor – you’ll make marks on it if you fall over.’

In (40), the speaker expresses her opinion about the possibility, or potentiality, of the proposition being realised, an opinion based on her knowledge that parquet floors are easily damaged and prone to scratching if not handled with care. The time reference for the proposition is posterior to the time of the modality expressed, as is usually the case with weak epistemic utterances. This indicates that the truth value of the utterance can only be verified after the proposition has been realised.

If a modal adverbial or particle is present in the utterance, the computer tests for the presence of passive voice. If the utterance is passive, it is classified as weak epistemic.

- (41) Det **kan** eventuellt övervägas att fastställa den högsta tillåtna  
it MOD MOD consider-PRES-PASS to fix-INF DEF highest allowed

kvoten till noll. (ECAR)  
limit to zero

Epistemic

'The possibility of a 0% lower limit could be envisaged.'

In (41), the passive voice is combined with posterior time reference, inanimate subject, and a modal adverbial *eventuell* 'possibly'. This combination of features demotes a deontic interpretation, promoting an epistemic, or weak epistemic, interpretation instead. As was discussed earlier, modal adverbials and particles may reinforce or neutralise the modality expressed in an utterance, as in the present example.

In active utterances, the type of situation has to be considered. Not surprisingly, atelic utterances, which often correspond to states, are interpreted epistemically.

- (42) Möjligen **kan** dessa i sin tur ha betydelse. (BJ) Epistemic  
 MOD MOD these in REFL turn have-INF meaning

‘These, in turn, may be of some significance.’

Many of the features discussed co-occur on a regular basis. Thus, atelic situation types co-occur not only with state predicates, but also with simultaneous time reference for the proposition. This combination of features promotes epistemic interpretation, as in (42), which in addition has an inanimate subject, which indicates lack of Controllability.

In telic utterances, on the other hand, introductory subject becomes important.

- (43) Det **kan** väl aldrig bli samma sak. (SC) Epistemic  
 it MOD MOD never become-INF same thing

‘But of course it can never be the same.’

In all relevant utterances with introductory subjects, the main predicate denotes a change of state, as *bli* ‘become’ in (43). The presence of an introductory subject effectively demotes deontic interpretation: it excludes the possibility of, among other things, the subject carrying out the command given by the addressee.

If there is no introductory subject in the context, but the subject is inanimate, the utterance is interpreted as weak epistemic, as in (44).

- (44) Ett studium av FN:s barnfond UNICEF:s stöd till  
 a study of UN’s child-foundation UNICEF’s support to  
 distriktsförvaltningar i samband med mödra- och barnvårdsinsatser **kan**  
 district-administrations in connection with mother- and child-care-work MOD  
 möjligen ge metoder. (CO) Epistemic  
 MOD give-INF methods

‘A study of UNICEF’s support of district administrations as part of the antenatal and childcare projects may possibly provide us with methods.’

In (44), the speaker not only expresses her opinion about the possibility of the realisation of the proposition, but also introduces her knowledge that research can generally provide us with tools or methods to be used later. The choice of an inanimate subject, although in combination with a telic event verb, demotes a (directed) deontic interpretation and promotes an

epistemic interpretation instead. This interpretation is further reinforced by the presence of the modal adverbial *möjligen* ‘possibly’ in the context of the utterance.

To summarise, on the right-hand side of the decision tree all the final classifications appear to be either epistemic or weak epistemic. The features associated with these interpretations, by themselves or in different combinations, are the ones that have repeatedly been implicated in this way in the previous discussions: (i) *inanimate subject*, (ii) *aspectual modification*, (iii) *the presence of a modal adverbial or particle*, (iv) *passive voice*,<sup>22</sup> (v) *type of situation*, and (vi) *introductory subject*.

On the left-hand side of the tree, most of the classifications are dynamic. Considering the poor success rate in the analysis of deontic and indeterminate examples, the features that appear in decision chains on the left-hand side of the tree can thus be claimed to be associated mainly with dynamic readings of *kan*.

In utterances containing animate subjects, aspectual modification becomes important. Similarly to other aspectually modified utterances in the data, utterances with an animate subject and perfect aspect are analysed as epistemic, as in (45).

- (45) Du **kan** ha inbillat dig att hon var  
you MOD have-INF imagine-PART you-ACC that she be-PAST

rädd. (HM)  
scared

Epistemic

‘You may have been imagining that she was frightened.’

When there is no aspectual modification, the computer tests for the main predicate type. With state predicates, further tests are conducted. First, the computer tests whether the modality is negated. If so, the utterance is classified as dynamic.

- (46) **Kan** man inte älska, kan man i varje fall hata. (PCJ)  
MOD one NEG love-INF MOD one in every case hate-INF

Deontic

‘If one cannot love, at least one can hate.’

<sup>22</sup> In most of the passive examples, the time reference for the proposition is anterior or simultaneous. When the time reference for the proposition is posterior, other features signal lack of control on the part of an intended agent.



The subject of (46) clearly lacks the ability to love, but is nonetheless able to hate. All sentences where the modality is negated are analysed as non-epistemic. This is in line with our general understanding that only in non-epistemic utterances can either the proposition or the modality itself be negated. In epistemic utterances, negation takes scope over the proposition only.<sup>23</sup> One possible explanation for this is found in Cinque (1999), who appeals to the order of the functional heads in the I-domain: the epistemic modal phrase is situated higher in the hierarchy than the non-epistemic ones, and the negation phrase, NegP, is located above the non-epistemic phrase but below the epistemic one.

In utterances where the modality is not negated, further tests were conducted. Different classifications were obtained for utterances containing (i) an animate subject, (ii) no aspectual modification, (iii) a state predicate, and (iv) no negation of the modality expressed, depending on the type of person. In utterances with 1<sup>st</sup> person subjects, the computer considered whether the utterance in question is assertive or not. Non-assertive utterances were classified as dynamic, as in (47).

- (47) Hur **kan** jag veta detta? (PCJ) Dynamic  
 how MOD I know-INF this

‘How can I know this?’

The subject of (47) is quite unusual. It is a brain, surgically removed from the body it used to occupy and placed in a protective casing for scientists to observe. The ability the brain wonders about is its peculiar awareness of the things that will necessarily alter its condition for the worse or make it comfortable in its present circumstances. The question here is addressed by the speaker to the speaker, the brain itself.

In assertive sentences, the issue of the subject’s control over the situation described in the proposition becomes of importance. When subjects exhibit control of the situation, the interpretation is dynamic, as in (48). These utterances are generally understood as statements about the subject’s ability to carry out the proposition.

- (48) Men eftersom jag redan **kan** stava, ligger jag istället och tänker på  
 but since I already MOD spell-INF lie-PRES I instead and think-PRES on

<sup>23</sup> See, for example, Palmer (1995), who observes a cross-linguistic irregularity in the relation between negation and modals of possibility and necessity. See also Palmer (1997) for an overview of the relationship between negation and modality in Germanic languages.

Emma. (PCJ)  
Emma

Dynamic

‘But since I can spell already, I prefer to lie there thinking of Emma.’

Utterances where the subjects have no control of the situation, on the other hand, are considered epistemic. This is consistent with the results obtained from the analysis of the *may* data, where the issue of the subject’s control over the situation expressed in the proposition is crucial for the interpretation. Most of the utterances in which the subject displays no control of the situation are interpreted epistemically. In the *kan* data, however, there are no examples of this kind to support the computer’s classification. It is therefore disregarded at present.

With 2<sup>nd</sup> person subjects, the time reference for the proposition comes into play. No examples of utterances with a 2<sup>nd</sup> person subject and a posterior time reference for the proposition are found in the data. The classification of these examples as epistemic is therefore disregarded here. As mentioned earlier, however, in general, in utterances with this contextual make-up (containing *may* and *kan* with posterior time reference for the proposition) nothing precludes an epistemic interpretation.

Utterances containing all of the above features, but with simultaneous time reference for the proposition are considered dynamic by the computer.

- (49) Att du **kan** bo så här. (MR)  
that you MOD live-INF so here

Dynamic

‘Fancy living like this.’

In (49), for example, the speaker is amazed at the addressee’s, i.e. the subject’s, ability to put up with a noisy flat located on a very busy street in the centre of the city.

With 3<sup>rd</sup> person subjects, the presence of a modal adverbial or particle may distinguish between epistemic and non-epistemic interpretations. In (50), the epistemic interpretation is reinforced by the presence of the epistemic adverbial *möjligen* ‘possibly’.

- (50) Undis **kan** möjligen få lite tröst av den när hon blir  
Undis MOD MOD get-INF little comfort of it when she become-PRES

änka. (AL)  
widow

Epistemic

‘Undis might get a bit of comfort from it when she becomes a widow.’

In utterances where the interpretation is not reinforced by such an adverbial or particle, epistemic interpretation is not discouraged, only weakened, i.e. those utterances are interpreted as weak epistemic.

- (51) Även poliser **kan** vara ojämma. (HM) Weak epistemic  
even policemen MOD be-INF uneven

‘Cops can also be erratic.’

The utterance in (51) can be paraphrased as ‘It is possible even for policemen to be erratic’. The interpretation is based on the intuition that there is a general possibility for policemen to be erratic. This intuition is based on past experiences with erratic policemen.

In utterances with event verbs, the presence or absence of a modal adverbial or particle leads to a series of tests. If no adverbial or particle is present in the utterance, the computer tests for the type of person again. Assertive utterances with 1<sup>st</sup> person subjects are classified as dynamic.

- (52) Det är inte alltid jag hänger med, fast jag gör så gott  
it be-PRES NEG always I hang-PRES with although I do-PRES so good

jag **kan**. (ARP)  
I MOD

Dynamic

‘I can’t always keep up, though I do the best I can.’

Example (52) can be paraphrased as ‘..., although I act at the best of my ability’. Nothing in the context of this utterance promotes deontic or epistemic interpretation. There is no deontic source interested in the subject carrying out the proposition, the speaker does not express her judgement about the truth of the proposition, and no features signal lack of control on the part of an intended agent.

In non-assertive utterances, the time reference for the proposition once more becomes important. Utterances with posterior time reference for the proposition are generally identified as deontic, as in (53).

- (53) När **kan** vi gå ut i åkern? frågade Wallander. (HM) Deontic  
when MOD we go-INF out in field-DEF ask-PAST Wallander

“‘When can we go out in the field?’ asked Wallander.”

The speaker in (53) makes an inquiry about the time the policemen will be allowed to go out into the field and inspect the crime scene after the forensic team has processed it. In all utterances of this kind, speakers are asking some third party, usually the addressee, for permission to carry out the proposition.

With 2<sup>nd</sup> person subjects, the issue of control becomes important. Contrary to intuition, utterances where the subject exhibits no control over the situation described in the proposition are interpreted as dynamic. Indeed, if someone has the ability to perform some action, this person will also be able to control this ability. Consider (54) and (55), however.

- (54) Du **kan** inte annat än sprattla. (JMY) Dynamic  
 you MOD NEG other than struggle

‘You can’t do anything but flounder.’

- (55) Längre än så **kan** du inte komma. (SW) Dynamic  
 longer than so MOD you NEG come-INF

‘Further than that you can’t get.’

Both (54) and (55) are negated. More precisely, in both utterances it is the dynamic modality that is negated. In (54), an adult pinning a child to the floor gloats at the child’s inability to get free. In (55), the speaker conveys to the addressee the fact that one is unable to get further than Smygehuk on the Swedish coast, since it is the most southern point in Sweden. In both utterances, the situation described in the propositions came into existence through some external circumstances of which the subjects have no control, and the subjects are therefore unable to act on the proposition.

In utterances where the subject exhibits control over the situation, further tests are conducted to arrive at the final classification. First, the time reference for the modality expressed in an utterance is considered. If the time reference is past, the computer concludes that the utterance is deontic. No examples of this kind are found in the data, however, and this classification is therefore disregarded.

Utterances with future time reference for modality are also judged as dynamic.

- (56) Mitt enda öga **kan** jag – med litet tur – få ut genom en av  
 my only eye MOD I with little luck get-INF out through one of

magfistlarna. (PCJ)  
stomach-fistulae

Dynamic

‘With a little luck I’ll be able to push my single eye through one of its fistulae.’

In (56), the subject, a disembodied brain, plans its escape by making a laboratory dog swallow it whole so it will be able to move around by controlling the dog’s thoughts. Here, the subject clearly contemplates its future ability to find an outlet for its eye so that it will be able to see even when encapsulated in the dog’s stomach.

In utterances with present time reference for modality, the computer tests further whether the modality expressed in an utterance is negated or not. Instances where the modality is negated are classified as deontic. Consider (57).

- (57) Mamma, det drar, **kan** du inte stänga dörr. (MR) Deontic  
mother it pull-PRES MOD you NEG close-INF door-DEF

‘There is a draught, Mother. Couldn’t you shut the door.’

In (57), the girl does not inquire into her mother’s ability to close the door, but politely asks her to do so (cf. Papafragou 2002a on short-circuited implicatures). The negation is not necessary from a grammatical or semantic point of view, but is present to indicate the girl’s desire to soften her request, to make it sound more polite. This use of negation is quite common (see, for example, Høye (1997)).

If the modality is not negated, whether the utterance in question is assertive or not becomes important. Assertive utterances containing (i) an animate subject, (ii) no aspectual modification, (iii) an event predicate, (iv) no modal adverbial or particle, (v) 2<sup>nd</sup> person subject, (vi) subject that controls the situation described in the proposition, (vii) present time reference for the modality, and (viii) no negation of the modality expressed in the utterance are interpreted deontically, as in (58). Non-assertive utterances displaying the same contextual features are interpreted as dynamic, as in (59).

- (58) Du **kan** ta så många bilder du vill, svarade Wallander. (HM)  
you MOD take-INF so many pictures you want answered Wallander

‘“You can take as many pictures as you like”, replied Wallander.’ Deontic

- (59) I övermorgon eftermiddag klockan tre vid Stavnäs brygga, **kan** du  
in over-tomorrow afternoon clock-DEF three at Stavnäs wharf MOD you

komma? (JG)  
come

Dynamic

‘Day after tomorrow, tree p.m. at Stavnäs wharf – will you come?’

The utterance in (58) is a typical deontic utterance where the speaker gives permission to the addressee to carry out the action specified in the proposition by an event predicate. The permission is given at the time of the utterance, hence present time reference for the modality expressed. The addressee, who is also the subject of the utterance, is animate and capable of either carrying out the action as required or refusing to do so. There is also an asymmetrical relationship between the speaker and the addressee: the speaker, being a senior officer, has authority over the addressee. Example (59), on the other hand, is primarily an inquiry about the subject’s ability to fulfil the proposition. The subject asks whether there are any impeding circumstances that would force the addressee not to be in a certain place at a certain time. In certain contexts, an utterance like this may also be interpreted as deontic, a polite request to carry out the proposition, given the imbalance of power between the speaker and the addressee, as in (57).

With 3<sup>rd</sup> person subjects, the passive voice is a significant feature for the interpretation. Active utterances are interpreted as dynamic, as in (60), whereas in passive utterances, the time reference for the proposition is considered.

- (60) Om man ritar ett streck mellan de platser där vi hittade dom  
if one draw-PRES a line between those places where we find-PAST them

**kan** man se att hon faktiskt hade ringat in sig. (HM) Dynamic  
MOD one see-INF that she actually have-PAST circle-PART in REFL

‘If you draw a line through the spots where we found them, you can see that she had actually surrounded herself.’

In (60), the speaker reflects on one’s ability to observe a certain fact of importance for the police investigation at hand. There is nothing in the context of this utterance that indicates a deontic source interested in the proposition being carried out. There is also no indication that the speaker expresses his judgement of the possibility of the proposition being true or the agent having no control over the situation.

In passive utterances, the computer was unable to arrive at an interpretation without considering the time reference for the proposition. Thus, as

discussed in 4.1.3, passive utterances with posterior time reference were judged as epistemic, as in (61).

- (61) För internationella företag **kan** Sydafrika, om landet  
 for international companies MOD South-Africa if country-DEF  
 bedöms som stabilt, komma att betraktas som  
 judge-PRES-PASS as stable come INF consider-INF-PASS as  
 inkörsporten till SADCC-regionen och kanske t o m till länderna  
 entrance-port to SADCC region and maybe even to countries-DEF  
 söder om Sahara. (CO) Epistemic  
 south about Sahara  
 'For international companies South Africa may, provided it is considered stable, be regarded as the entrance to the SADCC region and possibly even to the Sub-Saharan Africa.'

The utterance in (61) is the only example of this kind found in the data. It is therefore difficult to claim that it is the context of this utterance and not the presence of the lexical item *komma att* that promotes epistemic interpretation. As discussed in 3.2.2.1, the use of *komma att* does not imply that the event described by the main predicate is planned or intended. Instead, it indicates a more or less competent prognosis on the part of the speaker and the fact that the speaker relies on (external) features to make such a prognosis. Also of importance is the fact that the proposition is situated in some indeterminate future.

Passive utterances with simultaneous time reference for the proposition are classified by the computer as weak epistemic.

- (62) Man **kan** lätt tjasas av prydliga diagram, abstrakta formler och  
 one MOD easy charm-INF-PASS by neat diagrams abstract formulae and  
 fullständigt logiska resonemang. (BB) Weak epistemic  
 completely logical argument  
 'It is easy to be enchanted by carefully prepared diagrams, abstract formulae, and completely logical discussions.'

In (62), the speaker does not reflect on one's ability to be charmed by neat diagrams and the like, but expresses a judgement about the general possibility to be enchanted by these things. The judgement is based on the fact that this has occurred at least once before.

In utterances that in addition to (i) animate subject, (ii) no aspectual modification, and (iii) an event predicate, also contain (iv) a modal adverbial or particle, the computer tested further whether the modality expressed is negated. When this is the case, the utterances are classified as dynamic.

- (63) **Kan** du inte simma kanske? undrade Bosse. (PP) Dynamic  
 MOD you NEG swim maybe wonder-PAST Bosse

‘You can’t swim, is that it? wondered Bobby.’

The speaker in (63) inquires whether the addressee lacks the ability to swim. The fact that the modality is negated may be due to the speaker’s desire to also indicate that the lack of such ability is not socially acceptable.<sup>24</sup>

When the modality is not negated and the utterance contains a non-specific subject, the issue of the subject’s control over the situation described in the proposition becomes important. When the subject exhibits control over the situation, the utterances are interpreted as epistemic. Conversely, when the subject lacks such control the interpretation is weak epistemic. Consider (64) and (65).

- (64) Man kanske **kan** säga att det är resultat av en ständigt  
 one MOD MOD tell-INF that it be-PRES result of a constantly  
 pågående intern spaning, oss poliser emellan. (HM) Epistemic  
 ongoing internal investigation us police-PL between

‘You might call it the result of an ongoing internal investigation, among us cops.’

- (65) Naturligtvis **kan** man få uppleva äkta flamenco under andra,  
 naturally MOD one get-INF experience-INF genuine flamenco under other  
 mindre idealiska förhållanden, men det är sällsynt. (BTC) Weak epistemic  
 less ideal circumstances but it is rare

‘Of course one can experience genuine flamenco under less ideal conditions, but it is rare.’

In (64), the speaker expresses his subjective opinion on what an appropriate course of actions would be in a specific situation. In (65), on the other

<sup>24</sup> Consider, for example, when someone asks about your age. The appropriate question in this case would be *How old are you?* Should the speaker choose the marked version of this question, *How young are you?*, she indicates that she also considers the addressee to be (too) young. For further discussion on issues of neutral and biased contexts see Bolinger (1977).



hand, the speaker expresses a judgement about the potentiality of an event occurring, the judgement being based also on the fact that this event has been known to occur before.

With specific subjects, also of significance is whether the subject is 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> person. In utterances with 1<sup>st</sup> person subjects, time reference for the proposition is examined. Utterances with posterior time reference for the proposition are classified as dynamic.

- (66) Eftersom jag fortfarande har kvar loggboken **kan** jag skriva av den  
because I still have-PRES left logbook-DEF MOD I write-INF of it

ordagrant. (BL)  
verbatim

Dynamic

‘Since I still have the logbook in my possession, I am able to copy it word for word.’

In (66), the speaker is about to describe some past event documented in a logbook that happens to be in his possession. The fact that the speaker has the logbook enables him to copy from it word for word.

There are, however, a few examples with simultaneous time reference for the proposition expressed in an utterance, which are classified as weak epistemic.

- (67) När jag talar om en “utredare” **kan** jag alltså lika väl  
when I speak about a investigator MOD I therefore equally well

mena en forskare eller en konsult. (BB)  
mean-INF a researcher or a consultant

Weak epistemic

‘When we talk about an “investigator”, we refer to a scientist or a consultant as well.’

Here, the speaker makes a clarification with regard to the terminology he uses. He is not reporting on his ability to use a certain term in a certain way, but on the range of possible applications of this term. Note also that it is the speaker himself who has the freedom to decide how the term in question should be used.

All instances of utterances with the above mentioned contextual background and 2<sup>nd</sup> person subjects are identified as deontic in the decision tree.

- (68) Och du **kan** lika väl hälla upp ett stort glas sherry när du  
and you MOD equally well pour-INF up a big glass sherry when you

ändå håller på och fumlär. (APR)  
 anyhow insist-PRES on and fumble-PRES

Deontic

‘And you might as well pour me out a large sherry if you’re going to fumble about with the decanter anyhow.’

In (68), the speaker gives a mild order or makes a suggestion to the addressee to carry out the action specified in the proposition. The deontic force in this case originates with the speaker. The addressee, the subject, is an animate responsible agent who is in control of his actions and may comply with the speaker’s request or refuse to do so of his own free will. The time reference for the modality expressed is simultaneous to the time of the utterance, i.e. the command or suggestion is given at the moment of speech. The time reference for the proposition, on the other hand, is posterior to the time of the utterance. Thus, there is nothing in the context of this utterance that demotes deontic interpretation.

In utterances with a 3<sup>rd</sup> person subject who is in control of the situation described in the proposition, the interpretation is indeterminate. When the subject exhibits no control of the situation, the interpretation is weak epistemic. Consider (69) and (70).

- (69) De **kan** väl åka ut till Marsvinsholm när de får  
 they MOD MOD drive-INF out to Marsvinsholm when they get-PRES

tid? (HM)  
 time

Ambiguous

‘They can drive out to Marsvinsholm when they have time, can’t they?’

In (69), also discussed as (102) in Chapter 3, the speaker comments not only on the ability of the police officers in question to drive out to the scene of the crime, but also on whether they will actually do that in the near future. The third possible interpretation, i.e. that of suggestion or mild order, arises from the fact that the speaker, being the chief inspector, is authorized to send the police officers to the scene of the crime to investigate. This is also supported by the fact that formally (69) is not an interrogative but a declarative sentence. Thus, *kan* shows the whole range of interpretations available. However, one should keep in mind that out of the 17 indeterminate examples containing *kan*, the computer succeeded in classifying only two (see the confusion matrix in Appendix V). With the other modals, the computer failed completely to identify such examples as indeterminate.

As mentioned above, utterances in which the subject has no control of the situation described in the proposition are classified as weak epistemic.

- (70) När den politiska situationen i Angola och Moçambique har  
when the political situation-DEF in Angola and Mozambique have-PRES

“lösts” på ett för Washington acceptabelt sätt **kan** möjligen de nya  
solve-PART on a for Washington acceptable way MOD possibly the new

regeringarna påräckna ett visst USA-stöd under en period... (CO)  
governments-DEF count a certain USA support under a period  
Weak epistemic

‘Once the political situation in Angola and Mozambique has been “resolved” in a way that is acceptable to Washington the new governments of these countries may possibly count on some USA assistance for a while...’

The speaker is not commenting on the ability of the newly assembled governments to count on some political and economic support from other countries. Instead, the utterance expresses the speaker’s judgement about the potentiality of these governments receiving such support.

With regard to the decision tree for the *kan* data, it is possible to conclude that this modal appears in utterances with somewhat different contextual make-ups than the other modals. This may be due to the fact that *kan* has a range of interpretations distinct from the other modals. Even with *kan*, however, the features that influence the interpretation are: *type of subject*, *type of main predicate*, *time reference* both for *modality* and *the proposition*, *aspectual modification*, the presence of a *modal adverbial or particle*, and *Controllability*. The most obvious difference between the decision tree for *kan* and the decision trees for the other modals lies in the fact that, in the case of *kan*, the computer tested for the same features more than once in the various parts of the tree. Chapter 1 suggested that *may* and *kan* may be comparable, much like *must* and *måste*. This expectation, however, is not supported by the results of the DM investigation, which has shown the decision trees for *may* and *kan* to be different. The next section discusses some of the reasons for this.

#### 5.4.1.2 Why do *may* and *kan* differ?

Let us review some of the research on the diachronic development of modal verbs in general, and *may* and *kan* in particular.

The general view on the emergence of modal verbs is that there is a unidirectional path of development from lexical items to modal auxiliaries, where the syntax and the semantics of these items undergo a gradual change over considerable periods of time.<sup>25</sup> As mentioned in 1.1, some of the hypotheses about the reasons for this change include *inter alia* appeals to metaphorization and metonomization (Sweetser 1990), grammatical reanalysis (Lightfoot 1982), and pragmatic inferencing (Krug 2000, Traugott and Dasher 2002). Whatever the reason, the semantic development of modals in English and Swedish seems to follow the strong cross-linguistic pattern for the diachronic development of modal meanings suggested in Bybee, Perkins, and Pagliuca (1994): epistemic interpretations tend to arise in contexts previously interpreted as indicating ability on the part of the subject, as indicated in Figure 8.

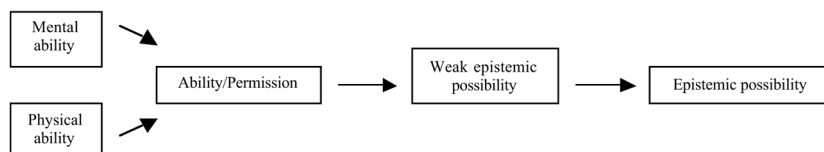


Figure 8. The diachronic development of modal meanings.  
(adapted from Bybee, Perkins, and Pagliuca 1994: 194, 199)

Deontic interpretations are generally said to develop from lexical verbs belonging to source semantic domains such as (i) future-oriented need and desire; (ii) being or coming into being; (iii) possession including owing; and (iv) positive evaluation (Traugott and Dasher 2002: 118-119).

*May* in PDE developed from an OE lexical verb *maeg* ‘be strong, have power or influence’<sup>26</sup> and followed the sense development path specified in Figure 8 quite closely. Firstly, it gradually came to be used in contexts expressing general ability or power. Later, it developed permission senses and, still later, weak and strong epistemic meanings. This semantic development was accompanied by the gradual loss of verb-like properties. Although auxiliaries in general, and modals in particular, shared “a range of properties with verbs throughout Old and Middle English”, “an essentially modern situation [i.e. PDE syntax of the modals, cf. the NICE-properties briefly discussed in 1.2.1] was established by 1850” (Warner 1993: 102, 67). Accompanying the loss of verbal properties was the gradual loss of

<sup>25</sup> See, however, Dahl (2000a) for an alternative view.

<sup>26</sup> The following information is from the OED at <http://dictionary.oed.com>.

*may*'s ability interpretations, considered more verb-like by Warner. What follows is development "into more distinctively modal epistemic and deontic areas" (Warner 1993: 181). This development of *may* into a full-fledged epistemic is traced in Kytö (1991) who claims that only 5 per cent of all occurrences of *maeg* in Old and Middle English were epistemic, while in modern corpora as much as 65 to 79 per cent of the occurrences of *may* are epistemic (Kitö 1991: 91ff, 153). This claim is confirmed by the distribution of the interpretations of *may* in this study: of the 361 examples, 274 were interpreted epistemically and 25 deontically.

Swedish *kan*, on the other hand, shows quite a different distribution of interpretations. In the sample of 1,001 examples, 448 were interpreted as dynamic (ability) and 366 as weak epistemic, whereas only 62 deontic and 101 epistemic utterances were found. This clearly indicates that, at least on the basis of the data investigated here, *kan* cannot be claimed to have grammaticalized into an epistemic marker to the same degree as *may*. Whereas *may* has not retained any verbal properties in PDE, *kan* in Present Day Swedish (PDS) still frequently occurs as a main verb in sentences like (71).<sup>27</sup>

- (71) Kalle kan                engelska väl.  
Kalle know-PRES English well

'Kalle speaks good English.'

In examples like this, *kan* exhibits the full range of verbal properties available in PDS and allows for the original interpretation 'to know, to know how' found as early as Old Swedish.<sup>28</sup>

Because *kan* is still available as a main verb and because of the distribution of its modal interpretations, it is possible to conclude that *kan* has not reached the same degree of grammaticalization as *may*. Support for this view is found in Aijmer (1999), who investigating translations concludes that "[w]hen *kan* is avoided in the translation, or needs support from co-occurring adverbs or subjective hedges, this is a sign that the epistemic meaning has not fully developed in these contexts" (Aijmer 1999: 317). She also observes that "[t]he paucity of epistemic modality markers expressed by a modal verb in Swedish originals is in contrast with the frequency of modal verbs in English. [...] In particular, *kan* was less frequent

<sup>27</sup> Note also that, as mentioned in 1.2.2, Swedish modals are not as easily identified on the basis of morpho-syntactic criteria alone as their English counterparts.

<sup>28</sup> This information is found in Svenska Akademiens Ordbok (SAOB) at <http://g3.spraakdata.gu.se/saob/index.html>.

than *may/might*, which supports the conclusion that *kan* has not developed into a prototypical exponent of Epistemic Possibility in Swedish” (Aijmer 1999: 318).

Thus, at this stage *may* and *kan* cannot be seen as equivalents, although both are positioned on the left-most end of the epistemic scales proposed in 1.2.3.1. In time, however, *kan* may undergo a similar development as *may* and become a “prototypical exponent” of epistemic possibility.

## Summary

In this chapter, I set out to illuminate the patterns of interpretation for the four modals under investigation with the help of a data mining (DM) program. By choosing to display the results in the form of decision trees consisting of decision chains, I was able to illustrate the recurring combinations of the features under discussion, i.e. how Controllability is coded in my data.

Although no common analysis is possible for all four modals at this stage of the investigation, *must* and *måste* were shown to pattern very similarly with respect to the features discussed and the resulting interpretations. The range of possible interpretations for these modals, from confident inference to obligation, was found very similar in the two languages. Thus, these two modals are good candidates for comparison. A common pattern of interpretation in the form of a decision tree for these two modals was suggested in 5.1.3.

*May* and *kan*, on the other hand, do not pattern in the same way, either with respect to the range of possible interpretations available or with respect to the relative order of the features important for the analysis. This discrepancy can be attributed to the different degrees of grammaticalization displayed by these two modals.

At this stage of the investigation, however, it is not possible to claim that the decision trees discussed throughout the chapter correspond to the way we interpret modality. Firstly, the analysis was based on a limited sample of language, namely only approximately 3,000 examples. Secondly, some of the interpretations for the modals were not proportionally distributed in the data. Some combinations of features were not present at all or were present only to a limited degree. This produced somewhat skewed results, i.e. the computer was not equally successful in learning to interpret all possible kinds of examples.

Although the decision trees obtained by the DM analysis cannot be taken at face value, many of the features discussed are repeatedly implicated, through the notion of Controllability, to play a role in the interpretation of utterances containing these modals. The features found to be of importance for the interpretation of *must* and *måste* are: (i) *aspectual modification*, (ii) *type of main predicate*, (iii) *time*

reference for the proposition, (iv) *implicit* and (v) *explicit condition*, (vi) *type of subject*, whether *generic* and *specific* or not, and (vii) *time reference for the modality* expressed in the utterance. Aspectually modified utterances, as well as utterances containing state verbs, tend to be interpreted epistemically, whereas utterances with event predicates are likely to be interpreted deontically. Utterances with anterior time reference for the proposition are almost always epistemic, whereas utterances with posterior time reference for the proposition tend to be deontic. Utterances with an explicitly or implicitly specified condition in the propositional or situational context are deontic. Non-specific generic subjects tend to demote epistemic interpretation. Present time reference for modality is often associated with epistemic interpretations, whereas utterances with past or future time reference for modality are often deontic. These observations, however, may not apply outside the context of the decision chains (Figures 3-7) that indicate the specific combinations of these features and their values leading the computer to its classification.

With *may*, the features that influence interpretation are: (i) *Controllability*, (ii) *aspectual modification*, (iii) *type of main predicate*, (iv) *type of person* (for the subject), (v) *time reference for the proposition*, (vi) *the presence of a modal adverbial or particle*, (vii) *type of subject*, whether *generic* and *animate* or not. The crucial distinction between epistemic and non-epistemic utterances is based on the issue of Controllability, i.e. whether the subject/the addressee is in control of his actions or not. Utterances where the subject cannot control the situation tend to be epistemic. With *may*, aspectual modification promotes epistemic interpretation in the examples analysed. Utterances containing state predicates are usually epistemic as well, whilst utterances with event predicates tend to be deontic. Posterior time reference for the proposition often coincides with deontic interpretation. Contrary to what was observed with *must* and *måste*, utterances with generic subjects are usually epistemic. The same is true of utterances containing an inanimate subject. These observations are valid only if considered in the context of decision chains specified by the computer (see Figure 6).

*Kan* exhibits much more complicated and somewhat irregular patterns of interpretation. Also, the classifications of the *kan* data provided by the computer were not as statistically robust as those for the other modals. One possible explanation for this is that utterances containing *kan* were more often than not interpreted as weak epistemic. Since the features were shown to combine to a lesser degree on this interpretation than in strong epistemic examples, the interpretation of weak epistemic examples is much more dependent on situational context, which was not made available to the computer. Nevertheless, the features that influence the interpretation of utterances with this modal are (i) *animacy of the subject*, (ii) *aspectual modification*, (iii) *the presence of a modal adverbial or particle*, (iv) *passive voice*, (v) *introductory subject*, (vi) *type of situation*, (vii) *type of main predicate*, (viii) *negation of modality*, (ix) *type of person*, (x) *time reference for the proposition*, (xi) *whether the utterance is assertive or not*, (xii) *Controllability*, (xiii) *time reference for the modality* expressed in an utterance, and (xiv) *the specificity of the subject*. The

observations as to the impact of aspectual modification, Controllability, the animacy of the subject, the time reference for modality, the presence of a modal adverbial or particle are born out similarly to the other modals. The appearance of additional features in the decision tree (Figure 7) cannot be evaluated with certainty at this point of research and on the basis of these data. Yet, the influence of these features on the interpretation is quite obvious in the examples discussed here.



# 6 Final remarks

## Abstract

This chapter consists of two parts: the first discusses the general implications of the study and the second summarizes the findings. In the first section, I focus on the universality of the interpretation patterns of modal utterances. This discussion is highly warranted given the research question formulated in 1.4 – what is it that enables speakers to encode modality in such a way that it can be correctly decoded by the interlocutors? Although at this stage some aspects of this discussion may be considered speculative, the facts appealed to in this section cannot be disputed, i.e. the appealed to in this section cannot be disputed, i.e. the ample evidence from language acquisition studies as to the sequence of acquisition of the different modalities, the sequence of diachronic change in modal verbs, and, indeed, the existence of a common modal function. Moreover, this study demonstrated that the features discussed are essential for the interpretation of modal utterances and, arguably, the overall organisation of discourse. In this last section, I sum up the content of the present study, concentrating on the major points of each chapter.

## 6.1 On the universality of the interpretation patterns

At the beginning of this study, we asked what enables speakers to code modality so it can be correctly decoded by the interlocutors. The obvious answer is that some salient semantic features in the context enable us to arrive at the relevant interpretation. Many of the contextual features discussed here were systematically associated with the interpretation through the notion of Controllability. This is more than mere coincidence. Although at this stage of research I am unable to provide firm conclusions, I assume that when (de)coding a modal utterance, a language user is sensitive to the features related to Controllability.

Since Controllability is a compositional notion, and the features encoding it are semantically complex, it may be too demanding on the language user to go through such a mental exercise. However, indirect support for the hypothesis can be found in Coates (1988), who observed that the system of modal meanings of eight-year-olds is only rudimentary, and that even by the age of twelve the child's modal system is not yet isomorphic with that of an adult. The fact that modality, and especially epistemic modality, is acquired at a later stage of language development suggests that it requires considerable cognitive abilities and world knowledge on the part of the speaker and the addressee as well as intimate understanding of the semantic and pragmatic mechanisms involved.<sup>1</sup> The hypothesis put forward here is also supported by the fact that there is considerable overlap between the features constituting Transitivity and those constituting Controllability. Thus, speakers rely on the presence of contextual features, which are salient, since they are used in the overall organisation of discourse, when (de)coding modally modified utterances.

It should also be noted that the function language users assign to modal expressions, to influence their environment in some way, can be considered a universal. Nuyts (2005) argues that categories such as modality "appear [...] to be a basic functional part of our system for conceptualising the world and, presumably, the basic elements of that system are the same in humans anywhere on earth, as biologically given" (Nuyts 2005: 19). Thus, it seems likely that a biologically given capacity to conceptualise the world is also put to use in a similar way: modality is interpreted in different languages by means of similar mechanisms such as, for instance, the encoding of Controllability. Nuyts's claim is echoed in Lyons (1977), who focuses on the possible origin of deontic modality:

The origin of deontic modality, it has often been suggested, is to be sought in the desiderative and instrumental function of language: that is to say, in the use of language, on the one hand, to express or indicate wants and desires and, on the other, to get things done by imposing one's will on other agents. It seems clear that these two functions are ontogenetically basic, in the sense that they are associated with language from the very earliest stage of its development in the child. It is equally clear that they are closely connected. (Lyons 1977: 826)

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<sup>1</sup> Cf. also Papafragou (1998b) and (2002b), who, coaching her account in the general theory of mind, comes to the conclusion that the stages of acquisition of modality parallel the stages of cognitive development.

According to Huddleston and Pullum (2002), it is generally possible to “regard deontic uses as more basic, with epistemic ones arising by extension to the domain of reasoning of concepts primarily applicable in the domain of human interaction” (Huddleston and Pullum 2002: 178). In directed deontic modality, the speaker’s involvement is direct in that the speaker actively strives to alter reality in accordance with her specifications by giving or seeking permission. In this case, the speaker herself is the source of the deontic force expressed in the utterance. There must be some imbalance of power between the speaker and the addressee so that one of them is in a position to give permission or put an obligation on the other to carry out the action specified in the proposition. This also presupposes that the one to realise the proposition is a responsible and capable agent. In expressions of non-directed deontic modality, the speaker is usually a mere reporter of the circumstances that facilitate the implementation of some action. In such utterances, the deontic force does not originate with the speaker, and the speaker and/or the addressee may or may not be the ones to carry out the action specified in the proposition.

The urge to modify one’s surroundings in this way must have been present in humans since time immemorial (cf. Lyons 1977). Therefore, it is not surprising that, as various studies indicate, deontic modality, particularly that expressed by modal verbs, is acquired first in both first and second languages (see Perkins 1983, Stephany 1986, 1993, Smoczynska 1993, Dittmar and Terborg 1991, Terborg 1993, Ramat 1992, Noveck, Ho, and Sera 1996). This is paralleled by the diachronic development, for example, of English modals, where deontic uses are established before epistemic ones (see Bybee, Perkins and Pagliuca 1994, Hopper and Traugott 1993, Traugott and Dasher 2002).

Epistemic expressions, on the other hand, may serve a variety of purposes. Firstly, the speaker may want to qualify her assertion so that the addressee will understand that what is said is less than a fact, i.e. the speaker does not commit herself to the truth of the proposition expressed in an utterance. Epistemic utterances not only signal the speaker’s judgement about the likelihood of an event or state occurring or having occurred, but also indicate that such judgement is based on some evidence available to the speaker (see Palmer 2001: 8-9 on the distinction between epistemic and evidential modality). The general function of epistemic expressions is to create common conceptual ground between the speaker and the addressee, modifying their perception of reality in some way. This involves, among other things, such complex notions as the ability to recognise the other as an individual with his own experience of the world or a different model of

the same world, and the understanding of the necessity of a common conceptual ground in a social community for its survival. It also involves the concept of time: the speaker may not only want to achieve consensus on some present or future events or states of affairs, but may also want to modify the understanding of past events or states. Therefore, it is not surprising that epistemic modality, particularly that expressed by modals, is acquired at the later stages of both first and second language acquisition (see Perkins 1983, Stephany 1986, as well as Dittmar and Terborg 1991, Ramat 1992, Terborg 1993), since it requires mastering both complex concepts and complex linguistic means of expression. Although mastered at a later stage, epistemic expressions are of great importance to successful communication. Ochs (1996) claims that epistemic and affective stances<sup>2</sup> are “central meaning components of social acts and social identities and that linguistic structures that index epistemic and affective stances are the basic linguistic resources for constructing/realizing social acts and social identities” (Ochs 1996: 419-420). Not only does Ochs draw our attention to the centrality of stance expressions for what is labelled “socializing humanity”, but she also points to the significance of the linguistic material with which these expressions are encoded.

The existence of a common function for modal expressions makes the suggestion that there are universal patterns for the interpretation of these expressions more plausible: a common function may be (de)coded in common ways on the general principle of iconicity. The association established in the present study between the features discussed and the notion of Controllability, on the one hand, and modal interpretations, on the other, is therefore not accidental. We can hypothesise that a broad cross-linguistic investigation may support the idea that the mechanisms of (de)coding modal expressions involve the notion of Controllability and the features related to it in various languages. At this stage, it is impossible to ascertain whether the analysis provided by the data mining program mimics the processes activated in the human mind when confronted with the task of (de)coding modal expressions. There is also no reason to claim that Controllability and the related features alone trigger an interpretation without the involvement of any or pragmatic or other factors. What is of impor-

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<sup>2</sup> Ochs (1996: 410) provides the following definitions:

“[E]pistemic stance refers to knowledge or belief vis-à-vis some focus of concern, including degrees of certainty of knowledge, degrees of commitment to truths of propositions, and sources of knowledge, among other epistemic qualities.

[A]ffective stance refers to a mood, attitude, feeling, and disposition, as well as degrees of emotional intensity vis-à-vis some focus of concern”.

tance, however, is the recognition of the features discussed in this study as fundamental for comprehension, the manipulation of reality, and the organization and planning of discourse.

6.2 Summing up

In Chapter 1, I provided an overview of the research on modality, from general functional to diachronic studies. I also defined some concepts central to the present study such as epistemic and non-epistemic modalities. I proceeded by examining the systems of modal verbs in English and Swedish, starting with the delineation of the group of modal verbs according to a number of strictly morphological criteria for English, and a number of criteria of a more semantic nature for Swedish, as well as some morphological ones. The main focus, however, was placed on the description of the range of possible interpretations of the relevant modals. Thus, I claimed that the interpretations available to the modals in question in the two languages can be organised on epistemic and deontic scales, according to speaker commitment to the truth of the proposition and speaker authority, respectively. For the purposes of this study, I excluded a number of modals in English and Swedish from the scales either because they appear in marked contexts, or because they do not facilitate the epistemic/non-epistemic distinction. I also excluded all Swedish evidentials from the scales, presented in revised forms in Figures 1-4.

CONFIDENT INFERENCE	REASONABLE INFERENCE	TENTATIVE INFERENCE	POSSIBLE CONCLUSION		
<i>must</i>	<i>will</i>	<i>should</i>	<i>may</i>	<i>might</i>	<i>can</i> <i>could</i>

Figure 1. The scalar organization of English epistemic modals

CONFIDENT INFERENCE	REASONABLE INFERENCE	TENTATIVE INFERENCE	POSSIBLE CONCLUSION		
<i>måste</i>	<i>bör</i>	<i>bör</i>	<i>borde</i>	<i>kan</i>	

Figure 2. The scalar organization of Swedish epistemic modals

OBLIGATION	RECOMMENDATION	PERMISSION	
<i>must</i>	<i>should</i>	<i>can</i>	<i>could</i>
		<i>may</i>	

Figure 3. The scalar organization of English deontic modals

OBLIGATION		RECOMMENDATION		PERMISSION	
<i>måste</i>	<i>ska</i>	<i>bör</i>	<i>borde</i>	<i>få</i>	<i>kan</i>

Figure 4. The scalar organization of Swedish deontic modals

On the basis of these scales, I chose two pairs of modals for this study: *must* and *måste*, and *may* and *kan*, since, arguably, these modals are placed on the left-most and right-most ends of the scales, respectively, and exhibit similar range of interpretations. I also introduced the main source of data for the present range of study, the English-Swedish Parallel Corpus, and addressed some aspects of corpus studies in general. Finally, I discussed the aims and organization of the study.

In Chapter 2, I presented Coates’s (1983) study dealing with the statistic relationships between certain syntactic features, and epistemic and non-epistemic modality. In my account of her study, I explicitly focused on the two modals, *must* and *may*, and their association with the features central to Coates’s analysis. In the second part of the chapter, I discussed some of the recent criticism of Coates’s approach, voiced primarily in Papafragou (1998a, 2000). Papafragou criticizes Coates’s study mainly on two points. Firstly, the association between the features discussed and epistemic and non-epistemic modality reflects a mere tendency and can be refuted with counter-examples. Secondly, the general claim that English modals are polysemous forces Coates to rely on the concept of indeterminacy, which gives rise to too many different meanings and shades of meanings. I also reviewed Papafragou’s own analysis of modality and modal meaning, coached in the general framework of Relevance Theory. Firstly, in Papafragou’s view, English modals are monosemous: they are considered sense-general expressions enriched and clarified in context by a series of pragmatic operations. Despite her claims as to the importance of context for the interpretation of modal utterances, Papafragou fails to provide an explicit account of the way context influences interpretation. I perceive this as a major drawback of her otherwise innovative study, and proceed to investigate the role of context, particularly propositional context, in the interpretation of modal utterances.

Consequently, in Chapter 3, I tested Coates's assumptions about the association between features such as *perfect* and *progressive aspects*, *introductory subject*, *state verb*, and *inanimate subject*, and epistemic and non-epistemic interpretations on my data. Not only was I able to confirm Coates's findings on a more extensive dataset in the two languages, but I also found additional features associated with interpretation: *implicit* and *explicit condition*, *time reference for modality* and *for the proposition*, *situation type*, *epistemic adverbial* or *particle*. Moreover, I demonstrated that there are individual differences between the modals. Thus, the modals belonging to the left-most end of the scales discussed in Chapter 1 and those belonging to the right-most end of the scales exhibit distinct patterns of correlations between the features discussed and the different interpretations. I also established that in most examples the features combine in such a way as to ascertain the intended interpretation. Finally, I discussed a number of indeterminate examples, claiming that the indeterminacy is due to the inconclusive or conflicting arrangements of the relevant features in these utterances.

In Chapter 4, I argued for the notion of Controllability underlying the features discussed previously. Reviewing some studies concerned with notions such as *agentivity* and *control* revealed no consensus as to what these notions designate. In this study, Controllability is concerned with the ability of an agent to control the event described in the proposition (of a modal utterance). On my proposal, the compositional nature of Controllability is best accounted for by appealing to the contextual features that may bring about the assumptions as to whether the event described in the proposition of a modal utterance can be controlled by an intended agent or not. Controllability is central to the interpretation of modal utterances: utterances in which propositions are encoded so as to indicate lack of agent control are interpreted epistemically, whereas utterances where the relevant features indicate that the intended agent is in control of the situation are deontic. *Type of subject*, the distinction between *states* and *events*, *time reference for modality* and *the proposition*, *explicit* and *implicit conditions*, and *situation type* all facilitate the notion of Controllability in English and in Swedish. A number of additional features, such as the presence of *epistemic adverbials* or *particles*, *utterance type* and *negation*, although not central to Controllability as such, were also discussed as being of importance for the interpretation of modal utterances. Furthermore, Controllability was linked to the notion of Transitivity as per Hopper and Thompson's (1980) article. I argued that these notions overlap. Transitivity is defined by Hopper and Thompson (1980) as the transfer of energy from an agent to a pa-

tient. Controllability involves, more specifically, the ability of the agent to choose to transfer the energy to a patient in order to carry out the event specified in the proposition (of a modal utterance). Controllability is also coded in a way similar to Transitivity: no single feature is sufficient to express Controllability, but each feature contributes to it.

Chapter 5 reported the results of the data mining analysis undertaken to uncover the statistically significant patterns of the features with respect to the interpretation and to confirm the results of the qualitative analysis in Chapter 3. It also served to establish how the features related to Controllability combine to give rise to the intended interpretation. At this stage, there are, however, some reservations as to the applicability of this analysis and the conclusions drawn from it. Firstly, the possible interpretations were not distributed evenly in the set of data presented to the computer, probably due to its size: some of the interpretations were not present at all or were present to a very limited degree. This may be why the computer was not equally successful in learning to classify all of the modals. The analysis is further limited by the fact that it involves only two languages, English and Swedish, and only two pairs of modals. Although the data mining analysis should not be taken at face value, it demonstrates that the features discussed in the present study as constituting Controllability are repeatedly implicated to systematically play a role in the interpretation of utterances containing *must*, *måste*, *may*, and *kan*. Furthermore, *must* and *måste*, belonging to the left-most end of the above-mentioned scales, pattern very similarly in the two languages with respect to the correlation of the relevant features and the interpretations. *May* and *kan*, situated on the right-most end of the scales, on the other hand, pattern differently not only in relation to *must* and *måste*, but also in relation to each other. Arguably, this difference is caused by the difference in the degree of grammaticalization of *may* and *kan*.



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## APPENDIX I *MUST*-DATA

Test mode: 10-fold cross-validation  
Scheme: weka.classifiers.trees.J48 -C 0.25 -M 2  
Relation: Must  
Instances: 461  
Attributes: 20  
interpretation  
advPart  
animates  
specS  
introS  
person  
genericS  
verb  
aspect  
timeMod  
timeProp  
passive  
ImpCond  
ExplCond  
negMod  
negProp  
assertion  
exclamation  
control  
situation

=== Summary ===

Correctly Classified Instances	445	96.5293 %
Incorrectly Classified Instances	16	3.4707 %
Kappa statistic	0.9253	
Mean absolute error	0.0329	
Root mean squared error	0.1312	
Relative absolute error	13.9446 %	
Root relative squared error	38.2823 %	
Total Number of Instances	461	



=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	Class
0.969	0.027	0.952	0.969	0.96	epistemic
0	0	0	0	0	epistemicW
0.98	0.048	0.973	0.98	0.976	deontic
0	0	0	0	0	ambiguous

=== Confusion Matrix ===

a	b	c	d	<-- classified as
157	0	5	0	a = epistemic
1	0	1	0	b = epistemicW
6	0	288	0	c = deontic
1	0	2	0	d = ambiguous

## APPENDIX II MÅSTE-DATA

Test mode: 10-fold cross-validation  
Scheme: weka.classifiers.trees.J48 -C 0.25 -M 2  
Relation: Måste  
Instances: 1017  
Attributes: 20  
interpretation  
advPart  
animates  
specS  
introS  
person  
genericS  
verb  
aspect  
timeMod  
timeProp  
passive  
ImpCond  
ExplCond  
negMod  
negProp  
assertion  
exclamation  
control  
situation

=== Summary ===

Correctly Classified Instances	958	94.1986 %
Incorrectly Classified Instances	59	5.8014 %
Kappa statistic	0.7802	
Mean absolute error	0.0592	
Root mean squared error	0.1796	
Relative absolute error	33.1646 %	
Root relative squared error	60.241 %	
Total Number of Instances	017	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	Class
0.826	0.034	0.815	0.826	0.821	epistemic
0.968	0.188	0.965	0.968	0.967	deontic
0	0	0	0	0	ambiguous

=== Confusion Matrix ===

a	b	c	<-- classified as
128	27	0	a = epistemic
27	830	0	b = deontic
2	3	0	c = ambiguous

### APPENDIX III *MUST/MÅSTE*-DATA

Test mode: 10-fold cross-validation  
Scheme: weka.classifiers.trees.J48 -C 0.25 -M 2  
Relation: Must and måste  
Instances: 1461  
Attributes: 20  
interpretation  
advPart  
animates  
specS  
introS  
person  
generics  
verb  
aspect  
timeMod  
timeProp  
passive  
ImpCond  
ExplCond  
negMod  
negProp  
assertion  
exclamation  
control  
situation

#### === Summary ===

Correctly Classified Instances	1388	95.0034 %
Incorrectly Classified Instances	73	4.9966 %
Kappa statistic	0.856	
Mean absolute error	0.0418	
Root mean squared error	0.1473	
Relative absolute error	23.7929 %	
Root relative squared error	49.7491 %	
Total Number of Instances	1461	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	Class
0.902	0.031	0.888	0.902	0.895	epistemic
0	0	0	0	0	epistemicW
0.972	0.113	0.968	0.972	0.97	deontic
0	0	0	0	0	ambiguous

=== Confusion Matrix ===

	a	b	c	d	<-- classified as
286	0	31	0	0	a = epistemic
1	0	1	0	0	b = epistemicW
32	0	11	0	0	c = deontic
3	0	5	0	0	d = ambiguous

## APPENDIX IV MAY-DATA

Test mode: 10-fold cross-validation  
Scheme: weka.classifiers.trees.J48 -C 0.25 -M 2  
Relation: May  
Instances: 361  
Attributes: 20  
interpretation  
advPart  
animates  
specS  
introS  
person  
genericS  
verb  
aspect  
timeMod  
timeProp  
passive  
ImpCond  
ExplCond  
negMod  
negProp  
assertion  
exclamation  
control  
situation

=== Summary ===

Correctly Classified Instances	280	77.5623 %
Incorrectly Classified Instances	81	22.4377 %
Kappa statistic	0.2699	
Mean absolute error	0.1673	
Root mean squared error	0.2999	
Relative absolute error	81.9603 %	
Root relative squared error	94.3392 %	
Total Number of Instances	361	

=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	Class
0.967	0.701	0.813	0.967	0.883	epistemic
0	0.015	0	0	0	epistemicW
0.6	0.027	0.625	0.6	0.612	deontic
0	0.018	0	0	0	ambiguous

=== Confusion Matrix ===

a	b	c	d	<-- classified as
265	1	3	5	a = epistemic
23	0	3	0	b = epistemicW
6	3	15	1	c = deontic
32	1	3	0	d = ambiguous

## APPENDIX V KAN-DATA

Test mode: 10-fold cross-validation  
Scheme: weka.classifiers.trees.J48 -C 0.25 -M 2  
Relation: kan  
Instances: 1001  
Attributes: 20  
interpretation  
advPart  
animates  
specS  
introS  
person  
genericS  
verb  
aspect  
timeMod  
timeProp  
passive  
ImpCond  
ExplCond  
negMod  
negProp  
assertion  
exclamation  
control  
situation

=== Summary ===

Correctly Classified Instances	662	66.1339 %
Incorrectly Classified Instances	339	33.8661 %
Kappa statistic	0.455	
Mean absolute error	0.1905	
Root mean squared error	0.321	
Relative absolute error	73.0149 %	
Root relative squared error	88.9304 %	
Total Number of Instances	1001	



=== Detailed Accuracy By Class ===

TP Rate	FP Rate	Precision	Recall	F-Measure	Class
0.267	0.026	0.54	0.267	0.358	epistemic
0.727	0.261	0.616	0.727	0.667	epistemicW
0.371	0.017	0.59	0.371	0.455	deontic
0.768	0.241	0.721	0.768	0.744	dynamic
0.083	0.001	0.667	0.083	0.148	ambiguous

=== Confusion Matrix ===

a	b	c	d	e	<-- classified as
27	61	0	13	0	a = epistemic
21	266	2	77	0	b = epistemicW
0	12	23	27	0	c = deontic
1	89	13	344	1	d = dynamic
1	4	1	16	2	e = ambiguous

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