

Oliver Wicher

Corpus-Driven Lexical Grammar and the Aspect-Modality Interface: The Case of French Past Modal Constructions

Abstract French modal verbs unite temporal, aspectual and modal values in past-tense constructs such as *j'ai voulu faire* vs. *je voulais faire* or *elle a pu rentrer* vs. *elle pouvait rentrer*. The semantics of these *past modal constructions* have been considered a puzzling area, as perfective aspect on root modals forces the complement to take place in the actual world, triggering the so-called 'actuality entailment' effect. The present study analyzes the behaviour of French past modal constructions from a corpus-driven constructional perspective. To this end, the author presents a new reference corpus of French and shows that past-tense choice of French modals can be considered a matter of collostructional preference: perfective and imperfective modals each choose distinct sets of verbal complements forming lexico-grammatical patterns. The results corroborate the actuality entailment hypothesis, and give the opportunity to discuss how the aspect-modality interface in French can be accounted for from a constructional perspective.

Keywords French, aspect, modality, lexical grammar, corpus-driven, collocation

1 Introduction

The present paper tackles a grammatical phenomenon known for its linguistic intricacy: the past-tense use of French modal verbs. They have been extensively analyzed in formal semantics (Bhatt 1999; Hacquard 2006, 2009; Borgonovo/Cummins 2007; Mari/Martin 2007; Martin 2009; Homer 2011; Laca 2012 among others; cf. Rubio Vallejo 2017 for a pragmatic analysis). However, their descriptive analysis in large-scale corpora has been uncharted territory. It will be demonstrated how a corpus-driven approach can lead to a more precise description of forms, meanings and usage patterns of these *past modal constructions* (PMCs):

- (1) a. Quand j'ai voulu passer le conservatoire, j'ai profité d'un déjeuner pour lui dire ce que je voulais faire. (TV)
 'When I wanted to pass conservatory, I took advantage of a lunch to tell him what I wanted to do.'
- b. Je voulais savoir si tu avais une place demain vers 16h ? (SMS)
 'I wanted to know whether you had a place tomorrow around 16h?'
- (2) a. Elle a pu rencontrer un beau garçon. (Fiction)
 'She could meet a handsome guy.'
- b. Tu étais assis très confortablement, tu pouvais rouler dans la neige. (TV)
 'You were sitting very comfortably, you could drive in the snow.'
- (3) a. Pour prendre soin de toi, j'ai souvent dû délaissier ta sœur aînée. (Letters)
 'In order to take care of you, I often had to neglect your elder sister.'
- b. Il devait avoir touché une petite fortune pour un tel contrat. (Film)
 'He had to make a small fortune for such a contract.'
- (4) a. Il nous a bien fallu nous rendre à cette évidence. (Academic)
 'We had to acknowledge the evidence.'
- b. J'avais de super jambes. Il fallait que j'en profite. (Drama)
 'I had nice legs. I had to benefit from this.'

The examples (1–4), taken from the *Corpus de référence du français contemporain* (CRFC; Siepmann et al. 2017), illustrate some essentials of French modal semantics. All of them lexically encode the speaker's attitude to the assertion, modalizing it. The most common typology is the tripartition between deontic (coding authority), epistemic (coding an estimation) and dynamic (coding capacity) modality, with the term *root modality* sometimes being used to cover deontic and dynamic modality (Nuyts 2016). The four French modals presented here seem to allow more or less clear correspondences if considered in isolation: *vouloir* 'want' and impersonal *falloir* 'be necessary' code deontic modality. The modals *devoir* 'must, have to' and *pouvoir* 'can, be able to', however, are inherently polysemous (Boogaart 2009), since they allow deontic/epistemic or even deontic/dynamic/epistemic interpretations respectively.

The picture becomes more blurred if one adds the aspectual dimensions that are coded by grammatical aspect, i. e. *passé composé* (PC) and *imparfait* (IMP). The cases *vouloir* and *falloir* both still express deontic modality in the past, either in form of volition (1a–b) or of necessity (4a–b). Past-tensed *pouvoir* also keeps its polysemy in (2a): it allows a deontic reading (the woman had the permission

to meet the man), a dynamic one (she had the capacity to meet him), and an epistemic one (she may have met him). However, the proposition is ambiguous as to whether the woman has met the man or not. By contrast, the context in (2b) suggests a dynamic reading. Finally, *devoir* in (3a) expresses obligation in the past, whereas in (3b) it construes epistemic modality. French PMCs are thus located at the interface between tense, aspect and modality (TAM) (Desclés 2003). Consequently, it is quite difficult to disentangle their individual semantic values. As will be shown, an aspectual analysis cannot account for the past-tense behaviour of French modals. One appealing proposal is instead put forward by Hacquard (2006), following Bhatt's (1999) seminal work, who notes that perfective aspect on root modals triggers so-called 'actuality entailment': the action has in fact taken place in the actual world. However, the precise reason for this interaction between aspect and modality has been subject to controversy.

Corpus linguistics may contribute another piece in the puzzle by identifying the different form-meaning-correspondences and their usage patterns. If we know how French PMCs are distributed in actual speech, we can derive characteristic patterns and their underlying generalizations from them. It is therefore worth reanalyzing a TAM-phenomenon from a corpus-driven constructional perspective. Our central assumption is that the two French past tenses can be considered an alternation phenomenon: both of them depict a situation in the past, but they do so with different perspectives. Thus, this semantic difference should be reflected in a different lexico-grammatical patterning. We introduce a new reference corpus of French, the CRFC, and perform *distinctive collexeme analysis* (Gries/Stefanowitsch 2004) in order to identify the preferred verbal complements of each PMC, assuming that complementation has a pivotal role in determining their semantics. Concordancing eventually allows the detection of underlying constructional patterns that can be analyzed in terms of common semantic traits.

The paper is structured as follows: Section 2 outlines theoretical considerations, offering an overview of the aspect-modality interface in French. Furthermore, it briefly reviews the body of corpus-based work on French past tenses and gives a sketch on the (corpus-based) construction grammar (CG) paradigm, showing how CG can offer a fresh view on the semantics of aspect and modality. Section 3 introduces the CRFC and describes the methodology of the corpus study. Section 4 contains the results of the corpus analysis. Section 5 discusses the findings. Finally, Section 6 draws a short conclusion.

2 Theoretical considerations

2.1 Aspect and modal verbs in French

The choice between French PC and IMP — similar systems can be found in other Romance languages — is a matter of grammatical aspect. At least since the works of Garey (1957) and Comrie (1976) it has been considered common knowledge that grammatical aspect in French is limited to past tenses: perfective aspect is coded in the PC (and of course in the *passé simple*), construing a situation globally with its temporal boundaries as in (5). By contrast, the IMP codes imperfective aspect and focuses the internal perspective of a situation unfolding in time. Temporal boundaries are not considered, as shown in (6).

- (5) Je suis parti de chez moi vers 7h30. (TV)
‘I left home at 7h30.’
- (6) Nous parlions de ma santé quand soudain ils m’ont annoncé
la mort de mon père. (Diaries & Blogs)
‘We were talking about my health when suddenly they announced
the death of my father.’

The PC has relatively clear-cut semantics, encoding the result of an action and depicting this result as one whole event (Desclés/Guentcheva 2003), be it in connection with speech time (resultative) or isolated from speech time (perfective past). That is not the case with the IMP, which can be considered some sort of “chameleon”. It can represent aspectual, but also pragmatic and modal meanings: common subsenses are habituality, politeness and counterfactuality. Taking these — and other — usages into account, it has to be asked whether the IMP is in fact a tense, a mood, or a combination of both, whose temporal and modal values are intertwined (cf. Labeau 2002 for an overview of IMP meanings).

Searching for an invariant meaning in monosemic approaches leads to various proposals. Coseriu (1976) sees the core trait of the IMP in its “nonactuality”, refuting the claim to assign to it the status of a past tense. According to him, Romance tenses can be broken down to the opposition “actual vs. nonactual”: the present tense constitutes the core of the actual level (i.e. an action takes place either in the past, in the present, or in the future), whereas the imperfect is its counterpart, constituting the core of a second, nonactual level (i. e. the realization of the action is somehow impeded and can therefore only be hypothetical). Brisard’s (2010) criterion of “virtuality” is similar to this: the IMP creates a second virtual viewpoint distant from the speaker’s one. Turning to frameworks that go beyond the sentence level, Weinrich’s (1982) concept of discourse grounding is

certainly the most widespread explanation for past-tense use in discourse: the perfective past foregrounds situations, making the plot advance. By contrast, the imperfective backgrounds them, creating periods of stasis (cf. also Michaelis 2011; for a detailed discussion of different approaches to the IMP and related problems cf. Brisard 2010: 487–497).

As evidenced in Section 1, the modal verbs somewhat seem to escape these traditional approaches. Reconsider the examples (1–4): a purely aspectual analysis fails to motivate the past-tense alternations. In (3a), the signal word *souvent* would trigger a habitual reading and thus the IMP. By analogy, the IMP in (1b) is unexpected because the speaker's volition is delimited to the context of conversation. Instead, the polite imperfect in this case encodes a pragmatic value. The past-tense alternation of *vouloir* in (1a) poses another problem because it is not clear why the speaker's volition should be temporally delimited in *j'ai voulu passer le conservatoire*, but undelimited in *ce que je voulais faire*. It does not motivate the one in (4a–b) either. Narrative explanations like discourse grounding also seem to be problematic, since a text linguistic approach cannot be simply adopted to (informal) conversation like in (1a), (2b) or (3b). Briefly put, there must be more to past-tensed modals than the temporal delimitation or the discourse grounding of the proposition.

The works of Bhatt (1999) and Hacquard (2006, 2009) are most notably known for the hypothesis that perfective morphology on root modals neutralizes the modal value of the proposition, replacing it with an uncancelable inference: the proposition takes place in the actual world, giving rise to the so-called 'actuality entailment' effect (cf. Hacquard *to appear* for a detailed comparison of different explanations). Consider the following examples (Hacquard 2009: 288–290):

- (7) a. Jane a pu soulever cette table, #mais elle ne l'a pas soulevée.
 b. Jane pouvait soulever cette table, mais elle ne l'a pas soulevée.
 'Jane was able to lift this table, but she didn't lift it.'
- (8) a. Lydia a pu aller chez sa tante (selon les ordres de son père),
 #mais n'y est pas allée.
 b. Lydia pouvait aller chez sa tante (selon les ordres de son père),
 mais n'y est pas allée.
 'Lydia could go to her aunt (according to her father's orders),
 but she didn't go.'
- (9) Bingley a (bien) pu avoir aimé Jane, comme il a (bien) pu ne pas l'aimer.
 'Bingley may (well) have loved Jane, just as he may (well) not have loved her.'

It is impossible to cancel the action if perfective aspect operates on a root modal (7a, 8a). This is not the case for epistemic modals as in (9). Imperfective modals as in (7b) and (8b) are not subject to actuality entailment, which is presumably due to their generic nature. Note that whereas the modals *pouvoir*, *devoir* and *vouloir* have been analyzed fairly extensively in this framework, to our knowledge impersonal *falloir* has not been taken into consideration yet. It may be assumed that actuality entailment also affects perfective *falloir*, as it equally codes deontic modality. The following section deals with how corpus-driven CG can complement these theoretical claims with empirical data and how the semantics of PMCs can be grasped in terms of lexico-grammatical constructions.

2.2 Corpora, constructions and usage

The body of corpus-based work on French past tenses is rather modest, since several reasons reduce the representativeness of the studies. First of all, the data is based on small corpora sometimes representing particular text types. Common genres investigated are newspapers (Waugh/Monville-Burston 1986), television talk (Labeau 2006), sports commentaries (Labeau 2004, 2007) or obituaries (Do-Hurinville 2010, Labeau 2013). While this is not a lacuna *per se*, it would certainly be appreciated if the data basis were to be expanded to bigger sample sizes of spoken informal varieties. Unsurprisingly, the call for a mega-corpus of contemporary French has been repeatedly issued (Deulofeu/Debaisieux 2012, Bilger/Cappeau 2013). Second, these studies provide descriptive frequencies or percentages, without using any sort of inferential statistics that could possibly generalize the findings. Third, they mostly do not give any insights into whether single verbs show preferences for one of the past tenses, which could shed further light on the relationship between lexical and grammatical aspect. Narrowing the focus down to modal verbs, the only study providing frequency data is Blumenthal (1976): French PMCs prefer to be realized imperfectively, be it in radio interviews (ratio IMP to PC 2:1) or in fiction (ratio 3.5:1), the exception being newspaper articles (ratio approx. 1:1). But similar to the aforementioned studies, the sample size (no past-tense construction occurs more than 100 times) does not permit any representativeness.

Large-scale corpus linguistic work has shown that language consists of more or less schematized form-meaning-correspondences, so-called *constructions*: a linguistic unit is stored as a construction as long as it has non-compositional semantics (Goldberg 1995) or as long as it occurs with sufficient frequency (Goldberg 2006). Most constructional theories are also usage-based, highlighting the importance of frequency in language structure and acquisition: a given category is made of some high-frequent prototypes and a large number of low-frequent peripheral members (Diessel 2015). Prototypes are processed faster and

can trigger priming effects, facilitating the acquisition of peripheral members (Ellis 2002). Another major CG tenet concerns the inseparability of lexis and grammar (Römer 2009, Hunston 2015), be it from a *lexis-to-grammar* perspective (a linguistic unit selects lexico-grammatical environments in which it occurs preferably), or from a *grammar-to-lexis* perspective (a grammatical construction attracts specific collocates). One statistically reliable method to calculate the attraction between a construction and its collocations is collostructional analysis (Gries/Stefanowitsch 2004). Taking observed and expected frequencies of collocates into account, one can calculate the collostructional strength, a value indicating how strongly a construction attracts a collocate in a slot. These so-called *collexemes* can be ranked in terms of their collostructional strength, with highly distinctive collexemes being indicative of relatively frozen constructional patterns, prone to be entrenched and stored separately.

What do these ideas imply for the analysis of French PMCs? We assume that they can be analyzed from a corpus-driven constructional perspective. Perfective and imperfective modal constructions are an alternation phenomenon and thus likely to co-occur with different sets of verbal complements. The retrieval of distinctive collexemes may shed light on preferred co-occurrence patterns and eventually on the underlying semantics of PMCs. Notions such as ‘actuality entailment’ can thus possibly be grasped in terms of highly frequent lexico-grammatical constructions. In fact, there is substantial empirical evidence that a CG analysis of modality is possible and explanatory (see e. g. the thematic issue 8/1 of *Constructions and Frames*). Consider, for instance, syntactic patterns in English that correlate with epistemic modality (Wärnsby 2002) or collocational preferences of modal verbs (Hilpert 2016). Further hints at the constructional relevance of modal semantics are provided by De Haan (2012), who investigates the patterning of the English modal *must*. His findings show a strong correlation between modality and verbal construction: ‘*must* + progressive’ as well as ‘*must* + perfect’ almost exclusively express epistemic modality, whereas ‘*must* + V’ yields a deontic interpretation. Moreover, he points out the importance of register and person as additional factors. Another piece of evidence comes from German and Dutch, where impersonal complementation triggers an epistemic reading (Boogaart/Fortuin 2016: 529f.).

3 Corpus and methodology

3.1 The Corpus de référence du français contemporain

The CRFC is the first genre-diverse reference corpus of contemporary French with about 310 million words, evenly distributed among spoken, written and

pseudo-spoken¹ varieties (cf. Siepmann et al. 2017 for detailed information on its design and compilation). The corpus has been POS-tagged via the *French Tree Tagger* (Stein 2003), but lacks prosodic annotation for the spoken varieties as well as syntactic parsing. It includes over 155 million words of (pseudo-)spoken language such as informal conversation, drama scripts, discussion forums, chats or television subtitles. The written subcorpora include another 155 million words of academic texts and lectures, prose fiction, newspaper articles, parliament speeches and several smaller-sized genres such as diaries and blogs. Table 1 illustrates its composition.

Table 1: Compilation of the CRFC (Siepmann et al. 2017: 70).

Category	Subcorpus	Size in mill.	Category	Subcorpus	Size in mill.
Spoken	Informal	30	Written	Academic papers	30
Pseudo-spoken	Drama scripts	30		Non-academic texts	30
	TV subtitles	2,5		Prose fiction	30
	SMS and chats	2,5		Newspaper articles	45
	Discussion forums	60		Magazines	10
Pseudo-written	Formal	30	Diaries and blogs	5	
			Letters and e-mails	1	
			Miscellaneous	4	
		155			155

Previous studies in lexicography (Siepmann 2015) and descriptive grammar (Siepmann/Bürgele 2015, 2016) have shown that a thorough corpus-driven look at linguistic phenomena in French can generate new insights on their distributions that have hitherto been neglected in traditional grammars. The CRFC is currently available on-demand on the platform *Sketch Engine*.

3.2 Data retrieval

The PMC can roughly be schematized as a tripartite structure [SUBJ MOD_{PST} COMP], with the subject being followed by the past-tensed modal and the verbal complementation slot, see (10). Note that two optional slots are added in order to account for possible adverbs or clitics. The examples (11a–d) show different instantiated constructs.

1 The term *pseudo-spoken* can best be explained in terms of the well-known distinction between *immediacy* and *distance* elaborated by Koch/Oesterreicher (2011), referring to written language that typically exhibits spoken language characteristics, e. g. chats, text messages and threads in discussion forums (*immediate language*).

- (10) [SUBJ (OPT) MOD_{PST} (OPT) COMP]
- (11) a. Je voulais te demander
 b. Mon frère n'a pas pu rentrer
 c. Il lui fallait bientôt arriver
 d. On ne devait plus jamais retourner

1. **Filtering and CQL-commands:** With the corresponding CQL-commands, it was possible to obtain all instances of PMCs. The verbal complements were retrieved in the interval 0–3R. As for the IMP-constructions, the conjunction *si* in the left periphery (0–5L) was filtered out in order to avoid irrealis conditional clauses, where the conjunction would automatically trigger the IMP (*Si tu faisais* ‘If you did’). One remaining problem concerned the occurrence of *que* ‘that’ in the left context, as it triggers the *imparfait de concordance* if the matrix verb is realized in a past tense, e. g. *Il a dit que je pouvais venir* ‘He said that I could come’. This bias could not be eliminated.
 2. **Collecting raw frequencies:** In a first step, we listed the most frequent verbal complements of each PMC, resulting in lists of 50 verbs for each PMC.² As Gries et al. (2010) have pointed out, however, raw frequencies are not reliable enough to tell whether a complement has a preference for one of the two constructions. That is why a distinctive collexeme analysis was performed.
 3. The **distinctive collexeme analysis** was carried out with the R script *Coll. Analysis 3.2a* (Gries 2007). Following previous work, the lists only present the most distinctive collexemes, in our case 15 (it will be noted if there are any more distinctive collexemes). One reason for this can be formulated from a statistical point of view: the significance level was put at $p < 0.001$, corresponding to a collostructional strength of over 3. Keep in mind that the complementation slot is open and every verb in the lexicon could theoretically occur in it. Consequently, a certain number of verbal complements would gain at least significant collostructional strength (Coll.str. > 1.3 ; $p < 0.05$), blurring the overall picture. By analogy, focussing on the most distinctive collexemes permits a) the detection of frozen phraseological expressions and b) a better evaluation of possible links between modality and constructional patterning: in the usage-based CG framework, high-frequent items are also often prototypes. If these prototypes, in our case the most distinctive collexemes, occur in a certain PMC then it is reasonable to assume that they form a close semantic
- 2 One might object that low-frequent verbs could possibly have high collostructional strength values. This was not the case, as has been tested for several examples: no significant collostructional strength could be measured.

link with the construction, following the basic principle of corpus linguistics that items occurring in similar contexts also have similar semantics (Stubbs 2016).

4. **Concordancing:** The fourth step was to investigate the constructional patterns of the PMCs by means of concordancing. The verbal complement may be, for instance, embedded in a secondary pattern; correlations may be established between modality and constructional patterning. This step, however, was only performed for the most distinctive collexemes and involved the researcher's intuition and a more qualitative analysis. Of course, future studies can apply more refined methods, submitting manually coded instances to multivariate procedures like correspondence analysis to identify semantic clusters; but in this case, and due to space restrictions, the results should still provide sufficiently clear answers to our questions.

4. Results

4.1 Overview: Raw frequencies

In a first step, we give an overview of frequencies and distributions. Figure 1 shows the raw frequencies for the four French PMCs in the CRFC.

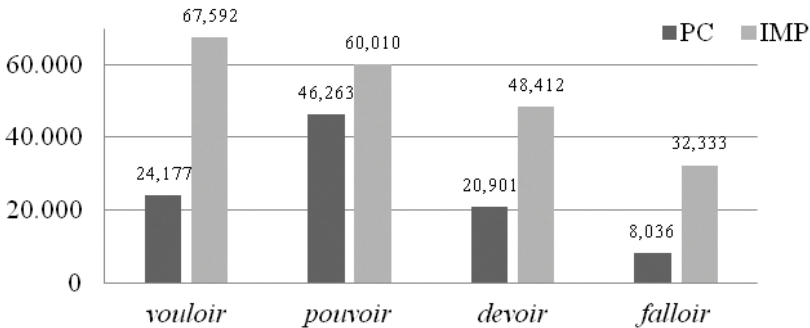


Figure 1: Raw frequencies of the French PMCs in the CRFC.

First of all, it has to be noted that raw frequencies of up to more than 60,000 are reached. Unsurprisingly, all of the PMCs tend to be realized imperfectively. The overall picture, however, is not uniform. The verb *pouvoir* almost equalizes this difference, with the IMP being only 1.3 times as frequent as the PC. The differences become bigger with *devoir* and *vouloir*, rising up to four times as frequent

imperfects with *falloir*. Furthermore, the ratio between IMP and PC is subject to genre-specific differences, as shown in Table 2. The IMP is only half as frequent as the PC in letters and e-mails, although this finding has to be treated with caution due to the small corpus size. In almost all the other subcorpora the IMP is more frequent, reaching the biggest ratio differences in the SMS and prose fiction subcorpora.

Table 2: Genre-specific IMP to PC ratios.

Subcorpus	IMP : PC	Subcorpus	IMP : PC
Letters and e-Mails	0.46	TV	1.89
Miscellaneous	0.66	Non-academic	1.94
Newspapers	1.17	Drama	2.19
Spoken formal	1.33	Discussion forums	2.24
Magazines	1.66	Spoken informal	2.38
Diaries and blogs	1.67	SMS	4.81
Academic	1.79	Prose fiction	5.77

Note finally that the genre differences already mentioned by Blumenthal (1976) are mirrored in the CRFC. On the one hand, we can observe a balance between the two forms in newspapers (ratio 1.17), on the other hand, the biggest difference can also be found in prose fiction (ratio 5.77).

4.2 Collostructional analysis: distinctive collexemes and their usage patterns

This section now turns to the results of the distinctive collexeme analysis. Of primary concern is the question of how the distributional properties of French PMCs can be described and if it is possible to group the collexemes into semantic classes and lexico-grammatical patterns.

The first case study is dedicated to the verb *pouvoir*. Table 3 compares the most distinctive collexemes for the two constructions. The PC seems to prefer verbs that represent some sort of (visual) realization such as *constater* ‘state, notice’, *découvrir* ‘discover’, *voir* ‘see’ or *observer* ‘observe’. Additionally, all of the collexemes are transitive verbs. The most distinctive collexeme *constater* has infinite collostructional strength, which hints at a frozen pattern (the concrete value could not be calculated due to processor restrictions). Quite strikingly, not a single distinctive PC-collexeme is represented in the IMP-list. Verbs such as *espérer* ‘hope’, *imaginer* ‘imagine’, *savoir* ‘know’, *soutenir* ‘bear’ or *penser* ‘think’ could possibly be grouped into a class of cognitive/psych-verbs.

Table 3: Distinctive collexemes of the past-tense constructions of *pouvoir*.

PC (N = 46,263)		IMP (N = 60,010)	
Collexeme	Coll.Str.	Collexeme	Coll.Str.
<i>constater</i> 'state, notice'	Inf	<i>espérer</i> 'hope'	81.77
<i>découvrir</i> 'discover'	80.74	<i>imaginer</i> 'imagine'	61.54
<i>voir</i> 'see'	59.92	<i>savoir</i> 'know'	60.84
<i>observer</i> 'observe'	55.41	<i>durer</i> 'last'	46.47
<i>mesurer</i> 'measure'	54.35	<i>permettre</i> 'allow'	37.55
<i>apprécier</i> 'appreciate'	53.86	<i>avoir</i> 'have'	26.84
<i>montrer</i> 'show'	53.44	<i>laisser</i> 'let'	26.19
<i>lire</i> 'read'	50.11	<i>être</i> 'be'	22.08
<i>assister</i> 'assist'	45.34	<i>continuer</i> 'continue'	10.27
<i>développer</i> 'develop'	40.57	<i>supporter</i> 'bear'	9.83
<i>obtenir</i> 'obtain'	38.17	<i>penser</i> 'think'	9.79
<i>établir</i> 'establish'	37.47	<i>aller</i> 'go'	7.46
<i>rencontrer</i> 'meet'	36.47	<i>compter</i> 'count'	7.05
<i>résister</i> 'resist'	29.08	<i>arriver</i> 'arrive'	6.58
<i>profiter</i> 'profit'	25.67	<i>manger</i> 'eat'	5.73
14 others			

Concordancing reveals clear-cut patterns for the PMCs of *pouvoir* (see Figure 2). The PC-constructions describe how the subject has managed to realize something. Actuality entailment is at hand, as the instances can be substituted with their lesser marked equivalent without a modal, e. g. *j'ai constaté que*. Two aspects hint at the phraseological nature of the PC-construction: first, they have a much higher number of distinctive collexemes than the IMP (29 versus 15); second, they occur predominantly with 1SG and 1PL. The IMP, by contrast, seems to express dynamic modality with constructs such as *on pouvait imaginer que* 'one could imagine that' or *je (ne) pouvais savoir que* 'I could (not) know that'.

The analysis of *vouloir* reveals another case of differently distributed collexemes (see Table 4). The IMP-collexemes can be grouped into a class of 'discourse verbs' with the members *dire* 'say', *savoir* 'know', *demander* 'ask', *parler* 'talk' and *remercier* 'thank'. The concordance in Figure 3 shows that they are used with the polite imperfect. The IMP almost exclusively instantiates this subsense as the overall number of distinctive collexemes (12) is rather low.

The PC differs insofar as none of its collexemes has an extraordinarily high collostructional strength, the most distinctive ones being *prendre* 'take' and *faire* 'make, do'. This in turn would mean that the PC of *vouloir* allows freer combinations. In fact, it simply seems to express the literal meaning of volition, as shown in Figure 3. The contrast between the PMCs of *vouloir* can also be described by means of 'speech situation': the IMP-construction instantiates a polite use and is thus predominant in dialogical settings, e. g. if the speaker addresses his

Drama	de Duchemin. RICHARD: Comme vous	avez pu	le constater nous venons de pratiquer
Fiction	sont de redoutables chicanesurs, j'	ai pu	le constater quand j'ai eu affaire à
Formal	surfaces sont équilibrés ? Nous	avons pu	le constater récemment avec les
TV	- Magique, bien sûr, mais je n'	ai pas pu	le voir naitre car j'ai eu une
Forums	les sentiers et chemins parcourus j'	ai pu	mesurer avec effroi l'ampleur de la
Formal	Bas, en Suède et en Espagne. Nous	avons pu	voir, je le souligne, toute la
Forums	dire plus sur ce reportage que je n'	ai pas pu	voir, mais pour ne pas encombrer le
Formal	schéma interrégional du littoral n'	a jamais pu	voir le jour et qu'aucun schéma de
TV	Car par ma propre pratique, j'	ai pu	voir les qualités de Bokar Rimpoché
TV	L'influence qu'on souhaiterait et qu'on	a pu	voir par le passé à d'autres
TV	à qui raconterait la meilleure. Ca	pouvait	durer 45 mn. Ils avaient tous les 2 le
Fiction	pessimiste sur le résultat que l'on	pouvait	en espérer. Il me l'avait dit
Magaz	que c'était le meilleur accord qu'on	pouvait	espérer. "Elle fut en effet à deux
News	mètres. "Ca dépasse tout ce que l'on	pouvait	imaginer, vu d'ici", soupirent Sophy
News	par la mère. Sauf que cela ne	pouvait pas	durer éternellement", commente-en
Fiction	c'était une fatalité et qu'elle ne	pouvait pas	espérer mieux. - Écrase-le, dit-elle
TV	les cheveux, il est trop moche! - On	pouvait pas	savoir ! Il est si moche que ça? Paola
Drama	toi. Oui... mais je savais pas, je	pouvais pas	savoir... J'étais à un feu... Non.
Drama	sur le champ. Le militaire: Vous ne	pouviez pas	savoir à qui vous aviez affaire.
Fiction	, que ça lui était égal. Elle ne	pouvait pas	savoir que c'était mon emploi qui

Figure 2: Concordances of the PMCs of *pouvoir*.

Table 4: Distinctive collexemes of the past-tense constructions of *vouloir*.

PC (N = 24,177)		IMP (N = 67,592)	
Collexeme	Coll.Str.	Collexeme	Coll.Str.
<i>prendre</i> 'take'	25.52	<i>dire</i> 'say'	174.38
<i>faire</i> 'make, do'	25.51	<i>savoir</i> 'know'	108.69
<i>mettre</i> 'put'	24.44	<i>demander</i> 'ask'	44.72
<i>donner</i> 'give'	24.40	<i>parler</i> 'talk'	31.32
<i>prêter</i> 'lend'	18.02	<i>être</i> 'be'	21.01
<i>créer</i> 'create'	14.92	<i>remercier</i> 'thank'	15.65
<i>reprendre</i> 'regain, start again'	14.68	<i>avoir</i> 'have'	7.53
<i>croire</i> 'believe'	14.29	<i>vivre</i> 'live'	5.40
<i>montrer</i> 'show'	13.92	<i>rester</i> 'stay'	5.23
<i>répondre</i> 'answer'	13.52	<i>devenir</i> 'become'	4.92
<i>comprendre</i> 'understand'	8.68	<i>voir</i> 'see'	3.86
<i>rendre</i> 'give back'	8.08	<i>entendre</i> 'hear'	3.20
<i>essayer</i> 'try'	7.18		
<i>jouer</i> 'play'	6.67		
<i>tuer</i> 'kill'	6.16		
2 others			

interlocutor(s). The PC-construction in turn is mainly used in narrative settings. These perfective instances do not code whether the action has taken place or not; actuality entailment is not triggered (cf. Hacquard *to appear* for a formal explanation).

The analysis of *falloir* reveals two considerably different collexeme sets (see Table 5). The list of PC-collexemes is characterized by a steep falling curve: the most distinctive complement *attendre* 'wait' has an extraordinarily high collostructional strength, followed in second rank by *adapter* 'adapt', whose value is more than ten times lower. Furthermore, most of them are rather middle-/low-frequent verbs, e. g. *réapprendre* 'relearn' or *batailler* 'fight'. Interestingly, some of the collexemes can be grouped into a class of 'construction'-verbs, such as *inventer* 'invent', *refaire* 'redo', *reconstruire* 'reconstruct', *créer* 'create' and *composer* 'compose'.

Most IMP-collexemes, on the other hand, are high-frequent verbs that cannot be easily grouped into a coherent semantic class. However, the concordance in Figure 4 gives evidence of an entrenched pattern *il a fallu attendre* + 'event / date' related to a narrative-historical text type. This pattern, as well as all the other examples, infers actuality entailment. On the contrary, typical IMP-constructs such as *(il) fallait y penser / le dire* 'should have thought about it / have said it' share a counterfactual meaning. The construct *(il) fallait le faire* 'it was necessary to do it', however, may also be non-implicative, as some contexts do not necessarily involve the fulfilment of the action.

Formal	Non pour la détruire, comme certains	ont voulu	le faire croire, mais pour garder
TV	sort. Et de me demander pourquoi, j'	ai voulu	lui faire honneur, faire le mieux
Drama	plus jeune âge... Quand ma belle mère	a voulu	me faire assassiner car j'étais
Forums	d'économiel Du moins c'est ce qu'elle	a voulu	me faire croire il y'a quelques
TV	Pour faire rire, c'est plutôt Moi j'	ai voulu	mettre la main sur Robin ne
Drama	pensé que c'était un souvenir, ils	n'ont pas voulu	nous faire de peine. LUDOVIC:
TV	au Président et à son - P. Loison: Il	a voulu	prendre le pouls du pays,
Forums	es en obésité morbide alors? Oui j'	ai voulu	que prendre vite les rdv pour m'en
Forums	terrestre, ni mortel ni immortel, j'	ai voulu	te donner le pouvoir de te former
TV	même. Ils seraient ravis mais n'	ont pas voulu	vous faire de la peine. Pour
Forums	coté de ça je suis pas fatiguée.. dc je	voulais	savoir si ça pouvait qd meme venir
Forums	acheter de la proteine en poudre et je	voulais	savoir laquelle choisir entre
Forums	merci de vos conseils!!! Etrebien2 je	voulais	savoir si a 48kg pou 1.61 si tes
Forums	un peu de beurre mais c'est rare Et je	voulais	savoir si je pouvais enlever le
Forums	la boite il y a marquer 4-6 mois mes je	voulais	savoir si des maman avez déjà
Forums	manger (ce qui en fait es faux). Je	voulais	dire que, si par exemple, la matin
Forums	: 02/07/02 à 18h46 Contenu: Salut, Je	voulais	te dire que les trente secondes
Forums	au Nord, l'autre Sud. Bien réussi, tu	voulais	dire ----- 21/6/2001 -
Drama	ai pas fait déranger. Dites donc, je	voulais	vous demander, vous en avez pas
Drama	depuis tout à l'heure ??? Antonia: Je	voulais	savoir si vous en vouliez une ou

Figure 3: Concordances of the PMCs of *vouloir*.

Table 5: Distinctive collexemes of the past-tense constructions of *falloir*.

PC (N = 8,046)		IMP (N = 32,333)	
Collexeme	Coll Str.	Collexeme	Coll.Str.
<i>attendre</i> 'wait'	195.42	<i>faire</i> 'make, do'	78.73
<i>adapter</i> 'adapt'	13.95	<i>dire</i> 'say'	37.58
<i>convaincre</i> 'convince'	10.01	<i>voir</i> 'see'	32.23
<i>battre</i> 'fight'	9.81	<i>être</i> 'be'	23.02
<i>inventer</i> 'invent'	8.64	<i>penser</i> 'think'	21.87
<i>réapprendre</i> 'relearn'	7.36	<i>laisser</i> 'let'	15.50
<i>refaire</i> 'redo, remake'	6.47	<i>oser</i> 'dare'	12.84
<i>batailler</i> 'fight'	5.40	<i>prendre</i> 'take'	10.83
<i>reconstruire</i> 'reconstruct'	5.32	<i>lire</i> 'read'	9.38
<i>créer</i> 'create'	5.14	<i>parler</i> 'talk'	7.61
<i>apprendre</i> 'learn'	4.84	<i>éviter</i> 'avoid'	7.24
<i>gérer</i> 'manage, handle'	4.56	<i>aller</i> 'go'	7.17
<i>expliquer</i> 'explain'	4.51	<i>donner</i> 'give'	7.03
<i>composer</i> 'compose'	4.21	<i>compter</i> 'count'	6.46
<i>résoudre</i> 'solve'	3.88	<i>arrêter</i> 'stop'	5.35
4 others		2 others	

The analysis of the PMCs of *devoir* is presented last, since it demonstrates the limits of a collostructional analysis limited to complementation. Several observations can be made for the PC (see Table 6). First, almost all collexemes are telic. Second, they tend to be middle-/low-frequent, e. g. verbs such as *abandonner* 'abandon', *résoudre* 'solve' or *affronter* 'face'. Third, collexemes such as *tromper* 'be mistaken, wrong (refl.); cheat (tr.)', *renoncer* 'give up', *abandonner* 'abandon' or *subir* 'suffer' hint at negative semantic prosody (Louw 1993). It is, however, difficult to tell which type of modality is being expressed by the PC. The same difficulties hold for the IMP-constructions. The strongest collexeme *être* can be explained with its use as the passive auxiliary, indicating that the imperfective constructions of *devoir* tend to be realized with the passive voice.

A closer look at concordances can help refine the picture (see Figure 5). The PC-constructions can be clustered into two classes: first, the constructions that express epistemic modality with constructs such as *j'ai dû me tromper* 'I must have been wrong' or its less frequent variant *j'ai dû oublier* 'I must have forgotten'. Second, the constructions that expresses deontic modality, where the subject is forced to react to external circumstances. Prominent patterns are *il a dû renoncer* 'he had to give up', *elle a dû s'adapter* 'she had to adapt' or *on a dû quitter* 'we had to leave', all of them triggering actuality entailment. By contrast, the IMP seems to have a preference for epistemic use, especially in combination with *avoir* or *être*.

News	l'enchaînement des faillites. II	a fallu	attendre fin 2011 pour que l'idée d
News	French; Français Graphique: II	a fallu	attendre 22 ans avant de pouvoir
Non-ac	Widerberg semble tarder <p></p> II	a fallu	attendre les années 1970 et la
Non-ac	fait de leur teneur en phosphore. II	a fallu	attendre l'application du procédé
Non-ac	est fondé à se demander pourquoi il	a fallu	attendre trois ans, et une campagne
Non-ac	<p></p> "La germanicité" <p></p> II	a fallu	attendre Madame de Staël et son
Non-ac	phraste (370-285 av. J.-C.) mais il	a fallu	attendre Adolphe Brongniard (1829)
Formal	image, oui ! M. Jean-Luc Drapeau. II	a donc fallu	attendre que la gauche arrive au
Formal	ces derniers jours à la Réunion. II	a fallu	attendre sept jours et la perte de
Formal	déloyaux. Malheureusement, il n'	a pas fallu	attendre longtemps pour voir le
TV	, c'était pas le tout de sortir, il	fallait	faire son trou. MITTERAND! MITTERA
Inform	écrivait! Mais cette communauté il	fallait	la faire, ce qui exigeait qu'on
Drama	: (l'ignore) L'oncle Philippe. Mais	fallait	le dire, Steevy m'a parlé au moins
Film	C'est une américaine qui le tient. -	Fallait	le dire avant. 197 00: 17:06
Drama	sur les lacets de son bustier) II	fallait	le dire avant. Les toilettes t sont
Forums	soins que je lui prodiguat etc... il	fallait	me faire lacher mon combat de mère!
News	Jean-Jacques", tout simplement, il	fallait	oser. D'autant plus en cette
Forums	, ce sont nos emprunts qu'il ne	fallait pas	faire. Vous ne pouvez pas vivre
Fiction	s'en apercevait. Sauf eux. Mais il	fallait	faire attention à ne pas se
TV	, voilà. - Ca vous a appris qu'il	fallait	faire gaffe au thème choisi? - Oui,

Figure 4: Concordances of the PMCs of *falloir*.

Table 6: Distinctive collexemes of the past-tense constructions of *devoir*.

PC (N = 20,901)		IMP (N = 48,412)	
Collexeme	Coll.Str.	Collexeme	Coll.Str.
<i>tromper</i> 'be wrong; cheat'	73.03	<i>être</i> 'be'	250.35
<i>renoncer</i> 'give up, renounce'	60.36	<i>avoir</i> 'have'	91.26
<i>abandonner</i> 'abandon'	46.07	<i>permettre</i> 'allow'	61.93
<i>faire</i> 'make, do'	45.38	<i>conduire</i> 'lead'	26.64
<i>adapter</i> 'adapt'	38.75	<i>rester</i> 'stay'	23.78
<i>oublier</i> 'forget'	37.94	<i>savoir</i> 'know'	23.77
<i>quitter</i> 'leave'	33.21	<i>devenir</i> 'become'	19.41
<i>arrêter</i> 'stop'	31.56	<i>servir</i> 'serve'	18.48
<i>entendre</i> 'hear'	26.95	<i>arriver</i> 'arrive'	16.17
<i>résoudre</i> 'solve'	26.76	<i>durer</i> 'last'	14.93
<i>subir</i> 'suffer'	25.85	<i>retrouver</i> 'find; meet'	13.80
<i>fermer</i> 'close'	24.92	<i>tenir</i> 'hold'	11.10
<i>affronter</i> 'face'	24.48	<i>donner</i> 'give'	10.17
<i>dire</i> 'say'	22.09	<i>revenir</i> 'return'	6.64
<i>tomber</i> 'fall'	20.13	<i>aller</i> 'go'	6.39
2 others		3 others	

Some cases found in the corpus, however, may allow a deontic interpretation as in (12) and (13). Yet, they do not imply that the action has in fact taken place.

(12) On pourrait dire que, pour nous, la recherche universitaire devait absolument être liée au mouvement social. (Discussion Forums)

'You could say that for us, scientific research had to be absolutely related to the social movement.'

(13) Celui-ci [le dossier, OW] devait être remis à la Commission européenne mercredi. (Newspapers)

'The dossier had to be handed to the European Commission on Wednesday.'

5 Modal constructions?

The findings of the corpus-driven analysis of French PMCs can be summarized in Table 7. The empirical evidence suggests that it is possible to establish certain correlations between modality and constructional patterning: the PC of *falloir* and *pouvoir* infers actuality entailment; perfective *vouloir* expresses literal volition, and *devoir* remains ambiguous between epistemic interpretations and actuality entailment with deontic modality. The IMP, on the other hand, encodes

TV	temps, mais dans les années 60, elle	a dû	<i>faire face à une sacrée concurrence: les</i>
Drama	francs de bougies! Bûchette: Ca	a dû	<i>faire plaisir au vieux barbu... C'était</i>
TV	ce travail à plein temps. Là, j'	ai dû	<i>faire un choix, peut-être le plus grand</i>
Drama	après le top... Top!" PAUL - J'	ai dû	<i>faire une erreur. Au revoir. GASTON - Au</i>
Drama	parles de mémé. LUDOVIC - Oui, elle	a dû	<i>leur faire peur. CLEMENCE - Mais non</i>
Film	fric... Je vais voir en cuisine. J'	ai dû	<i>me tromper d'adresse. Des canalisations</i>
Drama	non, c'est Jonathan ? Excusez-moi, j'	ai dû	<i>me tromper de numéro... Non, je me suis</i>
TV	de 24 ans sa cadette, Moustapha	a dû	<i>se faire à l'idée de côtoyer des gens</i>
Fiction	il a sauté du balcon, l'atterrissage	a dû	<i>se faire en douceur car il n'a été suivi</i>
TV	incohérences. Retournez l'interroger. Il	a dû	<i>se tromper. C'est déjà un miracle</i>
Fiction	, un soir, devant un caboulot - je	devais	<i>avoir cinq ou six ans - qui rampait sur</i>
Drama	venue ici que pour le tableau? Il	devait	<i>avoir de la valeur... a présent je</i>
Fiction	. Je m'aperçus que cette chose, qui	devait	<i>avoir soixante-dix ans, ne portait pas</i>
Fiction	présence du blessé mais le Stéphane	devait	<i>avoir une sorte de sixième sens car comme</i>
Drama	le saviez. Nathalie - Non, et je	devais	<i>bien être la seule, vous avez bien du vous</i>
Forums	etc.. Si tout ce qui est légitime	devait	<i>être accepté ss évolution, on en serait</i>
TV	cette chaîne. La bombe cachée dedans	devait	<i>être de fabrication artisanale. - C'est</i>
TV	informatiques, et sinon, cela	devait	<i>être détruit sans laisser de traces. C'</i>
Fiction	et les éclopés étaient demeurés. Ils	devaient	<i>être évacués sur Bangkok par le prochain</i>
Inform	spécifique comme ça <Who nb="1"/> ça	devait	<i>être la journée <Who nb="2"/> hm hm une</i>

Figure 5: Concordances of the PMCs of *devoir*.

counterfactual or non-implicative actions as with *falloir* or politeness with *vouloir*. Imperfective *pouvoir* predominantly expresses dynamic modality, whereas *devoir* is ambiguous: it is mainly used for assumptions in the past, but permits deontic readings as well.

Table 7: Overview of the French PMCs, their semantics and prototypical patterns.

	PC	IMP
falloir	deontic: actuality entailment (<i>il a fallu attendre</i> + 'event')	counterfactual (<i>[il] fallait oser / y penser</i>) non-implicative (<i>il fallait dire</i>)
devoir	epistemic (<i>j'ai dû me tromper</i>) actuality entailment (<i>il a dû quitter</i>)	epistemic (<i>cela devait permettre / il devait avoir</i>) deontic (<i>qqc devait être</i> + <i>past participle</i>)
pouvoir	dynamic: actuality entailment (<i>j'ai pu</i> + 'realization')	dynamic (<i>je (ne) pouvais</i> + 'imaginer')
vouloir	deontic: volition (<i>j'ai voulu prendre</i>)	polite imperfect (<i>je voulais dire que</i>)

The major question now is whether we can call the structures investigated genuine *constructions* at all. Recall that this term was *a priori* used as a tool to grasp the tripartite string of subject, past-tensed modal and verbal complement in the corpus analysis. Yet, it appears reasonable to treat them as constructions in a narrower sense. They fulfil the criterion of non-compositionality because it is often only the context of the assertion that disambiguates the modality coded in it. This is especially true for all those PMCs that trigger actuality entailment. The effect is simply not predictable from the mere combination of perfective aspect and root modal. Take, for instance, the string *il a dû renoncer* that can be read with an epistemic meaning (he must have given up) or with actuality entailment (he had to give up). Likewise, it is, strictly speaking, impossible to deduce the polite use of imperfective *vouloir* just from the linear sequence of the string *je voulais dire que*. The second criterion, sufficient frequency, is also met. This has been shown by the usage-based collostructional analysis: French PMCs do not select verbal complements arbitrarily but attract specific collexemes with very high frequencies. The most distinctive collexemes often appear in fixed expressions such as *j'ai pu constater que*, *je voulais dire que*, *je voulais savoir si*, *fallait y penser* or *j'ai dû me tromper*.

Finally, some remarks on the methodology adopted in this study: it should have become clear that a collostructional approach can generate interesting findings even if the alternation between French past tenses cannot strictly be seen as synonymous. Yet, it confirms the assumption that different semantics imply different lexico-grammatical patterns. Moreover, the corpus-driven approach permits us to disentangle the individual semantic values encoded in a construction

by extracting the most frequent instantiations, complementing the claims made by theoretical linguists. Only the modal *devoir* remains an outstanding problem, which should encourage further empirical investigations. Note, eventually, that the collostructional analysis has been restricted to complementation patterns. Analyzing modality, of course, necessitates the consideration of additional factors such as the use of pronouns or the role of negation, which is out of scope of this study and should be addressed in follow-up studies.

6 Conclusion

The present contribution aimed at demonstrating how a corpus-driven approach to French PMCs can reveal new insights into their distributional properties and thus into their semantics. The point of departure was to tackle a phenomenon that has received considerable attention in formal linguistics, but whose description in large-scale corpora had been a shortcoming. By means of distinctive collexeme analysis and concordancing, it has been possible to extract respective form-function-correspondences of the four past-tensed modals. The PMCs could thus be described as lexico-grammatical constructions that attract specific collexemes. The co-occurrence patterns reflect underlying semantics and demonstrate that PMCs can encode a variety of meanings that are not restricted to modality, providing an argument for a CG approach. Finally, the theoretical claims related to the actuality entailment effect could be validated on empirical grounds. It is hoped that our investigation stimulates further research into the link between lexico-grammatical patterns and the underlying semantics of French PMCs.

References

- Bhatt, Rajesh. 1999. *Covert modality in non-finite contexts*. Ph.D. Thesis, Univ. of Pennsylvania.
- Bilger, Mireille and Paul Cappeau. 2013. Comment les données de corpus pourraient renouveler les manuels de grammaire? *Linx* 68/69: 177–199.
- Blumenthal, Peter. 1976. Imperfekt und Perfekt der französischen Modalverben. *Zeitschrift für französische Sprache und Literatur* 86/1: 26–39.
- Boogaart, Ronny. 2004. Aspect and Aktionsart. In Geert Booij and Herbert Wiegand (eds.), *Morphologie. Ein internationales Handbuch zur Flexion und Wortbildung*, 1165–1180. Berlin: de Gruyter.
- Boogaart, Ronny. 2009. Semantics and pragmatics in construction grammar: The case of modal verbs. In Alexander Bergs and Gabriele Diewald (eds.), *Contexts and constructions*, 213–241. Amsterdam: Benjamins.

- Boogaart, Ronny and Egbert Fortuin. 2016. Modality and Mood in Cognitive Linguistics and Construction Grammars. In Jan Nuyts and Johan van der Auwera (eds.), *The Oxford Handbook of Modality and Mood*, 514–534. Oxford: OUP.
- Borgonovo, Claudia and Sarah Cummins, 2007. Tensed modals. In Luis Eguren and Olga Fernández-Soriano (eds.), *Coreference, Modality, and Focus: Studies on the Syntax-Semantics Interface*, 1–18. Amsterdam: Benjamins.
- Brisard, Frank. 2010. Aspects of virtuality in the meaning of the French imparfait. *Linguistics* 48/2: 487–524.
- Cappelle, Bert and Ilse Depraetere. 2016. Modal Meaning in Construction Grammar. *Constructions and Frames* 8/1: 1–6.
- Comrie, Bernard. 1976. *Aspect*. Cambridge: CUP.
- Coseriu, Eugenio. 1976. *Das romanische Verbalsystem*. Tübingen: Narr.
- De Haan, Ferdinand. 2012. The Relevance of Constructions for the Interpretation of Modal Meaning: The Case of Must. *English Studies* 93/6: 700–728.
- Desclés, Jean-Pierre. 2003. Interactions entre les valeurs de pouvoir, vouloir, devoir. In Merete Birkelund et al. (eds.), *Aspects de la modalité*, 49–67. Tübingen: Max Niemeyer.
- Desclés, Jean-Pierre. and Zlatka Guentchéva. 2003. Comment déterminer les significations du passé composé par une exploration contextuelle? *Langue française* 138/1: 48–60.
- Deulofeu, Henri-José and Jeanne-Marie Debaisieux. 2012. Une tâche à accomplir pour la linguistique française du XXI^e siècle: élaborer une grammaire des usages du français. *Langue française* 176: 27–46.
- Diessel, Holger. 2015. Usage-based construction grammar. In Eva Dąbrowska and Dagmar Divjak (eds.), *Handbook of cognitive linguistics*, 296–322. Berlin: De Gruyter Mouton.
- Do-Hurinville, Danh Thành. 2010. Etude des temps verbaux dans les articles nécrologiques. *Syntaxe & Sémantique* 11: 83–111.
- Ellis, Nick. 2002. Frequency effects in language processing: A review with implications for theories of implicit and explicit language acquisition. *Studies in Second Language Acquisition* 24/2: 143–188.
- Garey, Howard B. 1957. Verbal aspect in French. *Language* 33/2: 91–110.
- Goldberg, Adele. 1995. *Constructions: a construction grammar approach to argument structure*. Chicago: Chicago Univ. Press.
- Goldberg, Adele. 2006. *Constructions at work*. Oxford: OUP.
- Gries, Stefan. Th. 2007. *Coll. Analysis 3.2a. A program for R for Windows 2.x*.
- Gries, Stefan, Beate Hampe and Doris Schönefeld. 2010. Converging evidence II: more on the association of verbs and constructions. In: Sally Rice and John Newman (eds.), *Empirical and experimental methods in cognitive/functional research*, 59–72. Stanford, CA: CSLI.

- Gries, Stefan and Anatol Stefanowitsch. 2004. Extending collocation analysis. A corpus-based perspective on 'alternations'. *International Journal of Corpus Linguistics* 9/1: 97–129.
- Hacquard, Valentine. 2006. *Aspects of modality*. Ph.D. Thesis, MIT.
- Hacquard, Valentine. 2009. On the interaction between aspect and modal auxiliaries. *Linguistics and Philosophy* 32: 279–312.
- Hacquard, Valentine. Actuality entailments. To appear in Lisa Matthewson, Cécile Meier, Hotze Rullmann and Thomas E. Zimmermann (eds.), *The Companion to Semantics*. Hoboken: Wiley.
- Hilpert, Martin. 2016. Change in modal meanings. Another look at the shifting collocates of *may*. *Constructions and Frames* 8/1: 66–85.
- Homer, Vincent. 2011. French modals and perfective: a case of aspectual coercion. In Mary Byram Washburn, Katherine McKinney-Bock, Erika Varis, Ann Sawyer and Barbara Tomaszewicz (eds.), *Proceedings of the 28th West Coast Conference on Formal Linguistics*, 106–114. Somerville, Mass.: Cascadia.
- Hunston, Susan. 2015. Lexical grammar. In Douglas Biber and Randi Reppen (eds.), *The Cambridge Handbook of English Corpus Linguistics*, 201–215. Cambridge: CUP.
- Hunston, Susan and Gill Francis. 2000. *Pattern grammar: a corpus-driven approach to the lexical grammar of English*. Amsterdam: Benjamins.
- Koch, Peter and Wulf Oesterreicher. 2011. *Gesprochene Sprache in der Romania*. Berlin: De Gruyter.
- Labeau, Emmanuelle. 2002. L'unité de l'imparfait. Vues théoriques et perspectives pour les apprenants du français langue étrangère. *Travaux de linguistique* 45/2: 157–184.
- Labeau, Emmanuelle. 2004. Les temps du compte rendu sportif francophone. *Journal of French Language Studies* 14/2: 129–148.
- Labeau, Emmanuelle. 2006. French television talk: what tenses for past time? *International Journal of Corpus Linguistics* 11/1: 1–28.
- Labeau, Emmanuelle. 2007. Et un, ou deux, ou trois? Les temps-champions du compte rendu sportif depuis 1950. In Emmanuelle Labeau, Carl Vetters and Patrick Caudal (eds.), *Sémantique et Diachronie du système verbal français*, 203–221. Amsterdam: Rodopi (= Cahiers Chronos 16).
- Labeau, Emmanuelle. 2013. Les temps du compte rendu sportif francophone. *Journal of French Language Studies* 14/2: 129–148.
- Laca, Brenda. 2012. On modal tenses and tensed modals. In Chiyo Nishida and Cinzia Russi (eds.), *Building a bridge between linguistic communities of the Old and the New World. Current research in tense, aspect, mood and modality*, 163–198. Amsterdam: Rodopi (= Cahiers Chronos 25).
- Louw, Bill. 1993. Irony in the text or insincerity in the writer? The diagnostic potential of semantic prosodies. In Mark Baker, Gill Francis and Elena

- Tognini-Bonelli (eds.), *Text and Technology: In Honour of John Sinclair*, 157–175. Amsterdam: John Benjamins.
- Mari, Alda and Fabienne Martin, 2007. Tense, abilities, and actuality entailment. 151–156. Proceedings of the Amsterdam Colloquium.
- Martin, Fabienne. 2009. Epistemic modals in the past. In Janine Berns, Haike Jacobs and Tobias Scheer (eds.), *Romance Languages and Linguistic Theory 2009*, 185–202. Amsterdam: Benjamins.
- Michaelis, Laura. 2011. Stative by construction. *Language* 49/6: 1359–1399.
- Nuyts, Jan. 2016. Analyses of the modal meanings. In Jan Nuyts and Johan van der Auwera (eds.), *The Oxford Handbook of Modality and Mood*, 31–49. Oxford: OUP.
- Römer, Ute. 2009. The inseparability of lexis and grammar. Corpus linguistic perspectives. *Annual Review of Cognitive Linguistics* 7: 140–162.
- Rubio Vallejo, David. 2017. Actuality effects as conversational implicatures. *Journal of Pragmatics* 112: 44–67.
- Siepmann, Dirk. 2015. Dictionaries and spoken language: a corpus-based review of French dictionaries. *International Journal of Lexicography* 28/2: 139–168.
- Siepmann, Dirk and Christoph Bürgel. 2015. L'élaboration d'une grammaire pédagogique à partir de corpus: l'exemple du subjonctif. In Thomas Tinnefeld (ed.), *Grammatikographie und Didaktische Grammatik – gestern, heute, morgen. Gedenkschrift für Hartmut Kleineidam anlässlich seines 75. Geburtstages*, 159–185. Saarbrücken: htw saar.
- Siepmann, Dirk and Christoph Bürgel. 2016. Das *Corpus de référence du français contemporain* (CRFC) und sein Einsatz in der Grammatikographie am Beispiel des Präpositionsgebrauchs. In: Dirk Siepmann and Christoph Bürgel (eds.), *Sprachwissenschaft und Fremdsprachendidaktik. Zum Verhältnis von sprachlichen Mitteln und Kompetenzentwicklung*, 143–162. Baltmannsweiler: Schneider Hohengehren.
- Siepmann, Dirk, Christoph Bürgel and Sascha Diwersy. 2017. The *Corpus de référence du français contemporain* (CRFC) as the first genre-diverse mega-corpus of French. *International Journal of Lexicography* 30/1, 63–84.
- Stubbs, Michael. 2016. Corpus semantics. In Nick Riemer (ed.), *The Routledge Handbook of Semantics*, 106–121. London: Routledge.
- Waugh, Linda R. and Monique Monville-Burston. 1986. Aspect and Discourse Function: The French Simple Past in Newspaper Usage. *Language* 62/4: 846–877.
- Weinrich, Harald. 1982. *Textgrammatik der französischen Sprache*. Stuttgart: Klett.