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Making sense of negated modals

Abstract

The negation of a modalized sentence may affect the proposition or the modality. Languages need to find a solution for disambiguating these two scopes of negation. English mainly pursues a lexical strategy to disambiguate scope: the negated modals *mustn't* and *may not* typically have narrow scope, i.e. they affect the proposition, while the negated modals *can't* and *needn't* have wide scope, i.e. they affect the modality. Thus, prohibitions involve propositional, or internal, negation and hence are expressed by *mustn't*, as in *You mustn't come in*, while denials of permission involve modal, or external, negation and hence are expressed by *can't*, as in *You can't come in*.

It is mainly due to the different scopes associated with modals and constraints imposed on the use of modals by lexical pre-emption that the English system of negated modals gives the impression of incoherence. German, by contrast, employs a more systematic strategy in disambiguating scope: all negated modals affect the modality, and propositional negation is achieved by way of using inversely equivalent modals. The German system of negated modals perfectly fits in with the ecological slots established by a conceptual matrix of negated modality. In applying this conceptual framework to the negated modals of English, their distribution and use can be shown to be motivated and largely systematic after all.

Keywords: negated modality, scope of negation, internal negation, external negation, root modality, epistemic modality, modal suppletion, conceptual matrix, ecological niche, logical equivalence

1 Introduction

The interaction of modality and negation presents one of the most intriguing areas of English grammar. The complexities of negated modality mainly arise from different scopes of negation. A wide scope of negation, or external negation, affects the modality and ultimately the sentence as a whole, while a narrow scope of negation, or internal negation, affects the proposition. The two possible scopes of negation need to be marked somehow in language, otherwise ambiguity may arise. In his typological study of the interaction of negation and modality, de Haan (1997) distinguishes two strategies that languages use to disambiguate scope: negation placement and modal suppletion.

The negation placement strategy distinguishes wide and narrow scope by means of the position of the negation marker relative to the modal: the order [negation modal verb] indicates wide scope of negation, and the order [modal negation verb] indicates narrow scope of negation. Languages that make use of the strategy of negation placement include Italian, French, Russian, Modern Greek and Yoruba. De Haan (1997: 12f) gives the following Italian

examples of negation placement, where sentence (1a) illustrates wide scope and sentence (1b) narrow scope.

- (1) a. Gianni non deve andare a Roma.
 Gianni NEG must:3SG:PRES go:INF to Rome
 ‘Gianni needn’t go to Rome.’
 b. Gianni deve non andare a Roma.
 Gianni must:3SG:PRES NEG go:INF to Rome
 ‘Gianni mustn’t go to Rome.’

The strategy of negation placement is well-motivated. The order of negation and modal verb iconically reflects the scope of negation and no additional marking is needed: the same modal verb can be used in both scopes. The situation changes when a language adopts the strategy of modal suppletion, as in the English translations of the Italian sentences. Here, the scope of negation affects the choice of the modal verb: wide scope of negation as in (1a) is indicated by *needn’t*, and narrow scope of negation as in (1b) is indicated by *mustn’t*. Languages that make use of the strategy of modal suppletion include the Germanic languages, Scots Gaelic, Finnish, Tamil, and West Greenlandic. As a Germanic language, English distinguishes modal and propositional negation by using the strategy of modal suppletion.

The notion of suppletion raises several questions. Does the notion of suppletion presuppose a term that is expected to occur within a system but is not actualized in language? The modals *needn’t* and *mustn’t* in the English translation above indicate different scopes but apparently do not supplant another modal. How is suppletion motivated? What are the constraints governing modal suppletion? Such questions need to be addressed in exploring the system of negated modals in English.

2 Distinctions defining kinds of positive and negated modality

Positive and negated modalities form an ecological system with slots that are filled, or are fillable, by positive and negated modals. In fact, any linguistic unit is part of a system and motivated by distinctions imposed by the ecological system as a whole and ecological niches surrounding it (for ecological motivation see Radden & Panther 2004: 24-26). The distinctions that are crucial to the subsystem of modality in English are (i) type of modality, (ii) strength of modality, (iii) scope of negation, and (iv) source of modal assessment or potency.

(i) The main types of modality are root modality and epistemic modality. Both types of modality involve a person’s, typically the speaker’s, assessment of a situation. Epistemic modality is concerned with the potentiality of states of affairs, as in *Phil must be rich*. Root modality is concerned with the potentiality of events.¹ Root modality includes deontic and intrinsic, or dynamic, modality. Deontic modality is concerned with potential acts to be carried out, as in *You must go now*, while intrinsic modality is concerned with potential events

¹ The distinction between the modalities is very tricky. A reviewer provided the following examples: (a) *She must take the books back to the library* (deontic meaning) versus (b) *She must be taking the books back to the library* (epistemic meaning). The distinction between root and epistemic modality is thus not just a matter of events versus states but, more generally, of boundedness versus unboundedness. The progressive aspect in (b) unbounds the event (with implicit boundaries) and thereby makes it coincide with speech time so that it can be assessed epistemically as a present state of affairs.

arising from an internal disposition of a thing, as in *The meeting can be cancelled* ‘it is possible for the meeting to be cancelled’.

(ii) Modal notions can be distinguished according to their degree of strength along a scale. The modal notions at the endpoints of the scale of modality are compelling modalities and enabling modalities. In epistemic modality, these opposed modal notions are ‘necessity’ and ‘possibility’. The notions of ‘necessity’ and ‘possibility’ can also be understood as applying to root modality.² This follows from the semantic commonality of the two types of modalities. As pointed out by Langacker (1991: 272), epistemic modality indicates the likelihood of a process and root modality additionally involves some conception of potency directed toward the realization of that process. We will thus speak of *root necessity* and *root possibility* and only use the terms ‘obligation’ and ‘permission’ when specifically referring to the deontic meaning of modals. The notions of necessity and possibility are well-defined as scalar endpoints and are typically expressed by modal verbs. The modals denoting these two notions are the subject of this study.

(iii) The scope of negation in modal sentences reflects different modal constellations. External negation expresses a negative judgement about a positive proposition, internal negation expresses a positive judgement about a negative proposition. This important conceptual distinction is not systematically coded in modal suppletion languages like English. Only sporadically are prosody or cliticization used to indicate a particular scope (see Section 5.2). Apparently, the lack of linguistic marking is not detrimental to communication—one may suspect that native speakers are not even aware of different scopes of negation.

(iv) The source of a modal assessment or potency may be the speaker (or hearer in questions) or external circumstances. Speaker-based modality is often referred to as subjective and speaker-external modality as objective. Our conceptualization of modality has been shown to be metaphorically based on force-dynamic constellations, which also allow us to illustrate the difference between subjective and objective modality (see especially Johnson 1987, Talmy 1988, Sweetser 1990, and Pelyvás 1996, 2011). The interaction of forces and counter-forces is particularly perspicuous in the directive forces of deontic modality. Figure 1 illustrates the interplay of forces and counter-forces in three deontic situations: schema (a) represents the force-dynamic constellation underlying subjective obligation, schema (b) the force-dynamic constellation underlying subjective prohibition, and schema (c) the force-dynamic constellation underlying objective prohibition. The three schematic representations are meant to exemplify the force-dynamic nature of modality—in-depth analyses of force-dynamic schemas, particularly the schemas underlying *may* and *must*, are found in Pelyvás (1996 and 2011).

² Leech (1969 : 218) already speculated on the logical commonality of epistemic and deontic modality: “We may go so far as to claim, in fact, that ‘possibility’ and ‘necessity’ logically include ‘permission’ and ‘obligation’—that ‘permission’ is a particular kind of ‘possibility’, and ‘obligation’ a particular kind of ‘necessity’. So:

‘I am permitted to open this letter’ implies ‘It is possible for me to open this letter’.

‘I am obliged to open this letter’ implies ‘It is necessary for me to open this letter’.”

Cf. also Lyons’ (1977: 823) definition of deontic modality: “deontic modality is concerned with the necessity or possibility of acts performed by modally responsible agents.”

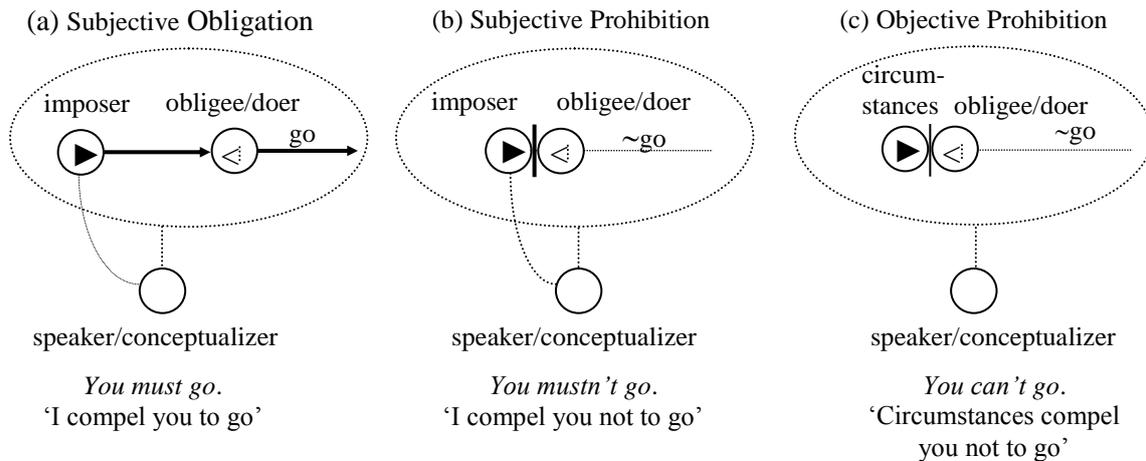


Figure 1: Subjective obligation and prohibition, and objective prohibition

The dotted ellipse represents the speaker's conceptualization of the modalized situation. The modalities of obligation (a) and prohibition (b) are subjective by virtue of the active role taken by the off-stage speaker/conceptualizer as the imposer of the obligation or prohibition in the on-stage situation. The identity of speaker/conceptualizer and imposer is indicated by a dotted line linking them. Due to his stronger force, the imposer is able to overcome the obligee's weaker counter-force and impose his will upon the obligee. In subjective obligations as in (a), the obligee reluctantly takes on the role of a doer and performs the act imposed by the speaker;³ in subjective prohibitions as in (b), the obligee's counter-force is blocked by the speaker so that he is barred from acting. The blockage is indicated by a thick vertical line. Both subjective obligation and subjective prohibition are expressed by the modal *must*, which typically specifies a compelling modality as subjective.

In objective prohibitions, the speaker/conceptualizer remains off-stage. The source of the compelling force is an external entity, in particular circumstances, conditions, regulations or rules. Objective obligations lack the strong volitional force of a human imposer and hence tend to be understood as less compelling and face-threatening than subjective prohibitions. In schema (c), the less compelling blockage of objective obligations is indicated by a light line.

The three force-dynamic schemas were meant to illustrate the conceptual difference between subjective and objective modalizations. The distinction between subjective and objective sources is less clear-cut in epistemic modality (Lyons 1977: 797-9). An epistemic assessment always includes an element of subjectivity. Nevertheless, we will assume that the distinction between subjective and objective sources is relevant to all kinds of modality and the modal verbs expressing them. The modals used in describing subjective modalities are *must* and *may*, the modals describing objective modalities are *have to* and *can*,⁴ and the negated modal *need not*.

³ As has been convincingly argued by Pelyvás (2011), the participant described as obligee/doer fulfils a dual role in an obligation: in the obligation portion of the complex situation, the participant adopts the passive role of an obligee at the end of the energy chain, in the action portion, he adopts the active role of a "doer" at the head of an energy chain.

⁴ Huddleston & Pullum (2002: 181, 183) draw attention to the possibility of using *must* and *may* objectively. Thus, the epistemic modal *must* is used objectively in *If I am older than Ed and Ed is older than Jo, I must be older than Jo*. Likewise, epistemic *may* is used objectively in *He may have misled Parliament: there is going to be an inquiry*. The same applies to deontic modals: deontic *must* is used objectively in *We must make an appointment if we want to see the Dean*, and deontic *may* is used objectively in *We may/can borrow up to six books*.

3 Conceptual matrix of kinds of modality

The four distinctions defining kinds of modality can be used to establish a matrix consisting of 16 cells for negated modal concepts. It is, of course, very uneconomical for a language to provide 16 distinct negated modals to match each conceptual slot. Modal suppletion languages like English have developed an elegant strategy that allows them to reduce the number of modals needed to fill the conceptual slots for negated modality: they make use of the principle of logical equivalence. According to the classical rule of logical equivalence, ‘possible not’ is logically equivalent to ‘not necessary’, and ‘necessary not’ is logically equivalent to ‘not possible’. These inverse relations of logical equivalence are stated in the logical rules of equivalence under (2), where ‘ \equiv ’ stands for logical equivalence, ‘poss’ for possibility, ‘nec’ for necessity, and ‘p’ for proposition.

- (2) a) $\text{poss } \sim p \equiv \sim \text{nec } p$ ‘possible not p’ \equiv ‘not necessary p’
 b) $\text{nec } \sim p \equiv \sim \text{poss } p$ ‘necessary not p’ \equiv ‘not possible p’

In accordance with equivalence rule (2a), for instance, the following epistemic statements are logically equivalent

- (3) a) *Cognitive grammar **may not** solve every problem.* [poss $\sim p$]
 ‘It is possible that cognitive grammar does not solve every problem’
 b) *Cognitive grammar **needn’t** solve every problem.* [$\sim \text{nec } p$]
 ‘It is not necessarily the case that cognitive grammar solves every problem’

It has often been noted that truth-conditional equivalence is not to be equated with sameness of meaning. In the sentences under (3), the same conceptual content is viewed from different vantage points. The possibility modal *may* in (3a) frames the proposition from the perspective of possibility. For example, in using cognitive grammar, it was possible for me to find solutions to explain word order, aspect and modality but, at the moment, I am stuck with problems of affix hopping—so *cognitive grammar may not solve every problem*.

The necessity modal *need* in (3b) makes us view the proposition from the perspective of necessity. The sentence may, for example, be set in a dispute about different theories of grammar in which a cognitive scholar contends that cognitive grammar can handle just about everything and a generativist objects that cognitive grammar cannot handle traces, whereupon the cognitivist retorts that there is no model of grammar that can solve all problems of grammar, so *cognitive grammar needn’t solve every problem* either.

In spite of the fact that logically equivalent construals are not semantically or pragmatically equivalent, the principle of logical equivalence pervades the system of negated modality and its use of modals. On the basis of the distinctions identified in Section 1, we can now set up a matrix consisting of 16 conceptual cells for negated modality according to (i) type of modality (root vs epistemic), (ii) strength of modality (necessity vs. possibility), (iii) scope of negation (propositional vs. modal), and (iv) source of modal assessment or potency (subjective vs. objective). This ecological matrix is presented in Table 1, with the positive modals of English already filled in. The cells are arranged conceptually and not, as usually, according to their form. Each line of cells contains related concepts so that propositional negations are in line with their equivalent modal negations. This way, it becomes apparent which conceptual niches for a kind of modality are filled by which modals and which niches are left blank.

	positive modality		negated modality			
	mod p		propositional negation		equivalent modal negation	
	subj	obj	subj	obj	subj	obj
Root necessity	<i>must</i>	<i>have to</i>				
Root possibility	<i>may</i>	<i>can</i>				
Epist. necessity	<i>must</i>	<i>have to</i>				
Epist. possibility	<i>may</i>	<i>(can)</i>				

Table 1: Ecological matrix of modality with slots for negated modal concepts

Some languages are apparently more logic-minded than others. Before turning to the English system of modality, let us take a look at a related language that is an epitome of orderliness in its system of negated modality: German.

4 The German system of negated modality

The German system of negated modality is fully regular and may help us understand (some of) the oddities of the English system. German has four basic modals that roughly translate as follows: *müssen* ‘must’, *dürfen* ‘may’, *brauchen* ‘need’, and *können* ‘can’. As in English, *müssen* and *dürfen* are subjective modals, and *brauchen* and *können* are objective modals. The negated models are listed in Table 2a in German and, for convenience, also in their English translations in Table 2b. The modals are arranged according to the matrix developed in Table 1. There is normally one modal available for each slot, and the modals printed in bold are the ones that are typically preferred for a negated modal concept. Negated modals that are put in parentheses are supplanted to fill ecological niches. The use of ‘n’ indicates the German negation marker *nicht*.

	mod	positive		propositional negation		equivalent modal negation			
		subj	obj	mod ~	subj	obj	~mod	subj	obj
Root	nec	<i>müssen</i>		nec ~	<i>(n dürfen)</i>	<i>(n können)</i>	~poss	<i>n dürfen</i>	<i>n können</i>
	poss	<i>dürfen</i>	<i>können</i>	poss ~	<i>(n müssen)</i>	<i>(n brauchen)</i>	~nec	<i>n müssen</i>	<i>n brauchen</i>
Epist.	nec	<i>müssen</i>		nec ~	<i>(n dürfen)</i>	<i>(n können)</i>	~poss	<i>n dürfen</i>	<i>n können</i>
	poss		<i>können</i>	poss ~	<i>(n müssen)</i>	<i>(n brauchen)</i>	~nec	<i>n müssen</i>	<i>n brauchen</i>

Table 2a: Negated modals in German

	mod	positive		propositional negation		equivalent modal negation			
		subj	obj	mod ~	subj	obj	~mod	subj	obj
Root	nec	‘must’		nec ~	‘(may not)’	‘(can’t)’	~poss	‘ may not ’	‘can’t’
	poss	‘may’	‘can’	poss ~	‘(mustn’t)’	‘(needn’t)’	~nec	‘mustn’t’	‘ needn’t ’
Epist.	nec	‘must’		nec ~	‘(may not)’	‘(can’t)’	~poss	‘may not’	‘ can’t ’
	poss		‘can’	poss ~	‘(mustn’t)’	‘(needn’t)’	~nec	‘ mustn’t ’	‘needn’t’

Table 2b: German negated modals translated into English

Three features of the German system of negated modality are especially striking.

Firstly, the German system of negated modality is wholly based on external negation. Internal negation is expressed by using the equivalent forms of external negation. Internal negation in German is thus fully suppletive. A conclusion that may be drawn from this pattern is that external negation, as displayed in the German system of modality, is probably the

default kind of negation for modal concepts; it may even be unlikely to find a language that is wholly based on internal negation.

Secondly, the same modals are used in negated root and negated epistemic modality, and they are used for exactly the same corresponding slots. As a result, only four modals are needed to code our 16 negated modal concepts.

Thirdly, for each modal notion two modal verbs are available, a subjective modal and an objective modal. For example, externally negated root necessity can be expressed by subjective ‘may not’ or objective ‘can’t’. As argued above, the modals reflect distinctions between source of assessment or potency so that each modal notion can be construed as having a speaker-based source or a speaker-external source.

Fourthly, for each pair of speaker-based and speaker-external modals, there is always a preference for one of them. The preferred choices of a modal are printed in bold. Thus, in root necessity, the negated subjective modal *nicht dürfen* ‘may not’ is preferred to the negated objective modal *nicht können* ‘can’t’. Interestingly, the pattern is reversed with epistemic modality. Thus, in epistemic modality, the negated objective modal *nicht können* ‘can’t’ is preferred to the negated subjective modal *nicht dürfen* ‘may not’. This asymmetry of modal distribution indicates that the speaker is seen as being more involved in root necessity than in epistemic necessity but as being less involved in root possibility than in epistemic possibility. We can, in fact, imagine that the folk model of force dynamics justifies this distribution. The directive force of a speaker laying a prohibition is certainly very strong, while the speaker’s subjective force in deductive reasoning is small compared to the force of external facts that guides his reasoning. Similar explanations may apply to the reversal of subjective and objective source in root and epistemic possibility.

5 The English system of negated modality

Let us now look at the more challenging English system of negated modality. Before summarizing the positive and negated modals in Table 3, their use will be elucidated by the examples given under (4) to (7) and by the terms by which each kind of modality is known—provided there is such a term. The modalities are ordered according to root and epistemic modality and their strength of compelling and enabling modality. For each modal concept the positive and the two negated modalities are provided. Root modality is exemplified by deontic modality, i.e. permission and obligation. Sentence (6b) is parenthesized because it does not occur in Standard British English (see Section 5.3).

- | | | | | |
|-----|-------------------------------|-----------|-------------------------|------------------------------|
| (4) | Compelling root modality | | | |
| | a) positive | nec p | obligation | <i>You must go.</i> |
| | b) negated | nec ~p | prohibition | <i>You mustn’t go.</i> |
| | c) | ≡ ~poss p | denial of permission | <i>You may not/can’t go.</i> |
| (5) | Enabling root modality | | | |
| | a) positive | poss p | permission | <i>You may/can go.</i> |
| | b) negated | poss ~p | ‘permission not to act’ | <i>You may not go.</i> |
| | c) | ≡ ~nec p | release from obligation | <i>You needn’t go.</i> |
| (6) | Compelling epistemic modality | | | |
| | a) positive | nec p | necessity | <i>That must be true.</i> |

b) negated	nec ~p	‘necessity that not p’	(That <i>mustn’t</i> be true.)
c)	≡ ~poss p	impossibility	That <i>can’t</i> be true.
(7) Enabling epistemic modality			
a) positive	poss p	possibility	That <i>may</i> be true.
b) negated	poss ~p	‘possibility that not p’	That <i>may not</i> be true.
c)	≡ ~nec p	exemption from necessity	That <i>needn’t</i> be true.

	positive			propositional negation			equivalent modal negation		
	mod	subj	obj	mod ~	subj	obj	~mod	subj	obj
Root	nec	<i>must</i>	<i>have to</i>	nec ~	<i>mustn’t</i>		~poss	<i>may not</i>	<i>can’t</i>
	poss	<i>may</i>	<i>can</i>	poss ~	<i>may nót</i>		~nec		<i>needn’t</i>
Epist.	nec	<i>must</i>	<i>have to</i>	nec ~	(<i>mustn’t</i>)		~poss		<i>can’t</i>
	poss	<i>may</i>		poss ~	<i>may not</i>		~nec		<i>needn’t</i>

Table 3: Positive and negated modals in English

Like the German system of negated modality, the English system makes use of four modals. However, the distribution of its negated modals is markedly different. While the German system exclusively relies on external negation, the English system is built on both external and internal negation. With the exception of root *may not*, the externally negated modals, *can’t* and *needn’t*, are objective, while the internally negated modals, *mustn’t* and *may not*, are subjective. In trying to resolve the apparent inconsistencies of the mixed system of English negated modality, we will make use of the regularities revealed by the German system of negated modality.

6 Discussion of the English system of negated modality

6.1 Compelling root modality and its negations

Positive compelling root modality in its deontic use applies to obligations or pieces of advice. It is expressed by the modal *must* or the semi-modal *have to*. The internal negation of an obligation is a prohibition, represented as ‘necessary not’. In English, this concept is expressed by using the negated necessity modal *mustn’t*, as in (8a). In accordance with the principle of logical equivalence, ‘not possible’ is equivalent to ‘necessary not’, i.e. a denial of permission [~poss p] is equivalent to a prohibition [nec ~p] and hence is expressed by negated possibility modals, i.e. *may not* or *can’t*, as in (8b) and (8c). The three construals are logically equivalent but, of course, not identical in meaning. Let us compare these three construals in the following sentences:

- (8) a) You *mustn’t* come in. We *mustn’t* disturb grandma. [nec ~p]
 b) You *may not* come in. It’s my room. [~poss p ≡ nec ~p]
 c) You *can’t* come in. Not with that dog. [~poss p ≡ nec ~p]

The internal negation of deontic *mustn’t* as in (8a) gives rise to the sense of prohibition: *must* retains its compelling force and *not* negates the proposition. Yet, this use of *mustn’t* is felt to be “irregular” and is also very rare cross-linguistically (Palmer 2001: 97). Palmer only found a similar use of negated ‘must’ denoting prohibition in Norwegian: *Han må ikke forlate rommet*, glossed as ‘he must not leave the room’, means, just as in English, ‘He *mustn’t* leave the room’. People’s feeling about the irregularity of English *mustn’t* may be due to its synonym *not have to*,

as in *You don't have to go*, which describes, not a prohibition, but the release from an obligation. *Not have to* thus means as much as *needn't*, i.e. 'not necessary', and one might expect that *mustn't* should also mean 'not necessary'—as it does e.g. in German. For some speakers of American English, this makes perfect sense because *mustn't* is also used epistemically in the sense of 'not necessary', i.e. exemption from necessity (see sentence 10a). Like obligatory *must*, prohibitive *mustn't* is certainly also avoided because of its strong authoritarian tone.⁵ Its "bad reputation" is reflected in its relatively low frequency: a Google search of the string "you mustn't come in" only listed 10,200,000 hits, compared to 82,200,000 hits for "you can't come in".

The most natural way of expressing a prohibition is by framing it inversely as a denial of permission. However, denying permission by means of subjective *may not* as in (8b) is not commonly done either, as witnessed by the lowest frequency of only 1,230,000 hits for the string "you may not come in" on Google. The most frequently used negated modal is thus the objective modal *can't*, as in (8c). Why should there be such glaring differences in use between *may not* and *can't*? To Palmer (2001: 98), *may not* is "regular" in its epistemic sense and "irregular" in its deontic sense. This is certainly true, but Palmer does not specify the criteria defining his notion of (ir)regularity. The criterion that is apparently at stake here is that of subjectivity as opposed to objectivity. Like *mustn't*, the subjective modal *may not* frames a prohibition on the grounds of social authority, while the objective modal *can't* frames it on the grounds of circumstances, rules and regulations. The low frequency of deontic *may not* is probably due to a range of factors: its authoritative flavor, its exceptional status among equivalent external negations (as the only subjective modal, see Table 3), and its polysemy (used for three kinds of negated modality). Conversely, the high frequency of deontic *can't* is probably due to its less imposing connotations, its conformity within the pattern of equivalent external negations, and its corresponding use in epistemic negation.

6.2 *Enabling root modality and its negations*

Let us also illustrate enabling root modality by using deontic modality and the notion of permission. Subjective permission-granting is expressed by *may*, objective permission-granting by *can*. The propositional negation of 'granting permission to act' is 'granting permission not to act'. The inversely negated modal *needn't* describes a release from obligation. Both construals are comparable in that they permit a person to act or not to act.

- (9) a) You *may nót* go to school today. [poss~p]
 b) You *needn't* go to school today. [~nec p ≡ poss ~p]

The negated modal *may nót* in sentence (9a) conveys 'permission not to act'. Normally people ask for permission only when they want to do something rather than when they want to refrain from doing something. Permitting a person not to act is therefore a rare situation. There is, in fact, no need to code this concept by a modal of its own because an act of permission-granting includes the permission not to carry out the act permitted. Yet, this concept has its ecological niche in contrast to 'be permitted to act'. For example, a smoking area might be designated as *You may nót smoke here*, where *nót* would be stressed and set off from *may* by a pause

⁵ Myhill's (1996) study of the development of the strong obligation system in American English revealed a dramatic drop of the strong obligation marker *must*. The objective semi-modals (*have got to* (53%) and *have to* (39%)) have almost completely ousted subjective *must*, which now only accounts for 8% of the compelling modals. Myhill attributes these recent shifts to two major social factors in American English: "colloquialisation" and "democratisation".

between *may* and *not*. These prosodic features serve to disambiguate this sense of *may not* in (9a) from the externally negated sense of prohibition, as in (8b). The pause between *may* and *not* signals that the negation belongs to the proposition, and the stress on *nót* signals that the proposition is being negated.

Construing the concept ‘poss ~p’ inversely by negating a necessity as in (9b) is, without doubt, more natural than expressing it directly, as in (9a). The suppletive modal *needn’t* denotes ‘lack of necessity’, but it never occurs as a modal in its positive form. However, its usage as a full verb, as in *We need to sleep*, does express the notion of necessity. The idea of non-necessity might equally well be rendered by the semi-modal *have to*: *You don’t have to go to school today*. The perspective adopted in negating a necessity is that of an obligation imposed upon by circumstances: we normally go to school but are released from the plight of having to do so today. This very common situation is, therefore, expressed by an externally negated, objective modal of necessity.

6.3 *Compelling epistemic modality and its negations*

In some, but not all, respects, epistemic necessity is on par with root necessity: the positive modals in both compelling modalities are *must* for subjective assessments and *have to* for objective assessments. However, the corresponding negated modal *mustn’t* is not available in Standard English.⁶ There is thus an ecological niche for internally negated necessity that is not filled by a modal form. At least in American English and dialects of British English, however, the modal *mustn’t* is also used epistemically filling this gap.⁷ The only option in British English, and the preferred option in American English, for expressing ‘necessary not’ is using the suppletive notion of denying its possibility by means of *can’t*.

- (10) a) You *mustn’t* have read all those books. (AmE) [nec ~p]
 b) You *can’t* have read all those books. [~poss p ≡ nec ~p]

Within the system of epistemic modality, *mustn’t* would be well-motivated to fill the ecological niche for subjective epistemic negation. It is, therefore, surprising that the subjective modal *mustn’t* should only be used in American English and dialects of English. The frequency of about 1,5 million hits on Google for the string “*mustn’t* be true” shows that epistemic *mustn’t* is, in fact, widely used, although it is not as common as *can’t* in the string “*can’t* be true” with almost 17 million hits. The usage of epistemic *mustn’t* has, to my knowledge, not yet been researched. Palmer (2003: 10) suspects that “The context in which *mustn’t* seems possible appears to be one in which it is important to stress ‘necessary not’ rather than ‘not possible’ – ‘it must be the case that not’ rather than ‘it can’t be the case that’.” In a language forum in which the use of *can’t* and *mustn’t* is being discussed, many contributors accept epistemic *mustn’t* and associate it with subjective and weaker meaning than *can’t*.⁸ For example, one contributor wrote: “If I say ‘he *mustn’t* know what he’s talking about’, I mean ‘he probably doesn’t know’. ‘He *can’t* know what he’s talking about’, for me, means that he just about absolutely doesn’t know.” The

⁶ Some scholars claim that the negated form *mustn’t* cannot be used epistemically. For example, Jennifer Coates (1983: 46) argues on the basis of the corpus used by her that “Epistemic MUST does not occur with negation.”

⁷ The string “*mustn’t* be true” has a frequency in Google of about 1.5 million. Its frequency is, of course, considerably lower than that of “*can’t* be true” with almost 17 million hits.

⁸ <http://forum.wordreference.com/showthread.php?t=335722&langid=3>

sense associated with epistemic *mustn't* seems to hover between 'impossibility', as conveyed by *can't*, and subjective 'possibility that something is not the case', as signalled by *may not*.

The use of objective *can't* as in sentence (10b) makes a straight claim about the impossibility for any normal academic of having read so many books. As already indicated in Section 3, our view of reasoning about epistemic necessities and impossibilities seems to be guided by external circumstances. Reaching the only possible conclusion in logical necessity requires considering all possible conditional factors. Since these factors are independent of the speaker, the process of reasoning may be seen as predominantly objective rather than subjective, as in root modality. It is, therefore, not surprising that the subjective modal *may not*, which was used for deontic denials of permission, is missing as an alternative to *can't* in epistemic impossibility.

6.4 *Enabling epistemic modality and its negations*

Like epistemic necessity, epistemic possibility shares some properties with its root counterpart but behaves differently in other respects. Thus, while permission is expressed by either *may* or *can*, epistemic possibility is only expressed by *may* and the distal form *could*. The use of *can* for epistemic modality is debatable.⁹ *May not* is also the only negated modal expressing the concept 'possible not'. In line with the use of *needn't* for 'release of obligation' in (9b), *needn't* is used for 'exemption from necessity' in (11b).

- (11) a) Peter's working days *may/could not* be over. [poss ~p]
 b) Peter's working days *need not* be over. [~nec p ≡ poss ~p]

The modal *may* in *may not* in (11a) is not stressed, as its corresponding deontic modal in (9a). Both situations are comparable in that the speaker does not commit herself to a positive assessment. Pragmatically, however, granting permission not to act is, as said above, a rare situation because it is included in permission-granting. Thinking of the possibility that a state of affairs does not hold, however, is a perfectly common situation. A typical context inviting the use of epistemic *may not* is that of an affirmative statement which the speaker feels should be qualified, as in the Google example: *Right now, all machines are at or very close to zero, but that may not be true forever*. The reverse situation of a preceding negated statement may invite the qualifying use of *may*, as in: *Usually, I'm not into stereotypes, but that may be true since I see a lot of White boys in flip flops and shorts on rainy days*. Epistemic *may* and *may not* are thus associated with different perspectives adopted by the speaker in assessing a state of affairs within the ongoing discourse.

The negated modal *may not* is also motivated ecologically. It provides a formal contrast with *can't*. As indicated above, the objective modal *can't* denotes 'not possible' and, via inverse equivalence, 'necessary not', while the subjective modal *may not* denotes 'possible not'. Thus, the source of assessment is used to distinguish scopes of negation and hence different kinds of modality. The negated modal *may not* is thus semantically opposed to *can't*. The contrastive stress, therefore, does not fall on *not*, as in the sense of 'permitted not' in (9a), but on the modal *may*, which is pronounced with fall-rise intonation.

⁹ Coates' (1983: 19) claim that *can* in its positive form is never epistemic, is certainly not correct. Generic situations, as in the warning *Smoking can damage your health*, call for the use of *can*. There are over a million hits on Google for "smoking can", listing all kinds of negative effects that smoking can cause. This use of *can* may, however, also be seen as an instance of intrinsic modality and paraphrased as 'it is possible for smoking to damage your health'.

The epistemic use of the strong negated modal *needn't* in (11b) corresponds to its deontic use in (9b). The inversely equivalent negation can also be conveyed by the semi-modal *have to*: *Peter's working days don't have to be over.*

7 Conclusion

The conceptual approach adopted here gave greater clarity on the intriguing usages of English modals. The conceptual matrix with its modal distinctions provided a useful framework in which each modal could be allotted its ecological niche and gaps as well as “irregularities” could be detected. The distribution of German modals within the matrix of negated modality was shown to be highly ordered and balanced. The German system exclusively relies on external negation and the rule of logical equivalence. The same negated modals are also used suppletively for internal negation. Differences in scope thus do not surface in the use of negated modals. Moreover, the German system of negated modality makes use of four modals, which are evenly distributed over root and epistemic modality on the one hand and subjective and objective sources of assessment on the other hand so that each modal is assigned its unique place in the system. This system is ecologically well-motivated and probably stable.

The English system of negated modality is far less orderly than the German system, but is certainly not as irregular as it may appear when looked at from a semasiological point of view, an approach typically adopted by most grammarians. The distribution of negated modals turns out to be much more systematic when looked at from an onomasiological, or conceptual, perspective. To show the purely visual advantage of a concept-based analysis, Table 3 is reproduced here as Table 4 with the preferred, or unmarked, negated modals highlighted by bold print.

	positive			propositional negation			equivalent modal negation		
	mod	subj	obj	mod ~	subj	obj	~mod	subj	obj
Root	nec	<i>must</i>	<i>have to</i>	nec ~	<i>mustn't</i>		~poss	<i>may not</i>	<i>can't</i>
	poss	<i>may</i>	<i>can</i>	poss ~	<i>may nót</i>		~nec		<i>needn't</i>
Epist.	nec	<i>must</i>	<i>have to</i>	nec ~	<i>(mustn't)</i>		~poss		<i>can't</i>
	poss	<i>may</i>		poss ~	<i>may not</i>		~nec		<i>needn't</i>

Table 4: Positive and negated modals in English

Unlike German, English does not express internal negation by way of suppletion but by its own set of negated modals. Each negated modal is associated with a specific scope of negation. The negated modals *can't* and *needn't* affect the modality, the negated modal *mustn't* affects the proposition, and the negated modal *may not* may affect the modality or the proposition. Apparently, the semantics of modal verbs plays a larger role in English than in German, whose system of negated modals is exclusively determined by structural patterns.

However, the English system of negated modality also displays conspicuous regularities. As can be seen from the forms printed in bold, external negation is more commonly used than internal negation: as in German, external negation is the default type of negation with modals. For each of the low-frequency modals an explanation was offered in Section 4. In internal negation, root *mustn't* is too authoritarian, root *may nót* is included in *may not*, and epistemic *mustn't* is only used regionally; in external negation, root *may not* competes with other uses of *may not*, in particular its established epistemic sense.

A striking feature of the English system of negated modality is the distribution of subjective and objective modals: internal negation is achieved by subjective modals, while external negation, with the exception of *may not*, is achieved by objective modals. This makes perfect sense: in negating the proposition, the speaker expresses his subjective assessment of a negated situation in the same way that he would assess a positive situation, whereas in negating the modality, the speaker redefines a modality. Thus, a prohibition such as *You may not come in* is set in the context of permission-granting: people are implicitly permitted to enter the room or had explicitly enquired to do so. Personally imposing a prohibition is a pragmatically realistic kind of situation and hence deserves to be coded in language—although, as stated in Section 5.1, this only occurs infrequently. Prohibitions expressed by *may not* are the only subjective externally negated modalities that are coded by a modal—in contrast to German, which supplies negated modals for all of these modalities.

This leads to a further question: why does English not provide subjective modals for the three remaining conceptual slots of external negation? The explanation is to be found in lexical pre-emption,¹⁰ i.e. a given modal verb cannot be used in a particular sense when it has already been assigned a different meaning. Deontic *mustn't* cannot be used to mean 'personal permission-granting' because it already denotes 'prohibition': thus, *You mustn't go to school today* does not mean 'you may not go to school today'. Deontic *may not* cannot be used to mean 'subjectively assessed impossibility' because it already denotes 'possible not'. Thus, *Peter's working days may not be over* does not mean 'it is not possible that Peter's working days are over'. Finally, the use of epistemic *mustn't* is, as observed in Section 5.3, divided. *Mustn't* would have been an appropriate form to express the subjective alternative to objective *needn't*, as in German *nicht müssen*—and some speakers of English apparently use *mustn't* this way. However, an external negation by epistemic *mustn't* would be in conflict with the internal negation by root *mustn't*, so it is possibly felt to be "distantly" pre-empted by root *mustn't*. As a result, subjective *may not* has largely taken over the sense of negated epistemic possibility.

The distribution and uses of negated modals in English could be shown to be motivated. The impression of irregularity conveyed by the English system of modality arises from two of its properties: the use of modals for both internal and external negation and constraints imposed by lexical pre-emption. The co-presence of two kinds of scope with modal verbs makes it harder for the language user and analyst to detect regular patterns of negated modality, and the principle of lexical pre-emption constrains the extension of modal senses.

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¹⁰ Ostler & Atkins (1992: 80f) distinguish between two kinds of pre-emption: "*semantic pre-emption*, where the sense is already represented by a different word; and *lexical pre-emption*, where the word has already been assigned a different sense."

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