

# Modality and Aspect

For *Cambridge Handbook of Natural Language Modality* (Arregui, Hacquard, & Ippolito, eds)

Perna Nadathur  
nadathur.3@osu.edu

May 12, 2026

## Abstract

This chapter examines the reality of conceptual and formal distinctions between the semantic categories of modality and (grammatical) aspect, focusing on three broad classes of phenomena in which these categories appear tightly intertwined. I first explore the case for eroding a formal distinction by examining arguments for incorporating modality in the semantic contribution of aspectual operators: I discuss modal solutions to the well-known *imperfective* (progressive) *paradox*, as well as apparently modal meaning associated with the core interpretation of (non-culminating) perfectives, perfects, and prospectives. Second, I discuss two phenomena in which modal interpretation appears to either be conditioned by or to select for specific grammatical aspects, examining research into the role of aspectual marking in the expression of counterfactual modality, as well as in habituality and/or genericity. Finally, I touch on two intriguing semantic interactions between (ostensibly) aspectual and modal operators, providing overviews of the phenomenon of *actuality entailments* and of *frustrative* marking in several understudied languages. The emergent picture is one in which a sharp distinction between (temporal) aspectual meaning and (possible worlds) modality is largely notional—albeit conceptually valuable—and does not appear to be reflected in sharp formal divisions between exponents of these two semantic categories.

## 1 Introduction

Tense, aspect, and modality comprise the major verbal categories that handle *displacement* (Hockett, 1960) in situation descriptions. Tense and aspect are traditionally taken to deal with temporality, grouping together against modality, which locates events in possible worlds. In practice, however—and as much research over the last half century has shown—it is difficult to draw a clear line between temporal and modal displacement. This chapter explores ways in which this conceptual distinction breaks down, focusing on phenomena in which modal meaning cannot be readily disentangled from the semantic contribution of an (ostensibly) aspectual operator.

In contemporary semantic theory, *aspect* refers to two distinct notions, both involving the temporal (re)presentation of situations. I will have little to say about **lexical aspect** (*Aktionsart*), which classifies eventuality predicates according to inherent temporal structure (Vendler, 1957; Mouratelos, 1978; Verkuyl, 1993, a.o.); I assume standard *aspectual class* distinctions and a domain of eventualities partially ordered by event inclusion ( $\sqsubseteq$ ; see Krifka (1989); Filip (2011); Mittwoch (2019) for formal discussion of the criteria employed in Table 1).

	stative	durative	telic	examples
states	+	+	−	<i>love, be sad</i>
activities	−	+	−	<i>run, swim</i>
achievements	−	−	+	<i>recognize, arrive</i>
accomplishments	−	+	+	<i>run a mile, build a house</i>
semelfactives	−	−	−	<i>cough, knock</i>

Table 1: Aspectual class distinctions (adapted from Smith, 1991, p.30)

I focus on the interaction between modality—roughly, semantic reliance on possible worlds—and **grammatical aspect**, which provides temporal *viewpoint* (Smith, 1991). Different aspects offer “different ways of viewing the internal temporal constituency of a situation” (Comrie, 1976, p.3), making a key distinction between an ‘external’ perspective which presents eventualities as complete(d) wholes, and an ‘internal’ perspective, from which eventualities are seen as ongoing or in development. Grammatical aspect is often marked as verbal inflection, with (1) illustrating the contrast between a completive French **perfective** and an in-progress **imperfective**.

- (1) French *passé simple* (perfective)<sup>1</sup> and *imparfait* (imperfective):
- a. Nur cour-ut.  
Nur run-PST.PFV  
‘Nur ran.’
  - b. Nur cour-ait.  
Nur run-PST.IMPF  
‘Nur was running.’

I adopt a tripartite temporal framework which distinguishes *event* ( $E$ ), *speech* ( $S$ ) and *reference* ( $R$ ) times (Reichenbach, 1947). Aspect and tense relate these times: tense establishes the order of reference and speech times, while aspect situates event time with respect to reference time. Table 2 schematizes Klein’s (1994) proposals for basic tenses and aspects: using these, past perfective in (1a) specifies  $R < S, E \subseteq R$ , and past imperfective in (1b)  $R < S, E \supset R$ .<sup>2</sup> Assuming a neo-Davidsonian event semantics, wherein aspects map properties of eventualities (type  $\langle v, t \rangle$ ) to properties of times (type  $\langle i, t \rangle$ ) to be saturated by tense, the aspectual relations below can be formalized as in (2): the function  $\tau$  maps an event to its *temporal trace* or *runtime* (Krifka, 1998).

- (2) Preliminary semantics for aspects (type  $\langle \langle v, t \rangle, \langle i, t \rangle \rangle$ ):
- a.  $\llbracket \text{PFV} \rrbracket^w := \lambda P_{s,vt} \lambda t_i. \exists e [\tau(e) \subseteq t \wedge P(w)(e)]$
  - b.  $\llbracket \text{IMPF} \rrbracket^w := \lambda P_{s,vt} \lambda t_i. \exists e [\tau(e) \supset t \wedge P(w)(e)]$
  - c.  $\llbracket \text{PERF} \rrbracket^w := \lambda P_{s,vt} \lambda t_i. \exists e [\tau(e) < t \wedge P(w)(e)]$

<sup>1</sup>The *passé simple* is obsolete in spoken French (Verkuyl et al., 2004). Perfective reference is colloquially marked with the compound *passé composé*, which combines a present auxiliary with the main verb’s past participle, structurally parallel to the English *present perfect* (see 3a). The *passé composé* has both perfect and perfective uses.

<sup>2</sup>*Nonpast* ( $R \geq S$ ) and *nonfuture* ( $R \leq S$ ) tenses are also attested. The status of a *neutral* aspect—which covers an eventuality’s initial phase (Smith, 1991)—is debated. Aspectual markers which have been argued to expone neutrality (Dahl, 2010) may be unified with (im)perfectives under the right implementation of (non-)completivity (Altshuler, 2014) and/or a pragmatic account of aspectual competition (Bohnenmeyer and Swift, 2004; Grønn, 2007, a.o.).

Temporal operator	Tense ( $S, R$ )	Aspect ( $R, E$ )
PST (past)	$R < S$	-
PRS (present)	$R = S$	-
PFV (perfective)	-	$E \subseteq R$
IMPF (imperfective)	-	$E \supset R$
PERF (perfect)	-	$E < R$
PROSP (prospective)	-	$E > R$

Table 2: Representation of basic tenses and aspects using the three times framework

$$d. \llbracket \text{PROSP} \rrbracket^w := \lambda P_{s,vt} \lambda t_i. \exists e [\tau(e) > t \wedge P(w)(e)]$$

Unlike the “inclusion” aspects (2a)-(2b), *perfects* and *prospectives* indicate an “ordering” relation (Rullmann and Matthewson, 2018). Their status in a crosslinguistic aspectual typology is debated (see, e.g., Bhatt and Pancheva, 2005; Bohnemeyer, 2014; Klein, 2014; Bertrand et al., 2022): for one, although tense-independent markers of anteriority and posteriority are well-attested—see, e.g., (3)—it is not clear that temporal ordering fully captures their semantics (see §2.3–§2.4).

- (3) English *perfect* and *prospective* (Binnick, 1971; Comrie, 1976):
- a. Nur has run. ( $R = S, E < R$ )
  - b. Nur is going to run. ( $R = S, E > R$ )

Further complicating matters, the uniform type signatures in (2) (cf. Kratzer 1998) preclude aspect “stacking”, but there is robust evidence that the ordering aspects can embed the inclusion aspects (viz., *Nur { has been / is going to be } running*; see also Iatridou et al. 2001; Pancheva 2003; Rullmann and Matthewson 2018) and more limited evidence that the reverse is possible (e.g., Matthewson et al. 2022). The proposals in (2) are thus not definitive: different authors switch between event- and time-based treatments, and I will introduce these shifts as needed.

The rest of the chapter is structured as follows. §2 considers potential (re)analyses of the aspects in Table 2, motivated by data suggesting the presence of modality in each case. In §3, I discuss two apparently modal phenomena—*counterfactuality* and *habituality*—which frequently collocate with fixed aspectual marking. §4 briefly discusses aspect-modality interactions in the context of two phenomena—*actuality entailments* (Bhatt, 1999) and *frustrativity* (Overall, 2017, a.o.)—where the composition of apparently distinct semantic elements leads to unexpected interpretive consequences. §5 offers concluding remarks.<sup>3</sup>

## 2 Modalizing aspects

Each of the aspects introduced above has been argued to warrant a modal analysis. For the inclusion aspects, these arguments typically relate to their interaction with *telic* predicates: §2.1 discusses modal solutions to the *imperfective paradox* and §2.2 examines modality and (non)maximality in

<sup>3</sup>I have had to omit several relevant topics. In focusing on grammatical over lexical aspect, I set aside discussion of interesting patterns of modal selection and the aspectual classification of modals and sublexically modal eventuality predicates (see, e.g., 4.5 SUBLEXICAL MODALITY). I have also set aside work on semantic change within and between aspectual and modal categories (see, e.g., Bybee et al., 1994; Aijmer, 2004; Deo, 2015) which may well inform the synchronic analysis of aspect and modality, and shed light on the conceptual reality of a division between the two.

(non)culminating telic perfectives. §2.3 explores links between the perfect and epistemic modality. Finally, §2.4 discusses the role of prospectivity in expressions of futurity.

## 2.1 The imperfective paradox

The so-called **imperfective paradox** (Dowty, 1979) is an analytical puzzle posed by the acceptability of progressively-inflected telic predicates in *non-culminating* contexts such as (4):<sup>4</sup>

- (4) Mahler was writing a tenth symphony when he died.

Uninflected telic predicates are usually assumed to denote culminated eventualities (i.e., events which realize a lexically-specified *culmination condition*; Kratzer 2004). Combined with a progressive like (2b), this *culmination assumption* predicts that telic progressives require the instantiation of a culminated eventuality in some interval containing reference time. Progressives of accomplishments should then describe events which eventually culminate, wrongly predicting automatic falsity whenever culmination is precluded, as in (4).

Since the ‘paradox’ involves a clash between data and theory, the obvious way forward is to revise the contributing theoretical assumptions. One option—relaxing the culmination assumption by permitting non-culminated eventualities to verify telic predicates—is pursued by Bach (1986) and Parsons (1990), among others, but faces serious challenges in explaining what unifies non-culminated (process-only) instances of telic predicates with their culminated counterparts. A more prevalent approach instead modalizes the progressive so that it shifts culmination from the evaluation world  $w^*$  to a constrained set of modal alternatives. Getting this right is also non-trivial: the culmination alternatives must be similar enough to  $w^*$  to ensure that some phase of the target eventuality is actually ongoing in  $w^*$  at reference time but simultaneously different enough to prevent  $w^*$  from being automatically included in the culmination set.

Accounts of the imperfective paradox have largely built on Dowty’s (1979) proposal that progressives introduce *inertial* (stereotypical) modality. For Dowty (pp.148–149),  $\text{PROG}(p)$  is true at world  $w^*$  and time  $t^*$  just in case  $t^*$  is contained in an interval which verifies  $p$  across a set of worlds which share a history with  $w^*$  through  $t^*$ , and afterwards develop in the way “most compatible with the past course of events”. Crucially, since  $w^*$  need not belong to the inertia set, actual culmination is not required. While this captures a key intuition—that telic progressives describe events which correspond to normal parts of culminating events, but which may actually be interrupted—it is overly strong: relying on a complete world-history to determine inertial development wrongly predicts that progressives like (4) should be false if some interrupting activity is already underway at  $t^*$  (e.g., if Mahler’s diagnosis was already established; Vlach 1981).

One solution is to relativize inertial development to a set of facts pertaining to the underlying event (see Landman, 1992; Bonomi, 1997; Varasdi, 2014, a.o.). For instance, Portner (1998) proposes that the progressive of predicate  $P$  invokes an *event-relative* circumstantial modal base (containing propositions pertaining to event-relevant facts and the subject’s intentions and abilities) and a “non-interruption” (NI) ordering source, containing propositions denying a range of potential obstructions to  $P$ ’s development. This progressive is satisfied just in case the best worlds in the modal base—those realizing the fewest interruptions—are in fact worlds where no interruptions occur at all, and a  $P$ -event is realized: following Landman (1992), Portner uses the ordering source to abstract away from all interruptions which might plausibly be avoided.

---

<sup>4</sup>The ‘paradox’ arises whenever imperfectives license progressivity, and is not limited to dedicated progressives.

- (5) **Event-relative inertia** (based on Portner 1998, p.774).  $\text{PROG}(P)$  is true at  $w^*, t^*$  iff there is an event  $e$  in  $w^*$  s.t.  $\tau(e) = t^*$  and  $\forall w \in \text{Best}(\text{circ}, \text{NI}, P, e), \exists t[t^* \subset_{\text{nonfinal}} t \ \& \ P(t, w)]$

Both Portner’s event-relative inertia and Landman’s conceptually-related construction of an uninterrupted *continuation branch* (roughly, a stepwise path through reasonable modal continuations of the target event) handle data like (4) while ruling out progressives of objectively impossible events (e.g., *#Jutta was wiping out the Roman army*) on the grounds that the set of potential interruptions in the latter cases are too extensive to be entirely avoided. They struggle, however, with events that are in principle achievable but locally “out of reach” (Nadathur and Bar-Asher Siegal, 2022). As Varasdi (2014) observes, progressives can be true in contexts like (6), which preclude the possibility that reference time events will develop to culmination.

- (6) [Benny is incapable of completing an ultramarathon due to insufficient endurance training; he nevertheless signs up, shows up at the start, and runs until the halfway point, where he collapses from exhaustion.]

Benny was running an ultramarathon when he collapsed.

For Varasdi, data like (6) necessitate moving away from inertial analyses. His account is based on the observation that telic progressives are entailed by corresponding nonprogressives—if *Mahler wrote a symphony*, then he must previously have been *writing a symphony* (Szabó, 2004)—so that the facts verifying a telic progressive are a subset of “the conditions necessary for [...] culmination” (Varasdi, p.194). The idea is this: while there is no realistic possibility that Benny’s activities in (6) will lead to culmination, they still count as an in-progress ultramarathon-running because they are characteristic of such events. Varasdi proposes that  $\text{PROG}(P)$  holds of an event  $e$  at  $w^*, t^*$  iff  $e$  verifies *sustaining* conditions for  $P$ -events (i.e., those which are required for continued progress towards culmination) as well as a set of *indicative* conditions which single out  $P$  from a set  $\Phi$  of contextually-supplied alternative outcomes. Indicativity is modally defined: a set  $F$  of properties *indicates*  $P$  in  $\Phi$  just in case these properties are necessary for  $P$  and every world in which an event verifying  $F$  develops into an event satisfying some predicate in  $\Phi$  is one in which it develops into a  $P$ -event—crucially, however, the worlds under consideration need not be ‘normal’ from the perspective of  $w^*$  and  $t^*$ .

Another problem for inertia-based accounts is the possibility of describing an in-progress event in distinct and incompatible ways (Abusch, 1985). Both (7a) and (7b) appear to be valid descriptions of a scenario where Benny’s path will shortly intersect with that of a truck, but the same facts cannot simultaneously predict both outcomes:

- (7) a. Benny was crossing the street.  
b. Benny was walking to his death.

Clearly, the set of facts under consideration—the appropriate *perspective* on events (Asher, 1992)—cannot be the same for both claims, but there is no fully satisfactory account of how to capture this intuition. Event relativity is insufficient: (7a) must ignore the truck, while (7b) cannot, but neither event predicate mentions the truck.<sup>5</sup> Varasdi’s proposal may fare better here, since indicativity is evaluated against a contextually-determined subset of reference time facts, but more must be said about the relationship between this and the set of alternative outcomes under consideration.

<sup>5</sup>Asher (1992) handles data like (7) by explicitly incorporating *perspectives*, which select subsets of reference time facts. However, since the proposal relies on the normal development of situations verifying a given perspective, it struggles to handle unlikely and out of reach events (Bonomi, 1997; Varasdi, 2014).

Such challenges notwithstanding, a modalized progressive evidently improves on the non-modal proposal in (2b) with respect to the problem of non-culmination. A number of authors further motivate a modal analysis of the imperfective on the grounds that it offers a path towards unifying progressive interpretations with *habitual* and/or *generic* readings of the same aspectual marker. I return to this in §3.2; see also 5.1 TENSE AND MODALITY.

## 2.2 (Non)culminating perfectives

According to Tatevosov (2014, p.196), “the perfective has never been among those aspectual categories that are believed to deserve a modal analysis [...] events described by the perfective occur entirely in the actual world, leaving no room for anything like the imperfective paradox to emerge.” This is only partly true. While the claim that perfective events are fully contained in the evaluation world—insofar as they are viewed as bounded wholes—does appear crosslinguistically valid, there is a substantial literature dedicated to the observation that telic perfectives in many languages can describe non-culminated and ostensibly ‘paradoxical’ events.<sup>6</sup> Hindi is one such language: the perfective claim in (8) can be true even if the cookie has not been completely consumed, as long as Maya ceased consumption within the reference interval.

- (8) Maayaa-ne biskaṭ khaa-yaa, { lekin use puuraa nahī khaa-yaa / #aur  
 Maya-ERG cookie eat-PST.PFV.M, { but it.ACC whole NEG eat-PST.PFV.M / #and  
 use ab tak khaa rahii hai. }  
 it.ACC now until eat PROG.F PRS }  
 ‘Maya ate the cookie, { but did not eat all of it / #and she is still eating it }’

The *perfective paradox* (Singh, 1998) largely parallels its imperfective counterpart. Under the culmination assumption, a nonmodal perfective like (2a) composes with telic predicates by instantiating a culminated event within reference time. Our analytic options are thus broadly the same: let go of the culmination assumption or modalize PFV, severing culmination from  $w^*$ . Non-culminating perfectives differ from progressives with respect to continuation: unlike (8), the Hindi progressive in (9) does not rule out that cookie-eating continues past reference time, and—following Altshuler (2014)—it is this difference that classifies the aspectual marker in (8) as a true perfective.

- (9) Maayaa biskaṭ khaa rahii thii, aur use ab tak khaa rahii hai.  
 Maayaa cookie eat PROG.F PST.F, and it.ACC now until eat PROG.F PRS.  
 ‘Maya was eating the cookie, and she is still eating it.’

For Altshuler, (8) shows that ‘completive’ semantics can target not just culminated events, but also those that have “ceased to develop further” (p.738). He analyzes non-culminating perfectives as *partitive* operators which permit the instantiation of (locally) *maximal stages* of  $P$ -eventualities (Filip, 2000, 2008), using a modal definition of event stages adopted from Landman (1992). Per (10), an actual event  $e$  qualifies as a  $P$ -stage just in case it develops into a  $P$ -event in some reasonable future (condition 10a); condition (10b) ensures cessation in  $w^*$  by guaranteeing that there is no actual  $P$ -stage properly containing  $e$ .

---

<sup>6</sup>A non-exhaustive list of such languages includes Mandarin (Koenig and Chief, 2008), Tagalog (Dell, 1983), Japanese (Ikegami, 1985), Hindi (Singh, 1991, 1998), Malagasy (Travis, 2000), Thai (Koenig and Muansuwan, 2000), St’át’imcets (Bar-el et al., 2005), Tamil (Pederson, 2007), Karachay-Balkar (Tatevosov, 2008), and Kimaragang (Kroeger, 2017). See Martin (2019).

(10) **Non-culminating perfective** (revised from Altshuler, p.761)<sup>7</sup>

$\lambda P_{vt}\lambda t_i.\exists e[\tau(e) \subseteq t \ \& \ \text{STAGE}(e, P, w) \ \& \ \text{MAX}(e, P, w)]$ , where:

- a.  $\text{STAGE}(e, P, w) = 1$  iff  $\exists w', e'$  such that  $w, w'$  are historically identical up to and including  $\tau(e)$ ,  $w'$  is a reasonable option for  $e$  in  $w$ ,  $P(e')(w') = 1$ , and  $e \sqsubseteq e'$
- b.  $\text{MAX}(e, P, w) = 1$  iff  $\forall e'[e \sqsubseteq e' \rightarrow \text{STAGE}(e', P, w) = 0]$

Altshuler envisions (10) as part of a crosslinguistically-valid parametric typology of partitive aspects: a non-culminating perfective might differ from a culminating one with respect to *proper* stagehood, with the latter replacing  $e \sqsubseteq e'$  with  $e = e'$  in (10a). This change makes vacuous the modality of (10a) and obviates maximality in (10b), effectively returning us to an included Kleinian perfective. However, while this derives the right result for strong perfectives, the effect—reducing semantic complexity—is somewhat at odds with the morphological facts of the Hindi aspectual system Altshuler aims to explicate, which crucially complements the “simple” *-yaa* perfective with a strong (culminating) compound form constructed by augmenting the main verb in (8) with the light verb *le*, as in (11).<sup>8</sup> A more natural analysis might tie the additional morphological material in (11) to a semantic component inducing culmination (see also Martin and Gyarmathy 2019, p.11).

- (11) Maayaa-ne biskat̄ khaa li-yaa,           #lekin use   puuraa nahĩ khaa-yaa.  
Maya-ERG cookie eat take-PST.PFV, #but it.ACC whole NEG eat-PST.PFV.  
Intended, impossible: ‘Maya ate the cookie, but did not eat all of it.’

There may, moreover, be reason to extend a modal treatment of non-culminating perfectives to their strong counterparts. Tatevosov (2014) points out that Russian perfectives—unlike their Romance alternatives—impose telicity on their inputs. In (12), the underlying predicate composes with a bare plural theme (*apples*) which is compatible elsewhere with both cumulative (indefinite plural) and definite (maximal) reference. In composition with the perfective verb, however, only the maximal interpretation is available:

- (12) Vasja s”-e-l           jablok-i           (za dva   čas-a   / \*dva   čas-a).  
Vasja PFV-eat-PST.M apple-ACC.PL (in two.ACC hour-GEN / two.ACC hour-GEN).  
‘Vasja ate all the apples (in two hours).’ (*Impossible*: ‘Vasja ate apples (for two hours).’)

Tatevosov derives this by modalizing the Russian perfective as in (13). The idea is that even a potentially atelic predicate  $P$  will be forced into a maximal interpretation if it is categorically *impossible* for a verifying event to continue to develop as an instantiation of  $P$ . (13) combines an included perfective with a modal element inspired by Portner’s (1998) progressive: the final conjunct in (13) derives the maximal apple-eating interpretation in (12) by forcing the actual  $P$ -eventuality to be one in which the incremental theme is completely affected, precluding continued apple-eating in the modal alternatives.

<sup>7</sup>I have made two changes to Altshuler’s proposal. First, where he treats grammatical aspects as time-independent (mapping eventuality predicates to event-stage predicates), I reintroduce temporal dependence. The second revision—to the maximality clause—is more consequential: Altshuler’s original (b) condition requires only that  $e$  is not properly contained in an actual  $P$ -eventuality. This fails to block the continuation in (8): a scenario in which Maya is still eating at speech time (so that there is as yet no complete cookie-eating) trivially satisfies the requirement (cf. Arregui, 2014, p.781). Requiring  $e$  to constitute the maximal actual  $P$ -stage achieves the desired *cessation* entailment.

<sup>8</sup>Complex predicates in Hindi/Urdu (Hook, 1974; Butt, 1995, a.o.) are formed by composing a lexical verb stem with an inflecting light verb from a limited set. *Le* (lit., ‘take’) incontrovertibly adds a culmination requirement in its perfective uses, but introduces a *dispositional* meaning elsewhere, suggesting that its semantics go beyond the aspectual (Butt, 1997; Nadathur, 2024).

- (13) **Strong (telicity-inducing) perfective** (adapted from Tatevosov, 2014, p.203).  
 $\llbracket \text{PFV} \rrbracket^w := \lambda P_{vt} \lambda t_i. \exists e [\tau(e) \subseteq t \ \& \ P(e)(w) \ \& \ w \in \text{Best}(\text{Circ}, \text{NI}, P, e)]$

The locus of the contrast between Altshuler’s and Tatevosov’s proposals is in the relative strength of a *maximality* requirement: non-culminating perfectives like (10) instantiate events which are maximal in the reference context, while (13) imposes a notion of maximality that applies across the modal domain. This suggests that it may be possible to integrate the two accounts into a single parametric typology, but it remains unclear how such an account could explain the difference between Slavic and Romance-type perfectives which motivates (13).

I conclude this section by briefly considering the neglected analytical alternative for handling non-culmination: relaxing the culmination assumption to allow non-culminated events to validly instantiate a telic predicate. As Nadathur and Filip (2021) point out, this move would obviate modalizing (im)perfective aspects: the intuitive contrast between weak and strong perfectives can then be parametrized as suggested above, in terms of selection between a “terminating” local maximizer (requiring an actual event  $e$  to be the largest reference time  $P$ -instantiation) and an “absolute” maximizer (requiring  $e$  to be maximal in the denotation of  $P$ ).

The challenge is to implement this idea in a principled fashion—that is, to provide a clear model-theoretic basis for treating non-culminating events as valid instances of telic predicates. Existing event structural approaches to the imperfective paradox rely on a link between partial instantiation and the partial affectedness of an object (Bach 1986; Parsons 1990; Hallman 2009; see also Singh 1998), but do not readily extend to predicates lacking incremental themes (Landman, 1992). Taking inspiration from predicate-driven analyses of non-culmination, however, a promising avenue may be to incorporate modality into the denotation of accomplishments themselves: Koenig and Muan-suwan (2000) explain data parallel to (8) by proposing that Thai accomplishments are inherently imperfective (progressive), and Bar-el et al. (2005) assign a modal semantics to the St’át’imcets *control transitivizer* which maps intransitive change of state predicates to non-culminating accomplishments. Nadathur and Filip (2021) suggest that the property of telicity is inherently modal, allowing a telic  $P$  to describe temporal “slices” of teleologically-optimal alternatives for  $P$ ’s culmination. Accounts of this sort offer rapprochement between extensional and intensional views: the phenomenon of telic non-culmination is treated as modal, but the requisite modality originates in *Aktionsart*, rather than grammatical aspect. Distinct approaches may be suited to different languages (see Martin, 2019), and this should be determined using language-internal evidence for the reality of culminated vs. non-culminated instantiations of telic predicates (see also Zucchi 1999).

### 2.3 Perfect modality: current relevance and evidentiality

Much of the literature on perfect markers focuses on the “remarkable empirical diversity” in their interpretation, within and across languages (Bertrand et al., 2022, p.2). The English perfect—formed by embedding a past participle under the auxiliary *have*—ranges from a “universal” use which arises only with stative or progressive participles and indicates that the target eventuality *continues* through reference time to three types of “existential” perfect (McCawley 1971; Mittwoch 1988; Iatridou et al. 2001) which block reference time persistence for the participle.

- (14) a. *Universal/continuative perfect*: Nur has lived in San Francisco for five years.  
 b. *Existential perfects*:  
 i. *Experiential*: Nur has seen the Aurora (before, and she may do so again).

- ii. *Resultative*: I have lost my glasses (#but I found them again).
- iii. *Recent past*: Archduke Ferdinand has been assassinated in Sarajevo.  
[“Hot news” circa June 28, 1914, unacceptable today]

Despite consequential differences between these perfects,<sup>9</sup> it is generally agreed that they share an *anteriority* distinct from that of past tenses (Klein, 1994; Bohnemeyer, 2014). In English, one manifestation of this contrast is in the incompatibility of (present) perfect claims with temporal modifiers specifying intervals that do not overlap reference time (Klein, 1992): see (15).<sup>10</sup> More generally, perfects convey a sense of *current relevance*, linking the target eventuality to some property obtaining at reference time.

$$(15) \quad *Ferdinand \text{ has } \left. \begin{array}{l} \text{lived in San Francisco} \\ \text{seen the Aurora} \\ \text{lost his glasses} \\ \text{been assassinated} \end{array} \right\} \left. \begin{array}{l} \text{last year} \\ \text{last week} \\ \text{yesterday} \\ \text{in 1914} \end{array} \right\} \quad (\text{the } \textit{present perfect puzzle})$$

Enter modality. McCawley (1971) suggests that current relevance is linked to *possibility*, requiring that participle-type events are replicable at reference time. Katz (2003) pursues this to explain the data in (15): on the assumption that definite temporal modifiers (e.g., *last year*) attach directly to event descriptions (and below the perfect), a perfect which asserts anteriority but presupposes the future possibility of a participial event will produce automatic presupposition failure whenever the participle is past-specified.

(16) **Epistemic modal perfect** (adapted from Katz 2003, p.154).<sup>11</sup>

$$[[\text{PERF}]^w := \lambda t \lambda P_{it}. \exists t' [t' < t \ \& \ P(t')(w)] \ \& \ \partial (\exists t'' [t < t'' \ \& \ \exists w' \in \text{Best}(\text{Epis}, \text{Norm}) [P(t'')(w')]])]$$

Proposal (16) shifts from event-based anteriority in (2c) to a version which allows perfects to embed aspectually-specified participles (Iatridou et al. 2001, a.o.).<sup>12</sup> The epistemic modal base in (16) must be hearer-relative to account for the acceptability of “hot news” perfects like (14b-iii): it cannot be the case both that Ferdinand died and that his future demise is possible, but Katz argues that what makes (14b-iii) both “relevant” and newsworthy is that its audience is taken to be uninformed about the death and thus in the position to entertain its possibility.

(16) is also intended to explain the “lifetime” effect which distinguishes the unacceptable perfect in (17a) from the acceptable (17b): the idea is that Einstein’s 1955 death precludes future visits to Princeton, resulting in presupposition failure. Unfortunately, however, the same reasoning wrongly predicts unacceptability from (17c):

- (17) a. #Einstein has visited Princeton.
- b. Fauci has visited Princeton.

<sup>9</sup>Space prevents me from setting out the distinctions in detail here. Portner (2011) and Grønn and von Stechow (2021) provide comprehensive overviews and evaluate the major types of perfect theory—*anteriority* accounts (Klein, 1992, 1994; Giorgi and Pianesi, 1998), *resultative* approaches (Moens, 1987; Parsons, 1990; Steedman, 1994), and “extended now” analyses (McCoard, 1978; Iatridou et al., 2001; Pancheva, 2003; Pancheva and von Stechow, 2004).

<sup>10</sup>This effect (Klein’s *present perfect puzzle*) is not uniformly observed in perfect-marking languages (Musan, 2001, a.o.). The contrastive crosslinguistic distribution of present perfects is often derived via idiosyncratic variation in the perfect form; alternatively, the effects may result from *competition* with the simple past: see, e.g., Schaden (2009).

<sup>11</sup>The  $\partial$  operator introduces presupposed material (Beaver and Krahmer, 2001).

<sup>12</sup>This is necessary not only to allow for progressive-marked English participles but also to reconcile the anteriority of perfect aspect with the reference time persistence of participial states in universal perfects like (14a).



## 2.4 Prospectivity and futurity

The prospective aspect is rarely discussed independently of modality. This is unsurprising, since prospectivity expresses a form of futurity, which is typically taken to be modal in nature (Abusch 1985; Copley 2009; Giannakidou 2014; Cariani 2021, a.o.; see also 5.3 MODALITY AND THE FUTURE). However, it is not clear that prospective markers (expressions introducing the  $E > R$  relation) are necessarily also modal: while many of the semantic elements analyzed as “prospective” do indeed demand modal analyses (e.g. Tonhauser, 2011), the literature also identifies potential prospectives which simply collocate with expressions of modality (Mucha, 2015; Matthewson et al., 2022). Future reference evidently requires both prospectivity (temporal *posteriority*) and modality (Rullmann and Matthewson, 2018, a.o.), but work on the semantics of futurity suggests that languages vary in whether futur(at)e constructions encode these components non-decompositionally or transparently compose distinct morphological elements as “building blocks” (von Stechow and Matthewson, 2008).<sup>14</sup>

The contrast between *will* and *be going to*—often described as a proximate future or prospective (Binnick, 1971; Hill, 2024)—provides an entry point into the typological landscape. While both expressions are modal and future-oriented, they are not interchangeable: for instance, only *will* is appropriate in offer contexts like (20) (see Copley, 2009; Klecha, 2011). The infelicity of *be going to* seems linked to its progressivity: (20a) describes a commitment taken on at speech time, but (20b) intuitively expresses a commitment that is already underway.

- (20) **Offer context** (Matthewson et al., 2022, p.14). I am hosting a potluck dinner next week. You have no idea what you’re going to bring because you haven’t thought about it yet. I tell you ‘Nobody has offered to bring fry bread, but I hope somebody does.’ You decide to offer to bring it so you reply:
- a. I will bring fry bread.
  - b. #I am going to bring fry bread.

Building on Copley and Klecha, Matthewson et al. (2022) analyze *be going to* as the composition of a modal progressive with a nonmodal prospective (*go*; see also Eckardt 2006), while *will* is the present tense spellout of an atemporal necessity modal (WOLL) embedding a covert prospective.<sup>15</sup> (21) provides the key ingredients: (21b) is a type-shifted version of Portner’s (1998) progressive, and (21a) adapts Bohnemeyer’s (2014) analysis of prospectives as introducing *preparatory* eventualities for events of the input type.<sup>16</sup> On this account, *be going to* (PROG>PROSP) describes an in-progress event which will lead to an event of the prejacent type if it is not interrupted, while *will*

---

<sup>14</sup>Putative prospectives have been identified in many languages, including Blackfoot (Reis Silva, 2006; Louie, 2015), English (Binnick, 1971; Comrie, 1976; Haegeman, 1989), Gitksan (Jóhannsdóttir and Matthewson, 2007; Matthewson, 2013), Hausa (Mucha, 2015), Ktunaxa (Laternus, 2014), Paraguayan Guaraní (Tonhauser, 2011), and St’át’imcets (Matthewson, 2006; Glougie, 2007). Aspectual prospectivity is argued to be covert but separable from modality in Blackfoot and English (Louie, 2015; Kratzer, 2011; Matthewson, 2012), overt and separable in Hausa, Gitksan and Ktunaxa (Mucha, 2015; Matthewson et al., 2022; Chen et al., 2017), and inseparable from modality in Guaraní and St’át’imcets (Tonhauser, 2011; Glougie, 2007).

<sup>15</sup>Matthewson et al. (2022) actually propose that WOLL marks prospectivity and collocates in (20a) with a silent necessity modal; treating WOLL as the modal aligns both with the standard view (Abusch, 1985; Condoravdi, 2002, a.o.) and with evidence that *will* has non-future uses (see Kaufmann, 2005; Tonhauser, 2011; Winans, 2016).

<sup>16</sup>It is fairly standard to describe expressions which involve CAUSE as *nonmodal*, but I am not convinced that this is innocent. Where CAUSE is given a model-theoretic analysis, it is frequently a modal one (Dowty, 1979), and a number of authors explore the idea that causal relations and modality are tightly connected (see, e.g., Kaufmann, 2013; Ilić, 2014; Nadathur, 2023), so that causal expressions may inherently invoke consideration of (modal) alternatives.

(WOLL>PROSP) establishes a reference-time preparatory event in the optimal modal alternatives, deriving the contrast in (20).

(21) Components of future reference (based on Matthewson et al., 2022):

- a.  $\llbracket \text{PROSP} \rrbracket^w := \lambda P_{vt} \lambda t \lambda e. \tau(e) = t \wedge \exists e' \exists t' [t < t' \wedge \text{CAUSE}(e, e') \wedge \tau(e') = t' \wedge P(w)(e')]$
- b.  $\llbracket \text{PROG} \rrbracket^w := \lambda P_{\langle i, vt \rangle} \lambda t \lambda e. \tau(e) = t \wedge e \text{ in } w \wedge \forall w' \in \text{Best}(\text{circ}, \text{NI}, e, P, w, t) [\exists e' \exists t'. t \subset t' \wedge P(t')(e')(w')]$
- c.  $\llbracket \text{WOLL} \rrbracket^{w, f, g} := \lambda P_{\langle i, vt \rangle} \lambda t \lambda e. \forall w' \in \text{Best}(f, g, w, t) [P(w')(t)(e)]$

The analysis extends to a pair of Gitksan futures. Given the offer context in (20), Matthewson et al. observe that Gitksan *dim* in (22a) patterns with *will*, while *yukw dim* in (22b)—transparently composing *dim* with progressive *yukw*—patterns with *be going to*:

- (22) a. Dim di-bagw-i-'y=hl eeja-m t'ilix  
PROSP COM-arrive.PL-TR-1SG.II=CN fry-ATTR grease  
'I'll bring fry bread.'
- b. #Yukw dim=in di-bakw=hl eeja-m t'ilix.  
#PROG PROSP=1SG.I COM-arrive.PL=CN fry-ATTR grease  
'#I'm going to bring fry bread.'

Per Matthewson et al., apparently unembedded *dim* reflects the presence of a wide-scope, covert necessity modal akin to WOLL.<sup>17</sup> *Dim* itself is analyzed as prospective, giving *yukw dim* in (22b) the same structure as *be going to*. If this is correct, English and Gitksan futures are formed in the same way, and provide evidence that aspectual prospectivity can be encoded separately from a required modal element. At the same time, however, a putative prospective marker—overt or otherwise—is obligatorily modally embedded in both languages, suggesting that PROSP cannot stand alone.

There is little crosslinguistic evidence for an ‘orphan’ prospective. Glougie (2007) describes a pair of St’át’incets futures which behave like the English and Gitksan doublets: *kelh* (analyzed as a future-shifting modal; Matthewson 2006) patterns with *will*, while *cuz’* (prospective; Davis and Matthewson 2022) patterns with *be going to*.<sup>18</sup> Unlike their English and Gitksan counterparts, however, neither *kelh* nor *cuz’* is morphologically complex, suggesting that prospectivity lacks independent expression in St’át’incets. Paraguayan Guaraní is similar: Tonhauser (2011) analyzes the future marker *-ta* as a “modal prospective” or necessity modal which obligatorily forward-shifts its prejacent.<sup>19</sup> Hausa (Mucha, 2015) offers yet another interesting example. Here, future reference requires combining modal (*zá*) with a low prospective-marking tone on an embedded *weak subject pronoun*. Mucha observes both that *zá* is incompatible with other aspects, and that PROSP cannot appear alone, and treats the latter as having a “deficient” aspectual type: one which outputs a property of events, and requires an embedding modal to close off the open variable.

A pattern begins to emerge. With prospectives, as with perfectives, imperfectives, and perfects, we find no clear separation between markers of aspect and modality; however, where the other

<sup>17</sup>*Dim* is obligatory with circumstantial modals (argued to forward-shift their prejacent; Condoravdi 2002, a.o.) in Gitksan, but occurs only in the prejacent of future-shifted epistemic modals (Matthewson, 2012, 2013).

<sup>18</sup>Blackfoot also has a doublet: Glougie (2007) and Louie (2015) cite unpublished work from Reis Silva (2006) for evidence that the modal *áak* patterns with *will* in future-oriented uses, while *áyaak*—which composes the progressive *á* (Dunham, 2008) with *áak*—behaves like *be going to*. The similarity to Gitksan *dim/yukw dim* is immediate.

<sup>19</sup>Tonhauser (2011) differentiates *-ta* from English *will* on the basis of this forward shift: unlike *will* (but like St’át’incets *kelh*) *-ta* cannot introduce (epistemic) possibilities that obtain at the reference time.

aspects seem to incorporate modal semantics, prospectives’ licit use seems to require collocation with a (potentially independent) modal expression. Thus, while the forward-shifting prospective effect is a key ingredient of future-oriented modality, it need not be independently represented. Moreover, even when a prospective marker can be morphologically distinguished from modality, prospectivity seems unable to stand alone, and it is in this sense that it can be described as aspectually “deficient”. If Matthewson et al. (2022) are correct, Gitksan *dim* occurs only in the scope of a (potentially covert) modal; English *go* does not seem able to express a purely temporal shift without an embedding progressive. Similarly, while Mucha observes that the Hausa prospective can occur without an overt embedding modal, this happens only in imperative constructions, which are independently argued to involve wide-scope modality (see, e.g., Kaufmann 2012).

It is not entirely clear why prospectivity should lean on modality in this way. It is certainly possible to express the relevant temporal relationships in a manner which formalizes dependency (see, e.g., Mucha), but this does not explain the phenomenon. In a nondeterministic perspective, future developments are taken to be metaphysically unsettled (Thomason, 1984; Schulz, 2008, a.o.), so it may simply be the case that prospectivity requires a modal anchor in order to instantiate posterior events. One way of implementing such an idea might be to treat the causal component of a prospective like (21a) as an obligatorily subordinating modal (Roberts 1989; Klecha 2011; see also 5.3 MODALITY AND THE FUTURE), but an account along these lines has yet to be developed.

### 3 Aspect-conditioned modality

The previous section explored phenomena in which grammatical aspects appear to contribute modal meaning. I now turn to aspect-modality interactions in which the direction of influence is less clear, focusing on independently-observed modal phenomena which carry at least a surface association with particular aspects. **Counterfactuality** and **habituality** show a robust—albeit non-universal—crosslinguistic tendency to collocate with overt imperfectivity, but there is significant debate about the role played by this marking. §3.1 surveys perspectives on aspect in the expression of counterfactuality, and §3.2 discusses the relationship between habituality and imperfectivity.

#### 3.1 Aspect and counterfactuality

Counterfactual constructions are distinguished from other modals in conveying a high degree of remoteness from reality (i.e., falsity or unlikelihood; Arregui 2021, see also Stalnaker 1975). This is linked to an overt morphological signal which varies crosslinguistically (von Stechow and Iatridou, 2023): while many languages employ dedicated counterfactual markers, Iatridou (2000, 2009) describes a robust tendency for languages to simply constrain the expression of tense and aspect in counterfactual environments, so that the signal appears to be carried by “fake” temporal marking.

The temporal strategy is illustrated in (23a)-(23b). Despite past marking in both clauses,<sup>20</sup> neither the English conditional in (23a) nor its Greek counterpart (23b) is interpreted with past reference, instead describing an unlikely (“less vivid”) future contingency. Greek counterfactuals also require imperfective marking, but—per Iatridou—this does not restrict the marked clause to a truly imperfective reading: (23b) defaults to an episodic perfective interpretation, on which (hypothetical) improvement occurs only after medicine-taking is complete.

---

<sup>20</sup>English *would* is usually analyzed as the past form of future-oriented WOLL (Abusch, 1985).

(23) Fake tense and aspect in English and Greek:

a. If he took this medicine (today/tomorrow), he would feel better.

b. An { eperne / \*pire } to farmako, tha { ginotan /  
 If { take.PST.IMPF / \*take.PST.PFV } the medicine, FUT { become.PST.IMPF /  
 \*egine } kalitera  
 \*become.PST.PFV } better

‘If s/he took the medicine, s/he would get better.’ (Iatridou, 2009, p.6)

Iatridou argues that languages that use the temporal strategy for counterfactuals invariably employ “fake” pasts and imperfectives; she additionally suggests that languages with “fake” imperfectivity are a subset of those with “fake” past, indicating that the latter must be the locus of counterfactuality. This conclusion has fueled a long-running investigation into the role of past in counterfactuality, centered on a debate over whether it is truly fake—contributing an atemporal *exclusion* or *non-coincidence* feature (Iatridou 2000; Ritter and Wiltschko 2014; see also Schulz 2014; Mackay 2019)—or real but displaced, composing with an obligatory modal (e.g., English WOLL, Greek *tha*) by backshifting the projection time for modal alternatives. Counterfactual remoteness is derived by competition with non-shifted modals, which implicates that backshifted projection was required in order to include in the modal domain world where the target proposition was still possible; (Ippolito 2004; Arregui 2005; Anand and Hacquard 2009, a.o.; see also Mirrazi 2022).

The phenomenon of fixed or “frozen” aspect in counterfactuals also warrants explication. If Iatridou’s generalizations are correct, there are two options: either “fake” imperfectivity arises as a default, or it makes a real semantic contribution. Iatridou herself takes the former route, suggesting that fake imperfectivity shows up in grammatical contexts where the relationship between event and speech time—typically established via the joint effect of tense and aspect (see §1)—is disrupted. This occurs in counterfactuals (as a result of atemporal past tense) and Iatridou argues that the account further unifies counterfactual imperfectivity with the imperfective of habituality (see §3.2) with which it is invariably syncretic:<sup>21</sup> the idea is that habitually-interpreted imperfectives relate reference time to “habit time” (rather than to a verifying instance for the underlying predicate), thereby disrupting the speech-event relationship in spite of real tense.

English presents a potential problem here. Iatridou predicts that the simple past (see 23a) should correspond to the default (“non-tensed”) aspect, but English also allows overt progressivity in counterfactual environments (viz., *If he was taking the medicine, he would be improving*), which retains its real aspectual value despite ostensibly fake past. Arregui’s (2005; 2007) version of the default approach offers a possible workaround: she adopts a referential (rather than quantificational) treatment of perfective aspect—on which it introduces an event pronoun which presupposes a real-world referent—proposing that the range of permissible aspectual markings in counterfactual environments is constrained by the semantic incompatibility of perfectivity and counterfactuality.<sup>22</sup>

<sup>21</sup>This is a non-trivial claim for languages that distinguish progressives and habituales (e.g., Hindi): in these cases, the counterfactual imperfective matches the habitual rather than the progressive marker.

<sup>22</sup>Per Arregui, a referential English perfective opposes a quantificational past perfect (pluperfect), which is the option selected for strongly counterfactual conditionals: compare the “less vivid” (23a) to (1):

(1) If he had taken this medicine (today/tomorrow), he would feel better.

A similar contrast—between less vivid conditionals with “simple” aspectual marking and strongly counterfactual claims with ostensible pluperfects—is also observed in Greek (Iatridou, 2000, 2009), which may suggest a role for the perfect aspect in counterfactuality (see also Ippolito, 2008). Whether this conclusion is warranted is, however, a

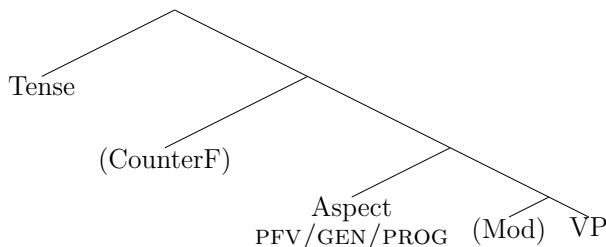
However, neither Iatridou’s nor Arregui’s accounts can be easily extended to languages like Russian (Iatridou, 2009; Grønn, 2013), Spanish (Borgonovo and Cummins, 2007), or Palestinian Arabic (Halpert and Karawani, 2012), which permit perfective marking alongside “fake” past.

Hacquard (2006) proposes a more radical version of the default approach. Her account is based on the structure of French counterfactuals, which require “fake” *imparfait* (fusing past and imperfectivity) in their antecedents and *conditionnel* marking—analyzed as the composition of a (modal) future and the *imparfait* (Iatridou 2000, pp.266–268)—in their consequents:

- (24) Si Lydia lis-ait un livre, sa mère lui donne-rait une pomme.  
 If Lydia read-PST.IMPF a book, her mother her give-COND an apple  
 ‘If Lydia read a book, her mother would give her an apple.’ (Hacquard, 2006, p.83)

Hacquard suggests that counterfactuality is introduced by a dedicated modal which optionally scopes between tense and aspect, as shown in (25). On her analysis, perfective marking surfaces just in case past tense is immediately adjacent to perfective aspect, and the *imparfait* is simply the spellout of PST in any other configuration: PST > PROG (past progressive/habitual), PST > GEN (past generic), or crucially PST > MOD<sub>cf</sub> > PFV/GEN/PROG (counterfactual). This account, too, has limited extendability: while it seems to capture the facts for French and Italian (Hacquard, 2006, p.99), the relevant spellout conditions are likely to vary from one language to another, particularly where tense and aspect are morphologically decoupled.<sup>23</sup>

- (25) Romance clausal skeleton (Hacquard, 2006, p.98):



The alternative approach—which treats “frozen” aspect as real—is taken up by Anand and Hacquard (2009) and Ferreira (2016).<sup>24</sup> Both accounts take the view that “fake” temporal morphology is simply displaced, treating past and imperfective marking in the antecedents and consequents of

---

matter of some debate: while Arregui’s analysis relies on the semantics of the perfect, others (Iatridou, 2000; Ippolito, 2003; Karawani, 2014, a.o.) argue that strong counterfactuals simply make use of an inflecting auxiliary (elsewhere used for the perfect) in combination with a past participle to introduce two layers of past morphology; an analysis along these lines is corroborated in some languages (e.g., Hindi; Bhatt 1997) by the use of aspectual inflection—prohibited in true perfects—on the auxiliary. Whether this second layer of past tense must be “real” (interpreted below the clause level) or can serve to modify the ‘degree’ of counterfactuality of the target claim varies by language.

<sup>23</sup>Assuming that CounterF in (25) can be covert, Hacquard’s proposal handles counterfactual Italian conditionals which contain only the *imperfetto* (PST+IMPF; Ippolito 2004). However, it also forces the surprising conclusion that perfectly-interpreted counterfactual antecedents (e.g., 24) must contain a covert modal at the CounterF site, in order to block surface perfectivity. It is not clear what the role of this modal might be, nor how it should interact with the obligatory modal in the conditional consequent (which the antecedent is assumed to restrict; Kratzer 1981).

<sup>24</sup>Ippolito’s (2004) analysis of strongly counterfactual Italian “imperfect” conditionals also centers aspect: she argues that certain modal uses of the *imperfetto* reflect a structure in which the past component of the marker scopes above a modal imperfective and backshifts its evaluation time, deriving the counterfactual signal from pragmatic competition with standard indicatives. Since Ippolito carefully distinguishes imperfect conditionals from “subjunctive” counterfactuals—a class including English *would*-conditionals as well as data like (23b)-(24)—her proposal does not obviously extend to a more general treatment of counterfactual aspect.

counterfactual conditionals as reflections of operators which scope above a (future-oriented) modal heading the conditional structure. Anand and Hacquard then build on Hacquard’s (2006) proposal that modals project their alternatives from an event variable—rather than a world or world-time pair—tied to the closest event-binder with wider scope: since, on the proposed counterfactual structure, a modal imperfective operator (e.g., Portner’s 1998 PROG) sits directly above the future modal, event-relativity forces the two modals to project from the same “forking” event, obviating the quantificational effect of the higher modal.<sup>25</sup> Displaced past (bundled with imperfectivity in Romance counterfactuals) does the rest of the work, presupposing a past location for the forking event and deriving counterfactual “remoteness” from backshifted projection, as outlined above.

For Ferreira, displaced past backshifts the projection time of the future modal (cf. Condoravdi 2002), outputting a stative (modal) predicate of eventualities which then composes with the displaced imperfective. Ferreira argues that this explains the syncretism between counterfactual and habitual imperfective markers, since dedicated progressives—but not habituals—resist composition with statives (e.g., *\*I was knowing the answer*). He further suggests that perfective marking is blocked in counterfactuals due to a default to present tense above displaced aspect, appealing to an independently-observed prohibition on present perfectives (Malchukov, 2009).<sup>26</sup>

Any account which treats frozen counterfactual imperfectivity as real must not only explain why other aspectual values are precluded in counterfactual environments, but also why blocking does not occur in the handful of languages that permit surface perfectivity in counterfactual clauses. A scope-based explanation might be constructed for languages which, like Russian, permit aspectual marking to vary with the actual aspectual interpretation of the clause. The idea would be that transparently real aspect necessarily scopes inside the counterfactual clause, while “fake” marking scopes high; however, such an account will also need to explain the proposed scopal differences between “fake” and “transparent” languages. A larger challenge for real-imperfective accounts comes from Palestinian Arabic, which requires “fake” perfective aspect in counterfactual clauses: as Halpert and Karawani (2012) argue, past perfective marking in the antecedent and on the auxiliary *kaan* in the consequent of (26) does not constrain the real aspectual value of either clause (see also Karawani and Halpert, 2023).

- (26) iza ʔileʔ                    halaʔ, kaan                    b-iwsal                    ʔa l-waʔt    la l-muħaadara  
 if leave.PST.PFV now,    be.PST.PFV IMPF-arrive on the-time for the-lecture.  
 ‘If he left now, he would arrive on time for the lecture.’ (Halpert and Karawani, p.101)

Bjorkman and Halpert (2017) use Palestinian Arabic as well as fixed-imperfective languages like French and Zulu (Halpert, 2012) to motivate a reconsideration of the default approach in terms of the within-language distribution of temporal resources. Their central claim is that the combination of “fake” past and “fake” aspect occurs only in languages where the (im)perfective opposition is morphologically fused with past tense: substantiating Iatridou’s (2000) claim that only “fake” past is required for counterfactuality, they propose that one of the aspectual markers—crucially, the one which shows up in counterfactual contexts—in fusing languages is formally specified only as past, receiving its ordinary aspectual interpretation via pragmatic competition with a “true” (tenseless) aspectual marker (IMPF in Palestinian, PFV elsewhere). This predicts that languages which separate

<sup>25</sup>Schematically,  $\forall w \in \text{ACC}(e)[\forall w' \in \text{ACC}(e)[p(w')]] \equiv \forall w \in \text{ACC}(e)[p(w)]$  (Anand and Hacquard, 2009, p.44).

<sup>26</sup>Anand and Hacquard (2009) do not explain why counterfactual environments block perfective marking, and since displaced past scopes above displaced imperfective on their analysis, Ferreira’s account cannot apply: one explanation might be that perfective modals’ *actuality entailments* (Bhatt 1999; see §4.1) somehow “override” counterfactuality.

tense and aspectual marking should allow the free expression of real aspect in counterfactual clauses: as Table 3 shows, this typological slot is plausibly occupied by Russian (and perhaps by English as well, since both simple and progressive pasts can be interpreted counterfactually).

<i>Language</i>	<i>Morph. marker</i>	<i>Tense spec.</i>	<i>Aspectual spec.</i>	<i>Marks CF?</i>
Russian, possibly English	“past”	PST	IMPF/PFV	✓
French, Greek, Zulu	“past imperfective”	PST	∅	✓
	“past perfective”	∅	PFV	X
Palestinian Arabic	“past imperfective”	∅	IMPF	X
	“past perfective”	PST	∅	✓

Table 3: Formal values for counterfactual temporal morphology (adapted from Bjorkman and Halpert 2017, p.169)

A potential counterexample to the above prediction comes from Hindi, which separates tense and aspectual information but requires “fake” imperfective in counterfactual contexts (Bhatt, 1997). The challenge here runs even deeper: Hindi counterfactuals seem to violate Iatridou’s (2000) generalization about the central role of “fake” past, insofar as a tense marker which is obligatory in ordinary imperfectives is prohibited in counterfactuals:

- (27) agar Raam davaaai pii-taa {\*hai/\*thaa}, to use acchaa lag-taa  
 if Ram medicine drink-IMPF.M {PRS/PST.M}, then he.DAT good feel-IMPF.M  
 {\*hai/\*thaa}  
 {PRS/PST.M}.  
 ‘If Ram drank this medicine, he would feel good.’

Iatridou argues that (27) contains a covert past, building on Bhatt’s claim that non-counterfactual contexts which permit untensed Hindi imperfectives are invariably past-oriented. If this is correct, then Hindi conforms after all to Iatridou’s generalization (albeit not to the dependent-aspect theory of Table 3), but there are at least two reasons to be cautious about the hypothesis. First, tense marking is not *obligatorily* covert in other Hindi environments which permit its nonexpression (see also Karawani and Halpert 2023, p.19); second, bare imperfectivity can be interpreted as present-oriented when it occurs under negation.

Bjorkman and Halpert (2017) argue that Hindi patterns with a small group of languages (including Farsi and Amharic; Karawani and Halpert 2023) where the counterfactual signal is, *contra* Iatridou, located in “fake” imperfective marking (but see Mirrazi 2022 for recent arguments that aspect in Farsi counterfactuals is real). They suggest this reflects the presence of a covert, independent, wide-scope counterfactual modal—realized by overt, dedicated counterfactual markers in languages like Cantonese, Somali (van Linden and Verstraete, 2008), and Hungarian (Iatridou, 2009), and by “fake” (atemporal) past in languages like French, Greek, Palestinian Arabic, and Zulu—which imposes selectional restrictions on the embedded expression of aspect. While there is evidently a great deal more to be explored in this arena—including the precise nature of the affinity between covert counterfactuality and (formal or semantic) imperfectivity—the literature on counterfactual marking nevertheless seems to converge on a typological picture in which aspectual semantics do not contribute substantively to the remoteness of counterfactual expressions.

### 3.2 Imperfectivity, habituality, and genericity

Imperfective aspect is frequently associated with **habituality** as well as progressivity (Comrie, 1976, a.o.). The French *imparfait* licenses both readings: (28a) picks out an ongoing running event, while (28b) describes a pattern of activity which obtained throughout reference time.

- (28) a. À 8h45, Nur cour-ait.  
 At 8:45am, Nur run-PST.IMPF  
 ‘At 8:45am, Nur was running.’  
 b. Dans sa jeunesse, Nur cour-ait.  
 In her youth, Nur run-PST.IMPF  
 ‘In her youth, Nur used to / would run.’

The frequency of progressive/habitual syncretism (seen in Greek, Romance, Slavic, and elsewhere; Bybee et al. 1994) motivates analyses which assigns the readings a shared modal core. Ferreira (2005, 2016) (for instance; see also del Prete 2013) proposes that event predicates denote both singular and plural (sums of singular) events (Kratzer, 2003): progressive readings result when IMPF instantiates a singular event, while habituality corresponds to plural instantiations. In both cases, a modal imperfective (e.g., 5) ensures that instantiated events extend into idealized futures of the reference interval: Ferreira argues that this accounts for the non-accidental, “lawlike” character of habitual imperfectives.

Deo (2009) achieves a similar result by using *regular partitions* ( $\mathfrak{R}$ ) to divide an interval into a covering set of non-overlapping, equi-long subintervals. Her imperfective (see 29) requires that each partition cell of an interval  $j$  (properly containing reference time  $i$ ) coincides with a  $P$ -event fully contained in an inertial modal alternative. An interval which is long compared to a typical  $P$ -event—as in (28b)—will be coarsely partitioned, so that coincidence requires multiple  $P$ -events, while a relatively small interval will trigger an infinitesimal partition-measure, requiring continuous (thus singular) instantiation of  $P$  to achieve uniform coincidence.

- (29) **Partition-based imperfectivity** (adapted from Deo 2009, p.491). Given a context  $c$ ,  
 $\llbracket \text{IMPF} \rrbracket^c := \lambda P \lambda i. \forall h [h \in \text{INR}(c) \rightarrow \exists j [i \subset_{\text{nonfin}} j \subset h \wedge \forall k [k \in \mathfrak{R}_j^c \rightarrow \text{COIN}(P, k, h)]]]$ .

Arregui et al. (2014) (see also Cipria and Roberts 2000) take a radically modal approach, treating imperfectives as universal quantifiers over *situations* (Kratzer, 1989): distinct interpretations correspond to distinct, contextually-determined modal flavours. Progressives are obtained when (30) is interpreted with an *event-inertial* modal base (cf. Portner 1998), while habituais result when the modal base returns *characteristic* subsituations of the reference context.<sup>27</sup>

- (30) **Situational imperfectivity** (Arregui et al., 2014, p.313). Given a context  $c$ ,  
 $\llbracket \text{IMPF} \rrbracket^c = \lambda P_{\langle v, st \rangle} \lambda s. \forall s' : s' \in \text{MB}_\alpha(s) [\exists e. P(e)(s')]$ , where  $\text{MB}_\alpha$  is a salient modal base.

A unified analysis needs not only to explain progressive/habitual syncretism, but also the crosslinguistic occurrence of dedicated markers of both kinds. A strict parametric account (appealing to selectional restrictions, and compatible with the above proposals) is complicated by the availability of habitual readings for “progressive” markers (Moens and Steedman, 1988; Deo, 2009):

<sup>27</sup>A strength of the situation-based approach is that it readily extends to other modal uses of imperfectives: for instance, Arregui et al. (2014) derive futurate readings (cf. Copley 2009) by means of *preparatory inertia* (a type of event inertia which picks out situations verifying preparations for a  $P$ -event).

- (31) Habitual progressives in English and Hindi:
- a. Nur is baking baguettes these days.
  - b. Nur aajkal gaarīi calaa rahii hai.  
Nur these.days car drive PROG.F PRS  
'Nur is driving a car these days.'

While (31) at first seems to indicate that dedicated progressives are just flexible imperfectives, this misses an important contrast. Habitual progressives lack the “lawlike” character of (28b), instead expressing simple temporal contingencies (Deo, 2009; Boneh and Doron, 2013): (31a) describes a pattern which happens to obtain at reference time, rather than characterizing Nur. Both Deo (2009) and Ferreira (2016) ultimately differentiate progressive from habitual markers via a *boundedness* requirement—imposed on the extent of the partitioned interval for Deo and over modal instantiations of the input predicate for Ferreira—but there is no obvious way to explain the contrast between (28b) and (31) on Arregui et al.’s situational approach.<sup>28</sup>

Imperfectivity is not the only way to express habitual meanings. Many languages—including English (Binnick, 2005), Hebrew (Boneh and Doron, 2008), Polish (Boneh and Doron, 2010), Czech (Filip, 2015), and Tlingit (Cable, 2022)—employ specialized habitual morphology in addition to allowing “bare” imperfective or simple (aspectually-unmarked) verbs to convey habituality. There is a crosslinguistically robust pattern of contrast between these forms, illustrated in (32)-(34): neutral or imperfective forms license *dispositional* interpretations, which can be true absent verifying instances, while specialized habitual marking requires instantiation of the ‘habit’.

- (32) Tlingit imperfective and habitual modes (Cable, 2022, pp.4–5).

*Context:* We just bought a new coffee machine. It’s never before been used. But, this is a great model of coffee machine. Everyone agrees that this model makes great coffee.

- a. Yá yées aa washéen kúnáx linúktsi coffee áwé  
DEM new PART machine very IMPF.3SBJ.sweet.REL coffee FOC  
alúkx  
3OBJ.IMPF-3SBJ.boil.REP  
'This new machine boils very sweet coffee.'
- b. (#)Yá yées aa washéen kúnáx linúktsi coffee áwé  
DEM new PART machine very IMPF.3SBJ.sweet.REL coffee FOC  
oolúk-ch  
3OBJ.PFV.3SBJ.boil-HAB  
'This new machine boils very sweet coffee.' (Semantically coherent, rejected in context)  
*Speaker comment:* “No. That means that you’ve used it.”

- (33) Hebrew “bare” and periphrastic habituals (Boneh and Doron, 2010, p.354)

- a. Meri tipl-a b-a-do’ar me-’antarqtiqa. Mikevan še-lo haya  
Mary handle.PST-3SF at-the-mail from-Antarctica. Because that-not HAB.PST.3SM  
do’ar kaze, haya l-a harbe zman panuy  
mail such, HAB.PST.3SM to-her lots time free

<sup>28</sup>Both Deo and Ferreira explain dedicated progressives’ incompatibility with stative predicates by appealing to competition with the unbounded aspectual form: progressives are out where a termination inference introduced by boundedness contradicts world knowledge about the type of state under description.

‘Mary handled the mail from Antarctica. Since there was no such mail, she had a lot of free time.’

- b. Meri hayt-a metapel-et b-a-do’ar me-’antarqtiqa. #Mikevan še-lo  
 Mary HAB.PST-3SF handle-SF at-the-mail from-Antarctica. #Because that-not  
 haya do’ar kaze, ...  
 HAB.PST.3SM mail such ...

‘Mary used to handle the mail from Antarctica. #Since there was no such mail ...’

(34) French dispositional imperfective:

Marie s’occup-ait du courrier de l’Antarctique, mais aucun courrier de  
 Marie REFL-handle-PST.IMPF of.the mail from Antarctica, but any mail of  
 ce type n’est jamais arrivé.  
 DEM type NEG-is never arrive.PP.

‘Marie handled the mail from Antarctica, but no such mail ever arrived.’

There is not yet consensus regarding such data. One option is to treat dispositional readings as **generic** claims (see 6.6 GENERICITY AND MODALITY). For instance, Hacquard (2006) suggests that (34) contains a covert generic modal GEN which quantifies over *ideal* situations: on her account, PST>GEN is spelled out as the *imparfait* (see 25) but lacks true imperfective semantics. An analysis involving covert GEN can likewise be extended to (32a), (33a), and their English counterparts: on this approach, actualized habituals like (28b) and 31a-31b would remain compatible with a unified imperfective *à la* Ferreira or Deo,<sup>29</sup> but claims like (32b) and (33b) would require an imperfective-independent carrier of habituality.

Filip and Carlson (1997) argue that habituality represents a *sui generis* semantic category that need not be expressed by aspect. Further motivating the aspectual independence of “lawlike” habituality, (32b) demonstrates the compatibility of HAB and PFV in Tlingit, and actualized habituality is likewise reported for Romance and Slavic perfectives:

(35) Habitually-interpreted perfectives in French and Czech:

- a. Paul est allé à la messe le dimanche pendant trente ans.  
 Paul go-PST.PFV to the church on Sunday during thirty years.  
 ‘Paul went to church on Sunday for thirty years.’ (Boneh and Doron 2010, p.343)
- b. Kdykoli tam přijdu, nabídou mi slivovici.  
 whenever there come.1SG.PFV offer.3PL.PFV me plum.brandy.  
 ‘Whenever I visit there, they offer me plum brandy.’ (Filip and Carlson, 1997, p.99)

Once habituality and imperfectivity are decoupled, genericity need not be involved in non-actualized but habitual imperfectives. These claims can instead be treated as the composition of a potentially covert, iterative HAB (cf. Boneh and Doron) with a modal IMPF. Further support for an approach on which non-actualization is attributed to the modal semantics of imperfectivity comes from habitual-mode Tlingit imperfectives (not shown): per Cable, these claims combine an imperfective

<sup>29</sup>Neither Arregui et al. (2014) nor Ferreira (2016) account for non-actualized habituals; Deo (2009) suggests that these readings occur when the relevant partition-measure (induced, for instance, by the infrequency of Antarctic mail) is larger than the reference interval, so that the coincidence required by (29) can be obtained without reference time instantiation of the target predicate.

verb form with dedicated habitual marking, and contrast with the perfective habitual in (32b) in licensing purely dispositional readings.<sup>30</sup> Thus, while the precise nature of a habitual operator and its interaction with aspect offer plenty of scope for further investigation, crosslinguistic data supports the idea that habituality constitutes an independent notional category which may—but crucially need not be—expressed via imperfectivity.

## 4 Other aspect-modality interactions

The preceding sections explore phenomena which blur the lines between grammatical aspect and modality, either because aspectual marking itself appears to introduce modality, or because the contributions of distinct aspectual and modal elements are difficult to tease apart. Here, I briefly introduce two phenomena in which the interaction between seemingly-independent exponents of aspect and modality produces unexpected results.

### 4.1 Actuality entailments

Past-tense attributions of ability (e.g., *was able*) are well-known to license *actualized* readings (Thalberg, 1972, a.o.). Bhatt (1999) was the first to point out the aspectual dimension of this phenomenon: imperfective ability modals can describe ‘pure’ (potentially unrealized) potentialities, but their perfective counterparts license **actuality entailments** (AEs), forcing realization of the modal’s prejacent. The pattern in (36) occurs across a range of aspect-marking languages, including (but certainly not limited to) French, Greek, Spanish, Palestinian Arabic, and Blackfoot.

(36) Pure ability and actualized interpretations for Hindi *sak* (‘can’):

- a. Yusuf havaii-jahaaz uṛaa sak-taa      thaa, lekin woh havaii-jahaaz nahī̃ uṛaa-taa  
 Yusuf air-ship      fly    can-IMPV.M PST.M but    3SG air-ship      NEG fly-IMPV.M  
 thaa.  
 PST.M  
 ‘Yusuf had the ability to fly a plane, but he didn’t fly a plane.’
- b. Yusuf havaii-jahaaz uṛaa sak-aa,                      #lekin us-ne      havaii-jahaaz nahī̃  
 Yusuf air-ship      fly    can-PST.PFV.M, #but    3SG-ERG air-ship      NEG  
 uṛaa-yaa.  
 fly-PST.PFV.M  
 ‘Yusuf was able to fly the plane, #but he didn’t fly the plane.’

AEs are not straightforwardly predicted by received accounts of (abilitative) modality or (perfective) aspect. Combined with a fairly standard treatment of ability as *circumstantial possibility* (but see 2.3 CIRCUMSTANTIAL AND ABILITY MODALS), an ‘including’ perfective should describe a limited past *opportunity* (i.e., a bounded period during which the possibility obtained), but seems instead to erase the contribution of the modal operator.<sup>31</sup> Extensive work on the topic refines Bhatt’s initial description—showing, for instance, that AEs are not restricted to abilitative

<sup>30</sup>Cable (2022) attributes non-actualization in (32a) and habitual-mode imperfectives to the presence of imperfective aspect; however, he treats the dedicated habitual marker as a reflex of wide-scope temporal quantification, rather than a marker of iterativity. Quantificational approaches to habituality are also explored in Bonomi (1997) and Lenci and Bertinetto (2000), a.o.; Deo (2009) offers some counterarguments.

<sup>31</sup>This oversimplifies: Bhatt (1999) notes that actualized ability is better paraphrased by *managed* than by *did*, adding an inference of effort or non-triviality to the entailed prejacent proposition.

modality, but arise from any type of goal-oriented (non-epistemic) modal (Hacquard, 2006; Mari, 2016)—and proposes a number of potential modifications to the contributing elements. Existing lines of analysis explore, for instance, the scope interactions between aspect and modality (Piñón, 2003; Hacquard, 2006; Borgonovo and Cummins, 2007; Mari, 2016), a potential role for modally-embedded (and possibly covert) *prospectivity* (Kratzer, 2011; Matthewson, 2012; Mari, 2016), an *Aktionsart*-selective approach to perfectivity (Mari and Martin, 2007; Homer, 2021; Alxatib, 2021; Nadathur, 2023), the link between *genericity* and imperfectivity (Bhatt, 1999; Hacquard, 2006) and the underlying event structure of abilitative and other actualizing modals (Louie, 2015; Nadathur, 2023; Privoznov, 2023); Hacquard (2020) and Nadathur (2025) offer recent overviews of the literature. While a definitive account of actuality entailments remains outstanding—indeed, AEs remain a very active area of investigation—these approaches offer a number of fruitful insights into various components of the aspect-modality interface. The compositional nature of the puzzle means that its solution may well shed light not only on abilitative (goal-oriented) modals and perfective aspects, but also on the appropriate treatment of seemingly-unrelated data examined in the preceding sections.

## 4.2 Frustratives: between modality and aspect

**Frustrative** markers—grammatical elements that convey “the non-realization of some expected outcome implied by the proposition expressed in the marked clause” (Overall, 2017, p.479)—sit, almost by definition, at the aspect-modality interface, combining the modality of expectation with a sense of “incompleteness” suggestive of an aspectual core. Frustratives are well-documented in Amazonian languages (see Overall 2017; Carol and Salanova 2017), as well as in Uto-Aztecans (Tohono O’odham, Hale 1969; Copley 2005; Copley and Harley 2014; O’dam, Nadathur and Everdell 2025), Austronesian (Kimaragang Dusun; Kroeger 2017, 2024), and Salish (St’át’imcets; Davis and Matthewson 2022), but have only recently become the target of semantic investigation.

Frustrative-marked clauses vary in the extent to which an underlying predicate of events is instantiated. Three distinct uses of the Kimaragang frustrative *dara* are illustrated in (37): ‘proper’ frustrativity in (37a) expresses that the target event was completed “in vain” (without precipitating an expected consequence), (37b) has an *incompletive* reading (on which the relevant event began but was not completed), and (37c) describes an action *narrowly averted* (so that the marked clause event was anticipated but not initiated). These examples are representative of crosslinguistic frustrative use, but are not exhaustive: *dara* can also indicate the *non-continuation* of a (past) state, and appears in *optative* (desiderative) contexts and in the consequents of counterfactual conditionals. Additional politeness and/or evaluative uses are reported in other languages (Overall, 2017).

(37) ‘Proper’, incompletive, and avertive uses of Kimaragang *dara* (Kroeger, 2024)

- a. n-o-sii-∅                      ku no        dara it=tasu    nga’ n-iit-an        oku=i’  
 PST-NVOL-say.sii-OV 1SG already FRUST NOM=dog but PST-bite-DV 1SG=EMPH  
 ‘I said *Shii!* to the dog, but I got bitten anyway.’
- b. k<um>orop no        dara it=pilat        dialo, naka-raa        kembagu  
 <AV>scab    COMPL FRUST NOM=wound 3SG PST.AV.NVOL-blood again  
 ‘His wound was beginning to scab over, but then it started bleeding again.’
- c. patay-on ku    dara ilo’    masalong nga’, tiniag                      oku di=ama.  
 kill-OV    1SG FRUST that cobra        but PST.forbid.OV 1SG GEN=father  
 ‘I was going to kill that cobra, but Father forbade me.’

Incompleteness and avertivity have the most obviously aspect-like character—respectively expressing what might be called *anti*-progressivity and *anti*-prospectivity—but the relevant notions of non-completion are also in play in ‘proper’ frustrativity: it is simply that the salient goal (the target of frustration) here goes beyond what is lexically specified in the marked clause. Some frustratives appear amenable to analysis as clause-scoping *not at-issue* modals (Davis and Matthewson, 2022) or markers of non-inertia (Copley and Harley, 2014), with readings parallel to those in (37a)-(37c) derived in (respective) composition with perfective, progressive, and prospective propositions. The relationship between frustrativity and (independent exponents of) grammatical aspect is not always so clear, however: for instance, Nadathur and Everdell (2025) report that the contrastive distribution of two frustratives in O’dam privileges a view on which these particles “merge” with the aspectual layer, combining with aspectual operators as well as event predicates (see also Carol and Salanova, 2017). To the extent that the precise range of frustrative uses varies from one language to another, these markers offer a rich and still underexplored vantage point from which to examine how aspectually-relevant modal notions of (non)inertia, consequence, and expectation interact with event structure and the specific TAM resources of a given language.

## 5 Conclusion

The preceding sections introduced a diverse set of phenomena at the interface between aspect and modality, warranting an equally diverse array of solutions, many of which are not obviously mutually compatible. Despite the complexity of the overall landscape, some core ideas emerge: most significantly, that it seems impossible to conduct a study of aspectual semantics without encountering a variety of modal meanings that seem to emerge in interaction with the semantic and lexical categories with which aspect combines.

§2 illustrated the difficulty of maintaining a purely temporal treatment of aspect, showing that the “viewpoint” differences on which classical aspectual contrasts are based necessarily intertwine with modal notions of inertial development, (non)culmination, (epistemic) relevance, and/or futurity. A key example of the conceptual inseparability of aspect and modality comes from the link between prospectivity and futurity (§2.4). While modality is at the heart of futurity, future reference evidently requires a semantic component which introduces temporal posteriority—the prospective aspectual relation. Similarly, while purely temporal prospectivity can be conceptually distinguished from modal quantification, and while dedicated exponents of this meaning can be identified in some languages, we saw that these prospectives appear distributionally dependent on markers of modality.

The discussion of (im)perfectives in §2.1–§2.2 likewise reveals the difficulty of severing modality from aspect. Even if the intensionality required to explain non-culminating interpretations of telic predicates can be shifted to the domain of lexical aspect (as suggested at the end of §2.2), aspectual semantics must still reference modality in order to handle information pertaining to continuation, cessation and/or (absolute) notions of event maximality. Moreover, while the discussion in §3.1 suggested that imperfective aspectual markers need not themselves contribute to counterfactuality, its expression is evidently intertwined (both formally and semantically) with the presence of modal elements. There is also evidence that imperfectivity is responsible for the modal, non-actualizing meaning of dispositionally-interpreted habituals (see §3.2), and a similar component of meaning may ultimately be implicated in the puzzle in §4.1, explaining the absence of actuality entailments where an otherwise actualizing modal composes with overt imperfective aspect.

The emerging picture is one on which a strong distinction between (strictly temporal) aspectual and modal features of semantic interpretation can only be notionally maintained: it does not seem to be reflected in sharp formal divisions between exponents of aspect and modality. This view may guide the development of theories of tense-aspect-modality systems in the crosslinguistic perspective, suggesting that grammatical items which express various forms of displacement (e.g., §4.2) need not fit neatly into either the temporo-aspectual or modal categories, but instead should be analyzed in terms of combinations of basic features from each of the relevant buckets: temporal perspective, epistemic and/or inertia-based modality, iterativity, remoteness, and so on. Each of these features can be conceptually identified and clearly described, but need not be realized as independent lexical items in a given language: instead, different exponents of aspect and/or modality may lexicalize distinct combinations or configurations of these basic components, resulting in typologically-distinct TAM systems which center different dimensions of contrast.

## References

- Abusch, Dorit. 1985. *On verbs and time*. Ph.D.thesis, University of Massachusetts at Amherst.
- Abusch, Dorit. 1988. Sequence of tense, intensionality, and scope. In *West Coast Conference on Formal Linguistics*, volume 7, pages 1–14, Stanford, CA: CSLI.
- Aijmer, Karin. 2004. The semantic path from modality to aspect: ‘be able to’ in a cross-linguistic perspective. In Lindquist and Mair (eds.), *Corpus approaches to grammaticalization in English*, pages 57–78, Amsterdam: John Benjamins.
- Altshuler, Daniel. 2014. A typology of partitive aspectual operators. *Natural Language and Linguistic Theory* 32, 735–75.
- Alxatib, Sam. 2021. The ability root in Palestinian Arabic and its actuality entailment. *Natural Language and Linguistic Theory* 39, 657–685.
- Anand, Pranav and Hacquard, Valentine. 2009. The role of the imperfect in Romance counterfactuals. In *Sinn und Bedeutung*, volume 14, pages 37–50.
- Arregui, Ana. 2005. *On the accessibility of possible worlds*. Ph.D.thesis, University of Massachusetts at Amherst.
- Arregui, Ana. 2007. When aspect matters. *Natural Language Semantics* 15, 221–264.
- Arregui, Ana. 2014. Aspectual operators across languages: a commentary on the paper by Daniel Altshuler. *Natural Language and Linguistic Theory* 32, 777–789.
- Arregui, Ana. 2021. Counterfactuals: “If kangaroos had no tails ...”. In Daniel Gutzmann, Lisa Matthewson, Cécile Meier, Hotze Rullmann and Thomas Ede Zimmerman (eds.), *The Wiley Blackwell Companion to Semantics*, pages 1–33, Hoboken, NJ: John Wiley and Sons.
- Arregui, Ana, Rivero, María Luisa and Salanova, Andrés. 2014. Cross-linguistic variation in imperfectivity. *Natural Language and Linguistic Theory* 32, 307–362.
- Arregui, Ana, Rivero, María Luisa and Salanova, Andrés. 2017. Aspect and tense in evidentials. In Ana Arregui, María Luisa Rivero and Andrés Salanova (eds.), *Modality Across Syntactic Categories*, pages 211–234, Oxford: Oxford University Press.
- Asher, Nicholas. 1992. A default, truth conditional semantics for the progressive. *Linguistics and Philosophy* 15, 463–508.
- Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9, 5–16.

- Bar-el, Leora, Davis, Henry and Matthewson, Lisa. 2005. On non-culminating accomplishments. In Leah Bateman and Cherlon Ussery (eds.), *North East Linguistics Society*, volume 35, pages 87–102.
- Beaver, David and Krahmer, Emiel. 2001. A partial account of presupposition projection. *Journal of Logic, Language and Information* 10, 147–182.
- Bertrand, Anne, Aonuki, Yurika, Chen, Sihwei, Davis, Henry, Gambarage, Joash, Griffin, Laura, Huijsmans, Marianne, Matthewson, Lisa, Reisinger, Daniel, Rullmann, Hotze, Salles, Raiane, Schwan, Michael David, Todorović, Neda, Trotter, Bailey and Vander Klok, Jozina. 2022. Nobody's perfect. *Languages* 7, 148.1–28.
- Bhatt, Rajesh. 1997. Counterfactual morphology in modern Indo-Aryan languages: semantic and typological issues, ms, University of Pennsylvania and MIT.
- Bhatt, Rajesh. 1999. *Covert modality in non-finite contexts*. Ph.D.thesis, University of Pennsylvania.
- Bhatt, Rajesh and Pancheva, Roumyana. 2005. The syntax and semantics of aspect, course notes from Linguistic Society of America Linguistic Institute.
- Binnick, Robert. 1971. *Will and be going to*. In *Chicago Linguistic Society*, volume 7, pages 40–52.
- Binnick, Robert. 2005. The markers of habitual aspect in English. *Journal of English Linguistics* 33, 339–369.
- Bjorkman, Bronwyn and Halpert, Claire. 2017. In an imperfect world: deriving the typology of counterfactual marking. In Ana Arregui, María Luisa Rivero and Andrés Salanova (eds.), *Modality across syntactic categories*, Oxford Studies in Theoretical Linguistics, pages 157–178, Oxford University Press.
- Bohnenmeyer, Jürgen. 2014. Aspect vs. relative tense: the case reopened. *Natural Language and Linguistic Theory* 32, 917–954.
- Bohnenmeyer, Jürgen and Swift, Mary. 2004. Event realization and default aspect. *Linguistics and Philosophy* 27, 263–296.
- Boneh, Nora and Doron, Edit. 2008. Habituality and the habitual aspect. In Susan Rothstein (ed.), *Theoretical and Crosslinguistic Approaches to the Semantics of Aspect*, pages 321–347, John Benjamins Publishing Company.
- Boneh, Nora and Doron, Edit. 2010. Modal and temporal aspects of habituality. In Malka Rappaport Hovav, Edit Doron and Ivy Sichel (eds.), *Lexical Semantics, Syntax, and Event Structure*, pages 338–363, Oxford University Press.
- Boneh, Nora and Doron, Edit. 2013. Hab and Gen in the expression of habituality. In Alda Mari, Claire Beyssade and Fabio del Prete (eds.), *Genericity*, pages 176–191, Oxford: Oxford University Press.
- Bonomi, Andrea. 1997. The progressive and the structure of events. *Journal of Semantics* 14, 173–205.
- Borgonovo, Claudia and Cummins, Sarah. 2007. Tensed modals. In Luis Eguren and Olga Fernández-Soriano (eds.), *Coreference, Modality, and Focus: Studies on the Syntax-Semantics Interface*, pages 1–18, John Benjamins.
- Büring, Daniel. 1997. The great scope inversion conspiracy. *Linguistics and Philosophy* 29, 175–194.
- Butt, Miriam. 1995. *The structure of complex predicates in Urdu*. Stanford: CSLI.
- Butt, Miriam. 1997. Dispositional complex predicates in Urdu. Talk, *Sinn und Bedeutung*.

- Bybee, Joan, Perkins, Revere and Pagliuca, William. 1994. *The evolution of grammar: tense, aspect, and modality in the languages of the world*. Chicago: University of Chicago Press.
- Cable, Seth. 2022. Two paths to habituality: the semantics of habitual mode in Tlingit. *Semantics and Pragmatics* 15, 11.1–49.
- Cariani, Fabrizio. 2021. *The modal future: a theory of future-directed thought and talk*. Cambridge: Cambridge University Press.
- Carol, Javier and Salanova, Andrés. 2017. Frustratives and aspect. Presentation, Conference on Indigenous Languages of Latin America 8.
- Chen, Sihwei, Hohaus, Vera, Laturnus, Rebecca, Louie, Meagan, Matthewson, Lisa, Rullmann, Hotze, Simchen, Ori, Turner, Claire and Vander Klok, Jozina. 2017. Past possibility cross-linguistically: evidence from twelve languages. In Ana Arregui, María Luisa Rivero and Andrés Salanova (eds.), *Modality Across Syntactic Categories*, pages 235–287, Oxford: Oxford University Press.
- Cipria, A. and Roberts, Craige. 2000. Spanish *imperfecto* and *preterito*: truth conditions and aktionsart effects in situation semantics. *Natural Language Semantics* 8, 297–347.
- Comrie, Bernard. 1976. *Aspect*. Cambridge: Cambridge University Press.
- Condoravdi, Cleo. 2002. Temporal interpretation of modals – modals for the present and for the past. In David Beaver, Stefan Kaufmann and Brady Clark (eds.), *The Construction of Meaning*, pages 59–88, CSLI Publications.
- Copley, Bridget. 2005. When the actual world isn't inertial: Tohono O'odham *cem*. In Michael Becker and Andrew McKenzie (eds.), *Semantics of Under-represented Languages in the Americas*, volume 3 of *University of Massachusetts Occasional Papers 33*, pages 1–18, Amherst, MA: GLSA.
- Copley, Bridget. 2009. *The semantics of the future*. New York: Routledge.
- Copley, Bridget and Harley, Heidi. 2014. Eliminating causative entailments with the force-theoretic framework: the case of the Tohono O'odham frustrative *cem*. In Bridget Copley and Fabienne Martin (eds.), *Causation in Grammatical Structures*, Chapter 6, Oxford University Press.
- Dahl, Eystein. 2010. *Time, tense and aspect in Early Vedic Grammar: Exploring Inflectional Semantics in the Rigveda*. Boston: Brill Academic Publishers.
- Davis, Henry and Matthewson, Lisa. 2022. St'át'imcets frustratives as not-at-issue modals. *Linguistics* 60, 1337–1397.
- del Prete, Fabio. 2013. Imperfectivity and habituality in Italian. In Alda Mari, Claire Beyssade and Fabio del Prete (eds.), *Genericity*, Oxford Studies in Theoretical Linguistics, pages 222–249, Oxford: Oxford University Press.
- Dell, Francois. 1983. An aspectual distinction in Tagalog. *Oceanic Linguistics* 22-23, 175–206.
- Deo, Ashwini. 2009. Unifying the imperfective and the progressive: partitions as quantificational domains. *Linguistics and Philosophy* 32, 475–521.
- Deo, Ashwini. 2015. The semantic and pragmatic underpinnings of grammaticalization paths: the progressive to imperfective shift. *Semantics and Pragmatics* 8, 14.1–52.
- Dowty, David. 1979. *Word Meaning and Montague Grammar*. Dordrecht: Reidel.
- Dunham, Joel. 2008. A unified analysis of the habitual and in-progress readings of á in Blackfoot, ms.
- Eckardt, Regine. 2006. *Meaning change in Grammaticalization: an enquiry into semantic reanalysis*. Oxford: Oxford University Press.

- Ferreira, Marcelo. 2005. *Event quantification and plurality*. Ph.D.thesis, MIT.
- Ferreira, Marcelo. 2016. The semantic ingredients of imperfectivity in progressives, habituals, and counterfactuals. *Natural Language Semantics* 24, 353–397.
- Filip, Hana. 2000. The quantization puzzle. In Carol Tenny and James Pustejovsky (eds.), *Events as grammatical objects*, pages 39–91, Stanford: CSLI Publications.
- Filip, Hana. 2008. Events and maximalization. In Susan Rothstein (ed.), *Theoretical and Crosslinguistic Approaches to the Semantics of Aspect*, pages 217–256, Amsterdam: John Benjamins.
- Filip, Hana. 2011. Aspectual class and Aktionsart. In Klaus von Stechow, Claudia Maienborn and Paul Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning*, volume 2, pages 1186–1217, Berlin: Mouton de Gruyter.
- Filip, Hana. 2015. Grammaticalization of generic markers. Workshop on *Habituality and Genericity in Flux*, 22nd International Conference on Historical Linguistics, University of Naples, Italy.
- Filip, Hana and Carlson, Gregory. 1997. *Sui generis* genericity. In *Penn Working Papers in Linguistics*, volume 4, pages 91–110, University of Pennsylvania.
- Giannakidou, Anastasia. 2014. The prospective as nonveridical: polarity items, speaker commitment, and projected truth. In Jack Hoeksema and Dicky Gilbers (eds.), *The Black Book: Festschrift for Frans Zwarts*, pages 101–124, de Vries.
- Giorgi, Alessandra and Pianesi, Fabio. 1998. *Tense and aspect: from semantics to morphosyntax*. Oxford: Oxford University Press.
- Glougie, Jennifer. 2007. Aspect in St’át’imcets future expressions. In Kristin Jóhannsdóttir and Martin Oberg (eds.), *Papers for the international conference on Salish and neighbouring languages 42*, volume 20, pages 220–235, Vancouver, CA: UBC Occasional Papers in Linguistics.
- Grøn, Atle. 2007. Horn strategies and optimization in Russian. In Anton Benz, Christian Ebert and Robert van Rooij (eds.), *ESSLLI workshop on Language, Games, and Evolution*, pages 17–24.
- Grøn, Atle. 2013. Aspect and tense in counterfactual main clauses. In Folke Josephson and Ingmar Söhrman (eds.), *Diachronic and typological perspectives on verbs*, volume 134 of *Studies in Language Companion Series*, pages 133–158, John Benjamins Publishing Company.
- Grøn, Atle and von Stechow, Arnim. 2021. The perfect. In Daniel Gutzmann, Lisa Matthewson, Cécile Meier, Hotze Rullmann and Thomas Ede Zimmerman (eds.), *The Wiley Blackwell Companion to Semantics*, Oxford: John Wiley and Sons.
- Hacquard, Valentine. 2006. *Aspects of modality*. Ph.D.thesis, Massachusetts Institute of Technology.
- Hacquard, Valentine. 2020. Actuality entailments. In Daniel Gutzmann, Lisa Matthewson, Cécile Meier, Hotze Rullmann and Thomas Ede Zimmerman (eds.), *The Wiley Blackwell Companion to Semantics*, Oxford: Wiley.
- Haegeman, Liliane. 1989. *Be going to* and *will*: a pragmatic account. *Journal of Linguistics* 25, 291–317.
- Hale, Ken. 1969. Papago /čim/. *International Journal of American Linguistics* 35, 203–212.
- Hallman, Peter. 2009. Proportions in time: interactions of quantification and aspect. *Natural Language Semantics* 17, 26–61.
- Halpert, Claire. 2012. Zulu counterfactuals in and out of conditionals. In Bruce Connell and Nicholas Rolle (eds.), *Annual Conference on African Linguistics*, volume 41, pages 117–127.

- Halpert, Claire and Karawani, Hadil. 2012. Aspect in counterfactuals from A(rabic) to Z(ulu). In Jaehoon Choi, E. Alan Hogue, Jeffrey Punske, Deniz Tat, Jessamyn Schertz and Alex Trueman (eds.), *West Coast Conference on Formal Linguistics*, volume 29, pages 99–107.
- Hill, Angelica. 2024. What about *about to*? A proposal for proximate future reference. In Nikolas Webster, Yağmur Kiper, Richard Wang and Sichen Larry Lyu (eds.), *West Coast Conference on Formal Linguistics*, volume 41, pages 204–211.
- Hockett, Charles. 1960. The origin of speech. *Scientific American* 203, 88–96.
- Homer, Vincent. 2021. Actualistic interpretations in French. *Semantics and Pragmatics* 14, 12.1–56.
- Hook, P.E. 1974. *The compound verb in Hindi*. The University of Michigan: Center for South and Southeast Asian Studies.
- Iatridou, Sabine. 2000. The grammatical ingredients of counterfactuality. *Linguistic Inquiry* 31, 231–270.
- Iatridou, Sabine. 2009. About the imperfective in counterfactuals. Handout, Yale Imperfective Workshop.
- Iatridou, Sabine, Anagnostopoulou, Elena and Izvorski, Roumyana. 2001. Observations about the form and meaning of the perfect. In Michael Kenstowicz (ed.), *Ken Hale: A Life in Language*, pages 189–238, Cambridge, MA: MIT Press.
- Ikegami, Yoshihiko. 1985. ‘Activity’-‘Accomplishment’-‘Achievement’-A language that can’t say ‘I burned it but it did not burn’ and one that can. In Adam Makkai and Alan K. Melbeds (eds.), *Linguistics and Philosophy: Essays in Honor of Rulon S. Wells*, pages 265–304, Amsterdam: John Benjamins.
- Ilić, Tatjana. 2014. Modality and causation: two sides of the same coin. In Bridget Copley and Fabienne Martin (eds.), *Causation in Grammatical Structures*, pages 152–175, Oxford: Oxford University Press.
- Inoue, Kyoko. 1979. An analysis of the English present perfect. *Linguistics* 17, 561–589.
- Ippolito, Michela. 2003. Presuppositions and implicatures in counterfactuals. *Natural Language Semantics* 11, 145–186.
- Ippolito, Michela. 2004. Imperfect modality. In Jacqueline Guéron and Jacqueline Lecarme (eds.), *The syntax of time*, pages 359–387, Cambridge, MA: MIT Press.
- Ippolito, Michela. 2008. Subjunctive conditionals. In Atle Grønn (ed.), *Sinn und Bedeutung*, volume 12, pages 256–270.
- Izvorski, Roumyana. 1997. The present perfect as an epistemic modal. In *Semantics and Linguistic Theory*, volume 7, pages 222–239.
- Jóhannsdóttir, Kristin and Matthewson, Lisa. 2007. Zero-marked tense: the case of Gitksan. In Emily Elfner and Martin Walkow (eds.), *North East Linguistics Society*, volume 37, pages 299–310.
- Karawani, Hadil. 2014. *The real, the fake, and the fake fake: in counterfactual conditionals, cross-linguistically*. Ph.D.thesis, Utrecht.
- Karawani, Hadil and Halpert, Claire. 2023. Aspects of aspect in counterfactuals, ms, Universität Konstanz and University of Minnesota.
- Katz, Graham. 2003. A modal account of the English present perfect puzzle. In Robert Young and Yuping Zhou (eds.), *Semantics and Linguistic Theory*, volume 13, pages 145–161.
- Kaufmann, Magdalena. 2012. *Interpreting imperatives*, volume 88 of *Studies in Linguistics and*

- Philosophy*. New York: Springer.
- Kaufmann, Stefan. 2005. Conditional truth and future reference. *Journal of Semantics* 22, 231–280.
- Kaufmann, Stefan. 2013. Causal premise semantics. *Cognitive Science* 37, 1136–70.
- Klecha, Peter. 2011. Optional and obligatory modal subordination. In Ingo Reich, Eva Horch and Dennis Pauly (eds.), *Sinn und Bedeutung*, volume 15, pages 365–379.
- Klein, Wolfgang. 1992. The present perfect puzzle. *Language* 68, 525–551.
- Klein, Wolfgang. 1994. *Time in Language*. New York: Routledge.
- Klein, Wolfgang. 2014. Is aspect time-relational? Commentary on the paper by Jürgen Bohnemeyer. *Natural Language and Linguistic Theory* 32, 955–971.
- Koenig, Jean-Pierre and Chief, Liangcheng. 2008. Scalarity and state-changes in Mandarin, Hindi, Tamil, and Thai. In Olivier Bonami and Patricia Cabredo Hoffer (eds.), *Empirical Issues in Syntax and Semantics*, volume 7, pages 241–262, Colloque de Syntaxe et Sémantique à Paris.
- Koenig, Jean-Pierre and Muansuwan, Nuttanart. 2000. How to end without ever finishing: Thai semi-perfectivity. *Journal of Semantics* 17, 147–182.
- Korotkova, Natasha. 2020. Evidential meaning and (not-)at-issueness. *Semantics and Pragmatics* 13, 4.1–26.
- Kratzer, Angelika. 1981. The Notional Category of Modality. In Hans-Jürgen Eikmeyer and Hannes Rieser (eds.), *Words, Worlds, and Contexts. New Approaches in Word Semantics*, pages 38–74, Berlin: de Gruyter.
- Kratzer, Angelika. 1989. An investigation of the lumps of thought. *Linguistics and Philosophy* 12, 607–653.
- Kratzer, Angelika. 1998. More structural analogies between pronouns and tense. In *Semantics and Linguistic Theory*, volume 8, pages 92–110.
- Kratzer, Angelika. 2003. The event argument and the semantics of verbs, ms, University of Massachusetts at Amherst.
- Kratzer, Angelika. 2004. Telicity and the meaning of objective case. In Jacqueline Guéron and Jacqueline Lecarme (eds.), *The Syntax of Time*, pages 389–423, Cambridge, MA: MIT Press.
- Kratzer, Angelika. 2011. What ‘can’ can mean. Slides from *Semantics and Linguistic Theory* 21, Rutgers University.
- Krifka, Manfred. 1989. Nominal reference and quantification in event semantics. In Renate Bartsch, Johan van Benthem and Peter van Emde Boas (eds.), *Semantics and Contextual Expression*, pages 75–115, Dordrecht: Foris Publications.
- Krifka, Manfred. 1998. The origins of telicity. In Susan Rothstein (ed.), *Events and Grammar*, pages 197–235, Dordrecht: Kluwer.
- Kroeger, Paul. 2017. Frustration, culmination, and inertia in Kimaragang grammar. *Glossa* 2, 56.1–29.
- Kroeger, Paul. 2024. Frustratives in St’át’imcets vs. Kimaragang: parameters of variation. *Glossa* 9, 1–35.
- Landman, Fred. 1992. The progressive. *Journal of Semantics* 1, 120–124.
- Lasnik, Howard. 1993. Existence presuppositions and background knowledge. *Journal of Semantics* 10, 113–122.
- Laturnus, Rebecca. 2014. Ktunaxa future modals. In Hannah Greene (ed.), *Semantics of Under-*

- represented Languages in the Americas*, volume 7, pages 71–87.
- Lenci, Alessandro and Bertinetto, Pier Marco. 2000. Aspect, adverbs, and events: habituality and perfectivity. In James Higginbotham, Fabio Pianesi and Achille C. Varzi (eds.), *Speaking of events*, Oxford University Press.
- Louie, Meagan. 2015. *The temporal semantics of aspect and circumstance in Blackfoot*. Ph.D.thesis, University of British Columbia.
- Mackay, John. 2019. Modal interpretation of tense in subjunctive conditionals. *Semantics and Pragmatics* 12, 2.1–34.
- Malchukov, Andrej. 2009. Incompatible categories: resolving the ‘present perfect paradox’. In Lotte Hogeweg, Helen de Hoop and Andrej Malchukov (eds.), *Cross-Linguistic Semantics of Tense, Aspect, and Modality*, pages 13–31, Amsterdam: John Benjamins.
- Mari, Alda. 2016. Actuality entailments: when the modality is in the presupposition. In Maxime Amblard, Philippe de Groote, Sylvain Pogodalla and Christian Retoré (eds.), *Logical aspects of computational linguistics (LACL)*, volume 10054 of *Lecture Notes in Computer Science*, pages 191–210, Berlin: Springer.
- Mari, Alda and Martin, Fabienne. 2007. Tense, abilities, and actuality entailments. In Maria Aloni, Paul Dekker and Floris Roelofsen (eds.), *Amsterdam Colloquium*, volume 16, pages 151–156.
- Martin, Fabienne. 2019. Non-culminating accomplishments. *Language and Linguistics Compass* 13, 1–20.
- Martin, Fabienne and Gyarmathy, Zsófia. 2019. A finer-grained typology of perfective operators. In Christopher Piñón (ed.), *Empirical Issues in Syntax and Semantics*, volume 12, pages 187–216, Colloque de Syntaxe et Sémantique à Paris.
- Matthewson, Lisa. 2006. Temporal semantics in a supposedly tenseless language. *Linguistics and Philosophy* 29, 673–713.
- Matthewson, Lisa. 2012. On the (non-)future orientation of modals. In *Sinn and Bedeutung*, volume 16, pages 431–446.
- Matthewson, Lisa. 2013. Gitksan modals. *International Journal of American Linguistics* 79, 349–394.
- Matthewson, Lisa, Todorović, Neda and Schwan, Michael David. 2022. Future time reference and viewpoint aspect: evidence from Gitksan. *Glossa* 7, 1–37.
- McCawley, James. 1971. Tense and time reference in English. In Charles Fillmore and D. Terence Langendoen (eds.), *Studies in Linguistic Semantics*, pages 96–113, New York: Holt.
- McCoard, R.W. 1978. *The English Perfect: Tense Choice and Pragmatic Inferences*. Amsterdam: North-Holland.
- Mirrazi, Zahra. 2022. *Tense in conditionals: ins and outs*. Ph.D.thesis, University of Massachusetts at Amherst.
- Mittwoch, Anita. 1988. Aspects of English aspect: on the interaction of perfect, progressive, and durational phrases. *Linguistics and Philosophy* 11, 203–254.
- Mittwoch, Anita. 2019. Aspectual classes. In Robert Truswell (ed.), *The Oxford Handbook of Event Structure*, Oxford Handbooks, pages 30–49, Oxford: Oxford University Press.
- Moens, Marc. 1987. *Tense, aspect, and temporal reference*. Ph.D.thesis, University of Edinburgh.
- Moens, Mark and Steedman, Mark. 1988. Temporal ontology and temporal reference. *Computational Linguistics* 14, 15–28.

- Mouratelos, Alexander. 1978. Events, processes, and states. *Linguistics and Philosophy* 2, 415–434.
- Mucha, Anne. 2015. *Temporal interpretation and cross-linguistic variation: a formal semantic analysis of aspectual reference in Hausa and Medumba*. Ph.D.thesis, University of Potsdam.
- Musan, Renate. 2001. The present perfect in German: outline of its semantic composition. *Natural Language and Linguistic Theory* 19, 355–401.
- Nadathur, Prerna. 2023. *Actuality inferences: causality, aspect, and modality*. Oxford: Oxford University Press.
- Nadathur, Prerna. 2024. On the interaction of aspect and ability in two Hindi/Urdu constructions. In *Formal Approaches to South Asian Languages*, volume 14, pages 163–183.
- Nadathur, Prerna. 2025. Actuality entailments. *Annual Review of Linguistics* 11, 275–297.
- Nadathur, Prerna and Bar-Asher Siegal, Elitzur. 2022. Modeling progress: causal models, event types, and the imperfective paradox. In Jiayi Lu, Erika Petersen, Anissa Zaitso and Boris Harizanov (eds.), *West Coast Conference on Formal Linguistics*, volume 40, pages 254–264.
- Nadathur, Prerna and Everdell, Michael. 2025. Reanalyzing frustration: event maximality and inertia in two O’dam frustratives. In *Semantics and Linguistic Theory*, volume 35, pages 458–478.
- Nadathur, Prerna and Filip, Hana. 2021. Telicity, teleological modality and (non)culmination. In *West Coast Conference on Formal Linguistics*, volume 39, pages 617–625.
- Ogihara, Toshiyuki. 1989. *Temporal reference in English and Japanese*. Ph.D.thesis, University of Texas at Austin.
- Overall, Simon. 2017. A typology of frustrative marking in Amazonian languages. In Alexandra Aikhenvald and Robert Dixon (eds.), *The Cambridge Handbook of Linguistic Typology*, pages 477–512, Cambridge: Cambridge University Press.
- Pancheva, Roumyana. 2003. The aspectual makeup of perfect participles and the interpretations of the perfect. In Anastasia Alexiadou, Monika Rathert and Arnim von Stechow (eds.), *Perfect explorations*, pages 277–306, Berlin: Mouton de Gruyter.
- Pancheva, Roumyana and von Stechow, Arnim. 2004. On the present perfect puzzle. In *North East Linguistics Society*, volume 34, pages 469–484.
- Parsons, Terence. 1990. *Events in the Semantics of English: A Study in Subatomic Semantics*, volume 19 of *Current Studies in Linguistics*. Cambridge, MA: MIT Press.
- Pederson, Eric. 2007. Event realization in Tamil. In Penelope Brown and Melissa Bowerman (eds.), *Cross-linguistic Perspectives on Argument Structure: Implications for Learnability*, pages 331–355, New York: Lawrence Erlbaum.
- Piñón, Christopher. 2003. Being able to. In Gina Garding and Mimura Tsujimura (eds.), *West Coast Conference on Formal Linguistics*, volume 22, pages 384–397.
- Portner, Paul. 1998. The progressive in modal semantics. *Language* 74, 760–787.
- Portner, Paul. 2003. The (temporal) semantics and (modal) pragmatics of the perfect. *Linguistics and Philosophy* 26, 459–510.
- Portner, Paul. 2011. Perfect and progressive. In Klaus von Stechow, Claudia Maienborn and Paul Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning*, volume 2, pages 1217–1261, Mouton de Gruyter.
- Privoznov, Dmitri. 2023. On actuality entailments, causation, and telicity in Balkar. *Languages* 8, 178.1–43.

- Reichenbach, Hans. 1947. *Elements of Symbolic Logic*. New York: The Free Press.
- Reis Silva, Maria. 2006. Two futures in Blackfoot, paper presented at the TAMTAM workshop in Nijmegen.
- Ritter, Elizabeth and Wiltschko, Martina. 2014. The composition of INFL: an exploration of *tense*, *tenseless* languages, and *tenseless* constructions. *Natural Language and Linguistic Theory* 32, 1331–1386.
- Roberts, Craige. 1989. Modal subordination and pronominal anaphora in discourse. *Linguistics and Philosophy* 12, 683–721.
- Roberts, Craige. 1996. Information structure in discourse: towards an integrated formal theory of pragmatics. *Ohio State University Working Papers in Linguistics* 49.
- Rullmann, Hotze and Matthewson, Lisa. 2018. Towards a theory of modal-temporal interaction. *Language* 94, 281–331.
- Schaden, Gerhard. 2009. Present perfects compete. *Linguistics and Philosophy* 32, 115–141.
- Schulz, Katrin. 2008. Non-deictic tenses in conditionals. In *Semantics and Linguistic Theory*, volume 18, pages 694–710.
- Schulz, Katrin. 2014. Fake tense in conditional sentences: a modal approach. *Natural Language Semantics* 22, 117–144.
- Singh, Mona. 1991. The perfective paradox: Or, how to eat your cake and have it too. In Laurel Sutton, Christopher Johnson and Ruth Shields (eds.), *Berkeley Linguistics Society*, volume 17, pages 469–479.
- Singh, Mona. 1998. On the semantics of the perfective aspect. *Natural Language Semantics* 6, 171–99.
- Smith, Carlota. 1991. *The Parameter of Aspect*. Dordrecht: Springer Science and Business Media.
- Stalnaker, Robert. 1975. Indicative conditionals. *Philosophia* 5, 269–286.
- Steedman, Mark. 1994. Temporality. In Johan van Benthem and Alice ter Meulen (eds.), *Handbook of logic and language*, Amsterdam: Elsevier.
- Szabó, Zoltan. 2004. On the progressive and the perfective. *Noûs* 38, 29–59.
- Tatevosov, Sergei. 2008. Subevental structure and non-culmination. In Olivier Bonami and Patricia Cabredo Hoffer (eds.), *Empirical Issues in Syntax and Semantics*, volume 7, pages 393–422, Colloque de Syntaxe et Sémantique à Paris.
- Tatevosov, Sergei. 2014. Perfectivity in Russian: a modal analysis. In Jyoti Iyer and Leland Kusmer (eds.), *North East Linguistic Society*, volume 44(2), pages 196–210.
- Thalberg, Irving. 1972. *Enigmas of Agency: Studies in the Philosophy of Human Action*. London: George B. Allen Unwin.
- Thomason, Richmond. 1984. Combinations of tense and modality. In Dov Gabbay and Franz Guenther (eds.), *Handbook of Philosophical Logic: Extension of Classical Logic*, pages 135–165, Dordrecht: Reidel.
- Tonhauser, Judith. 2011. The Paraguayan Guaraní future marker *-ta*: formal semantics and cross-linguistic comparison. In Monika Rathert and Renate Musan (eds.), *Tense across languages*, pages 207–231, Tübingen: Niemeyer.
- Travis, Lisa. 2000. Event structure in syntax. In Carol Tenny and James Pustejovsky (eds.), *Events as grammatical objects: the converging perspectives of lexical semantics and syntax*, pages 145–

- 185, Stanford: CSLI Publications.
- van Linden, An and Verstraete, Jean-Christophe. 2008. The nature and origins of counterfactuality in simple clauses: cross-linguistic evidence. *Journal of Pragmatics* 40, 1865–1895.
- Varasdi, Karoly. 2014. Making progressives: necessary conditions are sufficient. *Journal of Semantics* 31, 179–207.
- Vendler, Zeno. 1957. Verbs and times. *The Philosophical Review* 66, 143–160.
- Verkuyl, Henk. 1993. *A Theory of Aspectuality: The Interaction between Temporal and Atemporal Structure*. Cambridge Studies in Linguistics, Cambridge: Cambridge University Press.
- Verkuyl, Henk, Vet, Co, Borillo, Andrée, Bras, Myriam, Draoulec, Anne Le, Molendijk, Arie, de Swart, Henriëtte, Veters, Cart and Vieu, Laure. 2004. Tense and aspect in sentences. In Francis Corblin and Henriëtte de Swart (eds.), *Handbook of French Semantics*, Chapter 14, pages 233–270, Stanford: CSLI Publications.
- Vlach, Frank. 1981. The semantics of the progressive. In Philip Tedeschi and Annie Zaenen (eds.), *Syntax and semantics 14: Tense and aspect*, pages 271–294, New York: Academic Press.
- von Stechow, Kai and Iatridou, Sabine. 2023. Prolegomena to a theory of X-marking. *Linguistics and Philosophy* 46, 1467–1510.
- von Stechow, Kai and Matthewson, Lisa. 2008. Universals in semantics. *The Linguistic Review* 25, 49–111.
- Winans, Lauren. 2016. *Inferences of will*. Ph.D.thesis, University of California, Los Angeles.
- Zucchi, Sandro. 1999. Incomplete events, intensionality, and imperfective aspect. *Natural Language Semantics* 7, 179–215.