



REVIEW

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Ilse Depraetere, Bert Cappelle, Martin Hilpert, Ludovic De Cuypere, Mathieu Dehouck, Pascal Denis, Susanne Flach, Natalia Grabar, Cyril Grandin, Thierry Hamon, Clemens Hufeld, Benoît Leclercq and Hans-Jörg Schmid, *Models of modals: From pragmatics and corpus linguistics to machine learning* (Topics in English Linguistics 110). Berlin and Boston: De Gruyter Mouton, 2023. Pp. viii + 274. ISBN 9783110738612.

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Models of Modals (MoM), written by thirteen authors, compiles research on the English modal auxiliaries carried out as part of the funded Franco-Swiss project *Rethinking English Modal Constructions (REM): From feature-based paradigms to usage-based probabilistic representations*. *MoM*'s contents include an introduction, nine chapters and a subject index.

The introduction (pp. 1–13), by Ilse Depraetere, Bert Cappelle and Martin Hilpert, highlights the wealth of already existing research on the area, due to the essential role of modality in human cognition and the semantic versatility of the English modal auxiliaries. This rich literature is argued not to preclude the need for *MoM* as a contribution whose addition to existing knowledge consists mainly in digging deeper into the role of context (thus shedding light on implications for the semantics-pragmatics interface), the interaction between theories and methodologies, and the factors that motivate the speaker's choice among the different modals. The introduction ends with an overview of the chapters.

Chapter 1, 'English modals: An outline of their form meanings and uses' (pp. 14–59), by Ilse Depraetere and Bert Cappelle, proposes an overview of the English modal auxiliaries, describing their well-known formal properties in NICE contexts (negation, inversion, 'code' and emphasis). The approach concentrates on modal auxiliaries with the meanings of possibility and necessity, to the exclusion of *will*, *shall* and *would* on the grounds that they are primarily tense forms whose modal meanings (volition and predictability) cannot be easily approached in terms of possibility and necessity. A taxonomy is then proposed for the meanings of the modals, based on the well-known distinction between epistemic and root modality. Epistemic modality is said to be unproblematic, with the only caveat that evidentiality is arguably a subcategory of epistemic meaning. This view can be agreed upon, since English epistemic modal auxiliaries may be considered to ultimately mean epistemic possibility or necessity even if this assessment may be more or less strongly based on evidence depending on

individual contexts. More space is devoted to the submeanings of root modality, which are classified according to the taxonomies presented earlier in Depraetere & Reed (2011) for possibility and Depraetere (2014) for necessity. The taxonomy is based on two factors:

1. Scope, classified as broad or narrow depending on whether the modality scopes over the whole proposition, or else over the Verb Phrase – in this latter case, it is predicated of the subject referent. For characterising broad scope, the term ‘state of affairs’ would have been a more accurate option, since root modality, independently of its subtype, does not scope over a proposition but over a state of affairs: the content under its scope can be said to occur but cannot be assessed in terms of truth or falsity (cf. Boye 2023).
2. Source, which concerns the origin of the modality.

The possibility meaning has the additional factor of potential barrier, which is positive ‘when the source of the modality can potentially get into the way of actualization’ (p. 31), or negative in other cases. The resulting meanings are five for possibility (ability, opportunity, permission, general situation possibility, situation permissibility) and three for necessity (narrow-scope internal necessity, narrow-scope external necessity, general situation necessity). After the presentation of the taxonomy, the chapter specifies its position about a few highly debated issues. It advocates for the polysemy of the modals, evidenced by Zwicky & Sadock’s (1975) tests by means of anaphoric constructions; it claims that Coates’ (1983) notions of gradience, ambiguity and merger are not necessary, since they may be handled by the meanings distinguished in the taxonomy; and it upholds a neat distinction between the semantics and pragmatics of the modals, acknowledging the existence of short-circuited implicatures such as the pragmatic function of objection triggered by the construction *why should I...?* The chapter ends with an overview of the theoretical models, methods and datasets used in *MoM*, with special attention to the REM dataset, consisting of *c.* 5,000 contextualised examples of ten modal verbs randomly extracted from the *Corpus of Contemporary American English* (COCA) and annotated in an Excel table according to 36 syntactic, semantic, pragmatic and lexical features – named ‘predictors’ because they were predicted to account for usage differences. The REM dataset is used in four of the empirical chapters (3, 4, 5, 8). The Excel table and the annotation guidelines are freely available in the *MoM*’s website.

Chapter 2, ‘Modality revisited: Combining insights from Construction Grammar and Relevance Theory’ (pp. 60–92), by Benoît Leclerq, presents an analysis of modal meaning which, through a combination of Construction Grammar and Relevance Theory, proposes that the interpretation of modals includes an inferential process of lexically regulated saturation – necessary for arriving at a propositional form – in which search for relevance is a key factor. The saturation process is guided by a network of modal constructions, approached through sample constructions discussed

in the literature, such as SUBJ *must be* V-ing, *I must* V, *I don't think we should* VP or *I can't tell you how*. Leclerq claims that modals have a dual nature: they have a procedural part, since they express attitudes, and a conceptual part due to the centrality of the notions of possibility and necessity. I would argue, though, that the meanings of possibility and necessity may be considered as attitudinal on the grounds that assessing a proposition or state of affairs as possible or necessary is expressing an attitude; modals could then be viewed as encoders of instructions for computing propositional representations as possible or necessary, thus being wholly procedural.

Chapter 3, 'Possibility modals: Which conditions make them possible?' (pp. 93–117), authored by Bert Cappelle, Ludovic De Cuypere, Ilse Depraetere, Cyril Grandin and Benoît Leclerq, expounds an analysis of the possibility modals specified in chapter 1 – *be able to*, *can*, *could*, *may* and *might* – using the REM dataset. The analysis includes a bivariate analysis, whose results confirm the significance of most predictors for the use of individual modals, and a multivariate analysis using Conditional Inference Trees and Conditional Random Forests, whose results provide evidence that the distribution of the modals is associated with the predictors CATEGORY, TEMPORAL LOCATION, POLARITY and NEXT CONSTITUENT. These predictors were also found to display associations, which are argued to have pedagogical implications for the development of pedagogical materials. The methodology has the shortcoming that no measures of inter-rater reliability are included, since all the annotation was done by a single researcher – one of the authors of the chapter annotated 33 predictors and another the remaining three.

Chapter 4, 'Necessity modals and the role of source as a predictive factor' (pp. 118–48), by four of the authors of chapter 3 (Benoît Leclerq, Bert Cappelle, Ilse Depraetere and Cyril Grandin), sets forth an analysis of the root modality occurrences in the REM dataset of the necessity modals identified as such in chapter 1 (*must*, *have to*, *need*, *ought to* and *should*) on the basis of the predictor SOURCE, adopting the five categories annotated in the REM data, namely subject-internal, discourse-internal, conditional, rules and regulations and circumstantial. Inter-rater reliability was first confirmed through the annotation of one-fifth of the occurrences of the necessity modals in the REM dataset by two researchers and posterior calculation of Kappa scores. The remaining four-fifths of the dataset were then coded by one annotator. The results of the analysis, tested through the *vcd* package in R, strongly point to the association of each modal with one source: 'rules and regulations' for *must*, 'conditional' for *need to*, 'discourse-internal' for *ought to* and *should*, and 'circumstantial' for *have to*.

The topic of necessity modals is continued with chapter 5, 'You *must* / *have to* choose: experimenting with choices between near-synonymous modals' (pp. 149–76), by Susanne Flach, Bert Cappelle and Martin Hilpert, where the factors underlying speakers' choices of either modal are approached through the combination of a corpus analysis and an experimental analysis. The corpus analysis was based on part of the predictors annotated in the REM data, namely ASSOCIATION, PERSON, AGENTIVITY, GENERICITY and SOURCE. This last factor was collapsed into two types, 'rules and regulations' and 'non-rule'. The experimental analysis was based on the responses obtained from the completion by 100 native North American English speakers recruited

via Prolific.ac. of an offline split-100 task, which consisted in issuing acceptability judgements on two options to fill in sentences by dragging a 0-100 slider. The sentences were inspired by corpus sentences in the REM data, modified in order to cover all the combinations of predictors. In order to conceal the true purpose of the task to the participants, items demanding the judgement of *have to* vs. *must* were alternated with ‘fillers’ from classic alternation phenomena. The results show that SOURCE and ASSOCIATION were the only significant predictors in the two types of data, while PERSON and GENERICITY were significant only for the corpus data.

Based on a previous study by Schmid *et al.* (2021) on the construction *that's* + ADJECTIVE, chapter 6, titled ‘Does the intersubjectivity of modal verbs boost inter-individual differences?’ and authored by Clemens Hufeld and Hans-Jörg Schmid (pp. 177–98), hypothesises a high degree of inter-individual variation in the use of modals due to their strong intersubjectivity. Using the *British National Corpus* (2014) as dataset, individual variation was compared in 11 modal and 11 non-modal n-grams, considering the sociolinguistic factors of age range, social grade, gender and educational quality. The results regarding sociolinguistic predictors are interpreted as not displaying a coherent picture, although, on the whole, social variables had a stronger effect on the use of modal than non-modal n-grams. Concerning individual inter-speaker variation, the results show a high degree of quantitative differences among speakers for all the grams under analysis, but no differences between modal and non-modal n-grams. The ensuing discussion session interprets possible reasons for these null results, pointing to the exclusion in the analysis of semantic and pragmatic aspects and of situational and topical variation, the mechanical nature of the choice of the n-grams under study, the uneven distribution of data across sociolinguistic variables and the different usage frequencies between the n-grams analysed. The conclusion states that the confirmation of the null hypothesis invites further research about individual variation in the use of modals across corpora.

Chapter 7, ‘Modals as a predictive factor for L2 proficiency level’ (pp. 199–224), by Natalia Grabar, Thierry Hamon and Benoît Leclercq, addresses the extent to which the use of modality can predict the proficiency level of non-native speakers of English, through the application of Natural Language Processing techniques to the *EF-Cambridge Open Language Database* (EFCAMDAT), a 70-million-word corpus of written compositions assessed by placement test on levels from A1 to C2. This investigation of automatic predictability comprises 17 modal auxiliaries, including some excluded in other chapters, such as *had better*, *be allowed to* or *be supposed to*, as well as other predictors, like other modal expressions, readability scores and learner n-grams. The meanings of the modals were not considered. By means of Random Forest, the 17 modal verbs alone are shown to correctly classify two-thirds of the productions. The classificatory power of the model is shown to perform better with the lower proficiency levels. The reasons lie in several factors: first, the higher number of productions in lower levels – the influence of the data size on the predictive power of the model was corroborated by an under-sample dataset analysis; second, the high distance between lower level productions and those of native users; third, the similar

percentages of productions with and without modals between the levels B2, C1 and C2. In the final discussion session, the authors acknowledge that the results could improve by introducing distinctions in the meanings of the modals.

Chapter 8, 'Revisiting modal sense classification with contextual word embeddings' (pp. 225–53), by Mathieu Dehouk and Pascal Denis, addresses automatic meaning classification in the context of the possibility and necessity modals listed in chapter 1. The results of different Natural Language Processing models applied to two existing datasets (MPOA and EPOS) and to the REM dataset prove the higher accuracy of BERT in comparison to other models. BERT was tested by training both a unique shared model for all modals and an independent model for each modal; the better performance of one or other is shown to depend on the individual modal. The chapter opens up interesting directions for further research, such as testing an intermediate model between the independent and the unique, and obtaining a more accurate approach to speakers' knowledge of modality, which has proved to go beyond syntactic and lexical clues from a narrow context.

Construction Grammar is resumed in chapter 9, 'Modals in the network model of Construction Grammar' (pp. 254–69), by Martin Hilpert and Susanne Flach, a theoretical chapter that advocates for the applicability of Schmid's (2020) Entrenchment-and-Conventionalisation model to research on speakers' knowledge of modal constructions. Schmid proposes that linguistic knowledge is available only in the format of associations: according to this view, a construction is no longer a node qualitatively different from links connecting the nodes, but a set of associations that process information. Constructions with modals are no exception; therefore, speakers' network model for the use of modals might consist of knowledge of associations and links between linguistic elements. Hilpert & Flach defend the viability of the model through the description, illustrated with examples extracted from relevant bibliography, of the four types of associations distinguished in the model (symbolic, paradigmatic, syntagmatic and pragmatic), and point out that this viability is supported by the results of chapter 5, by the same authors plus Bert Cappelle.

MoM more than meets its aims of shedding light on speakers' knowledge of the modals and showing the fruitfulness of the interaction between different theories – chapter 2 is a case in point – and methodologies. By contrast, *MoM*'s implications for the semantics-pragmatics interface could be considered to be more modest, due to the subsidiary role of pragmatics – none of the chapters is genuinely centred on the pragmatic dimension of the modals. Little or no mention is made of politeness, face-saving or power relationships among speakers and addressees, which are indeed part of speakers' knowledge about the use of modals. *MoM* does mention a few pragmatic issues, but their discussion is brief: an example is the association, addressed in chapter 4, of *ought to* and *should* with a 'discourse-internal' source, in the sense that necessity is assessed by the speaker rather than derived from rules and regulations. Although the issue is not further discussed, there is the possibility that this association could be due to face-saving reasons, given that these two modals are often viewed in the literature as weaker than the other necessity modals. Similarly, chapter 6 evaluates some results on

sociolinguistic predictors of inter-individual variation as ‘not yield[ing] a coherent picture’ (p. 190), while more fine-grained analyses could have uncovered the reasons for some differences; for example, the model’s predicted overuse by people above the age of 29 of *can you* and *you can* might well be related to the tendency of this age group to be in more powerful positions in comparison to younger people, given the frequent use of both n-grams in directive speech acts. The issues of genre and topic, which are also part of speaker’s knowledge about the choice of modals, are not treated in depth either. It must be noted, though, that pragmatics and variation across corpora are mentioned as part of the suggestions for further research in several chapters.

Another point worth consideration is the approach to the term ‘source’ for distinguishing subtypes of root modality. As stated above, the taxonomy of the source types used in the REM dataset and three chapters (chapters 1, 3, 4) consist of the categories ‘subject-internal’, ‘discourse-internal’, ‘conditional’, ‘rules and regulations’ and ‘circumstantial’. In view of the results of the empirical chapters, especially chapter 4, this division – at least in the way annotated in the REM data – seems to be useful for shedding light on the speakers’ knowledge about the choice of modals. However, the taxonomy is based on a mix of different dimensions, which may lead to confusion. The type ‘conditionality’, which singles out those modal assessments dependent on a condition, is fully compatible with the other four sources and hence should be an independent predictor. In addition, the term ‘source’ is used in two senses (i) the originator of the root modal assessment – i.e. the one that assesses a state of affairs as enabled, permitted, obligatory, forbidden... – and (ii) the entity whose properties motivate the modal assessment, which may be the subject (‘subject-internal type’) or not. It may be argued that some modal assessments may be both discourse-internal and subject-internal, as in the following example from the COCA corpus:

- (1) You have always seemed older than your years, and now I understand why. You **can not** [sic] be a child any longer, my beautiful, brave daughter. You **must** become a woman. (FIC: Lenobia’s vow, 2012)

where it is the speaker (discourse-internal) that assesses the states of affairs modalised with *cannot* and *must* as impossible and necessary, respectively, but these assessments are based on properties of the referent of the subject (subject-internal).

To conclude this review, *MoM* is a welcome addition to the existing literature on modality and the English modal auxiliaries. The volume provides a rich sample of the advantages of many recent methods and statistical procedures for corpus analysis, and also shows the potential for improvement of automatic classification of the meanings of the modals by means of NLP’s increasingly sophisticated techniques.

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