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► **To cite this version:**

Ilse Depraetere. Modals and lexically-regulated saturation. Journal of Pragmatics, Elsevier, 2014, 7, pp.160-177. hal-01083051

HAL Id: hal-01083051

<https://hal.univ-lille3.fr/hal-01083051>

Submitted on 30 Aug 2017

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Modals and lexically-regulated saturation[☆]

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Received 8 June 2013; received in revised form 4 August 2014; accepted 4 August 2014



Abstract

This paper presents a framework for the analysis of the meaning of modals which builds on key concepts from recent research on the semantics/pragmatics interface, in particular saturation, and on insights from lexical semantics; it is based on extensive data analysis, *may* and *must* serving as a test case. It is argued that a layered account in terms of context-independent semantics, context-dependent semantics (resulting from lexically-regulated saturation) and pragmatic meaning is needed to capture all the meaning distinctions communicated by modal verbs. While embedded in insights from Contextualism and compatible with approaches in formal semantics, the paper argues that the context-dependent semantic layer needs to be defined in a more explicit and more rigorous fashion and it shows how this aim can be achieved.

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Keywords: Saturation; Free pragmatic enrichment; Modal meaning; Polysemy/monosemy of modals

1. Background and aims

This article presents a new framework for the analysis of modal meanings, which aims to reconcile findings resulting from extensive data analysis with theoretical insights from philosophy of language (viz. the semantics/pragmatics interface) and lexical semantics. In previous discussions of the meaning of modal verbs, it is either empirical analysis or a specific theoretical framework that dominates, and as I see it, this kind of methodological one-sidedness has resulted in less than satisfactory accounts.

The main topic of this paper is embedded within the monosemy/polysemy debate in research on modals, that is, do modals have a core meaning which is underspecified and context-dependent (monosemy) or are the different meanings semantically sufficiently differentiated to allow us to say that a modal is polysemous?

Corpus-based analyses of modal verbs are almost unanimous in their view that modals are polysemous, or at least those modal verbs (like *may* or *must*) that can express epistemic meaning as well as non-epistemic meaning. Some (e.g. Coates, 1983) maintain that the meaning distinctions within the realm of non-epistemic modality constitute a gradient or a continuum that does not result in distinct categories of meaning. In other words, on such an approach, certain modals are monosemous (e.g. *can*) (as they only express non-epistemic meaning), while other modals (e.g. *may*) appear to be polysemous and monosemous to a certain extent (as they can communicate epistemic as well as non-epistemic meanings). In other empirical studies (e.g. Collins, 2009) it is argued that the different non-epistemic meanings are further illustrations of the polysemous nature of modals but this view is often more based on intuition rather than on argument.

[☆] I am grateful to Raphael Salkie for insightful discussion of the semantics/pragmatics interface and for his critical input on a draft of this paper, and to Maarten Lemmens and Nick Riemer for useful discussion of some questions relating to polysemy. I would like to thank the reviewers, whose suggestions have helped me to make a number of issues more explicit.

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Overall, there is a touch of hesitation in the more empirical literature: meaning distinctions are posited but they seem to be overshadowed by the overlap between the categories and indeterminacy, which is amply illustrated. In other words, the potential theoretical impact of the fuzziness of the boundaries on the status of modal categories appears to be tacitly accepted but it is not explicitly addressed.¹ Overall, the more theoretical question of how the meanings are derived in context is not the primary concern.

The meanings of modals have also been analyzed within pragmatic theory, and especially within Relevance theory (e.g. Klinge, 1993; Groefsema, 1992, 1995; Berbeira Gardón, 1998; Papafragou, 2000). Here, the specific approach to meaning, which offers due space to contextually derived semantics, necessarily seems to result in a monosemous approach to modals. Likewise, Kratzer's formal semantic model (1981, 1991) is basically monosemous. Compared to the empirical literature, the more delicate taxonomic questions are not central to the discussion.

I will present a three-layered model for the analysis of modal meaning (with a context-independent semantic layer, a context-dependent semantic layer and a pragmatic layer) and I will show how concepts from pragmatic theory, in particular saturation, have a crucial role to play in accounting for the context-dependent semantic layer. I will argue for a distinction between lexically-regulated saturation and saturation with open-ended valuation. Modals need to be saturated; the template that needs to be contextually filled in will be made explicit. In short, the speaker determines in what sense a modal is used and the hearer needs to recover that meaning: the context-independent meaning of the modal (of possibility or necessity) is necessarily fleshed out through lexically-regulated saturation; additional pragmatic effects may be communicated. It will become clear that context-dependence is not incompatible with the view that modals are polysemous; the semantic meaning distinctions will be defined on the basis of four criteria.

The paper is organized as follows. Section 2 offers of brief sketch of foundations from lexical semantics about the ambiguity–polysemy–vagueness triad. The tests underlying the conceptual distinctions will be applied to sentences with modals and will lead me to conclude that modals are polysemous, irrespective of whether they only communicate non-epistemic meanings or non-epistemic and epistemic meanings alike: the different meanings that modals communicate are semantically distinct. The crucial step in the development of framework will involve concepts from pragmatic theory (section 3). It will be examined to what extent saturation and free pragmatic enrichment (e.g. Carston, 2009; Recanati, 2010) are involved in the derivation of the context-dependent semantic meaning intended by the speaker: I will argue that lexically-regulated saturation constitutes a fundamental building block. This approach will be compared to Kratzer's model (1981, 1991) and Papafragou's (2000) analysis of modal meaning. In section 4, I will illustrate my framework. First, starting from Depraetere and Reed (2011), I will present the defining criteria which I consider to be essential to define modal meanings, both in the realm of modal possibility and in the realm of modal necessity.² A set of examples will be given to illustrate the model, which encompasses a context-independent semantic layer, a context-dependent semantic layer (lexically-regulated saturation) and a context-dependent, pragmatic layer.

2. Polysemy vs. monosemy

In this section, I will address the polysemy/monosemy of modals: are the meaning distinctions modals communicate semantically distinct or are they pragmatic variants? In order to answer this question, it is necessary to establish the basic categories of modal meaning.

¹ While Palmer (1990:14–18) is critical of the 'monosemantic approach', he empathises with (monosemist) Ehrman (1966) who writes that we can only arrive at a 'rather loosely structured set of examples' (Ehrman cited in Palmer, 1990:49). Having said this, he does argue that the 'messy' nature of modals should not stop one from distinguishing subcategories of modal meaning. Palmer often comments on examples that are hard to classify. For instance, some sentences with *must* are indeterminate between deontic modality and dynamic modality (when there is reference to a compelling situation resulting from a rule). He also points out that there is indeterminacy between 'neutral dynamic possibility' and 'subject-oriented possibility' and between 'neutral dynamic necessity' and 'discourse-oriented necessity' (1990: 49, 132).

Like Palmer, Huddleston et al. (2002) distinguish between epistemic, dynamic and deontic modality; they use the clearly ambiguous example *She can speak French* to differentiate the categories of deontic and dynamic possibility. However, they immediately point out that the boundary between deontic and dynamic modality is 'somewhat fuzzy' (2002:179).

Collins (1990) likewise presents the fuzziness of the borderlines as a potential counterargument to polysemy: 'In the present study we assume a polysemy position, while at the same time acknowledging that the dividing line between deontic and dynamic modality will in general be less determinate than that between epistemic modality and either of these root categories. Furthermore the three primary meanings have subsumed uses which are not always clearly distinguishable' (2009:23).

² I will follow Van der Auwera and Plungian (1998) in restricting the study to those modals that systematically enter into the necessity vs. possibility paradigm, thus leaving *shall* and *will* out of the discussion.

2.1. A taxonomy of modal meaning

Modal meaning is crucially concerned with the expression of possibility and necessity. A fairly widespread categorization of modal meanings (e.g. Nuyts, 2001; Huddleston et al., 2002; Verstraete, 2005; Ziegeler, 2006; Collins, 2009) is that originating in Palmer (1990), who distinguishes three major classes:

- (a) epistemic modality (possibility – necessity): ‘essentially (...) [makes] a judgement about the truth of the proposition’ (Palmer, 1990:6)
- (b) dynamic modality (possibility: ability, neutral possibility, volition, power, habit – necessity: dynamic necessity)³
- (c) deontic modality (possibility: permission – necessity: deontic necessity)

The following examples from Palmer (1990) illustrate the different categories:

- (1) You *may* not like the idea of it, but let me explain. (1990:51) (epistemic possibility)
You *must* find it quite strange being back in London. (1990:53) (epistemic necessity)
- (2) I *can* make or break my life and myself. (1990:85) (ability)
I know that place. You *can* get all sorts of things here. (1990:84) (neutral possibility)
I’m seeing if Methuen *will* stump up any money to cover the man’s time. (1990:134) (volition)
You know that certain drugs *will* improve the condition. (1990:136) (power)
So one kid *will* say to another, one kid *will* make a suggestion to another, he’ll say the moon’s further away from the earth than the sun. (1990:136) (habit)
When this happens, you will see the boat’s speed fall off and you *must* pay off just a little. (1990:116) (dynamic necessity)
- (3) If you want to recall the doctor, you *may* do so. (1990:71) (permission)
You *must* keep everything to yourself, be discreet. (1990:32) (deontic necessity)

For the time being, this standard classification will be used. In section 4.1, I will argue though that this three-fold distinction needs to be refined and I will present a more explicit taxonomy of modal meanings that is defined in terms of three criteria: scope, source and potential barrier.

Discussions of modal taxonomies very often address the question of monosemy/polysemy, which closely ties in with the nature of meaning distinctions. A logical strategy to answer the question whether modals are polysemous or monosemous is to apply the diagnostic tests used in lexical semantics.⁴ I will first explain the conceptual distinctions involved (section 2.2) and I will then present evidence in favour of the polysemy of modals (section 2.3) and argue against monosemy (section 2.4).

2.2. Lexical semantics: ambiguity (homonymy), polysemy, vagueness (monosemy)

The triad commonly discussed in lexical semantics is that of homonymy, polysemy, and vagueness, standard examples being, respectively, *bank*, *mouth* and *aunt*. The different meanings of *bank* are unrelated, a natural corollary being that *bank* has two separate entries in a dictionary (one word, two meanings); *mouth* has distinct but conceptually related meanings, and therefore words that are polysemous usually feature under one and the same entry in a dictionary (there is an etymological link between the different meanings and one may be a metaphorical extension of an other or may result from metonymical transfer). A lexical item that is vague has a fundamental meaning but it is underspecified as regards certain aspects of meaning that may be different according to the context and that may impact on denotation (an aunt on father’s side (with or without blood ties) or an aunt on mother’s side (with or without blood ties)).⁵

As pointed out in section 2.1, modal verbs are often categorized according to whether they communicate possibility (e.g. *may*, *can*, *might*, *could*) or necessity (e.g. *must*, *should*). In other words, the two sets of modals share a common core, namely, that of expressing either possibility and necessity. Therefore, the question to be answered in the context of

³ In work following Palmer (1990), dynamic possibility sometimes only covers the categories of ability and volition.

⁴ Carretero (2004) is the only discussion of modal meaning that I know of in which the linguistic test is used to diagnose the status of modal meanings. She uses what she calls ‘the test of substitution with SO/TOO’ to determine whether *will* is polysemous. The evidence resulting from the test is one of the reasons why she considers volitional *will* to be an implicature.

⁵ This short discussion of the categories of polysemy, homonymy and vagueness does not do justice to the rich and sophisticated literature in lexical semantics. (Riemer (2010:160–169) offers an interesting overview of the issues involved.) However, for the purposes of the argument these fairly straightforward definitions are sufficient.

modals is whether they are polysemous or vague, the latter concept usually referred to as *monosemous* in research on modals. A terminological point should be added: in the modality literature, the question of the theoretical status of the meaning distinctions is referred to as the monosemy/polysemy debate. However, when adducing evidence in favour of 'polysemy', a common argument is that modals are 'ambiguous'. In lexical semantics, ambiguity is associated with homonymy (or it is used as a more general term to refer to semantic multiplicity, covering both homonymy and polysemy). So there is potential terminological confusion: the terms *ambiguity* and *ambiguous* are used even though it is clearly polysemy that is at stake (cf. Traugott (2003:661) for a similar terminological point).

Three tests have been put forward to diagnose the status of meaning distinctions: (a) the definitional test (which goes back to Aristotle),⁶ (b) the logical test (originally put forward by Quine (1960:129)),⁷ (c) the linguistic test (or 'identity-of-sense' test Lakoff (1970) and Zwicky and Sadock (1975)). The focus will here be on the linguistic test, which works as follows: in the case of ambiguity, the use of an anaphoric construction⁸ forces one to choose one of the available interpretations, which applies to both clauses. When a lexeme is vague, crossed readings are not ruled out; the first clause may get one interpretation and the anaphoric clause another one:

- (4) They saw her duck and so did he.
- (5) *At midnight, the ship passed the port and so did the bartender (Geeraerts, 1993:229).
- (6) I saw a dog and so did Harold (Zwicky and Sadock, 1975:24).

In (4) crossed readings are ruled out: *her* is either a possessive determiner in both clauses or a personal pronoun in both clauses, the conclusion being that the sentence is (structurally) ambiguous. In (5), *port* in the first clause necessarily means *harbour*, and *port* in the second clause is necessarily an alcoholic drink. Crossed readings are required but not available, and this results in an anomalous (zeugmatic) sentence. The conclusion is that *port* is ambiguous (a homophone). Example (6) is different: here, crossed readings are allowed. It is possible to interpret both the first and the second clause as referring to a male dog (a) or to have a reading according to which gender is not part of the denotation (b), but it is also possible to have combined readings: (a) – (b) or (b) – (a). Accordingly, *dog* is said to be vague.

Two observations should be added: identity-of-sense tests are used by Zwicky and Sadock to distinguish ambiguity (structural and lexical ambiguity (homonymy)) from vagueness (monosemy). The distinction at stake in the context of modals is that between distinct meanings that are related (polysemy) vs. vagueness (monosemy). However, Zwicky and Sadock's tests have been used in lexical semantics to identify polysemy as well as homonymy (ambiguity), in other words, irrespective of whether the different meanings are related or not. (e.g. Geeraerts, 1993; Ravin and Leacock, 2002; Riemer, 2010) It is therefore possible to apply them to modals as well with a view to determining the status of the meaning distinctions. Secondly, the reliability of the three tests has been questioned (e.g. Geeraerts, 1993; Tuggy, 1994; Riemer, 2005). When it comes to the linguistic test, the criticism is that judgments are delicate and not always stable, and that issues relating to reference may interfere in the judgments. (e.g. Riemer, 2005:140–142) For instance, if *Tina* and *a disaster* are identical in *Hank is courting Tina and a disaster* ('In courting Tina he is courting a disaster') the sentence is less zeugmatic than when they are not. (Riemer, 2005:141) However, I would like to take sides with Dunbar (2001:5–6) who argues that examples like the one just cited show that is possible to identify, in a principled way, the context in which the linguistic test is not useful. As the sentences with modals discussed here do not qualify as contexts in which issues concerning reference possibly interfere, the use of the linguistic test to establish the polysemy or vagueness of modals is justified.

2.3. Why modals are polysemous

The existence of 'ambiguous' examples is quite often used as evidence for the claim that epistemic meanings and non-epistemic meanings are semantically distinct (e.g. Coates, 1983:16; Huddleston et al., 2002:178):

- (7) Sarah *may* help. ((a) epistemic ('Maybe she will'), (b) non-epistemic, permission ('She is allowed to'))
- (8) The children *must* be hiding. (Depraetere and Langford, 2012:209) ((a) epistemic ('I logically conclude that they're hiding since I can't see them anywhere'), (b) non-epistemic ('The children must be hiding when grandma arrives; otherwise, it'll spoil the surprise'))

⁶ The number of meanings of a word is determined by the number of definitions it is compatible with.

⁷ There is ambiguity or polysemy if '[f]or a given state of affairs, the sentence can be both truly affirmed and truly denied' (Gillon, 1990:407). Cf. Gillon (1990), Geeraerts (1993), Dunbar (2001) for a critical discussion of this test.

⁸ Zwicky and Sadock (1975) also mention conjunction reduction (*They saw her duck and (her) swallow*), deletion-upon-identity (*She called Jane a cab, and he a dog-cart*), VP deletion-upon-identity (*I wouldn't call her a cab, but George might.*) as alternatives to the use of pro-forms. Their paper is almost exclusively focussed on structural ambiguity.

The linguistic test confirms this hypothesis, as crossed readings are not available. If the first clause in (9) is meant to communicate that Sarah will probably help (epistemic reading), *may* necessarily also communicates epistemic meaning in the following clause. If the first one communicates permission, so does the second. Likewise, in (10), *must* either communicates epistemic meaning in both clauses or it communicates non-epistemic necessity both in the first and in the second clause. In other words, the interpretation of the modal in the first clause determines the interpretation of the modal in the second clause:

- (9) Sarah *may* help. And so *may* Mary-Anne.
 (10) The children *must* be hiding. And so *must* their friends.

The conclusion so far is that modals that can express epistemic as well as non-epistemic modality are polysemous, a view supported by e.g. Lyons (1977), Leech and Coates (1979), Traugott (1989), Nuyts (2001), Palmer (2001) and Huddleston et al. (2002).⁹

The next question to be answered is whether non-epistemic meaning distinctions are further cases of polysemy. Out of context, the examples below can be interpreted in different ways, that is, they are ‘ambiguous’.

- (11) Bicarbonate can be added to a pool. ((a) ‘Adding bicarbonate is technically possible, for instance, by dissolving the powder in water’, (b) ‘Adding bicarbonate is permissible: swimmers won’t have health problems if you do so’)
 (12) Jennifer can swim. ((a) ability, (b) permission)
 (13) Jennifer must have that dress. ((a) internal necessity ‘she insists’, (b) external necessity ‘I insist’)

The identity-of-sense test produces the same results as in the case of epistemic vs. non-epistemic meaning; crossed readings are ruled out. In other words, the different non-epistemic meanings as well are indicative of the polysemy of modals¹⁰:

- (14) Bicarbonate can be added to a pool. So can sodium sesquicarbonate.
 (15) Jennifer can swim. So can Robin.
 (16) Jennifer must have that dress and so must Cathy.

The overall conclusion to the discussion is that the different meanings communicated by modals are semantically distinct.

2.4. Why modals are not monosemous

Having justified the polysemy approach, it is useful to check the arguments put forward in favour of monosemy. Ehrman (1966) can be listed among the historically first to have taken a monosemous approach to modals. Monosemy seems to follow from the aim of her study:

⁹ Further syntactic evidence adduced in favour of polysemy between epistemic and non-epistemic readings is the difference in scope of negation: while in the case of epistemic meaning, *not* scopes over the proposition, in the case of non-epistemic meaning, *not* has scope over the modal:

- (i) He may/not be at home. (It is possible that he is not at home) (epistemic)
 (ii) You may not/come in. (It is not possible for you to come in) (non-epistemic)

However, while this distinguishing feature works well with *may*, the results for *must* do not conform to the generalization, an additional constraint being that an epistemic reading is more natural if *not* is not contracted with *must*:

- (iii) You must/not be well. (It is necessarily the case that you are not well.) (epistemic)
 (iv) He must/n’t have done it deliberately. (It is necessarily the case that he didn’t do it deliberately) (Huddleston et al., 2002:180) (epistemic)
 (v) You must/n’t stay out late. (It is necessary for you not to stay out late.) (non-epistemic)
 (vi) You must/not stay out late. (It is necessary for you not to stay out late.) (non-epistemic)

As Huddleston et al. (2002:180) observe, even though an epistemic reading in sentences like those in (iv) is not impossible, if *not* is contracted, the interpretation is usually one in terms of non-epistemic modality.

¹⁰ As pointed out in the introduction, it is not unusual to see polysemous and monosemous approaches united: Leech and Coates (1979), for instance, argue that epistemic and non-epistemic readings are semantically distinct, but they also observe that ‘*can* is essentially a monosemous modal: there are no clear divisions between permission, possibility and ability’ (1979:84). In a similar way, Timotijević (2009:227) argues that the monosemy/polysemy question should be answered in function of specific modals in specific languages.

'My primary interest was in the discovery of the most general meaning(s) for each modal auxiliary that would apply to as many occurrences as possible. Meanings conditioned by specific sentence elements and features of nonsemantic interest have generally been distinguished by the term *USE*, and they have been perhaps less than systematically treated. Those which I discussed appeared within the corpus and were generally dealt with to make distinctions or to illustrate the generality of the basic meaning' (1966:10).

Her view is not based on extensive argumentation or a specific theory of meaning but on the observation that, with the exception of *may*,¹¹ there is a common denominator, or a 'unitary meaning' to all uses of all modals:

'The *BASIC MEANING* is the most general meaning of the modal in question, the meaning that applies to all its occurrences. In a sense it is the lowest common denominator of all the occurrences, for the determination of which context is unnecessary. There also appear for almost all of the modals what I have perhaps metaphorically called *OVERTONES*. These are subsidiary meanings which derive from the basic meaning but which add something of their own. No overtone accounts for all the occurrences of a modal (in that case it would be a basic meaning), and are all conditioned by elements of the context which cannot be identified, isolated, and listed. The factors which account for overtone variation are almost certainly from the content of the surroundings.' (Ehrman, 1966:10–1)

Tregidgo (1982) offers an analysis of *may* and *must* and argues that all their uses (including epistemic readings) can be explained through the single notion of, respectively, 'permit' and 'demand'. He shows how the idea of 'demand' (p.79) is interpreted in function of the context in which *must* is used, a similar interpretation gradient being available for 'permit' (p.84–85) with *may*. In other words, like Ehrman's, his line of reasoning is that the availability of a notion capturing the common denominator of meaning of these verbs in context is evidence for the fact that the verbs are monosemous. However, this does not seem a convincing argument: there is semantic commonality between polysemes (e.g. Cruse, 2002, Riemer, 2005) as well. A common semantic core is not a sufficient condition for vagueness/monosemy; the different of meanings of a homophone (e.g. *bank*) may even be said to share a common feature ([+ thing]).

Accounts of modals within Relevance theory also start from the observation that precise unitary meanings can be given for each modal, and that specific interpretations result from inferential enrichment, a view which implies monosemy (e.g. Klinge, 1993; Groefsema, 1992, 1995; Papafragou, 2000).¹² The following are some of the arguments that Relevance theoreticians have put forward against polysemy:

- (a) indeterminate examples: some examples are hard to classify (One thing you want to avoid, if you possibly *can*, is a present from my mother. Palmer (1979:73) cited in Groefsema (1995:55) – indeterminate between ability and possibility)
- (b) merger: in some examples two meanings co-exist (e.g. Coates, 1983) (It is important to note that where high concentrations are theoretically possible in the plant evaporator, the time required to build them *may* be considerable). (Coates (1983:145) cited in Groefsema (1995:56) – merger of epistemic and non-epistemic modality)
- (c) pragmatic extension: in certain examples the illocutionary force of the sentence seems to impact dramatically on the meaning of the modal, which no longer matches any of the traditional categories (*You must come to dinner sometime* (Groefsema, 1995:57) in fact means *We would like you to come to dinner sometime*)
- (d) validity of different interpretations rather than validity of specific interpretations (possibility, ability, ability): in answer to a question like *Can you drive?* a wide range of answers can be given (*No, I can't, because my licence has been endorsed/my car is broken/because my eyesight is too bad – Yes, I can, but my licence has been endorsed*) and therefore all the question is meant to communicate is whether conditions are such that [you drive].

The fact that disambiguation is not always possible (cf. (a) and (b)) nor desirable (cf. (d)) points to the need of a unitary meaning for each of the modals, the principle of Relevance guiding the reader in selecting specific interpretations. In response to the objections raised in (a) and (b), the rejection of polysemy because of occasional examples of merger and indeterminacy is too drastic, especially in the face of conclusive evidence from linguistic tests about the status of the

¹¹ 'Instead of having a unitary meaning, *may* is defined in terms of a continuum characterized by two dimensions of meaning' (1966:22), 'circumstance' and 'occurrence'.

¹² In the same way as there is the occasional touch of hesitation in the polysemist camp (cf. footnote 2), so there are reconciliatory comments by the monosemists in the direction of polysemy. For instance, Papafragou writes: 'My aim in this chapter has been to strike a middle way between polysemy-based and radical monosemy accounts of English modals. I have tried to offer a semantics rich enough to allow for difference in content in various modals, and yet underspecified to the extent of drawing on extensive pragmatic inferencing until it yields a complete truth-evaluable representation' (2000:84).

different meanings. As pointed out in [Depraetere and Reed \(2011:16–17\)](#), it is one thing to distinguish or identify different subtypes of non-epistemic meaning, but that does not imply that the classification of examples in terms of a specific taxonomy is unproblematic and always straightforward. It is inadvisable to use fuzziness or the fact that it is difficult to assign certain examples to a specific category as an argument against polysemy. Positing monosemy does not solve the problem of indeterminacy and does not facilitate an accurate description of meaning. Once the choice in favour of monosemy has been made, it remains a fact that meaning distinctions are real and must be accounted for. As I see it, the starting point must be that ‘ambiguous’ examples exist. Evidence from diagnostic tests, in particular the linguistic test, confirms that the meanings are semantically distinct; it will be shown in section 4.1 how defining criteria like source, scope and potential barrier help to make explicit the meanings of the mutually exclusive classes in the realm of non-epistemic modality. Certain examples may be hard to classify, but even then the defining parameters, if adequately operationalized, will eventually tip the scales in favour of one class or another. In other words, what might at first sight seem indeterminate examples or less prototypical examples are not incompatible with a polysemous approach to modals. To put it in [Aarts’s \(2007\)](#) terminology, it is subsective (intra-categorical) gradience rather than intersective (inter-categorical) gradience that modal verbs in context illustrate. Pragmatic extension (argument (c)) shows that a multi-layered approach to modal meaning is necessary. The fact that a specific illocutionary force is foregrounded does not imply that the semantic core of the modal is wiped out. It will be argued in section 4.2. that an additional layer of context-dependent pragmatic meaning needs to be added (next to the context-independent semantic layer and the context-dependent semantic layer) to cater for implicated meaning effects. With respect to argument (d), there is no genuine proliferation of senses in the example given: the set of examples illustrate one main distinction, namely that between a subject internal source (ability) and a subject external source (opportunity). (cf. section 4.1).

[Depraetere and Reed \(2006\)](#) end their brief discussion of the monosemy/polysemy debate as follows: ‘If one argues for a unitary treatment of meaning, the unitary meaning will provide the relatively small base which needs to be considerably enriched so as to find ways of explaining how the multiple interpretations are pragmatically derived. While the polysemy/monosemy question is obviously important, in the end, one is basically pursuing the same aim: that of setting up a taxonomy into which all the meanings find their place, the difference being that the semantics/pragmatics dividing line is drawn at different points’ (2006:284). This conclusion brings up an important theoretical question: can contextual information be considered as part of the semantics of a lexical item? If so, how can this be accounted for in theory of meaning?

3. Modals and lexically-regulated saturation

3.1. Contextual meaning: saturation and free pragmatic enrichment

Since [Grice \(1975\)](#), linguists have taken a keen interest in the various ways in which context contributes to meaning. In particular, different views have been put forward about the extent to which context is important for utterance interpretation, a key question also being whether or not the different types of contextual information are part of the semantics of an utterance or whether they belong to the level of pragmatics. Grice acknowledged that the context is required to establish reference and to disambiguate and that in this way it contributes to ‘what is said’. However, many argue that context is even far more dramatically involved in recovering a full proposition, that is, one that is (minimally) truth-evaluable. Relevance theoreticians ([Sperber and Wilson, 1995, 2012](#); [Carston, 2009, 2010](#)) have argued for a distinction between explicature (resulting partly from the processes of saturation and free enrichment) and implicature.¹³ They claim that Grice’s conventional implicatures and generalized conversational implicatures belong to the explicature, the latter notion encompassing further aspects of contextual information that Grice did not address. [Table 1](#) visualizes the different views on the role of context and its contribution (or not) to semantics/‘what is said’

¹³ While [Bach \(2007\)](#) also recognizes that context has a more essential contribution to make to utterance understanding than acknowledged by Grice, he argues that the theoretical status of that information cannot be captured in terms of an explicature; rather, apart from distinguishing ‘what is said’ from ‘what is implicated’, due space should be given to a category of meaning he labels ‘implicature’ (what is implicit in the explicit), which may involve completion and/or expansion. As Bach’s concept of ‘completion’ basically covers the same empirical data as the category of ‘saturation’ in Relevance Theory and in Recanati’s work and as ‘expansion’ covers the same phenomena as ‘free pragmatic enrichment’ (‘modulation’ in Recanati’s work), we will, in order not to multiply the terminology unnecessarily, use ‘saturation’ and ‘free pragmatic enrichment’ in the discussion. While there is similarity between the concepts of saturation/completion and free enrichment/expansion/modulation, it needs to be borne in mind that the general theoretical approach to meaning in which they are embedded is different across authors. Bach does not consider ‘completion’ and ‘expansion’ to be inferential processes; they refer to information that is part of ‘what is meant’ by the speaker.

Table 1
Contextual meaning and the semantics/pragmatics interface.

Elements of meaning that are communicated by an utterance							
Contextually derived information							
Grice	Code	Reference assignment & disambiguation			Conventional implicatures	GCI ¹⁴	Particularized conversational implicatures
	What is said			What is implicated			
Carston	Code	Reference assignment & disambiguation	Saturation	Free pragmatic enrichment	Conventional implicatures	GCI	Particularized conversational implicatures
	What is said – explicature						What is implicated

Saturation and free pragmatic enrichment refer to different types of information that are part of the propositional form. Saturation is obligatory; it ‘involves finding the intended content (or value) for a linguistically indicated variable or slot’ (Carston, 2009:49). For instance, the example in (17a) does not communicate a complete (minimally truth-evaluable) proposition unless it is made explicit what he is too young for. Both examples in (17) contain linguistic markers (*too* in (17a) and the comparative in (17b)) that point to the saturation requirement.

- (17) a. He’s too young. (*for what?*) (Carston, 2009:49)
b. Paracetamol is better. (*than what?*) (Carston, 2009:49)

Saturation is obligatory in the sense that the proposition communicated is incomplete without the contextual specification of the variable. A further set of examples commonly given to illustrate saturation involve missing arguments (‘argumental underdetermination’ (Bach, 1994b)):

- (18) a. John is ready/late. (*to or for what?*) (Bach, 1994b:285)
b. Mary finished. (*what?*) (Bach, 1994b:285)

Free pragmatic enrichment is different in two respects: first, there is a minimal (truth-evaluable) proposition that is communicated by the utterance but it does not seem the one intended by the speaker. Secondly, pragmatic enrichment is ‘free’ in the sense that it is not triggered by a linguistic variable; it ‘involves pragmatic enrichment of the decoded linguistic meaning in the absence of any indication (overt or covert) within the linguistic form that this is necessary’ (Carston, 2009:49):

- (19) a. It’s going to take time for these wounds to heal. [*considerable time*] (Carston, 2009:50)
b. Boris is a *man*. [*the ideal man*] (Carston, 2009:50)
c. This policy will *bankrupt* the farmers. (loose use of ‘bankrupt’) (Carston, 2009:51)

In all of the examples in (19) the literal proposition is one that is truth-evaluable so free pragmatic enrichment is, strictly speaking, not compulsory. Still, there is something about the minimal proposition that makes it unlikely to be the one intended by the speaker and from that point of view, enrichment is needed, the bracketed information in the examples in (19) being part of the explicature. The examples in (19b) and (19c) illustrate, respectively, ‘narrowing’ and ‘broadening’; these are ‘cases where the pragmatic process does not supply a whole new constituent of content but adjusts or modulates an existing element of linguistic meaning’ (Carston, 2009:51). The examples in (20) illustrate a second type of ‘free enrichment’; here the ‘pragmatically supplied constituents of the explicature have no presence in the linguistic form used, so are known as ‘unarticulated constituents’ (Carston, 2009:50):

- (20) a. It’s snowing. [*in location x*] (Carston, 2009:50)
b. I’ve had a shower. [*today*] (Carston, 2009:50)

The concepts of saturation and free pragmatic enrichment both refer to contextual information that is relevant at the semantic level. When applied to modals, we need to determine which process is involved in the fleshing out of the semantic core of either possibility or necessity in order to arrive at the more fine-grained semantic meaning distinctions.

¹⁴ GCI = generalized conversational implicature.

3.2. Pragmatic processes in Papafragou and Kratzer

I will first describe how the contribution of the context is accounted for in analyses of modal meaning in Relevance Theory and in Kratzer's formal semantic possible worlds model.

The specific proposals put forward by Klinge, Groefsema and Papafragou for the semantics of the modals under investigation differ (slightly), but the basic theoretical stance is the same: there is a common semantic base to all uses of a specific modal and the specific interpretation of a modal is the result of the activation by the principle of Relevance of specific states of affairs (Klinge, 1993) or background assumptions (Groefsema, 1995). Papafragou (1998, 2000) argues that there is an empty slot in the semantics of *may* and *must* that needs to be saturated; *can* and *should* are semantically complete but need to be pragmatically (freely) enriched. More generally, modals express a relationship between the proposition *p*, embedded under the modal, and the context. Using *p* for the proposition embedded under the modal, and *D* for a set of propositions in a domain (the context), Papafragou claims that the logical relation between *p* and *D* can be entailment or compatibility.

<i>may</i>	<i>p</i> is compatible with the set of all propositions in domain <i>D</i> (<i>D</i> -value → unspecified)
<i>can</i>	<i>p</i> is compatible with the set of all propositions in domain <i>D</i> (<i>D</i> -value → factual)
<i>must</i>	<i>p</i> is entailed by the set of all propositions in domain <i>D</i> (<i>D</i> -value → unspecified)
<i>should</i>	<i>p</i> is entailed by the set of all propositions in domain <i>D</i> (<i>D</i> -value → normative)

May and *must* place no restrictions on value of *D*. These verbs require pragmatic saturation of an unspecified semantics: 'the empty slot in their lexical semantics has to rely on on-line processes of pragmatic comprehension for completion' (2000:43). In the case of *can* and *should* though, the semantically encoded content of the verbs place restrictions on the value of *D*: 'A semantically specified restrictor offers a conceptual search-space, which can be further narrowed down pragmatically, if necessary. (2000:43)' In other words, these verbs involve 'free pragmatic enrichment of an already complete, albeit vague, semantic content.' (2000:43–44) The scope of this article does not allow for an in-depth critical analysis and comparison of the proposals (e.g. Salkie, 2002 and Closs Traugott, 2003 for a critical evaluation of Papafragou, 2000, e.g. Berbeira Gardón, 1998 for a critical analysis of Walton, 1988; Klinge, 1993; Groefsema, 1995; Berbeira Gardón, 1996). In general, it is not always fully explicit what motivates the specific semantics of the modals under discussion or how exactly inferential enrichment operates. More specifically, in the case of Papafragou's account, one may wonder why there is saturation in the case of *can* and *should* and free enrichment in the case of *may* and *must*. (cf. Salkie, 2014:340 for critical observations on Papafragou's differentiated approach in terms of saturation and free enrichment) Another issue is whether the semantics for the different modals are sufficiently differentiated.¹⁵ For instance, the semantics of *must*, *may* and *should* and *can* in Papafragou's approach seem to imply that in contexts where *may* (*must*) can be used, it can always be replaced by *can* (*should*), which is not the case (cf. Salkie, 2002:717–718; Salkie, 2014:339).

Papafragou's model builds on some insights from Kratzer's formal semantic possible worlds model (1981, 1991). In Kratzer's framework, modal verbs express a modal relation (of possibility or necessity) between a proposition and a modal base, such as epistemic, deontic or circumstantial, conversational backgrounds which serve to distinguish the different readings. The modal determines the kinds of conversational backgrounds it is compatible with. Conversational backgrounds are relevant in two ways, in that an ordering source determines the order in which the available worlds will be accessed: 'The modal base determines the set of accessible worlds (for a given world). The ordering source imposes an order on this set' (Kratzer, 1991:645–646). In other words, modals come with two parameters that need to be contextually fixed in order for the modal to express a proposition (e.g. Kratzer, 1991:646–647; Portner, 2009:71–72 for examples).

Before I present the approach which I believe provides a more adequate framework for the analysis of modal meaning, I would like to highlight the points on which Papafragou's and Kratzer's views converge (with mine) or diverge (from them):

- Kratzer's model is commonly classified as being monosemous (Westney, 1995; Papafragou, 2000; Timotijević, 2008; Boogaart, 2008); Papafragou explicitly takes a monosemous approach to modal meaning. I have explained why I do not share this point of view. It is beyond doubt that the context constitutes the basis for determining the specific modal meaning communicated by the speaker. However, I do not believe that the only conclusion that can follow from that

¹⁵ The cognitive principles or mechanisms that result in the specific interpretation of modals in context is an issue that is not addressed in this paper.

observation is that modals are monosemous. A key point in Relevance theory is exactly that contextual meaning also contributes to ‘what is said’ or to the ‘explicature’.

- I agree with one of the basic premises in both models, namely that there is a layer of what I will call ‘context-independent semantics’ and a layer of ‘context-dependent semantics’. Both authors argue that pragmatic processes are involved in the derivation of modal meaning, but the operationalization of this idea is different in the respective models. Kratzer’s appeal to contextual input serves to make the context-independent meanings of ‘necessary’ and ‘possible’ more explicit. I will outline an approach in which lexically-regulated saturation explains how the different readings arise in context. Papafragou quite rightly observes that compared to Kratzer’s, her proposal pays ‘more detailed attention to pragmatic contributions to the derivation of modal interpretation’ (2000:33). Like Papafragou, I will make use of the pragmatic concept of saturation, but her characterization of the meaning of *may*, *can*, *must* and *should* is rather incompatible with the model I will present.
- A further difference with Papafragou’s model is that I do not believe that the pragmatic processes are differentiated across modal verbs; I will argue that it is through the process of lexically-regulated saturation that modal meaning is determined. The parameters involved in this process are defined in terms of epistemic/non-epistemic, source, scope and potential barrier.
- It remains a fact that the empirical part of the discussion in both models, that is, the accurate delineation of the meaning categories, is not the focus of attention; it is rather the technical aspect of the derivation within a specific theory. Any account should start from fully explicit taxonomic distinctions: the context-dependent layer will be defined in terms of the four distinguishing features just mentioned. It will be shown in section 4.2 that making explicit the meaning also involves paying due attention to genuinely pragmatic and implicated meaning.

3.3. Context-dependent semantics and lexically-regulated saturation

I will now offer an alternative multi-layered approach to modal meaning: I will first address the question of the specific process involved in determining the context-dependent semantic layer of meaning. It has become clear in the discussion that contextual information is needed to arrive at the explicature of an utterance with a modal verb. The key question is that of determining whether it is saturation rather than free pragmatic enrichment that is involved. As the input from the context is necessary or obligatory, in the sense that there is no complete proposition unless there’s contextual specification of the value of the modal, the pragmatic process involved in sentences with a modal is closer to that in (17) and (18) than to that in (19) or (20). My conclusion is therefore that saturation is required.¹⁶

There are no examples with modals in the theoretical discussions of saturation and free pragmatic enrichment. However, questions of polysemy are addressed in the saturation/free pragmatic enrichment debate (even though they are not necessarily discussed under this denominator),¹⁷ and it will be useful to see whether they can shed light on the current discussion. While Bach (1994a, 2007) rejects the Relevance theory notion of explicature (cf. footnote 13), he agrees that utterances may be underdetermined in two ways: *completion* (semantic underdetermination), corresponding to what is called *saturation* in Relevance Theory and/or *expansion* (pragmatic underdetermination), corresponding to free enrichment, may determine what he calls the ‘implicature’. While it is not my aim to discuss in detail the overall difference in approach to theory of meaning between the authors, it is interesting to point to some of the examples listed by Bach in his extensive empirical overview (Bach, 1994b, 2007). Among the cases of completion, he includes those whose ‘incompleteness is due to a particular term or phrase that does not determinately express one property (or relation), but not because of ambiguity or vagueness’ (2007:32), *get*, *put*, *take* being cited as examples of ‘lexical underdetermination’ and *HAPPY girl/face/days*, *girl/drug ABUSE* illustrating ‘phrasal underdetermination’. The input from the context in the case of modals is different from the examples that illustrate lexical and phrasal underdetermination: in his examples, it is the co-occurrence pattern that drives meaning assignment while modals start out with a semantic profile or a semantic template that needs to be filled out with the help of the context. (cf. section 4.1) However, Bach’s observations are useful because modals also qualify as cases of semantic underdetermination and accordingly, the proposition expressed by the utterance in which they are used has to be completed (saturated).

The different steps in the argument so far lead me to put forward the following hypothesis: each modal has a context-independent semantic core (of possibility or necessity). When processing an utterance with a modal, there is a specific semantic gap that needs to be filled out, namely, one needs to determine whether epistemic or non-epistemic meaning is communicated, and, in the case of non-epistemic meaning, one needs to look in the context for information relating to ‘source’, ‘scope’ and ‘potential barrier’, which helps to pin down the specific non-epistemic meaning that is communicated.

¹⁶ Salkie (2014:340–341) considers *can* and *may* to be monosemous; they both involve implicature (Bach, 1994a).

¹⁷ In a recent paper, Bach (2013) writes that polysemy belongs to the ‘deep end’, that is, ‘newer (...) issues in speech act theory needing serious consideration.’

(cf. section 4.1) This is the second, context-dependent semantic layer: it is the (linguistic and non-linguistic) context that drives the semantic interpretation of the modal meaning as intended by the speaker. In other words, each modal comes with a semantic template that needs to be contextually filled in.

The examples in the literature that illustrate saturation often involve the genitive or the comparative; saturation is triggered by a linguistic variable. It will be clear that modal verbs do not match that part of the definition. However, the fact that there is necessarily input from the context in selecting a (non-)epistemic interpretation (in the same way as missing arguments need to be provided in cases of argumental underdetermination) (cf. (18)) justifies the claim that saturation is involved in utterances with modals. The notion of saturation needs to be refined though, in that the output of the saturation here is lexically-regulated, that is, by the template of modal meaning (in terms of the features that will be defined in section 4.1) of the verb. The observations made indeed justify a distinction between two types of saturation: saturation with open-ended valuation (examples in (17)) and saturation with lexically-regulated valuation (modals).¹⁸

1. Saturation with open-ended valuation
2. Saturation with lexically-regulated valuation

In (17a), for instance, *too* requires that a 'slot' be filled in, but leaves the choice of value largely unconstrained: there is a large, essentially open class of possible contextual resolutions. Modals *too*, contain a 'slot' that must be saturated. However, the values for this slot are drawn from a narrowly limited (and small) class of discrete options, which are specified by lexical meaning (possibility or necessity) of the modal.¹⁹ In other words, while both are instances of saturation, the saturation required for modals is lexically more regulated.²⁰ In the approach argued for here the semantic template of modals is filled in by the (linguistic and non-linguistic) context through the process of lexically-regulated saturation.

In the next section, I will zoom in on the semantic template of modals and I will illustrate in detail how encoded meaning, contextually determined semantics and pragmatic meaning interact to make up a complete profile.

4. A framework for the analysis of modal meaning

4.1. Modal meanings: a more explicit taxonomy

In order to explain and illustrate how the meaning of modal verbs is constituted, it is necessary to define accurately the classes of modal meaning. While widespread, the three-class taxonomy 'epistemic–deontic–dynamic' presented in

¹⁸ I am grateful to the reviewer who made very useful suggestions as to how to make my view on the different types of saturation more explicit.

¹⁹ Carston (1999) writes: 'Disambiguation is inherently constrained; the linguistic system supplies a restricted range of specific options for pragmatic selection' (1999:79). This begs the question whether the process involved in assigning meaning to modals should not be addressed in terms of disambiguation (along the lines of *bank*). Recanati writes that disambiguation is pre-semantic and implies that there is a set of discrete senses available from which the relevant sense is selected. He argues that in the case of polysemy there is no such set available: 'polysemy proceeds from modulation (since the array of senses of a polysemous expression reflects conventionalized patterns of modulation), not the other way round' (2004:135). (Recanati's 'modulation' encompasses 'free enrichment'). Bach also comments on the link between ambiguity and completion/expansion. He writes that the pragmatic specialization involved in cases of lexical underdetermination and phrasal determination (examples cited on p. 15) should be addressed in terms of *local completion*. 'In any event, it seems that we should include local completion, along with disambiguation and reference assignment, among the pragmatic processes that enter into the determination of the explicit content of an utterance' (Bach, 1994a:152). It is not possible, in the context of this article, to compare the views expressed, the more so as it is not the question of polysemy in itself that is a central issue in discussions of saturation/pragmatic enrichment. However, an important parameter in the distinction between ambiguity and polysemy is the overlap of meaning between the polysemes. It will be clear that modals answer that part of the definition. My view is that lexically-regulated saturation (not modulation or free pragmatic enrichment) adequately captures the concept involved in the establishment of their semantics.

²⁰ As pointed out by one of the reviewers, ideally, one would like to have a test that can distinguish both types of saturation. It appears that the linguistic test is not helpful in this respect. Consider the example in (i):

- (i) Mary is too young, and so is Sue.

The sentence cannot mean that Mary is too young for driving and that Sue is too young for drinking. (cf. Recanati, 2004:134 for a similar observation but he argues the process involved is modulation (enrichment).) The anaphoric link requires identity of saturations and therefore the test cannot distinguish lexically unconstrained saturation (as in (i)) from lexically-regulated saturation (the case of modals). If *too* is left out, the test does not give the same results:

- (ii) Mary is young, and so is Sue.

The standard with respect to which Sue is young is not necessarily the same with respect to which Mary is young. *Young* is vague rather than polysemous. So while the sentence in (i) tells us more about the impact or nature of saturation (the effect of *too*), it does not provide evidence for or against lexically-regulated saturation. While it would be helpful to have a test that can help to differentiate the two types of saturation, answering that question will require the consideration of a wider empirical base of cases of saturation, which will be reserved for future research.

Table 2
Taxonomy of non-epistemic possibility in Depraetere and Reed (2011).

	Ability	Opportunity	Permission	General situation possibility (GSP)	Situation permissibility
Scope	Narrow	Narrow	Narrow	Wide	Wide
Source	Internal	External	External	External	External
Potential barrier	– Potential barrier	– Potential barrier	+ Potential barrier	– Potential barrier	+ Potential barrier

section 2 is not without problems, both in terms of the relative vagueness of certain categories (such as dynamic modality, e.g. Gisborne, 2007) and in terms of the lack of principled definition, that is, the systematic application of a set of defining criteria, especially when it comes to subclasses of non-epistemic meaning.²¹ Let us first focus on possibility meanings. The identification and definition of epistemic possibility is relatively unproblematic. In Depraetere and Reed (2011), which is focussed on non-epistemic possibility, the authors argue for a taxonomy which pins down, in a more explicit way, categories of meaning that are not ability and not permission. The taxonomy distinguishes between general situation possibility (GSP), permissibility, permission, opportunity and ability and it is based on a clear set of defining parameters, which are systematically used to define the different categories of meaning: (a) scope of the modality (wide scope or narrow scope), (b) source of the modality (subject-internal or subject-external) and (c) potential barrier. Scope of the modality relates to what it is that is possible, and in line with Nordlinger and Traugott (1997), it is argued that, like epistemic modality, certain types of non-epistemic modality also bear on a complete proposition. While the modality involved is clearly related to the theoretical possibility of actualization (rather than the likelihood of actualization, the defining characteristic of epistemic modality), it is the actualization of a *situation* that is at stake. This criterion results in the basic distinction between wide scope modality and narrow scope modality. ‘Source’ refers to the situation, person or institution that lies at the origin of the possible state of affairs. In the case of wide scope modality the source is always subject-external; in the case of narrow scope modality, the source may be subject-internal (this corresponds to the modal meaning of ability) or subject-external. One final criterion, that of potential barrier, makes for the distinction between on the one hand, wide scope GSP and wide scope permissibility, and on the other hand between narrow scope, subject-external opportunity and narrow scope, subject-external permission. (cf. Table 2 for a survey of the defining features) If the source has source status because it can potentially impose a barrier on the actualization of the situation, the sentence has the feature [+ potential barrier], and the meaning communicated is one of permissibility (in the case of wide scope possibility) and permission (in the case of narrow scope possibility) (cf. Depraetere and Reed, 2011:13–16).

The following examples (taken from the appendix in Depraetere and Reed (2011)) illustrate the five categories of non-epistemic possibility meaning:

- (21) What *can* you tell me about Roland La Starza, who challenged Rocky Marciano for the world heavyweight title? (Cobuild) (ability)
- (22) You *can* find out the balances on your Saver Plus and Current Account simply by using your Saver Plus Card at our Self-Service machines. (BNC) (opportunity)
- (23) Well let’s go on if we *may* to the other sort of legacy of Harold Wilson’s Prime Ministership. (ICE-GB) (permission)
- (24) Still to come on Central News, the fruits of mass production. *Can* farmers cut spraying and still make a living? (BNC) (GSP)
- (25) 29. Can our programme offer incentives to students who test negative for drugs?
No, grant funds *may* not be used to provide incentives for students to participate in the drug-testing programme.
<http://www2.ed.gov/programs/drugtesting/faq.html#park> (accessed 7 February 2010) (situation permissibility)

Depraetere and Reed (2011) does not address the question of whether and how the same criteria can be used to distinguish subcategories of non-epistemic necessity. In general, in discussions of non-epistemic meaning, non-epistemic necessity tends to appear as more of an organic block than non-epistemic possibility. No sharp distinction is systematically made between (deontic) ‘obligation’ and the rest of non-epistemic necessity. It seems that two of the three criteria mentioned above can be applied to sentences that express non-epistemic necessity, the result being a three-class taxonomy: (a) first, (again) following Nordlinger and Traugott (1997), non-epistemic necessity may *scope* over a complete situation (e.g. (30), (31)) or not (e.g. (27)–(29)). (b) The *source* of the necessity may be subject-internal or

²¹ The discussion of modal taxonomy has to be relatively short in the context of this paper, whose main focus is the nature of contextual meaning and the facets involved in modal meaning distinctions. In footnote 2, some examples of taxonomic indeterminacy are given. Depraetere and Reed (2006:281–282) and Depraetere and Reed (2011) deal with some of the issues that need to be addressed when categorizing modal meanings.

Table 3

Taxonomy of non-epistemic necessity.

	Narrow scope internal necessity	Narrow scope external necessity	General situation necessity (GSN)
Scope	Narrow	Narrow	Wide
Source	Internal	External	External

subject-external. While the existence of ‘subject-oriented’ necessity meanings (with *need* and *must*) has been pointed out in previous work (e.g. Palmer, 1990:130; Declerck, 1991:386; Quirk et al., 1985:225; Huddleston et al., 2002:185),²² no special label seems to be available as in the case of its mirror category ‘ability’, which covers the semantic load of narrow scope possibility examples with a subject-internal source. The systematic application of categorization principles across modal possibility and necessity justifies the category of ‘subject-internal necessity’, illustrated by the example in (27) (cf. section 2 for further evidence). (c) The criterion of *potential barrier* cannot be adapted and applied to necessity: the very idea of a barrier being potentially imposed is not compatible with the fact that non-epistemic necessity refers to necessary actualization. The sources involved in necessity (be they circumstances, discourse participants, rules and regulations) all motivate or impose actualization and their source status can therefore not be due to the fact that they can potentially block actualization. Table 3 gives an overview of the modal necessity meanings and the criteria on the basis of which they have just been defined. The following examples illustrate epistemic as well as non-epistemic meanings.

- (26) Douglas Hurd will doubtless be grateful for that endorsement not least because of the pressure he *must* be feeling this morning. (ICE-GB) (epistemic necessity)
- (27) If you *must* put it like that. (ICE-GB) (narrow scope internal necessity) (if it is necessary for you/to put it like that)
- (28) The city has no river and *must* bear the heavy cost of pumping water in and sewage out over the surrounding mountains. (ICE-GB) (narrow scope external necessity) (it is necessary for the river/to bear the heavy . . .)
- (29) However, the important thing is that we are having a house warming party and you *must* come. (ICE-GB) (narrow scope external necessity) (it is necessary for you/to come)
- (30) Many of the technical problems posed have been resolved, but some major developments *must* still be made, so such a vehicle *must* remain a long-term ideal. (ICE-GB) (GSN) (‘the situation of major developments being made/ is necessary’)
- (31) Sanctions *must* go. (ICE-GB) (GSN) (‘the situation of sanctions going/is necessary’)

The paraphrases following the examples bring out the nature of the scope (narrow or wide) of the modality. The source of the modality is subject-internal in example (27) only: the necessity originates in the subject referent. In the other examples, the source is subject-external (circumstances in (28), (30) and (31) and a human authority (the speaker) in (29)).

As there are a large number of modal expressions that can be used to communicate non-epistemic necessity, it will be clear that one modal may be more readily used to communicate, say, subject-external necessity, than another, or that specific meanings are not readily communicated by all modals (e.g. Von Stechow, 2006:2).²³ Moreover, criteria such as strength of the modality, the subtype of subject-external source (e.g. Depraetere and Verhulst, 2008; Verhulst, 2012) or illocutionary force have a role to play in bringing about differences in shades of meaning and in determining the most natural contexts of use of specific modal verbs. However, the set of criteria described are sufficient (and necessary) to distinguish the major semantic categories of non-epistemic possibility and non-epistemic necessity. The role of pragmatic features such as those just mentioned will be taken up again in section 4.2; they must also be integrated and accounted for in a framework for the analysis of modal meaning if it is to be descriptively and explanatorily adequate. *May* and *must* will serve to illustrate the model, but the theoretical approach that has been argued for can be applied to any modal verb. *Must* is a modal auxiliary that can express epistemic necessity (as in (26)), narrow scope internal necessity (as in (27)) narrow scope external necessity (as in (28) and (29)), and GSN (as in (30) and (31)). *May* can communicate epistemic possibility (as in (32)), situation permissibility (as in (33)), GSP (as in (34)) and permission (as in (35)) (Examples (33)–(35) are taken from the appendix in Depraetere and Reed (2011)).

²² Declerck uses ‘internal necessity’ to refer to a specific use of *need to*, as in *He needs to talk to others about his work. (because of his character)* (1991:386).

²³ A similar observation applies to the distribution of possibility modals (*can, could, may, might*) across the different subcategories of modal necessity meanings. Questions of distribution are not addressed in any quantitative detail in Depraetere and Reed (2011). Leech and Mair (2006) and Leech et al. (2009:71–90) offer a survey of recent changes in the frequency of modal verbs and their distribution.

- (32) You *may* have a little trouble getting in. (ICE-GB) (epistemic possibility)
- (33) Festival Cities Rovers cover the area between North Berwick, Bathgate, Edinburgh, Glasgow, Stirling, Cardenden, Kirkcaldy, Falkirk and intermediate stations. Tickets *may* be used on most trains, but are not valid before 0915 Mondays to Fridays; on trains timed to depart Glasgow, Edinburgh or Haymarket between 1625 and 1740 Mondays to Fridays. (situation permissibility)
- (34) Alpine species *may* only be grown in temperate zones where cold winters, plentiful rainfall, and long summer days are assured. <http://books.google.be> (accessed 1 December 2010) (GSP)
- (35) My district would like to implement a research-based programme to help students stay drug free. *May* we use grant funds to purchase the programme and train teachers in its implementation? (permission) (<http://www2.ed.gov/programs/drugtesting/faq.html#park>, accessed 7 February 2010)

4.2. Context-independent semantics, context-dependent semantics and pragmatic meaning

In Depraetere (2010), I used ‘modality grids’ to capture modal meaning, the aim being that of offering a layered structure with due space for the either obligatory or optional layers of meaning that make up the meaning of a modal in context. The first layer is constituted by the inherent, context-independent semantic core of possibility (with possibility modals) and necessity (with necessity modals): *may* means possibility, *must* means necessity. This semantic core is obligatorily contextually saturated. In other words, both modals come with a semantic template that is contextually saturated in terms of four features (epistemic vs. non-epistemic, non-epistemic: scope, source, potential barrier). If the meaning is non-epistemic, contextual information will help to determine, for *may*, whether, permissibility, GSP or permission, and, for *must*, whether narrow scope internal necessity, narrow scope external necessity or GSN is communicated. The context drives the interpretation and provides the input needed to flesh out the semantic profile of the modal in question. Not just any context-dependent element of meaning contributes to the explicature: occasionally, there is a further pragmatic layer that often relates to indirect speech act value, which is implicated meaning. The different layers of meaning are represented in Tables 4 and 5.²⁴

An approach along these lines gives due space to contextually derived aspects of modal meaning that impact on the semantics (through the process of lexically-regulated saturation) as well as to contextually derived aspects of modal meaning that do not impact on the semantic level but nevertheless have a crucial role to play in the discourse context in which the modal is used. The latter type of pragmatic aspects of meaning have been widely discussed before (e.g. Palmer, 1990:71, 73, 86; Coates, 1983:87–88; Groefsema, 1992; Stefanowitsch, 2003; Collins, 2009:104) but they have not always been explained in a satisfactory way from a taxonomic point of view. For instance, in her discussion of the meanings of *can*, Facchinetti (2002) points to some ‘peculiar uses’ (2002:236), that is, those in which the utterances with modals function as suggestions, offers and requests:

- (36) Well I mean we you know we *can* have a chat on the twentieth when we see each other anyway. (ICE-GB)
Can you wash those few cups up uhm Rich Stuart please (ICE-GB)

While Facchinetti is right to point out that it is the illocutionary force that is foregrounded in the discourse, I do share her point of view when she writes: ‘The semantic label of ‘dynamic modality’ which might be applied to all such cases would not qualify them correctly, since they only superficially belong to this category’ (2002:237). Inspired by Palmer (1990:86), she labels such examples as ‘dynamic implication’, ‘since their literal semantic meaning is dynamic and their correct interpretation depends on their illocutionary force’ (2002:237) and in her overview of the meanings of *can*, six classes are identified: (a) ability, (b) dynamic possibility, (c) implication, (d) epistemic, (e) deontic and (f) borderline. It will be clear the nature of the criteria that the different classes hinge on is not the same across the taxonomy. In the more fine-grained approach that I have developed in this paper, illocutionary force is a pragmatic phenomenon which does not in itself justify the creation of a taxonomic class. While it is the functional load of the utterance that is the most prominent in examples like those in (36), this does not mean that *can* has an additional meaning that can be captured in terms of classes such as ‘suggestion’ or ‘advice’ or ‘implication’ that are on a par with ‘ability’ or ‘epistemic meaning’. In a similar way, I disagree with Stefanowitsch (2003), who also argues that the indirect speech act wipes out semantic core in specific cases (e.g. *Can you pass me the salt?*) In his constructional approach, the indirect speech construction does not ‘inherit the semantics of *can*’ (2003:10) and ‘loses the meaning of the ‘direct’ construction’ (2003:11). It is crucial to observe that even though the speech act associated with this kind of utterance has become highly conventional or

²⁴ The framework presented here is not incompatible with Cruse’s (2002) approach in terms of sense nodules and facets.

Table 4

Modal meaning grid for *may*.

Context-independent semantics	POSSIBILITY			
Context-dependent semantics (obligatory layer)	EPISTEMIC		NON-EPISTEMIC	
Context-dependent semantics (obligatory layer)	NO FURTHER DISTINCTIONS		Permission	GSP
Pragmatic meaning (optional)	- Effect of illocutionary force - Effect of context of speech (pragmatic strengthening) etc.			

Adapted from Depraetere (2010).

Table 5

Modal meaning grid for *must*.

Context-independent semantics	NECESSITY			
Context-dependent semantics (obligatory layer)	EPISTEMIC		NON-EPISTEMIC	
Context-dependent semantics (obligatory layer)	NO FURTHER DISTINCTIONS		Narrow scope internal necessity	GSN
Pragmatic meaning (optional)	- Effect of illocutionary force - Effect of context of speech (pragmatic weakening) - Effect of strength of the modality etc.			

standardized, the status of the indirect speech act is clearly that of an implicature, witness the fact that the indirect speech act value can be cancelled:

- (37) A: *Can* you carry my suitcase?
 B: Yes, I *can* but I *won't*.
 A: I didn't ask if you were willing to; I just wanted to know whether you are strong enough.

I agree with Keck and Biber (2004), who distinguish between the 'meaning of modals' and the 'communicative functions of modals'. The authors conclude that 'general semantic classes such as possibility and necessity do not always capture the full range of meanings that particular modals convey' (2004:24).²⁵ Instances of what Huddleston et al. (2002:176–177) have called 'pragmatic strengthening' (*You may leave now.* (= instruction rather than permission)) or 'pragmatic weakening' (*You must have one of these cakes* (= offer rather than an order)) likewise belong to the (genuinely) 'pragmatic layer'. In cases like these as well, while it may not often happen in conversation (and if it does, it is likely to be in a jocular context), it is possible to cancel the 'strengthened' or the 'weakened' layer of meaning.

In sum, the advantage of the model presented here is that it disentangles the different factors that contribute to modal meaning (context-independent vs. context-dependent), it identifies different kinds of contextual information (contributing to the semantics or to the pragmatic layer) and it shows how they can be explained through concepts recently developed in theory of meaning. The meaning distinctions at the context-dependent semantic layer are defined explicitly, in terms of a clearly defined set of parameters: each of the modals comes with a semantic template the filling out of which is driven by the context through the process of lexically-regulated saturation.

Table 6 visualizes the approach argued for: it shows how different layers of meaning, some context-independent, others context-dependent, cooperate to bring about an interpretation. In this example, *may* communicates epistemic meaning. However, there is clearly pragmatic strengthening in the sense that the speaker is not just referring to a situation that may potentially actualize, but would actually like the addressee to move the table. The response of the latter is adequate in the sense that he reacts to the indirect speech act value. The example in Table 7 illustrates general situation possibility; the result of the saturation process is as follows:

- non-epistemic
- wide scope (the situation of a chemical being screened against enzymes implicated in the disease is possible)
- subject-external source (circumstances)
- [- potential barrier] (cf. Depraetere and Reed, 2011:13–16)

²⁵ It is especially the pragmatic layer of modals in context that is in need of a detailed and systematic empirical study.

Table 6
Example with epistemic *may* + pragmatic strengthening.

	A: Thinking of moving your table out to your main room. You <i>may</i> want to do that. Right that's cleared up. B: Quickly cleared off (ICE-GB)		
Context-independent semantics	POSSIBILITY		
Context-dependent semantics	EPISTEMIC	NON-EPISTEMIC	
Pragmatic meaning	Pragmatic strengthening		

Table 7
Example with GSP *may*, no pragmatic effects.

	For instance, a chemical <i>may</i> be screened against enzymes implicated in disease (ICE-GB)			
Context-independent semantics	POSSIBILITY			
Context-dependent semantics	EPISTEMIC	NON-EPISTEMIC		
Context-dependent semantics	NO FURTHER DISTINCTIONS	Permission	GSP	Permissibility

Table 8
Example with GSN *must*, no pragmatic effects.

	Moving on to small private pensions, you may be able to take relatively small pension savings wholly in cash under an arrangement known as "trivial commutation". To do this you <i>must</i> be at least 60 years old and the value of your total pension benefits from all sources, excluding state pensions, must not exceed £18,000 (www.bbc.co.uk).			
Context-independent semantics	NECESSITY			
Context-dependent semantics	EPISTEMIC	NON-EPISTEMIC		
Context-dependent semantics	NO FURTHER DISTINCTIONS	Narrow scope internal necessity	Narrow scope external necessity	GSN

These features together make up the meaning of General Situation Possibility (GSP).

The final example illustrates general situation necessity; the saturated meaning can be made explicit in the following way:

- non-epistemic
- wide scope (the situation of 'you being sixty years old' is necessary)
- subject-external source (regulations)

In this example, as in the previous one, there are no pragmatic effects (Table 8).

The preceding tables show how modal meanings can be accounted for in the framework presented here. It will be clear that further empirical research is needed, especially to survey the pragmatic layer and the role it has to play in discourse and to pin down the differences in effect between modals that communicate the same meaning (e.g. *can* and *may* for permission or GSP, *must* and *should* for narrow scope external necessity). The extent to which modal meaning is constructional and the question of how the model can be enriched to integrate constructional meaning is another issue that needs to be addressed.

5. Conclusion

In this article, I have presented a model for the analysis of modal meaning: each modal has a context-independent semantic core (possibility or necessity) and a specific semantic template that needs to be contextually specified through lexically-regulated saturation. I have made explicit the meaning distinctions on the basis of four distinguishing features. Not any kind of contextually derived aspect of meaning or discursive function of an utterance with a modal should be considered as evidence for a separate modal category: next to the context-independent semantic layer and the context-dependent semantic layer, there is pragmatic layer that caters for potential pragmatic effects. While developing the framework I have argued that modals are polysemous; the results of a diagnostic test used in lexical semantics prove that

the different meanings are semantically distinct; indeterminacy is not by definition indicative of monosemy rather than polysemy.

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