

Diagnosing Modality in Predictive Expressions

Peter Klecha
University of Chicago

Abstract

This short paper argues that predictive expressions (*will*, *gonna*) are modals. In section 1 I provide three empirical arguments for a treatment of predictive expressions as modals: i) they behave like modals in that they can occur in overt and covert conditionals in a way that non-modal operators cannot; ii) they have morphological variants which show displacement behaviors, i.e., nonveridicality; iii) like modals, they obviate the personal experience requirement on predicates of personal taste. In section 2 I specifically rebut arguments by Kissine (2008) that *will* is not a modal. In section 3 I conclude.

In this paper I argue that what I call predictive expressions (PEs) in English, words like *will* and *gonna*, are modal operators rather than simple temporal operators.

- (1) a. Ryan will leave for California tomorrow.
- b. Ryan is gonna leave for California tomorrow.

The distinction between temporal and modal corresponds to a question about what the nature of the future is, or at least, how language treats the nature of the future: as a linear continuation of time, no different from the past (what can be called the Linear Future Hypothesis, sometimes called Ockhamist), or as a range of possible paths, a potentially infinite set of open possibilities (what can be called the Open Future Hypothesis, sometimes called Peircian); see, e.g., Kaufmann et al. (2006). On the former view, there is a single actual world, even if we can never have the knowledge needed to distinguish it from other worlds. This view is compatible with a temporal analysis of the future, since we can simply refer to the future of said actual

This is a pre-publication draft, to appear in *Journal of Semantics*. Thanks to four anonymous reviewers, Karlos Arregi, Lisa Bylina, Lucas Champollion, Kai von Stechow, Itamar Francez, Anastasia Giannakidou, Thony Gillies, Lelia Glass, Valentine Hacquard, Chris Kennedy, Stefan Kaufmann, Angelika Kratzer, Marcin Morzycki, Alan Munn, Paul Portner, Cristina Schmitt, Judith Tonhauser, and audiences at Chronos 9 and the University of Chicago Workshop on Semantics and Philosophy of Language. All errors are mine.

world. On the latter view, there is no on single actual world since the future is metaphysically yet unsettled. In a $T \times W$ framework, this is because there are many worlds which are identical in terms of what has already been settled, but distinct in terms of the future; in a Branching Times framework, this is because there is a single world with many branches representing future possibilities, thus there is no single whole history representing the actual world. In either framework, the Open Future Hypothesis strongly suggests a modal view of the future since there is no one actual world that we can predicate future events of.

A temporal analysis of the future was first proposed by Prior (1967), and has been argued for most recently by Kissine (2008), while a modal analysis was first suggested by Thomason (1970) and has recently been advocated by Enç (1996), Copley (2002) and Condoravdi (2003). The following serve as examples of temporal and modal analyses (but are not the only possibilities).

$$(2) \quad \llbracket \text{future temporal operator} \rrbracket^{w,i} = \lambda p[\exists j > i[p(j)(w)]]$$

$$(3) \quad \llbracket \text{future modal operator} \rrbracket^{w,i} = \lambda p[\forall v \in M(w, i)[\exists j > i[p(j)(v)]]]$$

(2) says that a future temporal operator takes a proposition argument (type $\langle i, st \rangle$), presumably denoted by a vP , and is evaluated with respect to time and world arguments. The time and world arguments are, if the operator is unembedded, satisfied contextually by the time and world of evaluation. The expression then returns true iff there is a time after the evaluation time such that the proposition p is true at that time and in the evaluation world. In other words, it says “ p is true after now”. (3) says that a future modal operator takes the same arguments and returns true iff, in every world which is the same as the evaluation world up to the evaluation time, there is a time after evaluation time such that p is true at that time, in that world. In other words, “ p is true in every world that this world might turn out to be, after now”, or even more succinctly “ p is true in every possible future”.

Note that the modal analysis contains a temporal operator. First, this is not crucial if the temporal properties can be derived another way; e.g., Condoravdi (2002) and Werner (2006) propose just this. Moreover, the inclusion of a temporal operator does not muddle the modal vs. temporal debate; the real question here, as I take it, is whether a modal component is needed or not.² This is because if PEs can be shown to be modals, the Open Future Hypothesis is strongly suggested, since it provides a natural motivation for a modal account, whereas a Linear Future view would make the lack of a simple future tense puzzling. On the other hand, if PEs can be

²As such, when I refer to “temporal operators” from here on out, I mean expressions which are just temporal operators and do not have a modal component; when I refer to “modals” or “modal operators” I mean expressions which at least have a modal component, regardless of other components.

shown to be temporal operators, the Open Future Hypothesis loses a major point of support.³

In section 1 below I provide three empirical arguments for a treatment of predictive expressions as modals: i) they behave like modals in that they can occur in overt and covert conditionals in a way that non-modal operators cannot; ii) they have morphological variants which show displacement behaviors, i.e., nonveridicality; iii) like modals, they obviate the personal experience requirement on predicates of personal taste. In section 2 I specifically rebut arguments by Kissine (2008) that *will* is not a modal. In section 3 I conclude.

1 Diagnosing Modality

Kissine (2008) argues that *will* is not a modal by examining the logical properties of various possible parameters (force, modal base) for *will* and determining that they all give rise to false predictions, and that *will* thus cannot be treated as a modal. Kissine goes on to argue for a covert epistemic modal, like the one proposed by Kratzer (1986) for epistemic conditionals, which scopes over all sentences. Kissine then argues that various modal-like behaviors of *will* can be attributed to this covert epistemic.

However, there are certain modal behaviors that Kissine did not examine which set modals apart from non-modal operators. In this section I point out three modal-like behaviors which diagnose modality, and show that PEs, but not simple temporal operators, display these behaviors, contrary to what is predicted by Kissine's theory.

1.1 Conditionals

One way to define a modal is as a relation between two sets of worlds: a backgrounded body of contextual information called a modal domain (determined from a modal base, an ordering source, and possibly other ingredients) and a foregrounded proposition called a prejacent. While the prejacent is easy to detect (it is usually present as the syntactic complement of the modal), the modal domain is less so since it is contextually determined, i.e., silent. However, conditionals offer a means of getting at the modal domain and diagnosing its presence.

On Kratzer's (1986) theory of conditionals, an *if*-clause restricts the domain of the modal; see also von Stechow (1994). On Roberts's (1989) view, modal subordination is simply a covert conditional, restricting the domain anaphorically; see also Frank (1997) and Klecha (2011). Thus conditionals, either overt or covert, should diagnose modality. Condoravdi (2003) makes

³But is not defeated – e.g., see MacFarlane (2008) for a simple tense account of *will* in light of an Open Future view; branching worlds are accounted for in the way that simple truth is defined.

this argument with respect to the domain subtractor *unless*, arguing that it diagnoses modality in *will*.

(4) He'll eat fish unless steak is available.

There are two problems with overt conditionals, however, which is that sometimes modals are invisible (5a), and sometimes *if*-clauses restrict generics/habituals (5b).

- (5) a. If Alma turns red, she's angry.
b. If Alma turns red, she gets angry.

Kratzer's (1986) analysis of sentences like (5) is that they contain an implicit operator, whose domain is being restricted by the *if*-clause. In the case of (5a), an epistemic modal; in the case of (5b), a generic operator. The latter can easily be excluded from consideration as long as we focus on cases of PEs with only episodic readings. But what prevents us from analyzing PEs with *if*-clauses as cases like (5a), where what is being restricted is a silent epistemic modal?

Fortunately, conditionals like (5a) give rise to a tell-tale inference that distinguishes them from non-epistemic conditionals. Namely, they give rise to what Copley (2002) calls *indicational inferences* rather than *causal inferences*. The indicational inference in (5a) can be paraphrased as any of (6a-c).

- (6) a. If Alma turns red, then you'll know she's angry.
b. If Alma turns red, take that as an indication that she's angry.
c. If Alma turns red, it means she's angry.

But (5a) cannot have a causal reading. Compare to (7) which contains the overt modal *have to*.

(7) If Alma throws a tantrum, she has to go to bed.

(7) has two readings. One is an indicational reading like in (5a) and (6). It would be felicitous in a situation where the speaker is aware that Alma's bed time is eight o'clock, but Alma is also aware of this fact, and when the time to go to bed comes, she always preemptively throws a tantrum. In this situation, Alma's tantrum is an indication that he has to go to bed, and again, periphrastic substitutes along the lines of (6), like (8), would be felicitous.

(8) If Alma throws a tantrum, then you know she has to go to bed.

The other reading available in (7) is a causal one. On this reading, early bedtime is the punishment for tantrums, and so (7) can be uttered as a simple statement of the rules. On this reading, Alma's tantrum causes her

going to bed, at least in the deontically accessible worlds.

As first discussed by Copley (2002), the distinction in readings falls out naturally from the theory that there is one overt modal, *have to*, and (possibly) one covert modal scoping higher, so the *if*-clause might be restricting the domain of either; it is a kind of scope ambiguity.

Returning to sentences like (5a), which Copley did not analyze, we observe that no causal reading is possible. Again, this falls out naturally given that in (5a) there is only the covert epistemic modal to be restricted, and no non-epistemic modal. We can then indeed claim to have a diagnostic for (non-epistemic) modality: the presence of a causal conditional reading when combined with an *if*-clause. Note that the habitual in (5b) also has a causal inference; so we must take care to only consider episodic readings.

Returning to PEs, as noted by Copley (2002), the causal (episodic) reading is possible in both.

- (9) a. If Alma turns red, she's gonna be angry.
- b. If Alma turns red, she'll be angry.

The same argument can be made with modal subordination, perhaps even more clearly because it does not depend on distinguishing causal and indicational inferences. The same logic applies; if domain restriction takes place, there must be a domain to restrict, demanding a modal analysis. Consider (10a), from Roberts (1989), and its *gonna*-analog (10b).

- (10) a. If Edna forgets to fill the birdfeeder, the birds will go hungry. She'll get sad.
- b. If Edna forgets to fill the birdfeeder, the birds are gonna go hungry. She's gonna get sad.

The second sentence in each of (10a-b) has a conditional meaning: If Edna forgets to fill the birdfeeder and the birds go hungry, she'll get sad. If *will* and *gonna* are quantifiers over worlds, it follows naturally that their domains can be contextually restricted to a set of salient worlds.⁴

Roberts, in her original analysis, actually assumes *will* to be a temporal operator and suggests that some other strategy besides domain restriction is available for implicit conditional readings in the absence of modal operators.⁵ However, this cannot be: observe that while modal subordination is

⁴As discussed in Klecha (2011) *will* and *gonna* differ in that in a context which licences modal subordination, *will* subordinates obligatorily, while *gonna* does so optionally. However, the only crucial fact for the purposes of this study is that both *can* undergo modal subordination in such contexts.

⁵Namely, temporal anaphora and accommodation. Roberts argues that (10a) involves temporal anaphora between the temporal operator in the first and second sentences; since the proposition "she gets sad" is thus evaluated at a time following the time of "the birds go hungry", and since "the birds go hungry" is only true of some worlds, "she gets sad" is accommodated as being evaluated only at those worlds.

available in modals, it is never available in the absence of an overt⁶ modal auxiliary or verb:

(11) *Modal Operators*

- a. Tim can get a dog_i. But he has to feed it_i.
= Tim can get a dog. But if Tim gets a dog he has to feed it.
- b. You should get a green shirt_i. It_i would look great on you.
= You should get a green shirt. If you did, it'd look great on you.
- c. Rebekah was supposed to bake a cake_i. It_i should be maroon.
= Rebekah was supposed to bake a cake. If she baked a cake, it should be maroon.

(12) *Temporal Operators*

- a. If Martina went to New York, she bought lots. # She had fun.
≠ If Martina went to New York, she bought lots and had fun.
- b. Julia might be awake. # She's making breakfast.
≠ Julia might be awake. If so, she's making breakfast.
- c. Rebekah was supposed to bake a cake_i. # It_i's maroon.
≠ Rebekah was supposed to bake a cake. If she baked a cake, it's maroon.

If there were a strategy for producing implicit conditional readings without a modal, the second sentence in (12a) would have a reading like "If she went to New York, she had fun". But given the absence of such a reading it is clear that there is no such strategy; in other words, modal subordination consists only of implicit domain restriction of modals. It follows from this that the presence of implicit conditional readings is a diagnostic for modality.

(13) a. If Martina goes to New York, she'll buy lots. She'll have fun.

⁶One question that might be asked here is why the silent epistemic modal discussed in the previous subsection does not undergo modal subordination; i.e., why doesn't (ia) have the implicit conditional reading of (ib)?

- (i) a. Martina might be smiling. # She had fun.
- b. ≠ Martina might be smiling. If she's smiling, (that means) she had fun.

If modal subordination is a property of all modals, we would expect the covert epistemic modal posited for cases like (i) to partake in it too. There are at least two possible answers. One is that the covert epistemic modal *syntactically selects* for an overt *if*-clause. This account would suggest that the covert epistemic appears only with overt *if*-clauses.

A second possible answer is that the silent covert epistemic necessity operator simply idiosyncratically does not undergo modal subordination due to its lexical semantics, a possibility pointed out by Klecha (2011), who proposes that whether and to what extent modals undergo modal subordination is an idiosyncratic lexical property. This kind of account suggests that failure to undergo modal subordination does not diagnose a lack of modality – it is only a one-way implication.

- = If Martina goes to New York, she'll buy lots and have fun.
- b. If Martina goes to New York, she's gonna buy lots. She's gonna have fun.
- = If Martina goes to New York, she's gonna buy lots and have fun.

Clearly, PEs are compatible with implicit conditional readings; the only satisfactory analysis of this is one which says that they are modals which undergo modal subordination.⁷

1.2 Past Tense PEs

Another tell-tale sign of modality is displacement, or shifting evaluation away from the actual world. Not all modals give rise to displacement; only non-veridical ones. However, if non-veridicality *is* present, then that is a strong diagnostic for modality. Negation is the only case of an obviously non-modal non-veridical operator.

Non-veridical here simply means the following: an operator *O* is non-veridical if $O\phi$ does not entail ϕ . On the one hand, PEs seem to be veridical at least in the contexts examined above; clearly, if any outcome occurs in which Ryan does not leave for California, then (14) is false.

- (14) a. Ryan will leave for California tomorrow.
- b. Ryan is gonna leave for California tomorrow.

However, certain morphological variants of PEs are non-veridical:⁸

⁷It is often claimed in the literature on modal subordination, e.g., Asher and McCreedy (2007) that not only is *will* a temporal operator, but that in fact, contra Roberts (1989), it does not even get the implicit conditional readings which may be analyzed as modal subordination. Examples like (10) should make it clear that this is not the case, but see Klecha (2011) for more thorough arguments against this.

⁸There is a slight asymmetry here between *be gonna* and *will*, which became clear to me from an anonymous reviewer's discussion of this section. Namely, on its past perspective (in the terminology of Condoravdi (2002)) counterfactual use, *would* is followed by *have*, whereas if it is not it is instead a present perspective future-less-vivid marker (Iatridou, 2000). On the other hand, *be gonna* cannot have a FLV reading, and has the same morphology for its veridical and non-veridical past perspective uses.

- (i) a. Helena would freak out if Gallagher showed up.
- b. #Helena was gonna freak out if Gallagher showed up.

A reviewer also points out this minimal pair:

- (ii) a. The man who would become Mary's husband fell from the window.
- b. The man who was going to become Mary's husband fell from the window.

Where (iia) entails that the man becomes Mary's husband, (iib) does not. Thus there may very well be differences between *will* and *gonna*; Klecha (2011) argues for at least one; they may also differ in what kinds of modal bases/ordering sources they take when in

- (15) a. Julia was gonna finish her paper (but she got distracted/if she hadn't gotten distracted).
 b. Julia would have finished her paper (but she got distracted/if she hadn't gotten distracted).

Given that (15a-b) do not entail that Julia turned in her paper in the real world (and in fact, strongly implicate if not entail that she did not turn it in in the real world), *was gonna* and *would* must be classified as modals. (15a-b) mean something like "Julia handed in her paper in all the worlds consistent with what was expected or seemed likely at the time (but didn't hand it in in the real world)". If we then assume that these expressions are derivationally related to Present Tense PEs, a modal analysis of PEs generally is necessary.

Indeed it is widely held that *will* and *would* are tense-variants of a common lexical item, usually referred to as the abstract WOLL (Abusch, 1988). If we take this notion seriously, it follows that *will* should be considered a modal, since *would* undeniably is one; it really all comes down to WOLL being a modal.

Interestingly, while present PEs are veridical, past PEs are not; these counterfactual uses of *was gonna* and *would* do not appear in their corresponding present forms. To account for this, I assume that there is some co-restriction on tenses and conversational backgrounds (either modal bases or ordering sources), namely some relationship between Past Tense and counterfactuality. In other words, the modal base one posits for PEs in the present need not be the same one at work in these Past Tense PE cases. Yet while a PE-as-tense theory would have to posit multiple lexical items (even for the highly morphologically transparent *be gonna*), a modal account simply requires that the domain of the modal be contextually variable (Kratzer, 1977).

1.3 Predicates of Personal Taste

PEs also pattern with modals in that they obviate the personal experience requirement on predicates of personal taste. Consider that predicates of personal taste, unlike other predicates, come with an inference that the speaker has direct personal experience of the truth of the predicate (Pearson, 2013, Bylinina, 2013).

- (16) a. These cookies are tasty (#but I've never tried one).
 b. This cat food is delicious (#but I've never eaten it).

their past forms. Their obvious syntactic differences may also affect what kinds of other modal/temporal elements they may combine with. Addressing this is beyond the scope of this paper, but the crucial point here is that certain morphological variants of PEs can have non-veridical meanings when embedded under the Past Tense.

- (17) a. Fred is tall (though I've never seen him).
 b. Bryan's new car is blue (though I've never laid eyes on it).

This requirement is obviated by scoping evidentials and modals however.

- (18) a. Apparently, this cat food is delicious.
 b. This cat food must be delicious.

As well as by PEs.

- (19) *Context: A man is making some gourmet cat food.*
 This cat food is gonna be delicious.

(19) is acceptable even if we assume that the man has not eaten the cat food (and he cannot have since it does not exist yet). Note that this cannot be due to the "direct personal experience" requirement being shifted into the future along with the reference time of the prejacent, since there is not even an inference that the speaker is *going to* eat the cat food in the future. (19) can be uttered felicitously even if the speaker knows only cats will eat the food. But as soon as the cat food is made, the corresponding report in (16b) becomes infelicitous.

While a full theory of why PEs should have this effect on predicates of personal taste needs to be worked out, what is clear is that a simple temporal account of PEs cannot account for it. A modal account, however, at least puts PEs in the same category as the other expressions which have this effect.

2 Response to Kissine (2008)

Kissine (2008) is the only author I am aware of to argue explicitly for a theory of PEs as tenses.⁹ The first argument against Kissine's theory is its inability to account for the empirical facts pointed out above; since Kissine's covert epistemic operator scopes over all sentences, none of these behaviors can be attributed to it since these behaviors crucially differentiate PEs from simple temporal operators. The second point against Kissine is that the argument he develops against *will* as a modal is faulty.

Kissine claims a modal account of *will* to be untenable. He considers each possible modal base for *will* (epistemic, doxastic, metaphysical, historical) and rules each out on the basis of predictions supposedly made by them due to logical equivalences and axioms given for them. I will not address Kissine's discussion of epistemic, doxastic, or what he calls metaphysical¹⁰ modal bases since these are not taken to be possible modal bases

⁹Many accounts of other phenomena presuppose *will* to be a tense but I do not take these to be arguments for a tense account.

¹⁰Kissine's definition of the metaphysical accessibility relation is: w_1 is metaphysically

for PEs in recent literature on the topic (e.g., Condoravdi, 2003, Kaufmann, 2005). Instead I focus on his argument that historical modal bases derive wrong empirical predictions. In Kissine’s terminology, the historical modal base (often called *metaphysical* elsewhere) consists of worlds identical to the evaluation world up to the present time.

To make this notion of historical accessibility clear, consider a toy model with eight worlds and four propositions:

$$(20) \quad \begin{array}{ll} w_1 \models \{p, q; r, s\} & w_5 \models \{p, \neg q; \neg r, s\} \\ w_2 \models \{p, q; \neg r, s\} & w_6 \models \{p, \neg q; r, s\} \\ w_3 \models \{p, \neg q; \neg r, \neg s\} & w_7 \models \{\neg p, \neg q; \neg r, s\} \\ w_4 \models \{p, \neg q; r, \neg s\} & w_8 \models \{\neg p, \neg q; r, s\} \end{array}$$

Take p and q to be propositions indexed prior to speech time (i), and r and s to be propositions indexed after speech time. Suppose that the speaker is in a world where p and $\neg q$ are true, while r and s have yet to be settled. On an Open Future/ $T \times W$ frame like Condoravdi (2002) and Kaufmann (2005) use, any of the worlds $\{w_3, w_4, w_5, w_6\}$ could turn out to be the evaluation world, though at present they are epistemically and metaphysically indistinguishable. On a Branching Times model there is only one actual “world”, or branching structure, of which each of these four worlds is a branching history.¹¹

In any case, let @ stand for the equivalence class of worlds which branch from the actual world/history. The set of worlds historically accessible to @ (i.e., historically accessible any or all of the worlds in @) at i is therefore the set of worlds in which p is true and q is false, namely @ itself, shown in (21). These worlds differ only in what is true after speech time.

$$(21) \quad H_i(@) = \{w_3, w_4, w_5, w_6\}$$

Compare this to epistemic accessibility. Add to our toy model the information that only the proposition p is known by a relevant knower in each of $\{w_3, w_4, w_5, w_6\}$. (This agent could in principle know that $\neg q$ but happens not to, whereas she could not possibly know the truth value of r or s since these are after speech time.) Thus the epistemically accessible worlds are the worlds where p is true.

$$(22) \quad E_i(@) = \{w_1, w_2, w_3, w_4, w_5, w_6\}$$

Thus the epistemically and historical accessible worlds are distinct sets; even though w_1 and w_2 are not historically accessible, the knower cannot distinguish them from the historically accessible worlds. This is an important point for the argument against Kissine.

accessible from w if “ w is consistent with w_1 ”. (Kissine, 2008, p. 131)

¹¹Thanks to an anonymous reviewer for pointing this out.

Returning to Kissine, he argues, in a footnote, that historical necessity will not work for *will*'s modal base, at least not for sentences like (23), on the epistemic reading of *possible*.

(23) It's possible that Mary will come.

Abbreviating (23) as ' $\diamond will(p)$ ', he writes:¹²

What if *will* is a historical necessity in $\diamond will(p)$? The truth conditions of [(23)] are as follows then: $\diamond will(p)$ is true in w iff there is at least one possible world w_1 such that wE_iw_1 and such that, for every possible world $w_1 = w_2$ up to i , $[p \text{ at } j > i] \in w_2$. Either $w_1E_iw_2$ or $\neg(w_1E_iw_2)$. In the former case, in virtue of self-reflexivity, $\diamond will(p) \iff will(p)$; in the latter case, nothing prevents $will(\neg p)$ from being known in w , in which case $\diamond will(p)$ and $will(\neg p)$ should be compatible. (Kissine 2008: pg. 139, footnote 7)

Since historical accessibility entails epistemic accessibility, for all w_2 in Kissine's example, his first case holds ($w_1E_iw_2$). However, it does not follow from this that $\diamond will(p) \iff will(p)$, given the important point made above that epistemic and historical accessibility are distinct. Consider the model above. $\diamond_{E_i}\Box_{H_i}s$ is true, while $\Box_{H_i}s$ is false. This is because we can find a world epistemically accessible from @, namely w_1 , in which all historically accessible worlds have s as true.

- (24) a. $w_1 \in E_i(@)$
 b. $H_i(w_1) = \{w_1, w_2\}$
 c. $\diamond_{E_i}\Box_{H_i}s = 1$

However, s is not true in all the worlds historically accessible from @ itself, as can be seen in (21) and (20) above. Moreover, Kissine's second case ($\neg(w_1E_iw_2)$) never holds. Thus using historical accessibility for PEs does not generate the undesirable empirical predictions Kissine claims it does.

3 Conclusion

As shown in the previous section, a modal account of PEs cannot be ruled out as Kissine claims. Moreover, the arguments presented in Section 1 constitute a strong case for treating predictive expressions as modals. PEs give rise to non-epistemic conditionals, undergo modal subordination, are non-veridical on certain morphological variants, and, like modals, obviate the personal experience requirement for predicates of personal taste. Thus PEs

¹²Note that Kissine operates on the assumption that worlds are sets of propositions, rather than the reverse. Thus for him if p is true at world w , then $p \in w$ rather than the more common $w \in p$. But this difference is not important for present considerations.

pattern with modals, which militates against the Linear Future Hypothesis and for the Open Future Hypothesis and its proponents (Condoravdi, 2003, Kaufmann, 2005). Thus for an account of predictive expressions as simple temporal operators to hold up, well-motivated accounts would need to be given for the phenomena discussed here.

References

- Abusch, D. (1988). Sequence of tense, intensionality and scope. In H. Borer (Ed.), *Proceedings of the Seventh West Coast Conference on Formal Linguistics*.
- Asher, N. and E. McCready (2007). Were, would, might and a compositional account of counterfactuals. *Journal of Semantics* 24, 93–129.
- Bylinina, L. (2013). Judge-dependence, experience and gradability. *Proceedings of IATL* 28.
- Condoravdi, C. (2002). Temporal interpretation of modals: Modals for the present and for the past. In D. Beaver, S. Kaufmann, B. Clark, and L. Casillas (Eds.), *The Construction of Meaning*, pp. 59–88. CSLI Publications.
- Condoravdi, C. (2003). Moods and modalities for *will* and *would*. Handout at Amsterdam Colloquium.
- Copley, B. (2002). *The Semantics of the Future*. Ph. D. thesis, MIT.
- Enç, M. (1996). Tense and modality. In S. Lappin (Ed.), *The Handbook of Contemporary Semantic Theory*. Blackwell.
- Frank, A. (1997). *Context Dependence in Modal Constructions*. Ph. D. thesis, University of Stuttgart.
- Iatridou, S. (2000). The grammatical ingredients of counterfactuality. *Linguistic Inquiry* 31(2), 231–270.
- Kaufmann, S. (2005). Conditional truth and future reference. *Journal of Semantics* 22, 119–128.
- Kaufmann, S., C. Condoravdi, and B. Harizanov (2006). Formal approaches to modality. In W. Frawley (Ed.), *The Expression of Modality*, pp. 71–106. Mouton de Gruyter.
- Kissine, M. (2008). Why *will* is not a modal. *Natural Language Semantics* 16(2), 129–155.
- Klecha, P. (2011). Optional and obligatory modal subordination. *Proceedings of Sinn und Bedeutung* 15, 365–379.

- Kratzer, A. (1977). What 'must' and 'can' must and can mean. *Linguistics and Philosophy* 1(3), 337–355.
- Kratzer, A. (1986). Conditionals. *Proceedings of CLS* 22(2), 1–15.
- MacFarlane, J. (2008). Truth in the garden of forking paths. In M. Kölbel and M. García-Carpintero (Eds.), *Relative Truth*, pp. 81–102. Oxford University Press.
- Pearson, H. (2013). A judge-free semantics for predicates of personal taste. *Journal of Semantics* 30(1), 103–154.
- Prior, A. N. (1967). *Past, Present, and Future*. Oxford University Press.
- Roberts, C. (1989). Modal subordination and pronominal anaphora in discourse. *Linguistics and Philosophy* 12(6), 683–721.
- Thomason, R. (1970). Indeterminist time and truth-value gaps. *Theoria* 36, 264–281.
- von Stechow, K. (1994). *Restrictions on Quantifier Domains*. Ph. D. thesis, MIT.
- Werner, T. (2006). Future and non-future modal sentences. *Natural Language Semantics* 14, 235–255.