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Pluractionality in progress

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Pluractionality in progress

ABSTRACT

The goal of this dissertation is to describe and analyze the interaction of pluractionality, a kind of event plurality, and the progressive aspect. Based on original fieldwork, I present novel data showing that, in Balinese, when pluractional VPs combine with progressive aspect, we get some kinds of pluractional interpretations but not others. In particular, this combination yields *iterative* readings, where a series of events happen one after another a single occasion, but not *habitual* ones, where a series of events happen over a much longer period of time. Using the analysis of the progressive in Landman (2008), I argue that this result is expected if the progressive requires a particular kind of coherence, called *cross-temporal identity*, in the development of an event over time. The plural events in an iterative scenario have such coherence, while those in habitual scenarios do not. Turning to the habitual readings of the English progressive, I argue that these sentences should be decomposed into a progressive operator, a pluractional operator, and an operator that introduces a causative relation between eventualities called *dispositional causation* (Copley 2018). This additional device, which is unavailable with the Balinese progressive, allows the English progressive to describe habitual scenarios.

Finally, I attempt to extend this analysis to American Sign Language (ASL). ASL is argued to use iconicity to describe properties of event structure (Wilbur 2003, 2008; Kuhn & Aristodemo 2017; Kuhn 2017). To address the prevalence of the use of iconicity in eventuality descriptions, I conducted an elicitation survey in ASL. I find that repetition is widespread in ASL, being used in both habitual scenarios and episodic ones, which are not straightforwardly analyzed as involving pluractionality. I conclude that the most straightforward analysis of this kind of repetition in ASL is that it represents a general imperfective marker.

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Acknowledgments

Pathologically for me, the end of one of life's chapters is always partnered with melancholic reflection. That is no less the case now that I am writing the final piece of this dissertation. Fitting the theme of this thesis, there are so many worlds that could have been, so many things that could have happened, yet *this* is the world we are in and *this* is the dissertation that I wrote. And what a strange world it has been over the course of this project! The COVID-19 pandemic shut down the University two weeks after I began fieldwork and I will be fully vaccinated a day after this document is submitted.

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Chapter 1

Introduction and background

1.1 Goals of this study

We use language to talk about things that happen. We can categorize things that happen in different ways. One thing that's happening as I write this is that my cat, Osiris, is chewing on the house plant. This *event* of Osiris chewing on the house plant is *singular*; it's one single event lasting about 7 seconds (before I shoo him off the plant). I might describe this event with the sentence "Osiris is chewing on the house plant". But there are also, to my chagrin, *multiple events* of Osiris chewing the house plant that have occurred in the past and there are likely to be more in the future, and these multiple events together constitute a (very frustrating) *habit* of Osiris chewing the house plant. I might describe this fact with the sentence "Osiris chews on the house plant", and this sentence can be true even if Osiris isn't chewing on the plant as I type this. So we can use language to talk about things that happen not just once, but also various times over an extended period.

What these two sentences show, further, is that English has specialized ways of describing single events and multiple events. They share their lexical items: "Osiris", "chew

on", and "house plant". They differ on the set of functional items deployed, in particular they use different aspectual morphology. The first sentence utilizes the *progressive aspect* in describing a single event. The second sentence uses what is commonly called the *simple present* in describing multiple events. What this shows is that, superficially anyway, English has specialized morphology for describing single events and multiple events: grammatical aspect. This distinction between single-event describing progressive and habit-describing simple present is one broad way that different *imperfective* forms have been subcategorized (Comrie 1976, a.o.).

On the other hand, there are plenty of other ways of describing events as singular or multiple. We could, for example, simply describe the number of events directly using a numeral. If Osiris has chewed on the house plant 58 times, we can truthfully describe this by saying "Osiris chewed on the house plant 58 times". Of course, we may want to be less specific, since who knows how many times he's chewed on the house plant. Quantificational adverbs provide a more vague strategy of describing multiple events: "Osiris often chews on the house plant". It's not clear how many times he needs to chew on it for it to count as "often", but it's certainly too many.

Some languages have additional specialized morphology for describing multiple events: pluractional morphemes. Pluractionals differ from these other strategies in that they are derivational morphemes that describe multiple events but they are not grammatical aspect morphemes. Many authors take the term "pluractional" literally. In the same way that plural markers on nouns introduce plural individuals, pluractional markers on verbs introduce *plural events* (Cusic 1981; Lasersohn 1995; Wood 2007, a.o.). In other words, the basic function of pluractionals is the description of multiple events.

Pluractionals may compose with different grammatical aspects. For example, in

Chechen, pluractional verbs can appear in both perfective and imperfective aspects, as in the data from Yu (2003) in (1). Here we see a four way contrast between the non-pluractional verbs (in (1a) and (1b)) and pluractional verbs (in (1c) and (1d)), and imperfective aspect (in (1b) and (1d)) and perfective aspect (in (1a) and (1c)). We will get to precise definitions of these aspectual categories in a bit, but broadly speaking, the two differ in how the event is viewed. Perfective aspects take the view of an event as a single whole, while the imperfective peers into the event, looking at it from the inside (Comrie 1976). Thus the perfective sentences describe finished events, and the pluractional perfective sentence describes multiple events of singing that have finished, i.e., there will not be more singing events. The imperfective sentences locate the speaker in the middle of an event, and the pluractional imperfective sentence locates the speaker in the middle of multiple events.

(1) a. maliikas khaza jish leqira tkhuuna
Malika.ERG beautiful song sing.WP us.DAT
'Malika sang a beautiful song to us (and finished).'

b. maliikas khaza jish loqura tkhuuna
Malika.ERG beautiful song sing.IMP us.DAT
'Malika sang a beautiful song to us (and might still be doing that).'

c. maliikas khaza eesharsh liiqira tkhuuna
Malika.ERG beautiful song.PL sing.PLUR.WP us.DAT
'Malika sang beautiful songs to us repeatedly (and finished).'

d. maliikas khaza eesharsh luequra tkhuuna
Malika.ERG beautiful song.PL sing.PLUR.IMP us.DAT
'Malika sang beautiful songs to us (and might still be doing so).'

This brings us back to English. The progressive and simple present sentences that we saw earlier are both imperfective, they both view an event from the inside. We said that the essential contrast between the progressive sentence "Osiris is chewing on the house plant" and simple present sentence "Osiris chews on the house plant" is one of event number. This mirrors the contrast between the pluractional and non-pluractional imperfective sentences

in Chechen we see in (1). Where aspect seems to contribute event number in English, in Chechen it appears that pluractionality serves this purpose.

In fact, the situation is more complicated in English. It turns out that progressive aspect can also describe multiple events. This is especially noticeable when paired certain adverbials like *these days* or *lately*. For example, the sentence in (2) describes multiple events of Osiris chewing the plant, and like the simple present sentence, can be true even if Osiris isn't presently chewing the plant as I type this. We might wonder, then, what exactly the contribution of progressive and simple present aspect is, and how the two relate to pluralities of events in English. We might also wonder what imperfective aspects contribute in languages with event plurality marked *via* pluractionality.

(2) Osiris is chewing the plant lately.

This dissertation addresses the interaction between imperfective aspect, particularly progressive aspect, and pluractionality. I will argue that the encoding of event multiplicity is complex, involving different configurations of universal grammatical devices, including progressive aspect and pluractionality. These various configurations, while all resulting broadly in event plurality, show nuanced differences that arise naturally from the composition of these various grammatical devices. Languages differ primarily in which of these devices are *overt* or *covert*. The result of this is that languages like English without overt pluractionality are only superficially different than languages like Chechen which do have overt pluractionality. The underlying architecture is largely the same, though certain parameters of these elements may differ, constraining their combination.

In chapter 2, I argue that we can go a long way to explain *habitual progressive* constructions in English like that in (2) by examining the way off-the-shelf theories of the progressive (Landman 1992) and pluractionality (Lasersohn 1995) come together. A major component

of this argument is that pluractionality is covert in English. Thus progressive sentences in English are ambiguous on the surface between underlying forms with and without a covert pluractional morpheme. This proposal can explain empirical differences between habitual readings of the progressive and generic readings of the simple present, which I take to involve the generic operator GEN. This chapter sets up the project, demonstrating the idea that different expressions of event multiplicity may have their origins in different combinations of various grammatical devices.

Then, in chapter 3, I introduce original fieldwork in Balinese, a language of the island of Bali in Indonesia. Balinese has an overt progressive and overt pluractionality through verbal reduplication. After establishing certain background facts about the language, I show that the story in chapter 2 fails to capture the empirical picture in Balinese. Combining the progressive and pluractional in Balinese does not yield habitual readings. Instead, it yields only simple *iterative* readings, which describe a plurality of events conceivable as a single whole that occur on a single occasion, like over the course of a day.

In chapter 4, I revise the proposal in chapter 2 in light of the Balinese data. I argue that progressivity and pluractionality alone combine to form the iterative readings that we see in Balinese using the theory of the progressive in Landman (2008), which improves on the theory in Landman (1992). Further I introduce a novel theory of pluractionality, building on tools introduced in Landman's (2008) theory of the progressive. I argue that habitual readings of the English progressive involve an additional grammatical device mediating the progressive and pluractional: dispositional causation (Copley 2018). This device is also responsible for futurate readings of the English progressive. The Balinese progressive, by contrast, does not permit futurate readings. The dispositional causitive introduces a stative Davidsonian argument. The Balinese progressive may not compose with states, and

therefore may not have futurate readings or habitual readings with verbal reduplication. The end result of this theory is that various combinations of discrete grammatical devices are responsible for a number of different temporal properties of the progressive in Balinese and English.

Finally in chapter 5 I turn to American Sign Language (ASL), where I attempt to extend the analysis. ASL is argued to encode event structure *iconically* (Wilbur 2003; Wilbur 2008; Kuhn & Aristodemo 2017; Kuhn 2017). That is, the *form* of a sign reflects the temporal structure of the *event it describes*. In the pluractional domain, this means that, for instance, the speed that a verb form is repeated corresponds to how often the events are realized in time. Where I argue in the previous chapters that these kinds of temporal properties are a kind of side effect of the combination of various grammatical operators, this property of ASL ostensibly represents an alternative. The temporal constitution of plural events could be encoded more directly through the iconic properties of ASL signs. I present novel data collected through the use of a survey, and I argue that this data suggests this isn't the case. Instead, I propose that reduplication in ASL is a marker of imperfective aspect, an aspectual marker also regularly found in spoken language.

In the remainder of this chapter, I provide background on pluractionality and progressivity. I begin with an overview of pluractionality, its empirical properties, and formal analyses of the phenomenon. Then I discuss the progressive, including its empirical properties, and formal accounts of the progressive.

1.2 Pluractionality

Pluractionals are a class of verbal derivational morphology that are used to describe plural eventualities. They can be thought of as aktionsart modifiers (Yu 2003; Wood 2007). Ak-

tionsart (also called situation aspect, lexical aspect, or Vendler classification) describes the event-structural character of a verb or VP (Dowty 1979; Smith 1997; see Filip 2019 for an overview). In general, aktionsart classes are distinguished by other properties like (a)telicity, whether the event has a natural endpoint, and duration, whether an event persists in time. Achievements like *arrive* are punctual and telic. Accomplishments like *bike to the store* are durative and telic. Activities like *run* are durative and atelic. Semelfactives like *knock* are punctual and atelic. Pluractionals resemble activities in that they introduce atelicity and often also duration at the level of the VP. They describe an unspecified number of events over time or space or participants.

Much of the previous research into pluractionality has focused primarily on variation in pluractionals within and across languages (Cusic 1981; Lasersohn 1995; Wood 2007, a.o.). This variation mostly concerns the kinds of constraints that are imposed on the subevents composing the plural event. For example, some pluractionals require that subevents be temporally distinct, while others require spatial distinctness or distinctness in event participants. In the next section, I discuss variation in pluractionality and its importance to this project.

1.2.1 Variation in pluractionality

Cusic (1981) provides the first broad study of variation in pluractionals. He identifies four parameters where pluractionals may vary. The first is the *event ratio parameter*. This is a three-way distinction between pluractionals which, essentially, tracks how "bunched up" the subevents are over time. Events may be bunched up extremely closely with one another such that the subevents are hardly recognizable as discrete events. This is the category in (3a). Think the little bites that constitute a "nibble". In Cusic's terminology, the little

bites are internal phases. Second, multiple events occur over a single occasion, as in (3b). This is also called an *iterative reading*. As Bybee, Perkins & Pagliuca (1994) point out, the notion of "occasion" often referenced in definitions of iterativity are somewhat nebulous. The intuition here is that the events are fairly bunched up, they occur over the course of a day or a few hours, say, but recognizable as discrete events on their own. Cusic illustrates this with the sentence "the salesman rang the doorbell twice". The relevant reading is one where the salesman, standing at the door, presses the doorbell, waits a second or two, and presses the doorbell again. The final category is in (3c). This reading involves events that may be widely distributed over time. Habitual readings fall into this category. Despite these three distinctions, he notes that the latter two uses are often expressed using the same forms and should be treated as a single unit. While subsequent authors generally dispose with this three way distinction for this reason, I mention it here because I revive the idea later in chapter 4.

(3) Cusic's (1981) tripartite division of event plurality:
   a. Plurality is internal to an event if a single event on a single occasion consists of internal phases;
   b. Plurality is external to an event but internal to an occasion if a single bounded event (internally plural or not) is repeated on a single occasion;
   c. Plurality is external to event and occasion if a single bounded event is repeated on separate occasions.

In addition to the event ratio parameter, he distinguishes the *relative measure parameter*, the *connectedness parameter*, and the *distributive parameter*. The relative measure parameter imposes constraints on the relative size, temporal or spatial, of the subevents, the degree of effort involved, and the degree of success of the events. The connectedness parameter describes the degree of temporal and spatial connectedness between subevents. This interacts with the event ratio parameter, but essentially concerns whether, say, there's

temporal space between events in an iterative case. The distributive parameter concerns whether subevents are distributed across time, space, or actors. A pluractional distributing across actors distinguishes, e.g., collective action from distributed action. In this dissertation, we will mostly be concerned with pluractionality as it distributes events across time, i.e., the intuitions behind Cusic's event ratio parameter.

Much subsequent work of variation reduces Cusic's tripartite event ratio parameter down to two categories, codifying the suggestion that Cusic makes for the "external" categories in (3). Those pluractionals that fall under Cusic's definition in (3a) have been termed "event-internal" and those falling in (3b) and (3c) have been termed "event-external".

Event-internal pluractionality is evident in Yurok, an Algic language, from Wood (2007), which has both event-internal and event-external pluractionals. Event-internal pluractionals are formed via a reduplicative prefix. An example of this is below.

(4) kich **peg**pegoh ku 'yohlkoych'
PERF split.PLUR1 ART log
'I made the log into kindling (split it multiple times)'
[cf. *pegoh(s-)* 'to split']

In this case, the idea is that all of these splitting events are grouped close to one another, or happen on a single occasion.

Event-external pluractionality can be seen in a second Yurok pluractional as in (5), also from Wood (2007). This pluractional is formed via an infix *-eg-/ -rg-*. In contrast to the reduplicative prefix above, this pluractional is event-external.

(5) n**eg**ep-ek' nepuy
eat.PLUR2-1SG salmon
'I eat salmon all the time.'

Being event-external, the pluractional in (5) indicates that these salmon eating events take place on different occasions spread out in time, hence the use of "all the time" in the

translation. The events are likely distributed across many different days.

These examples also show that a language may have exponents for both types of pluractionals. Sometimes, however, a language may have one pluractional that can has an event-external or event-internal depending on the verb it combines with (Wood 2007).

This distinction is important because many identified parameters of variation track with the status of a pluractional as event-external or event-internal. Building from the typological work in Cusic (1981) and Wood (2007), Henderson (2012; 2017; 2019) summarizes the key areas of difference between event-internal and event-external pluractionals:

(6) From Henderson (2017), section 2:

a. **Aspectual selection**
Event-internal pluractionals are preferentially formed from verb stems that would otherwise be semelfactives or achievements. Event-external pluractionals are aspectually promiscuous and can be formed from verbs stems of a variety of aktionsarten.

b. **Contiguity**
The repetitions that form an event-internal pluractional event are preferentially contiguous in time and space. In contrast, event-external pluractionals do not place strict requirements on the temporal or spatial distance between the events that compose the plural events they denote.

c. **Genericity**
This feature is closely related to the previous one, though they do not completely overlap. The generalization is that event-internal pluractionals never allow generic readings, while event-external pluractionals often do.

d. **Cardinality**
Pluractional verbs denote plural events. This general requirement takes no stand on the number of events that compose the plurality. The event-internal / event-external distinction precisifies the plurality requirement. In particular, event-internal pluractionals generally require plural events with large cardinalities, while event-external pluractionals can often be satisfied by events of simple plurality, i.e., two or more events.

e. **Shared telos**
Event-internal pluractional verbs usually require that all of the events in the plurality share the same theme argument or progress toward a shared telos. In

contrast, event-external pluractionals do not share this requirement.

f. **Base-predicate entailments**
A sentence with an event-internal pluractional often fails to entail a minimally different sentence without the pluractional morphology. In contrast, event-external pluractional sentences often entail a corresponding sentence without the pluractional morphology.

That event-external readings give rise to generic readings, or *habitual* readings, which is what Henderson really seems to mean here, while event-internal pluractionals never do is shown in (7) and (8). The event-external pluractional *-löj* has habitual readings in (7), but the event-internal *-Ca'* in (8) can't have a habitual reading even in a habitual context.

(7) (Henderson 2012: 76–7)

a. (ojër) x-Ø-b'ixan-**ilöj**.
(before) COM-A3s-sing-löj
'He used to sing.'
(Speaker comment: like in a choir)

b. la achin la' n-Ø-xub'an-**alöj**.
DEM man DEM ICP-A3s-whistle-löj
'That man is always listening.'

(8) (Henderson 2012: 138)
#A Xwan x-i-ru-tz'et-etz'a'.
CLF Juan COM-A1s-E3s-look.at-Ca'
'Juan keeps looking at me.'
(Speaker comment: No, it would have to be like this speaker turns his head a bit and shoots a glance over and over.)

Importantly, because event-internal pluractionals never give rise to habitual readings (what Henderson calls generic), this dissertation will almost exclusively concern event-external pluractionality. While a central concern in the study of pluractionality is how the properties in (6) are derived from the internal/external split, which usually boils down to a difference in atomicity (Wood 2007; Henderson 2012), this is not a concern in this dissertation.

In the next section, I describe formal approaches to the semantics of pluractionality.

1.2.2 Formal accounts of pluractionality

Formal accounts of pluractionality essentially fall along two lines: event-based and interval-based. The neo-Davidsonian event-based approaches are Lasersohn (1995) and Henderson (2012), the latter of which incorporates the insights of the interval-based approach represented by van Geenhoven (2004). Ultimately, these three approaches suffer from the same problem: they fail to account for activity predicates. In chapter 4, I adopt an event-based approach, incorporating insights from literature on progressive aspect to account for activities.

1.2.2.1 Lasersohn (1995)

The event-based view is first due to Lasersohn (1995). Under this view, the pluractional operators bundle events denoted by the VP into plural events. Further, there are additional conditions that pluractionals may impose on the subevents in a plurality, which is meant to account for the variety of readings that pluractionals exhibit.

These conditions intuitively track the different readings, and a plain English description of some of Lasersohn's conditions gets us pretty close to descriptive accounts of pluractionality. For example, the events composing a plural eventuality may be required to be temporally distinct, i.e. temporally non-overlapping. This corresponds to the distribution-in-time reading that pluractionals often have.

The upshot of Lasersohn's theory is that the variety of readings that pluractionals exhibit cross-linguistically fall out from toggling just three switches and one dial:

1. The *property of subevents*: Whether the subevents are V events (events denoted by the

verb) or some other lexically-fixed property,

2. The *trace function*: The axes along which subevents must differ (e.g., temporal, spatio-temporal, etc.),

3. The *betweenness condition*: Whether the subevents are connected to each other or not, and lastly,

4. The *cardinality condition* (the dial): How many subevents do there need to be.

Lasersohn takes it that the basic version of a pluractional operator is in (9), where X is the plural event.

(9) Pluractional operator *V-PA* (basic version):
$V\text{-}PA(X) \Leftrightarrow \forall e \in X[P(e) \wedge \underline{\text{card}(X) \geq n}]$

The *cardinality condition* underlined here says that the number of (atomic) subevents of X must be larger than n. n is determined by pragmatic and lexical factors according to Lasersohn, but generally corresponds to 'many' events in some sense. To ensure actual event plurality, this must be greater than two.

The internal/external distinction is meant to be handled by the *property of the subevents*, $P(e)$ in the above. External pluractionals are simple repetitions of events of the verb; they entail the base predicate. Each event in the plural event is a V event, in other words. In this case, P above is set to V. The event-internal case is more tricky. They don't entail the base predicate. If a language formed a word meaning *nibble* from something meaning *bite* plus a pluractional morpheme, the little nibbles wouldn't each constitute a bite. In other words, the subevents of a plural event would not themselves satisfy *bite*. Thus the property P that each subevent must have may be fixed lexically by V. In the nibble case, it would be whatever property constitutes the little bitings.

To account for, e.g., the temporal conditions imposed on subeventualities, he now introduces the *trace function*. The idea behind the trace function is that the subeventualities must not overlap in certain dimensions. One of which might be temporal, corresponding to the distinctness in time condition. Another is spatial; events may be required to take place at different locations. These dimensions correspond to the function f in the underlined portion of (10). The underlined portion says that subevents must not overlap for some trace function f. For some pluractionals this might be the *temporal trace* function τ, for others it might be the *spatial trace* function σ, and for still more it might be the spatio-temporal trace function κ. This is also meant to account for the participant based readings as well; the θ-trace function returns the participants of an eventuality and requires that subevents have no common participants. Pluractionals may allow any number of these trace functions.

(10) Trace function condition:
$V\text{-}PA(X) \Leftrightarrow \forall e, e' \in X[P(e) \wedge \underline{\neg f(e) \circ f(e')} \wedge \text{card}(X) \geq n]$

Finally, he has the *betweenness condition*. The trace function condition is, on its own, not enough get us *bona fide* temporal separation. Two events may temporally satisfy (10) if they are merely adjacent. Some pluractionals, though, have stronger conditions on their temporal readings, requiring possibly significant degrees of temporal separation. Conversely, some pluractionals have an opposite reading where the events must be temporally bunched up. Lasersohn accounts for these facts by incorporating a betweenness condition, which is the underlined portion in (12). The definition of *between* is the usual one, supplied in (11). Though I use t, here, this variable could be a location in space, as well as an interval of time, a spatio-temporal location, and so on. This condition doesn't apply to θ, as participants aren't ordered. The betweenness condition could also be negated, which would require that there be no time/space/etc. between subevents. This corresponds to the continuous

reading that some pluractionals exhibit. It may also be absent entirely for pluractionals that are agnostic about connectedness.

(11) between(t, t', t'') iff $t' < t < t''$ or $t'' < t < t'$

(12) Betweenness condition:
$V\text{-}PA(X) \Leftrightarrow \forall e, e' \in X[P(e) \wedge \neg f(e) \circ f(e') \wedge$
$\underline{\exists t[\text{between}(t, f(e), f(e')) \wedge \neg \exists e''[t = f(e'') \wedge P(e'')]}$
$\wedge \text{card}(X) \geq n]$

For Lasersohn, the variety of meanings that various pluractionals have are gotten by flipping these individual switches. A pluractional that involves a habitual meaning might have $P = V$, $f = \tau$, a positive betweenness condition, and a high n. Others that require distribution in space might have the same conditions but with $f = \kappa$.

A problem for this view, pointed out by Henderson (2012), is that it overgenerates. Variation in pluractionals is more constrained than the picture that Lasersohn paints, especially regarding event-internal readings. The difference between event-internal and event-external readings is due to an independent parameter on this view. Independent of, say, temporal connectedness, P may be fixed to V or not. In reality, event-internal pluractionals tend to also be highly connected and may not distribute their events across multiple participants. Additionally, event-internal pluractionality is sensitive to the aktionsart class of the base predicate while event-external pluractionality is not.

Further, it does not properly capture the meaning of activity predicates. Activities like *run* are homogeneous (in some sense). If I run from 4pm to 5pm straight, I also run from 4pm to 4:15pm. I further run from 4:30pm to 4:37pm, and so on. We can take fairly arbitrary slices of this hour-long run, and these slices themselves count as running. So for any activity predicate, we could almost trivially satisfy Lasersohn's pluractional by joining arbitrary slices of the activity. We will see that the progressive requires us to include these slices

in our model, so we can't simply dismiss this. The betweenness condition won't save us either, though I delay discussion of this point to the next section. I discuss the problem that activity predicates pose for pluractionals in more depth in chapter 4.

1.2.2.2 Van Geenhoven (2004)

Van Geenhoven's (2004) approach has a different starting point than Lasersohn's. In particular, she is concerned primarily with the behavior of pluractional predicates under measure adverbials. Measure adverbials, or *for* adverbials in English, have both continuous and iterative readings. Krifka (1989) provides an example of this dual behavior, in (13). The continuous reading is natural in a context where the letter is very long and Anton fails to finish reading it in an hour. The iterative reading is natural if the letter is fairly short and John reads it over and over repeatedly. Iterative readings are even more apparent when we consider achievement predicates like *discover*. The sentence in (14), from Dowty (1979), describes repeated events of discovering crabgrass.

(13) John read the letter for an hour.

(14) John discovered crabgrass in his yard for 6 weeks.

Van Geenhoven proposes that the source of the iterative readings in English is a covert pluractional morpheme. She argues for this on the basis of a series of pluractional morphemes in West Greenlandic (Eskimo–Aleut; Greenland). West Greenlandic, unlike English, licenses iterative readings of measure adverbials only when a pluractional morpheme is present on the verb. This is evident in the examples in (15). Here we see that the sentence without a pluractional morpheme yields a "slow-motion" continuous reading. The iterative readings are available only for the sentences with pluractional morphemes. The difference between the pluractional markers in (15b) and (15c) is that the latter indicates that the

frequency of events was high, while the former leaves the frequency unspecified.

(15) a. ? Nuka ullaap tungaa tamaat sanioqquppoq.
Nuka ullaa-p tunga-a tama-at saniuqqut-puq
Nuka.ABS morning-ERG direction-3SG.SG.ABS all-3SG go.by-IND.[-tr].3SG
'Nuka went for the whole morning (moving very slowly) to pass by.'

b. Nuka ullaap tungaa tamaat sanioqqut**tar**poq.
Nuka ullaa-p tunga-a tama-at saniuqqut-**tar**-puq
Nuka.ABS morning-ERG direction-3SG.SG.ABS all-3SG go.by-**repeatedly**-IND.[-tr].3SG
'Nuka went by repeatedly for the whole morning.'

c. Nuka ullaap tungaa tamaat sanioqquteq**attaar**poq.
Nuka ullaa-p tunga-a tama-at saniuqqut(i)-**qattaar**-puq
Nuka.ABS morning-ERG direction-3SG.SG.ABS all-3SG go.by-**again&again**-IND.[-tr].3SG
'Nuka went by again and again for the whole morning.'

Van Geenhoven proposes an interval-based semantics for the pluractional markers in West Greenlandic. The meaning of the marker *-tar-*, witnessed in (15b), is in (16). She defines it in terms of the "crystal star" operator $*^t$, which is meant to parallel Link (1983)'s plural operator *. This operator builds in Lasersohn's (1995) betweenness condition for times. It says that the the predicate V holds true at a time t when there are number of subintervals of t that hold of V and there are times between these subintervals such that V is not going on.

(16) -tar- $\Rightarrow \lambda V \lambda t \lambda x (*^t V(x) \text{ at } t)$
where $*^t V(x)$ at $t = 1$ iff $\exists t'(t' \subseteq t \wedge V(x) \text{ at } t' \wedge \mathit{number}(t') > 1 \wedge \forall t'(t' \subseteq t \wedge V(x) \text{ at } t' \rightarrow \exists t''(t'' \subseteq t \wedge (t'' > t' \vee t'' < t') \wedge V(x) \text{ at } t'' \wedge \exists t'''(t' < t''' < t'' \vee t' > t''' > t'' \wedge \neg V(x) \text{ at } t'''))))$

To account for the more specific pluractional *-qattaar-* in (15c), she proposes that its semantics include an additional constraint on the number of subintervals that the predicate holds of.

First, this account is unable to capture non-temporal readings of pluractionals. As we will see, Balinese pluractionals may distribute events across time and across participants.

The participant readings may obtain even if the events are temporally overlapping. This account also does not attempt to account for the differences between event-internal and event-external pluractionals.

Second, this proposal also fails to account for activity predicates but in a different way than is suggested in the section above. Activity predicates tolerate temporal gaps. For example, let's say I go on a bike ride. Somewhere along the midway point, I stop, get off my bike, and take a breather. While this pause doesn't count as a bike-riding event *per se*, we nevertheless wouldn't want to split the total bike ride into two separate events for the purposes of counting, i.e., I didn't bike twice. Thus temporal gaps are not sufficient for the purposes of event individuation for pluractionals. Again, I take this up again in chapter 4.

1.2.2.3 Henderson (2012)

Henderson (2012) hybridizes the approaches in Lasersohn (1995) and van Geenhoven (2004). He uses a neo-Davidsonian event semantics and imposes temporal conditions on the verb such that event plurality is the only way that those conditions can be satisfied. His case study is Kaqchikel (Mayan; Guatemala), a language with both event-external and event-internal pluractionality, and the primary goal of this account is reducing the event-external and event-internal pluractionality to a limited number of parameters that capture their distinct properties.

Henderson argues that event-external and event-internal pluractionals have nearly the same core semantic components. They differ in their syntactic relation to a *cumulative closure* operator. A cumulatively closed predicate is one that is closed under sum formation. That is, it includes not just atoms satisfying the predicate, but also the sums of those atoms. The event $x \oplus y$ is the *sum* of x and y.

(17) *Cumulative closure* (Link 1983; Krifka 1989):
$*P$ is the smallest set P' such that:

a. $P' \supseteq P$

b. $\forall x, y[P'(x) \wedge P'(y) \rightarrow P'(x \oplus y)]$

Event-external pluractionals apply to cumulatively closed predicates of events, meaning that they apply to predicates of events that have pluralities in their denotations. Event-internal pluractionals apply to non-cumulatively closed predicates of events; this means that they apply only to atomic eventualities. In this way, Henderson adopts the insight of Wood (2007) who reduces the event-internal/event-internal distinction to one of atomicity: Event-external pluractionals describe true plural eventualities, while event-internal pluractionals describe (complex) atomic eventualities.

To see how his proposal works, we will first consider event-external pluractionality. Event-external pluractionals are marked with a morpheme *–löj*. This morpheme is like those in van Geenhoven (2004) in that it requires that events be distributed over time, motivating a temporal approach. Henderson's definition of *–löj* is in (18). The partition function Part applies to P for some t just in case P is a set of non-overlapping entities that sum to t. The function ϵ is adopted from Champollion (2010). It simply says that t is very small relative to $\tau(e)$. A predicate V and an event e will satisfy (18) iff there is some partition of the temporal trace of e where each of the partition cells is equal to the temporal trace of some atomic part of e and those cells are all small relative to the temporal trace of e.

(18) $[\![\text{–löj}]\!] =$

$$\lambda V \lambda e.[V(e) \wedge \exists P[\text{Part}(P, \tau(e)) \wedge \forall t \in P \exists e'[\tau(e') = t \wedge e' \leq e \wedge \textbf{atom}(e') \wedge \epsilon(\tau(e))(t)]]]$$

This formula, then, requires that e be a plural event. The only way that it can satisfy the temporal conditions is to contain atoms that have temporal traces that are small relative to

the temporal trace of the whole event. According to Henderson, plural events are the only way to satisfy this constraint, and thus it must apply after cumulative closure. Further, it captures the fact that *–löj* marked predicates may allow large temporal gaps because the partition itself simply stipulates that the partition cells not overlap; there may be large gaps between each cell of the partition.

Event-internal pluractionality is marked with the morpheme *-Ca′*. In this case, the scope of the pluractional and cumulative closure flips such that cumulative closure applies after pluractionality. Thus the pluractional can only apply to atomic eventualities. It's denotation is very similar to that of *–löj*, with some necessary modifications to account for its atomic nature. The definition of *-Ca′* is provided in (19). In this formula, Part is the same partition function as before. $\leq_m$ is the material part-of relation. The $e[\tau]e'$ notation says that e and e' may differ only in their temporal trace with respect to the other trace functions. That is, e and e' have the same values for all other trace functions. Finally, V must actually be a modified version of the predicate. Like other event-internal pluractionals, *-Ca′* is sensitive to predicate type. It mostly prefers semelfactives, but it can apply to predicates of other aktionsart types in limited circumstances. It appears to be sensitive to result states, and can combine with accomplishments and activities only if some result state is not realized, which in the accomplishment case amounts to non-culmination. Henderson explains that because e must be atomic, and atomic events are temporally contiguous, the subevents must be as well. This contiguity requirement precludes the realization of the result state. Thus we must be dealing with a (coerced) version of V that doesn't entail the result state. An event e and a predicate V, then, satisfy (19) when e is atomic, and there is some partition of the temporal trace of e such that each cell of the temporal trace of e is small enough and is equivalent to the temporal trace of a material event part of e satisfying the modified predicate V that

differs with e at most in its temporal trace.

(19) $[\![\text{-Ca}']\!] =$
$\lambda V \lambda e.[\mathbf{atom}(e) \wedge \exists P[\text{Part}(P, \tau(e)) \wedge \forall t \in P \exists e'[\tau(e') = t \wedge e' \leq_m e \wedge V(e') \wedge e[\tau]e' \wedge \epsilon(\tau(e))(t)]]]$

This will then apply before cumulative closure. Because it generates only atomic eventualities, participants can't distribute across subevents. Once cumulative closure applies, any distrubtion of participants will require each participant to engage in the *-Ca'* predicate itself and not the pluractional subevent. Further as explained above, Henderson attempts to account for non-culmination and temporal contiguity of subevents by appealing to the contiguity of the temporal trace of an atomic event. Because the partition requires that the cells sum to that temporal trace, the events temporally overlaying those cells must also be temporally contiguous. It is somewhat unclear what exactly the coercion mechanism is that "extracts" some semelfactive-like meaning from the base predicate.

For Henderson, then, the core components of external and internal pluractionals are alike, much like in Lasersohn's theory, but the correlated differences between the two fall out from the atomicity of the events they describe. Event-external pluractionals result in true event plurals, while event-internal pluractionals describe atomic eventualities.

Henderson's analysis of event external pluractionality suffers from the same problem as Lasersohn's for activities. It seems that practically any activity event would satisfy the definition of the event external pluractional in (18). Activities are themselves made of smaller activity event parts that themselves must be able to count as atomic. To see this, let's consider an event e which is an event of me walking from my house to the train station. Along this route, I have to pass through both the park and the market. Let's call the event of me walking through the market e_1 and the event of me walking through the park e_2. The sentence "Gunnar walked from his house to the train station" is true, given e. So is "Gunnar

walked through the park" for e_1 and "Gunnar walked through the market" for e_2. But e_1 and e_2 are *parts of e*. They must also clearly be able to count as atomic events in their own right. Thus for a (large enough) activity event, we could take that event, chop it into parts, and sum those parts, which would render the definition in (18) true, though it is is unlikely that an event like *e* would satisfy the pluractional in Kaqchikel.

1.2.3 Interim summary

We have seen three theories of pluractionality. Lasersohn (1995) represents an event-based approach, where pluractionals apply to predicates of events and yield predicates of *plural* events. In contrast, van Geenhoven (2004) proposes an interval-based approach. Finally, Henderson (2012) proposes a hybrid of the two. His theory is event-based, but temporal constraints on the events generate the right kinds of plural events.

As I have gestured at throughout this section, these theories all fail to adequately handle activity predicates. Activity predicates are problematic for two reasons. First, activities are homogeneous. A (large enough) activity event has parts that also satisfy the activity predicate and must themselves be considered atomic events. A pluractional shouldn't be satisfied by arbitrary collections of these smaller event parts. Second, they're not quite homogeneous in the way states are: activities tolerate pauses. Thus there may be temporal gaps in a single activity event where the event is not ongoing, and these gaps should not satisfy some temporal betweenness condition, like the one van Geenhoven (2004) argues for. This will be addressed in more detail in chapter 4.

Now that we have some background on the first major component of the dissertation, we are ready for the second: progressivity.

1.3 Aspect and the progressive

As a preliminary, I will clarify what exactly I mean by "aspect" in this dissertation. Because the terminology in the tense and aspect literature and in descriptive grammars is so wide-ranging and often contradictory, this should hopefully clarify the use of terms in this dissertation as well.

Broadly speaking, aspect concerns the point of view taken on an event. Consider the three examples in (20). These are all in the past tense, but their aspects differ. The first is perfective. It suggests that either Osiris ate his dinner fairly instantaneously at 7pm or that he started eating at 7pm. The second is progressive. This puts 7pm in the middle of the dinner-eating event. In some sense, we're looking inside the dinner eating event. Finally in the third sentence we have a perfect. It puts an entire event of Osiris eating dinner prior to 7pm.

(20) a. At 7pm, Osiris ate dinner.
b. At 7pm, Osiris was eating dinner.
c. At 7pm, Osiris had eaten dinner.

For the sake of discussion I adopt the neo-Reichenbachian framework of Klein (1994). Like Reichenbach (1947), Klein distinguishes between three parameters. First, there is the utterance time (or speech time), the time the utterance is produced. Then we have the topic time (or reference time), which is the time that the sentence is "about". Finally we have the eventuality time (or situation time), the time that the event denoted by the predicate takes place.

Tense is a relation between the utterance time and the topic time. For example, present tense indicates that the utterance time is also the topic time, and past tense indicates that the topic time precedes the utterance time. In (20), we have the past tense, putting the topic

time before the utterance time.

Aspect on the other hand is a relation between the topic time and the eventuality time. This is also sometimes called grammatical aspect or viewpoint aspect. In aspect, there are a number of classifications. One broad distinction is that of *imperfective* and *perfective*. In terms of topic time and event time, the former locates the topic time within the event time; the latter locates the event time within the topic time. In (20), 7pm represents the topic time. In (20b), the progressive, as an imperfective, locates the topic time, 7pm, within the event time. On the other hand, the sense that Osiris ate his dinner quickly in (20a) follows from the semantics of the perfective. The entire eating event would have to fit within the one minute time-span holding for 7pm. The *perfect* falls somewhat outside of this categorization; it locates the event time in the past relative to the utterance time. In (20c), this means the eating event occurs before 7pm.

However, there are also many "thick" aspectual categories that can't be described purely as a relation between times unlike the "thin" imperfective and perfective categorization. Comrie (1976) further divides, e.g., the imperfective into *habitual* and *continuous*, and then continuous into *non-progressive* and *progressive*. These thicker aspectual concepts are evident in the English simple present and the progressive. Both of these sentences are imperfective in that they describe situations that extend past and beyond reference time, the moment *right now*. They differ in their internal constitution. The first one describes a kind of habit, which involves multiple actual and non-actual cappuccino-making events. The second describes a single episode of cappuccino-making that has been started but not finished at the time of utterance.

(21) a. *Context: someone asks me what kind of coffee I make in the mornings.*
Right now, I **make** cappuccinos.
b. *Context: someone asks me what I am doing in the kitchen at the time of utterance.*

Right now, I **am making** cappuccinos.

Aspectual categories can often be quite complex, incorporating more tense-like notions like anteriority or retrospectivity in combination with (im)perfecitive-like meanings. This is the case, e.g., for the perfect in English, which can further combine with the progressive to indicate that an event was on-going at some period prior to the reference interval.

I include all of these dimension of meaning under the category "aspect". What I do *not* include in this category is aktionsart, which was discussed above. Aktionsart concerns the temporal contour of an event description at the level of the VP. That is, the standard Vendler classes, achievement, activity, accomplishment, semelfactive, are aktionsart categories *not* aspectual categories.

1.3.1 The progressive

This dissertation focuses on progressive aspect. We have already seen how the progressive is an imperfective category in that it puts the topic time within the event time. The progressive has a number of other empirical properties that have earned it much attention in formal semantics. In this section, I review these properties.

1.3.1.1 Imperfective paradox

The puzzle that has traditionally occupied the most thought in analyzing the progressive is that of the *imperfective paradox*, a term that goes back to Dowty (1977). The imperfective paradox is not really a paradox, but rather an empirical fact that theories of the progressive must account for. In brief, the progressive version of accomplishment predicates fails to entail that its telos was reached. Put another way, it fails to entail the base predicate. This is not so for activities, which do entail the base predicate in the progressive. This is unlike the

simple past tense in English. This is illustrated in (22), from Dowty (1977). The progressive sentence in (22a), which involves the accomplishment predicate *John draw a circle*, does not entail its simple past counterpart in (22b). He may have been interrupted and only have drawn a small arc. In this case, it would fail to entail that a circle exists at all. This is in contrast to (22c) with the activity predicate *Anton push a cart*, which does entail the simple past counterpart in (22c).

(22) a. John was drawing a circle.
b. $\not\Rightarrow$ John drew a circle.
c. John was pushing a cart.
d. $\Rightarrow$ John pushed a cart.

This data is made clearer still when we consider a telicized version of *John push a cart* like *John push a cart to the mine shaft*. In this case, while the base predicate fails to be entailed, the version of the sentence without the goal, however, does seem to be entailed. This suggests that even in the cases where the accomplishment predicate fails to hold, there must be some associated process that obtains.

(23) a. John was pushing a cart to the mine shaft.
b. $\not\Rightarrow$ John pushed a cart to the mine shaft.
c. $\Rightarrow$ John pushed a cart.

Relatedly, normality considerations play a role in the progressive's meaning. Landman (1992) provides the famous example in (24), suggested to him by Igor Kvart. The sentence in this example is false if uttered before Mary is killed. If the progressive doesn't require culmination, what makes this sentence false but the sentence in (22a) true? It seems that what matters here is that Mary "doesn't have a chance in hell of succeeding" in (24), but Anton does in (22a) and (23a). The role of normality is made more complex by the data in (25). Here we have a true sentence where culmination is very unlikely. The difference

between (24) and (25) seems to be related to something deeper about the events and their descriptions.

(24) *Context: Mary is fighting a Roman soldier. She will kill three Roman soldiers before getting killed.*
Mary is wiping out the Roman army.

(25) *Context: Mary is a few steps into the crosswalk as a parade of trucks with inattentive drivers heads right for her. She is hit by the first truck. If the first had not hit her, she surely would have been hit by the second, and if not the second, then the third, and so on.*
Mary is crossing the street.

Finally, these normality constraints are relaxed when the event actually does culminate. Consider the following example, also adapted from Landman (1992). Mary gets in the water in France and starts swimming westward. Given that Mary is a normal human being, (26) is false. But if by some miracle Mary actually did cross the Atlantic, and we are talking about this particular initial part of her crossing, this sentence would be true. So when an event actually does culminate, we dispense with normality considerations.

(26) Mary was crossing the Atlantic.

The intuition serving as the starting point for many theories of the progressive is that the progressive picks out some part of an event that would normally culminate, or achieve its natural end, e.g. a circle being drawn completely as in (22a) or a cart reaching a mine shaft in (23a). This it picks out the cart-pushing process in (23a). This fact becomes more complicated, however, when we consider predicates of other aktionsart types like achievements.

1.3.1.2 Progressive achievements and futurate readings

If the progressive picks out a part of an event that culminates in a VP event, then we might expect achievements to be unacceptable in the progressive. Achievements, unlike

accomplishments, are not durative and do not naturally have parts. If someone *arrives*, for example, it happens essentially instantaneously. If progressives pick out parts of events, and achievements have no parts, the progressive should go haywire when it meets an achievement.

In fact, as Rothstein (2004) has shown, progressive achievements are somewhat of a mixed bag. With some achievement predicates, they are okay; with others, they're weird as expected. Take the sentences in (27), adapted from Rothstein (2004). The sentence in (27a) with the achievement *spot* is strange, while the sentence in (27b) is okay. On Rothstein's account, this is because *spot* does not really have identifiable preparatory processes, while *arrive* does.

(27) a. #Mary is spotting her friend at the party.
b. Susan is arriving at the station.

A similar phenomena is witnessed in *futurate* readings. What gives futurate progressives their name is that they describe events taking place in the future relative to reference time. They are more restricted than true futures in that they seem to involve some notion of plannability. An example of a futurate is in (28). The plannability factor is evident in the difference between the *play* example in (28a), which can be planned, and the *win* example in (28b), which cannot be planned (Lakoff 1971; Dowty 1979).

(28) a. The Kansas City Royals are playing tomorrow.
b. #The Kansas City Royals are winning tomorrow.

In this case, the progressive doesn't seem to be picking out a part of a playing event, nor a process associated with a playing event, but rather it seems to be picking out a plan that provides for the playing event. Futurate constructions will be discussed in more detail in chapter 4.

1.3.1.3 Stativity of the progressive

One further consideration that a theory of the progressive must take into account is that the progressive is stativizing. This is because the progressive can be used with the present tense. The present tense, because it describes only points in time, can only appear with stative predicates. It follows, then, that the progressive is stativizing (Taylor 1977; Dowty 1979; Moens & Steedman 1988; Landman 2008). This fact will be important later in chapter 4.

1.3.2 Previous accounts of the progressive

Previous accounts of the progressive generally differ in whether they are modal, in the sense that they make use of a possible worlds semantics, or not. First, I will introduce the non-modal account represented by Parsons (1990). Then I will introduce the modal accounts in Dowty (1979) and Landman (1992).

1.3.2.1 The non-modal account: Parsons (1990)

Parsons (1990) presents an analysis of the progressive that is event-based but non-partitive. In a way, he flips the explanatory burden for the data in (22) from the progressive to the simple present. In the first version of Parsons' theory, VPs may denote non-culminating events as well as culminating events. On this view, $[\![$*Anton push a cart to the mine shaft*$]\!]$ includes not only the events that see Anton actually reach the mine shaft with the cart but also events that get interrupted before that happens. The difference between the progressive and simple past, then, is that the simple past includes a relation between events and times $\text{Cul}(e, t)$, which says that the event e culminates at time t. Effectively, this Cul relation picks out only the events that actually reach their telos. The progressive by contrast involves a relation between events and times $\text{Hold}(e, t)$, which simply says that the event e holds at

time t. These events need not culminate. So for achievement predicates, it's not the case that an event that holds culminates, and therefore (22a) does not entail (22b).

To account for the fact that progressivized activities do seem to entail their simple past tense counterparts, Parsons assumes that activity events are special. Activities are essentially made up of culminating subevents. This makes it so that, essentially, any activity event is also a culminating event. This gets the entailment pattern from (22c) to (22d).

Parsons illustrates the difference between the simple past and progressive formulas for the sentences "Agatha crossed the street" and "Agatha was crossing the street". These are provided in (29). The only difference between the two formulas concerns Cul and Hold.

(29) a. Agatha crossed the street.
$(\exists t)[t < \text{now} \wedge (\exists e)[\text{crossing}(e) \wedge \text{Subject}(e, \text{Agatha}) \wedge \text{Object}(e, \text{the street}) \wedge \mathbf{Cul}(e, t)]]$

b. Agatha was crossing the street.
$(\exists t)[t < \text{now} \wedge (\exists e)[\text{crossing}(e) \wedge \text{Subject}(e, \text{Agatha}) \wedge \text{Object}(e, \text{the street}) \wedge \mathbf{Hold}(e, t)]]$

There are a number of problems with this view. First, as Parsons himself addresses, this view commits Parsons to not only incomplete events but incomplete objects as well. Because there is no modal component to this analysis, a sentence like *Mary is building a house* would assert that there is some house that is the object of a building event. Of course, this sentence may be true if there is not really any house that has been built yet, but Mary has poured the foundation. Parsons' contention is that this is merely a question of what counts as a house. Certainly, *something* exists, it's a partly-built house. Parsons claims this is merely a matter of usage that is not a problem for the progressive itself. We can say things like "Sam put the cake in the oven" despite the cake being a mess of batter at that point and potentially never a "true" cake. Whether we assign the descriptor "cake" to this incomplete object is therefore independent of aspect.

However, as Landman (1992) points out, there are still cases where a process of creation fails to culminate where there is not even an incomplete object. He provides the example in (30). There may be no "incomplete" unicorn brought into existence as part of this process, which may involve merely speaking incancations and the like. However, this is not the strongest argument, as this example is fairly marginal.

(30) God was creating a unicorn, when He changed his mind.

Zucchi (1999) raises two further problems for Parsons' theory. First, take a scenario where Gianni is traveling by train from Milan to Florence. There is a stop in the middle in Piacenza. Gianni is stopped in Piacenza due to a railroad worker strike and never makes it to Florence. The event e describes this train ride and t is the time he reaches Piacenza. Here is the problem: on Parsons' theory e will have to both Hold and Cul at t. This means that the sentence "Gianni went to Florence" will turn out true on Parsons' theory. Why? Because e is a complete event of his traveling to Piacenza and therefore it culminates. It is also an incomplete event of his traveling to Florence and therefore it holds as well. But because Hold and Cul are merely properties of events and times that come along with the progressive and simple past respectively, "Gianni went to Florence" is predicted to be true because e culminates for one leg of the trip.

A second problem Zucchi raises is more conceptual. It is simply not clear what exactly the conditions are such that an event and time satisfy hold. Zucchi references the example from Landman (1992) in (24) above. This example is interesting because it suggests that there is a normative element of the truth conditions of the progressive. Parsons' theory has nothing to say about this fact.

Zucchi argues that Parsons' theory can be modified sufficiently using the insights from Landman (1992) to account for these problems. For now, I refer the reader to that paper for

these repairs and set them aside here.

1.3.2.2 Modal accounts of the progressive

The other approach to the progressive relates subparts of an interval or an event to a "whole" or culminating interval or event. These accounts are modal in that the culminating interval or event need not be located in the actual world, but merely some accessible one. First I review the interval-based approach in Dowty (1979), and then take up the event-based approach in Landman (1992).

1.3.2.2.1 Dowty (1979) Dowty (1977; 1979) offers a modal account of the progressive in an interval-based semantics. Dowty's analysis is based on the partitive analysis of the progressive in Bennett & Partee (2004). On their theory, for some interval I holding of a predicate P, the progressive holds of P for a non-final subinterval of I. As it stands, the analysis in Bennett & Partee (2004) predicts that there is in fact some interval of which P holds. As we've seen from the imperfective paradox, this isn't true as achievements need not actually hold for any interval of time.

Dowty solves this by introducing modality into the picture *via* a possible worlds semantics. In essence, P only need to hold of I for some possible world, not necessarily the actual world. He does this by introducing a function that on worlds and intervals called *Inr*, which outputs the *inertial worlds* for an interval and a world. These inertial worlds are the worlds just like the input world up to the end point of the given interval which continue past this point "in ways most compatible with the past course of events". His definition of the progressive is in (31). This definition says that P only need hold of the larger interval in some (possibly non-actual) inertial world.

(31) [PROG Φ] is true at $\langle I, w \rangle$ iff for some interval I' such that $I \subset I'$ and I is not a final subinterval for I', and for all w' such that $w' \in Inr(\langle I, w \rangle)$, Φ is true at $\langle I', w' \rangle$.

Like Parsons' theory, Dowty's doesn't say enough about the normative constraints on the progressive, though he does speculate that such constraints could be accounted for in the definition of *Inr* and what worlds count as inertial. Relatedly, Vlach (1981) points out that Dowty's theory incorrectly predicts the sentence in (25) to be false. In that example, the most compatible future outcome is one where Mary gets hit by a truck and fails to cross the street.

1.3.2.2.2 Landman (1992) Landman (1992) takes up Dowty's story and further refines it to account for these shortfalls. This dissertation adopts Landman's theory of the progressive, so it will be necessary to explain it in detail.

Landman moves from an interval based semantics to a neo-Davidsonian one. This leads to a reframing of the progressive as a relation between a culminating VP event and a *part* of that event instead of a relation between a culminating VP interval and a non-final subinterval. Thus the progressive is like a VP modifier in that it is a function from sets of events to sets of events. In this theory, it relates the culminating events denoted by the VP to a set of parts of those events.

However, Landman's parthood relation is special. He claims that the progressive actually describes *stages* of culminating events. In order to account for the imperfective paradox and normative constraints of the progressive, he then builds a complex modal algorithm that tracks events as they develop over time. I discuss event stages first, and then the modal algorithm second.

1.3.2.2.2.1 Event stages In explaining the intuition behind the semantics of the progressive, I introduced the idea that the progressive describes parts of events denoted by the VP. Let's hone this intuition by taking the sentence in (32), and imagine a culminating event of Anton driving to school. One part of this driving event is his pulling out of the driveway. In saying that the progressive describes a part of a culminating event, I mean that we can point to him pulling out of the driveway and say (32).

(32) Anton is driving to school.

However, there are many parts of a culminating event that would not permit us to say, on the basis of those events alone, a sentence like (32). In the middle of this drive, he may change the radio, pick his nose, or buy a drink at a gas station. If we can isolate just these alone, that is, we abstract these events away from the larger events of which they are a part, they seem to have nothing to do with the event of Anton driving to school. There's nothing about Anton's changing the radio that pertains to his driving to school, unlike his pulling out of the driveway. If Anton, for example, reaches for the radio to change the station, but then has to make a sudden evasive maneuver and never actually changes the radio, the radio changing event part has been interrupted, but this interruption is immaterial to the driving to school event. This is unlike the event of Anton pulling out of the driveway, where the interruption of this event could conceivably prevent the event of Anton driving to school from culminating.

Landman recognizes from this that we actually need a refined notion of event parthood for the progressive. The progressive is concerned with the development of an event part over time. Landman offers a special parthood relation he calls an *event stage* which he draws from Carlson's (1977) notion of an individual stage. He describes event stages in terms of the development of an event. As he puts it, an event is a stage of another "if we can point at

[the latter] and say, 'It's the same event in a further stage of development [...] to be a stage, a part has to be big enough and share enough with e so that we can call it a less developed version of e'' (p.23). A stage is in some sense a vital precursor to the culminating event. Further, there is a kind of recognizability involved with this notion. An event is a stage of another *when we recognize it as one and the same event*, albeit from different points in time.

Let's turn to a concrete example. An event of Anton driving to school event has many stages. One such culminating event e of Anton driving to school may begin with Anton pulling out of his driveway. This event of his pulling out of the driveway, f, is a stage of e. We recognize f as the initial development of the culminating driving to school event. It looks like the culminating event e in that it involves him driving; its *process characteristics* are the same. Let's assume there is also an event g where Anton pulls out of his driveway and drives a few blocks down the road. Now, f is a stage of g and g is also a stage of the culminating event e. However, e also has many parts that are not stages. Somewhere in g, there's an event h where Anton changes the radio. While h is a part of both g and e, it is a stage of neither. It doesn't resemble, on its own, an event of driving to school. If h, as a radio changing event, gets interrupted, the process of Anton driving to school is unaffected.

Landman's notion of stagehood ends up being actually somewhat broader than event parthood. He allows for event stages that are not, strictly speaking, parts of events to count as stages of those events. For example, Landman allows that some preparatory processes may count as the stages of an event, and these are meant to account for futurate progressives. If Anton is making coffee in the morning, for example, it seems fine (to me) to point to that event and describe it using (32) as long as, say, Anton usually makes coffee before heading to school. This is not really a part of an event of Anton driving to school, but it counts as a planning stage. Landman also allows for pause stages, stages of events where the event

isn't really ongoing, i.e. the event is temporally discontiguous. These will be important in the next chapter, but I set them aside for now.

1.3.2.2.2.2 The modal algorithm With event stages, we can now detail how Landman (1992) handles the imperfective paradox. To this end, he develops a robust modal algorithm. The intuition behind this algorithm is that we trace the development of an event over time through its stages. When we encounter an interruption, we hop to a different world where the event continues to develop, assuming this hop is reasonable. We continue to hop worlds as the event gets interrupted until, eventually, the event culminates. As long as we can trace the development in this way to culmination, the progressive holds.

Let's go back to our example of Anton pulling out of the driveway. While we did not know this at the time, Anton's tire would blow out a few minutes later after gets about halfway to school. Sadly for him, he doesn't make it to school that day. Despite this, the sentence in (32) is true for this pulling out of the driveway event. The event of him pulling out of the driveway is our initial event stage. That event continues until the blow out. In the actual world, the driving event stops as soon as the blow out occurs, and there is no event of Anton having actually gone to school. Now, we want to hop to a world very much like our own except that the blow out never occurs and Anton continues on his way to school. By hopping to a new world, we bypass the interruption and, assuming there's no more looming interruptions, an event of Anton driving to school culminates. The idea, then, is that we hop worlds whenever an interruption is met. We will now turn to the formal model.

Normality also plays a role, as was discussed above. We only want to hop worlds if it's reasonable for the event to continue in that other world. We identified the difference

between the Roman army example in (24) and the parade of trucks example in (25) as one of internal character. It would be unreasonable to expect Mary to wipe out the Roman army wholly due to facts internal to that event (e.g., Mary being a regular person and not, say, a trained killer). In (25), the interruption is due to external factors, i.e., the parade of trucks. The idea is that only internal factors are relevant to the normality condition of the progressive. Thus Landman defines the set of *reasonable options* for an event e in a world w, $R(e, w)$, as follows:

(33) $v \in R(e, w)$ iff there is a reasonable chance on the basis of what is internal to e in w that e continues in w as far as it does in v.

Landman then traces the development of e as defined by the *continuation branch* of an event e for a world w, $\text{Cont}(e, w)$. The idea is that we trace e in w until it stops, i.e., get interrupted. Then we want to jump to a different world w' in $R(e, w)$ where e is a stage of some larger continuation f. If f stops in w', we jump again, and so on until it can no longer continue. This way, we are jumping only when need be and only to reasonable worlds. The full algorithm is defined as follows, directly from Landman (1992) :

The continuation branch for e in w is the smallest set of pairs of events and worlds such that,

1. for every event f in w such that e is a stage of f, $\langle f, w\rangle \in \text{Cont}(e, w)$; the continuation stretch of e in w.

2. if the continuation stretch of e in w stops in w, it has a maximal element f and f stops in w. Consider the closest world v where f does not stop:

    - if v is not in $R(e, w)$ the continuation branch stops.

    - if v is in $R(e, w)$, then $\langle f, v\rangle \in \text{Cont}(e, w)$. In this case, we repeat the construction:

3. for every event g in v such that f is a stage of g, $\langle g, v\rangle \in \text{Cont}(e, w)$; the continuation stretch of e in w.

4. if the continuation stretch of e in v stops, we look at the closes world z where its maximal element g does not stop:

    - if z is not in $R(e, w)$, the continuation branch stops.
    - if z is in $R(e, w)$, then $\langle g, z\rangle \in \text{Cont}(e, w)$, and we continue as above, etc..

The idea here is that we want to follow an event and bypass interruptions by hoping to worlds without those interruptions. We track the development of an event in the actual world through the events it is a stage of until it stops. If and when it stops, we look to the world most similar to our own where it continues and if this continuation is reasonable, we then track the development of the event in that world. If the event developing again stops, we hop once more to the closest world where *that* event continues, and this process continues until we can no longer make a reasonable hop or we reach culmination.

Let's now couch the blow out scenario above in terms of the algorithm Landman develops. We'll call the event of Anton pulling out of the driveway e and call the blow out d. In the actual world w, e continues to develop up until it reaches d and Anton does not actually make it to school. Let's call the largest event that e is a stage of in w e'. This event ends right when d starts. Now we look at the next closest world w' where e' continues. In this world e' (and e) is a stage of an event f, and d never occurs in this world. Further, there's a reasonable chance that e' continues as f based on the the internal facts of e'. The blowout is external to e', so we can safely ignore it. Now we track f's development in w'. Let's assume that there are no interruptions of f in w', so we won't have to hop worlds again. This means that the maximal stage of f, let's call it g, is a culminating event of Anton

going to school in w'. While g is not in the actual world w, it is in this similar world w' where there's a reasonable chance e continues. Therefore, $\langle g, w' \rangle$ is in the continuation branch of e in w.

For Landman, then, the progressive takes a pair of an event and world and finds a pair of an event and world in its continuation branch where the VP holds. It's full denotation is in (34).

(34) $[\![\text{PROG}]\!] =$
$\lambda P \lambda e \lambda w . \exists e', w' [\langle e', w' \rangle \in \text{Cont}(e, w) \wedge P(e', w')]$

Thus Landman's theory of the progressive concerns actual event development over time. The stagehood notion that Landman lays out captures this development, while the modal algorithm chiefly deals with interruptions. Importantly, if there are no interruptions to an event, the modal algorithm is inert. There's no reason to hop worlds. However, event stagehood is always a concern. The event we point to in the world must be a *stage* of a culminating event, regardless of any potential interruption.

1.3.3 Interim summary

We have seen two kinds of theories of the progressive: non-modal, as in Parsons (1990), and modal, as in Dowty (1979) and Landman (1992). In the next chapter, I adopt Landman's theory of the progressive. We will see that the key component of this analysis is his notion of event stagehood. The upshot to this will be that the proposal in the next chapter is actually agnostic as to the status of the progressive as a modal operator.

1.4 Conclusion

With the foundations of pluractionality and progressive aspect now laid, I turn in the next chapter to the habitual reading of the English progressive. I will argue that we can use off-the-shelf theories of pluractionality, *via* Lasersohn (1995), and the progressive, *via* Landman (1992), to explain these readings. We will see that this way of generating habitual readings of progressives predicts a number of differences between habitual progressives and the habitual interpretation of the simple present, which have the quantificational adverb GEN.

Chapter 2

A first pass: progressivity and pluractionality in English

2.1 Introduction

As we saw in the last chapter, progressive aspect is often analyzed under the assumption that it describes a single event-in-progress. Under this assumption, (35) describes a single event of Kim running to the beach that is in progress at utterance time. This is a natural reading of the sentence when you ask Kim's sister where she is, and she replies with (35).

(35) Kim is running to the beach.

However, this sentence may also have a *habitual reading*. This reading is natural in the dialog in (36).

(36) *Context: you and your friend Kim are preparing for the Boston Marathon happening in a few weeks. You're getting dinner with your friend at a restaurant, who asks you about you and your other friend's training regimen.*
Friend: What does your training regimen look like?
You: Well I'm running on the treadmill, and **Kim is running to the beach**.

In this example, both clauses use the progressive but describe what are clearly habitual actions. What's more, these sentences can be true without you or Kim needing to be presently engaged in the activities described. Clearly in the context, you are not on a treadmill, as you're eating at a restaurant. Nor do either of these suggest there is an imminent running event. It may be days before either you or Kim run again. It does, however, suggest that there will be be running events in the future, just not imminently.

These habitual readings are not restricted to the present tense, either. The sentence in (37) admits both a single event-in-progress reading and a habitual-like reading.

(37) Wyatt was riding a horse to work.

This sentence can describe a single event of Wyatt riding a horse to work, and is natural, say, if the speaker is reporting a peculiar event she witnessed where Wyatt was riding a horse. This can also describe a period of time in the past where Wyatt's primary mode of transportation to work was a horse. This is the *habitual reading* of the progressive as opposed to the canonical *episodic reading*.

So the progressive does readily describe apparent habits or dispositions, *contra* the intuition expressed by Krifka et al. (1995) that "progressive and perfect sentences show at least a strong tendency toward a particular, noncharacterizing interpretation" (p. 6). These readings of the progressive require an explanation. What is the relationship between single event-in-progress readings of the progressive, which constitute the empirical focus for most analyses of the progressive, and these habitual uses of the progressive? Further, how do habitual progressives relate to alternative ways of expressing habituality, namely the simple present tense?

This last point is an important one: habitual or *generic* readings of the simple present are often attributed to a covert quantificational adverbial with a modal flavor called GEN

(Carlson 1977; Farkas & Sugioka 1983; Krifka et al. 1995, a.o.). As a quantificational adverb, GEN does more than just describe habits for single individuals; it can also incorporate nominals in its restriction to generate generic readings of these nominals. We will see that this point represents a significant difference between the two kinds of habitual constructions. The upshot of the proposal put forth in this chapter is that it can explain why habitual progressives do not do this. It also explains nuanced interpretive differences between the two constructions.

The proposal in a nutshell is this: Habitual readings of the progressive are generated by the composition of a *pluractional* VP, which in this section is analyzed with the theory in Lasersohn (1995), with the progressive operator. The modal or generic flavor of this construction sneaks in through the special parthood relation called the *stage-of* relation put forth in Landman (1992). For an event to be a stage of a plural event, it has to carry some import of that plurality, which will often mean that a true habit has been established. This turns out to be a quite different mechanism of generating habituality than GEN.

However, the proposal put forth in this chapter is merely a first pass. We will see in the next chapter that the system put forth here does *not* generalize cross-linguistically, which is evident in Balinese. This chapter establishes the validity of the approach taken in this thesis: that habitual readings can be generated through the interaction of modular, universal grammatical devices, in this case progressivity and pluractionality. Additionally, it clarifies the empirical domain of investigation, and hones our intuitions regarding the interaction of these operators.

This chapter is organized as follows. In the next section, I discuss the empirical properties of the progressive, showing the relation between the habitual readings of the progressive and the episodic readings. Further, it displays two particular properties of the generic sim-

ple present that the habitual progressive *lacks*. In section 3, I explain two previous accounts of habitual progressives in Ferreira (2005; 2016) and Deo (2009; 2015b) and discuss the shortfalls of these approaches. In section 4, I provide the first pass analysis. Here I borrow two off-the-shelf proposals of the progressive and the pluractional in Landman (1992) and Lasersohn (1995) respectively, and argue that habitual readings fall out straightforwardly from the composition of these two elements. In section 5, I compare this analysis of the habitual progressive to the analysis of habitual readings of the simple present that utilize GEN, and show that this account properly predicts their different properties. I wrap this chapter up in section 6.

2.2 Empirical properties of habitual progressives

In this section, I discuss various empirical properties of the habitual reading of the progressive. First I discuss the (in)sensitivity of habitual prgressive to various aktionsart classes, including statives. Then I discuss the role that canonical properties of the epsiodic progressive play in habitual progressive readings, including the imperfective paradox, normative constraints, and futurate readings. Finally I discuss two empirical differences between habitual readings of the progressive and generic readings of the simple present.

2.2.1 Aspectual (in)sensitivity

There may be habitual progressive readings of predicates of all aktionsart classes except statives. There may be habitual progressive readings of accomplishments, activities, semelfactives, and achievements. These are provided in (38).

(38) a. Kim was *running to the beach* (for exercise). [Achievement]
b. Leyla was *biking* (until her bike chain rusted). [Activity]

c. The student was *knocking* on doors (for the political campaign). [Semelfactive]
d. The dean was *arriving* at campus in a limo (until the faculty complained). [Achievement]

Importantly, the progressive is not grammatical with individual-level stative predicates. This is shown in (39) for the individual level predicate *know*. Given that these are generally incompatible with the progressive, it is not possible to say what a habitual reading of these predicates looks like.

(39) *Liz is knowing the answer.

I discuss individual-level stative predicates further in section 5.

By contrast, stage-level statives are not generally incompatible with the progressive. Let's look at the data in (40) from Dowty (1979). (40a) is felicitous, describing state of the sock lying on the floor at reference time. This contrasts, however, with (40b), which is weird in the progressive. This is usually explained pragmatically (Dowty 1979; Deo 2009; Deo 2015b). Cities generally lie somewhere permanently, while socks do not. The progressive contrasts with the simple present in that it suggests a property lasts only temporarily, thus capturing the contrast in (40).

(40) a. The sock is lying on the floor.
b. ??New Orleans is lying on the Mississippi.

Importantly, a contrast that has hitherto gone unnoticed is that the progressive can actually be used to describe states that do not actively hold at reference time, but this seems to depend on a kind of volition. The sentence in (40), for example, can't be used if the sock *often* or *usually* lies on the floor but is not doing so at reference time. On the other hand, the sentence in (41) can be used if Gil lately has been lying on the lounge chair, as opposed to the couch, and Gil is not lying on it at reference time.

(41) Gil is lying on the lounge chair (these days).

While we can sort of explain this in this chapter, we will have a full account of this difference in chapter 4.

2.2.2 Imperfective paradox

Because habitual progressives describe habits, they don't display the canonical lack of culmination entailments that episodic progressives do. The lack of culmination entailment depends on the telicity of accomplishment predicates. Even though habitual progressives may be used with accomplishment predicates, as was seen above, by virtue of being habitual, they are atelic. In neutral terms, the series of events that a habitual progressive achievement describes does not have an endpoint, though the individual events themselves do.

However, we can see evidence of the imperfective paradox in that the habits that habitual progressives describe may be interrupted. This is the case in (42), where Hazel's bike-riding habit was interrupted by her bike being stolen. Like activity predicates in the progressive, there is the implication that Hazel did realize a biking to work habit, it was merely shorter than intended.

(42) Hazel was biking to work this summer when her bike got stolen in early June.

However, this is merely an implication. In some cases, the habit may be interrupted before it becomes a "real" habit. This may be the case in (43), where Carl only managed to hack a single agency before getting caught. In this case, the hacking failed to become an actual habit; the attempted spree failed to actually become a spree.

(43) *Context: Carl planned to hack the FBI, the NSA, the CIA, and so on. He hacked the FBI. In the downtime before his next hack, he gets caught.*
Carl was hacking the government until he got caught.

2.2.3 Normality

Like episodic progressives, habitual progressives seem to be sensitive to normality constraints. This is somewhat more difficult to come up with an example of, but let's take (44). In baseball, pitching a perfect game is an incredibly rare and impressive feat. No player has done it more than once. Consider a scenario where Cy Young was having an incredible season, with a few near-perfect games. We are watching footage of Cy Young pitch a game that's "perfect" through the 6th inning.[1] In the previous game, he pitched a perfect game. We could say of this game that we're watching that *Cy was pitching a perfect game*, but, to my ear, (44) itself is false. It's simply too rare and too unlikely for a pitcher to pitch multiple perfect games at all, let alone the "many" this seems to imply.

(44) Cy was pitching perfect games.

Note that this should be distinguished from a scenario where Cy was simultaneously pitching two games, and through the 6th inning of both games he's perfect. For example, let's take a context involving an exhibition where two baseball games were happening simultaneously in two fields side-by-side. As part of the exhibition, Cy is pitching in both games, alternating between the games at half innings. If Cy was perfect through 6 innings in both, (44) seems like a rather reasonable description. In this case, we are considering the games individually in the calculation of the progressives normality constraint. That is, we are evaluating each game individually for the purposes of the normality constraint, not factoring in the fact that a second perfect game is being pitched next-door. In the case above, though, we are considering how normal it is for multiple perfect games to occur.

We see the same amelioration of this consideration when looking in the middle of an

[1] In 1904, Cy Young did nearly this. He pitched a perfect game on May 5th. On May 11th, his next outing, he pitched 6 hitless innings before giving up one hit in the 7th. (http://research.sabr.org/journals/clarifying-some-of-the-records)

event that actually did occur, as in Landman's Atlantic example. If it turned out that Cy actually did pitch several perfect games that season, (44) seems like a fine description.

2.2.4 Futurate readings

Just as episodic progressives have futurate readings, so too do habitual progressives. In this case, the futurate progressive describes an impending series of events, not just a single event.

Consider a scenario where Barry has agreed to ride a horse to work all summer in a promotional effort to "go green". It's currently May, and not summer yet. The habitual progressive in (45) is a perfectly fine description.

(45) Barry is riding his horse to work this summer.

Note that this in fact differs from simple present futurates, where the simple present counterpart of (45) is weird if meant to describe the habit itself and not a single horse riding episode.

(46) ?? Barry rides his horse to work this summer.

2.2.5 Generic readings of singular indefinites

A further difference between habitual readings of progressives and simple presents is that simple presents allow for generic readings of singular indefinites. This is extremely clear when we consider singular indefinites like *a cowboy*, as shown in (47). The simple present sentence describes a general property of cowboys, yielding a universal-like intepretation of the nominal. This is the generic reading of the singular indefinite. The progressive sentence completely lacks this reading, describing a habit of one single cowboy.

(47) a. A cowboy carries a gun (these days). (all cowboys)

b. A cowboy is carrying a gun (these days). (a specific cowboy)

This constitutes one of the most significant empirical differences between the simple present and habitual progressives.

2.2.6 Dispositional readings

Finally, simple present sentences often give rise to dispositional readings. These are readings that express a disposition towards something that has not actually been instantiated. Classic examples are in (48), from Krifka et al. (1995). In the first case, the machine must simply have the ability to crush oranges; it may be completely unused. In the second, Mary need not ever actually touch mail from Antarctica, which is highly likely.

(48) a. This machine crushes oranges.
b. Mary handles the mail from Antarctica.

(49) a. ??This machine is crushing oranges.
b. ??Mary is handling the mail from Antarctica.

While the simple present cases are easily understood out-of-the-blue, the progressive cases are much weirder on the intended dispositional reading. However, there seem to be some contexts where the dispositional readings are perfectly natural. In particular, the disposition itself is first realized close to reference time or made particularly relevant at reference time.

(50) a. *Context: The head chef at a restaurant unboxes two machines and sets them side-by-side. He says to the rest of the staff:*
This machine is crushing oranges (and this one is crushing apples).
b. *Context: Mary's boss says that Mary is in charge of mail from Antarctica, of which there is none. Someone missed the announcement and asks a coworker what happened. She replies:*
Mary is handling the mail from Antarctica.

2.2.7 Interim summary

We have seen here that habitual progressives resemble episodic progressives in that the habits they describe may be interrupted, they show normality effects, and they display futurate readings. We also see some of the primary differences between the simple present and habitual progressives. The simple present allows for generic readings of singular indefinites and dispositional readings. The progressive lacks generic readings of singular indefinites and allows dispositional readings in particular contexts.

2.3 Previous accounts

While habitual progressives have generally been neglected in the formal semantics literature, two series of works have attempted to account for habitual progressives from the perspective of a general typology of imperfective operators. I review these here.

2.3.1 Ferreira (2005; 2016)

Ferreira (2005; 2016) approaches habitual progressives in an attempt to account for the space of imperfective markers cross-linguistically. That is, he attempts to locate the difference between readings of imperfective markers in a single parameter: event number. Imperfectives that permit episodic readings apply to predicates of singular (atomic) events, while imperfectives that allow habitual interpretations apply to predicates of plural events. On his theory, the simple present applies only to plural eventualities, while the progressive, given its dual nature as having both episodic and habitual readings, applies to both singular and plural eventualities.

For Ferreira, the core meaning of all imperfective categories is the same. Ferreira com-

bines a Reichenbachian semantics of imperfectivity, where the reference interval is located within event time, with a modal component. Ferreira adopts the modal semantics for the progressive provided by Portner (1998). This semantics is couched in terms of a Kratzerian (1991) modal semantics. In this framework of modality, there are three ingredients: 1. a modal base M, a set of propositions determining the set of accessible worlds; 2. an ordering source O, which induces a partial ordering on the set of accessible worlds, and 3. quantificational force, either existential or universal. I set aside the exact details of Kratzer's proposal, but it's important that we see how Portner's account works. Our reference point will be Portner's example in (51). The modal base for Portner is circumstantial; it contains propositions about Mary's mental and physical condition, the geographic and climatic state, and so on. The ordering source is what allows Portner to bypass interruptions; it contains propositions like 'Mary did not get eaten by a bear', and so on. These represent the ideal worlds where Mary doesn't get interrupted on her way up the mountain. Further, the worlds in the accessibility relation will also depend on the reference interval and event description. The function Best takes these components and delivers the worlds where Mary's climbing doesn't get interrupted. The progressive then asserts that P occurs in all of these worlds. The definition of the number neutral imperfective operator and Best is in (52).

(51) Mary was climbing Mount Toby.

(52) a. $[\![\text{Imp}]\!] = \lambda P.\lambda t.\lambda w.\forall w' \in \text{Best}(P, M, O, w, t)\exists e : t \subseteq \tau(e) \wedge P(w')(e)$

b. $\text{Best}(P, M, O, w, t)$ = the set of worlds w' in $\cap M(P, w, t)$ such that there is no world w'' in $\cap M(P, w, t)$ where $w'' <_{O(P,w,t)} w'$.

For the episodic reading of (51), the progressive will be true as long as it's within Mary's capability to climb Mount Toby at t, and any potential interruptions are ignored.

We are now in a position to consider the contribution of plural event number. With a plural event, the modal base will include facts like the intention of the subject and the prior

events that the subject engaged in. On a plural reading of (53), the modal base will include things like "John played soccer with his friends several times recently" and "John intends to play soccer again". The ordering source will disclude potential interruptions like John breaking his legs. Because the modal base takes into account John's future intentions and past behavior, the habitual reading may obtain for (53).

(53) John plays soccer (regularly).

One issue for Ferreira's theory is that, ultimately, plurality alone does not seem sufficient to generate true habitual readings. These truth conditions are simply too weak. It should be enough to say (53) (ignoring the adverb) if John played soccer last week and is going to play soccer a few days from now and has no intention of playing any more than that.[2] Plurality as Ferreira has formulated it is just like plurality in the nominal domain: more than one event is all that is needed to make a plural event. The progressive version of (53) isn't good in this context either. This indicates that plurality alone is insufficient to account for the meaning of both the simple present and the progressive.

A second issue for Ferreira concerns the proposed difference between the English simple present and the progressive. On his account, the difference between the two is that the simple present selects only for predicates of plural events and the progressive is number neutral. The problem is that the two on their habitual readings are still distinct, though in a nuanced way. For example, the progressive appears to describe delimited, and possibly accidental habits while the simple present doesn't. This is shown for (54), from Boneh & Doron (2012).

(54) a. This student writes good papers

[2]Note that this does have a licit futurate reading, which obtains even if there is only one upcoming soccer event. The unattested reading we are looking for can be seen if we think of (53) as an answer to the question: "What does John do?"

b. This student is writing good papers.

Ferreira's (2016) solution to this is to suppose that the simple present requires that the predicate be *unbounded* which Ferreira defines in (55). The progressive, by contrast, requires *boundedness*, defined in (56). The unboundedness condition effectively states that for any event in P there is always some larger event of which it is part that is also a P event. First, this seems like an extremely strong condition. As it is now, it would demand effectively that the student in (54a) live forever and forever be writing good papers. Constraining this may be difficult in that the simple present itself can describe somewhat delimited habits. This is the case for the sentence in (57), where there are a set number of times that Manny updates the blog; he updates the blog as many times as there are weeks in the semester. Clearly this can't be unbounded as defined in (55). Notice, also, that in this case, the progressive version of the sentence is also acceptable and the difference in meaning is minimal and difficult to articulate.

(55) A property of events P is unbounded with respect to a set of worlds S iff
$\forall e \forall w \in S[P(w)(e) \rightarrow \exists e'[e < e' \wedge P(w)(e')]]$

(56) A property of events P is bounded with respect to a set of worlds S iff
$\forall w \in S \exists e[P(w)(e) \wedge \neg \exists e'[e < e' \wedge P(w)(e')]]$

(57) *Context: the department has a blog that is updated once a week.*
Manny updates the blog this semester.

Finally, there are a few further differences that go unexplained by this proposal. First, the differences in dispositional readings between the simple present and the progressive outlined in section 2 are not discussed and have no simple account here. Second, the behavior of indefinites also outlined in section 2 is unexplained.

2.3.2 Deo (2009; 2015b)

Deo (2009; 2015b) attempts to unify general imperfective operators as in, e.g., the Romance languages where one imperfective marker can have both habitual interpretations and single event-in-progress interpretations with progressive operators. The key theoretical tool she uses to accomplish this is the notion of a *regular partition* of time. A regular partition of an interval of time is a set of equimeasured, non-overlapping intervals (*cells*) such that their union is the original interval. The idea is that the imperfective and progressive both require that events of the VP overlap with the cells of a regular partition of an interval. The two differ in which interval they take the partition of. The imperfective may hold over partitions of fairly large intervals, while the progressive holds over relatively shorter intervals. To see how this works, let's now look at the formal system in Deo (2015b).

First, the formal definition of a regular partition is in (58). The first condition ensures that the subsets exhaust i. The second condition ensure they don't overlap. The final condition ensures the cells are the same size.

(58) R_i is a regular partition of i if R_i is a set of intervals $\{j, k, ...n\}$ such that:

a. $\bigcup\{j, k, ...\} = i$

b. $\forall j, k \in R_i \rightarrow j \cap k = \emptyset$ if $j \neq k$

c. $\forall j, k \in R_i \rightarrow \mu(j) = \mu(k)$
(where $\mu(x)$ stands for the Lebesgue measure of x. The Lebesgue measure for an (open or closed) interval of real numbers $[a, b]$ is simply $b - a$.)

Now we need to understand how the cells of the partition relate to the VP. This is provided by the COINcidence relation in (59). This holds between a predicate P, a partition cell i, and a world w. The function $Hist_{i_{inr}}$ handles the imperfective paradox; it returns the set of inertial worlds of i (c.f., Dowty 1979). The first case says that, if P is a predicate of events (E^E), then in all inertial worlds w', there is some event in P in w' that temporally

overlaps with i. The second case says that if P is a predicate of states (E^S) or intervals (I), then P holds of i in w.

(59) $\text{COIN}(P, i, w) = \begin{cases} \forall w' \in Hist_{i_{inr}}(w) : \exists e[P(e)(w') \wedge \tau(e) \circ i] & \text{if} P \subseteq E^E \\ P(i)(w) & \text{if} P \subseteq I \text{ or } E^S \end{cases}$

Now we can define the general imperfective. This definition is in (60). This formula says that the imperfective takes an initial superinterval, j, of the reference interval, i and stipulates that COIN hold of P for every cell of a partition of j. The size of partition cell must not exceed some contextual threshold. This is represented by c. Note that this superinterval may be non-proper, i.e., it may be just the reference interval itself.

(60) $\text{IMPF} = \lambda P \lambda i \lambda w. \exists j[i \subseteq_{ini} j \wedge \forall k[k \in R^c_j \rightarrow \text{COIN}(P, k, w)]]$

To see how this works, let's consider an example sentence from Gujarati in (61) adapted from Deo (2015a). This sentence may have both a habitual reading and a progressive one, as reflected in the translation. The LF for this sentence is in (62). The coincide relation has been spelled out in the formula. This says that there is some partition of an initial superinterval of *now* and every cell in this partition overlaps with some event of Nisa making bread in all inertial worlds.

(61) nisa rotli banav-e ch-e.
N.NOM bread.NOM make-IMPF.3SG pres-3SG
'Nisa makes bread.' or 'Nisa is making bread.'

(62) $[\![(61)]\!] =$
$\lambda w. \exists j[now \subseteq_{ini} j \wedge \forall k[k \in R^c_j \rightarrow \forall w'[w' \in Hist_{i_{inr}}(w) \rightarrow \exists e[\text{Nisa-make-bread}(e)(w') \wedge \tau(e) \circ k]]]]$

If we assume the superinterval is really small, possibly a few seconds, the partition cells will be even smaller. Thus a single event of Nisa making bread can satisfy this, as can be large enough to overlap with possibly the entire interval and therefore all the cells. This is the progressive reading. If the superinterval is really large, possibly a few years, the cells

will be relatively large, possibly a few months each. In this case, multiple events of bread making will have to be distributed across the cells, with each cell overlapping temporally with an event of bread making. This is the habitual reading.

The definition of the progressive is essentially the same but instead of partitioning a superinterval of the reference interval, it partitions the reference interval itself. This can be seen in (63).

(63) $[\![\text{PROG}]\!] =$
$\lambda P \lambda i \lambda w . \forall k [k \in R_i^c \rightarrow \text{COIN}(P, k, w)]$

Because definitionally the progressive can only partition the reference interval, it gives rise to only event-in-progress readings. The larger interval necessary for habitual readings is unavailable.

Slight revision is in order to account for habitual readings of the progressive on this theory. Specifically, Deo posits that in habitual progressive cases, a potentially larger reference interval is fixed by context or by adverbials like *these days*. Because these intervals may be longer, habitual readings may obtain. However, the imperfective, the simple present in this case, may still partition a superinterval of this reference interval.

These definitions give rise to *temporal contengence* in the progressive, according to Deo (2009).[3] If the speaker expected the habit to extend into the future, the speaker could have used the imperfective which provides for this by virtue of partitioning a superinterval of the reference interval. Because the speaker did not do so, it indicates that "the speaker is not in a position to extend his/her claims to superintervals extending to the future" (p. 511).[4]

[3]She revises this reasoning in Deo (2015b). In the story in that paper, temporal contengence arises only for stative predicates. It is unclear on that story why temporal contengence also seems to arise for habitual readings of eventive predicates in the progressive. By the reasoning in that paper, it is actually unclear whether we can account for temporal contingence for eventive predicates at all using this system.

[4]For a demonstration of the efficacy of Deo's pragmatic approach and its relation to semantic change, see Lund et al. (2019).

There are three problems I see with this analysis for the English case. First, this account runs counter to the canonical assumption that the present tense denotes a point in time. Second, this account cannot adequately capture futurate readings of the progressive on either the episodic reading or the habitual reading. Lastly, like Ferreira's proposal, this account leaves the facts regarding indefinites and dispositions unexplained.

On this account, the distinguishing feature of the progressive relative to the imperfective is that the partitioned interval is the reference interval as opposed to a super interval of the reference interval. However, it is generally assumed that the present tense fixes the reference interval to a *point* in time, namely utterance time (Taylor 1977; Dowty 1979). This means that the partition for the progressive in the present tense is a point in time. However, as is clear in the discussion of the general imperfective, habitual readings come about because a fairly large interval of time is partitioned. This is fine for the general imperfective because it can partition a superinterval of the reference interval. However, the progressive cannot. It must partition the reference interval itself. This suggests that progressive sentences should lack habitual readings, contrary to fact. Deo (2009) suggests that for habitual progressives, either the context or an adverbial like *these days* provides a larger partition measure, but it remains unclear how this would work compositionally or how such a strategy should interact with the picture of temporal contingence that Deo paints.

Second, as noted in Deo (2009), this account is unable to account for futurate readings of progressives. Consider what a sentence like that in (64) would mean under the theory laid out above. As before, the reference interval is *now*. Under her theory, every cell of a partition of *now* would have to overlap with an event with a runtime intersecting with *tomorrow*. This is seemingly an outright contradiction.

(64) The Royals are playing tomorrow.

Epsiodic futurates *can* possibly be accounted for if we assume some operation that extending the the time denoted by the VP such that it overlaps with *now*. For example, we include a preparatory event as part of the runtime of ⟦*The Royals play tomorrow*⟧. In this case, the partition cells of the reference interval could overlap with the preparatory stage. However, as we saw earlier in this chapter, there are futurate habitual readings of progressives as well. If habituality is contributed by locating events in each cell of the partition of an interval, a futurate habitual progressive would suggest that this partition occurs over an interval that is itself located in the future. There is no clear way of doing this in Deo's theory.

Finally, as is the case for Ferreira's theory, there is no clear explanation in this theory for accounting for the facts regarding dispositions and indefinites. These facts both hinge on the simple present involving a quantificational adverb like GEN, which is not involved in habitual readings of the progressive.

2.3.3 Interim summary

In this section, we saw two theories of the progressive in Ferreira (2005) and Deo (2009). While both accounts attempt to unify the progressive and simple present, they fail to adequately account for the important differences between habitual and generic readings of the simple present and habitual readings of the progressive. In the next section, I provide an account of the habitual readings of the English progressive which I argue can be traced back to the interaction of Landman's stage-of relation with a plural event generated by a pluractional VP. I argue that this analysis, paired with a GEN-based analysis of the simple present, accurately captures the empirical differences of the two.

2.4 The first pass

We now turn to the first pass analysis of habitual readings of English progressives. I will argue that we can get very far in explaining the empirical properties of habitual progressives by taking an off-the-shelf analysis of the progressive in Landman (1992) and pairing it with an off-the-shelf analysis of pluractionality in Lasersohn (1995). First, I will make clear the assumptions regarding the parts, PROG and PLUR. Then I discuss their composition.

2.4.1 The parts: PROG and PLUR

As I am arguing that habitual readings of the progressive can be captured by combining pluractionality with progressivity, I need to outline what assumptions I make about these parts. First, I adopt the theory of the progressive in Landman (1992). We will see that the crucial component of Landman's theory lies in his notion of stagehood. Second, I use the theory of pluractionality in Lasersohn (1995). Because Landman's theory of the progressive is neo-Davidsonian, it makes sense to adopt a neo-Davidsonian theory of pluractionality as well. Both of these theories were presented in the last chapter. In the following two sections, I jog our memories regarding these two theories, making clear the assumptions necessary for this first pass.

2.4.1.1 PROG: Landman 1992

I adopt the theory of the progressive in Landman (1992). On Landman's theory, the progressive is a function from sets of VP events to sets of special kinds of parts of those events.

Recall that Landman's account had two major components. The first is the event stagehood component. This is a special kind of parthood relation. An event is a stage of

another when we recognize it as the same event in a different stage of development. It has to be large enough and similar enough to bear a resemblance to the larger event.

Let's consider an analogy which brings us back to Carlson's (1977) original conception of stages of objects. We built a chair with a number of pieces of wood. At an early point in the process, the "chair" consisted merely of two legs screwed onto a seat. From the perspective of the finished chair, we recognize these two as one and the same. This earlier version of the chair was a *stage* of the later completed version. We can point to both and say "these are the same chair". But consider, say, a single screw. Certainly it is a part of the chair, but it doesn't share enough with the chair to consider it the "same" chair.

Landman also provides for *planning* and *pause* stages. A planning stage of an event is the preparatory stages of an event that are involved in futurate progressives. Pause stages are those points where an activity is not strictly speaking on-going. For example, there may be a pause in the middle where the cart-pusher stops pushing to spit on her hands. These are in contrast to *process* stages, which Landman defines in (65). This is meant to capture that a *Kim running to the beach* event is also a *Kim running event*. They share the same process characteristics.

(65) Process stages:
Let f be an activity or accomplishment and e a stage of f: e is a *process stage* of f iff e has the same process characteristics as f.

Crucially for us, Landman further provides the following activity postulate:

(66) Activity postulate:
The stages of accomplishment or activity e are either process, planning, or pause stages. Planning stages precede all process stages. Pause stages are flanked left and right by process stages.

These notions will be the subject of much refinement in chapter 4. If they seem a bit squishy at this point, I hereby write the reader an IOU to be redeemed in that chapter.

The other half of Landman's proposal is the modal algorithm. As explained in the last chapter, the idea behind the modal algorithm is that the development of an event can be traced through the events it is a stage of. When the event prematurely terminates, we hop to a reasonable world and continue tracing the development of the event until it culminates or we encounter another interruption and hop worlds again. This process maps out the continuation branches of the initial stage and world. As we will see, the specific notions involved in the modal algorithm turn out to be unimportant for this proposal.

Landman's progressive is true of an event e and world w when there is some event e' and world w' in the continuation branch of e and w such that P holds of e' in w'.

To make Landman's theory more concrete, let's walk through a derivation of an episodic progressive sentence. We'll use a version of the sentence in (35), repeated as (67).

(67) Kim was running to the beach.

Landman assumes that PROG first composes with the VP, and then tense applies after that. The LF for the single episode reading is in (68).

(68) [PAST [PROG [$_{VP}$ Kim run to beach]]]

The meaning of the VP is in (69). For readability's sake, I include the prepositional phrase in the verb and set aside the raising of the subject from a VP-internal position. This denotes the set of *run-to-beach* events in which Kim is the agent. Its type is $\langle v, st \rangle$. Note that this set contains only culminating events of Kim running to the beach.

(69) $[\![\text{VP}]\!]^{g,c} = \lambda e \lambda w[\text{run-to-beach}(e, w) \wedge \text{Ag}(e) = \text{Kim}]$

We will also need a semantics for the past tense. I will assume, following Partee (1973), that the past tense is anaphoric. It picks out some interval of time that is presupposed to be prior to utterance time. I further assume that existential closure of the event variable

occurs here, which is consistent with Landman's assumption that existential closure occurs topmost. This move does, however, explicitly force tense to apply after PROG due to semantic type. Both PROG and PAST take sets of events, but only PROG yields a set of events ($\langle v, st\rangle$) while PAST yields a proposition ($\langle s, t\rangle$). The formula for PAST is in (70). I use *now* to represent the utterance time. The temporal trace function τ returns the interval of time an event occurs at in a world. This formula simply says that there is some event with a temporal trace equal to some time before *now* and holds for P given w.

(70) $[\![\text{PAST}_i]\!]^{g,c}$ is only defined if $g(i) < now$, where *now* is the utterance time.
If defined, $[\![\text{PAST}_i]\!]^{g,c} = \lambda P \lambda w \exists e.g(i) = \tau(e) \wedge P(e, w)$

This together will yield the truth conditions in (71). I offset the presupposition introduced by tense with a comma at the end of the formula.

(71) $[\![\text{PAST}[\text{PROG}[\text{VP}]]]\!]^{g,c} =$
$\lambda w.\exists e[g(i) = \tau(e) \wedge \exists e', w'[\langle e', w'\rangle \in \text{Cont}(e, w) \wedge [\text{run-to-beach}(e', w') \wedge Ag(e', w') = \text{Kim}]], g(i) < now$

In short, this says that there is some event in the actual world e, an event occurring at some time before utterance time, that is a stage of some Kim-run-to-beach event e' in some reasonable-enough world w'. Let's consider a scenario where the sentence would be true. Kim starts running from her house with the beach as the intended endpoint of the run. The run continues until she gets about halfway to the beach. At that point she realizes at time t she might have left the oven on and runs home, never making it to the beach. Let's call this event up to t, but not including t, e. This is our anchoring event, the event in the real world. We now need to check that there is some e' and some w' satisfying $\langle e', w'\rangle \in \text{Cont}(e, w)$ and that e' is a Kim-run-to-beach event in w'. First, let's look at e up to the point where it stops, at t. We look to the closest world where e continues, that is, the closest world where e is a stage of some larger event. In this world, w', Kim doesn't have the realization at t. We now

need to check that this is reasonable given e, and it is. Then we check the development in of e in this world, and we find the maximal stage of e, which we'll call e'. This puts e' and w' in the continuation branch of e and w, satisfying $\langle e', w' \rangle \in \text{Cont}(e, w)$. In this world, there is no further interruption that Kim faces, and e' culminates. This means that ⟦Kim run to beach⟧ holds of e' in w'. As long as this event happens prior to utterance time, (67) is true.

Let's examine the stagehood relation a bit more in this scenario. It's clear that e is a stage because it shares much of the process characteristics of the culminating event e', since it consists mostly of running itself. What if Kim encounters an intersection and has to stop running to wait at a stop light? Landman provides for pause stages, where a pause stage is flanked by process stages, which in this case would be the actual running events. We can assume that a pause stage must still resemble the culminating event. It must provide evidence that the event will continue in a subsequent process stage. Kim stopping at the intersection does this because we understand she can't just run into traffic. Perhaps she is stretching with a determined look on her face, and maybe this intersection is a normal disruption in a route she normally takes when running to the beach. Now, what if Kim happens to pick her nose during the run? If we zoom in on just the nose picking, this really wouldn't count as a stage. It's too brief and disconnected from running to the beach as a process to count as a stage.

In the full formula, we also see the importance of existential closure over e. This provides the anchor to the real world. Tense locates an event e in the actual world some place in time. The progressive then traces the development of e through the events where e is a stage, looking for its culminating in a VP event. This event, e, is therefore the event we point to, in the actual world, as a stage of a culminating VP event. It is the evidence for the fact that a VP event is in progress.

Landman has worked out a system that gets us the right results for the single-episode readings of the progressive. In the next section, we examine the theory of pluractionality in Lasersohn (1995). Later on, we will see that Landman's proposal augmented with a pluractional notion of event plurality is a good first start at explaining habitual readings of the progressive.

2.4.1.2 PLUR: Lasersohn 1995

Let's now see how PLUR works in practice through an example, particularly one in a past perfective context, which allows us to make fewer assumptions about tense and aspect. We will borrow an example in Chechen from Yu (2003) in (72). The WP gloss indicates that the verb form is in the witnessed past tense. Like Yu, we will assume this is simply a past perfective.

(72) beer suuna marlilkhira
child 1SG.DAT hug.PLR.WP
'The child hugged me over and over again.'

This sentence has the following LF:

(73) [PAST [PLUR$_{che}$ [$_{VP}$beer suuna mar'iaqqa]]]

Let's recall the semantics that Lasersohn assigns to PLUR. It is a VP modifier, taking a set of events as input and yielding a set of plural events as output. Lasersohn's theory attempts to account for many readings of pluractionals, but here we are only concerned with the distribution in time reading. As Yu (2003) and Wood (2007) demonstrates, the range of readings of pluractionals as a whole in Chechen is a complicated subject. However, this particular predicate has only frequentive/habitual readings and participant-based readings. We will set aside these latter readings and focus on the temporal ones. The particular shape of this pluractional for frequentive/habitual readings is in (74). This formula says that some

plural event has a cardinality greater than some pragmatically determined number n, and all the atomic parts of that plural event are such that they are P events, their temporal traces do not overlap, and there is some interval of time between them such that a P event is not ongoing.

(74) $[\![\text{PLUR}_{che}]\!]^{g,c} =$

$$\lambda P \lambda e.\text{Card}(e) \leq n \wedge \\ \forall e', e'' \leq_{atomic} e[\neg\tau(e') \circ \tau(e'') \wedge P(e')(w) \wedge \\ \exists t[\text{between}(t, \tau(e'), \tau(e'')) \wedge \\ \neg\exists e'''[t = \tau(e''') \wedge P(e''')(w)]]]$$

For the (perfective) past tense, we will simply borrow the past tense from the previous section. The meaning for the sentence in (72), then, is in (76). This says that there is some plural event of children hugging the speaker where the plural event takes place in the past. The atoms of this plural event must be temporally separated. This captures the meaning of (72).

(75) $[\![\text{beer suuna mar'iaqqa}]\!]^{g,c} = [\![\text{VP}]\!]^{g,c} =$

$$\lambda e \lambda w.[\text{mar'iaqqa}(e', w) \wedge Ag(e', w) = \text{beer} \wedge Pat(e', w) = \text{suuna}]$$

(76) $[\![(72)]\!]^{g,c} =$

$$\lambda w \exists e.[\tau(e) = g(i) \wedge \text{Card}(e) \leq n \wedge \\ \forall e', e'' \leq_{atomic} e[\neg\tau(e') \circ \tau(e'') \wedge [\![(75)]\!](e')(w) \wedge \\ \exists t[\text{between}(t, \tau(e'), \tau(e'')) \wedge \\ \neg\exists e'''[t = \tau(e''') \wedge [\![(75)]\!](e''')(w)]]], \; g(i) < now$$

It turns out that the English past tense also has a kind of pluractional reading. Much like the progressive, the sentence in (77) can have two readings. It can describe a single episode of Leyla biking to work in the past. However, it can also describe multiple events of Leyla biking to work. If, for example, we are inquiring about Leyla's previous exercise

habits, (77) is an acceptable response. It describes multiple episodes, not just one.

(77) Leyla biked to work.

For now, I posit that these two readings each have different LFs, one without PLUR and one with PLUR. These LFs are in (78). Importantly, *pluractionality is covert in English*. I follow van Geenhoven (2004) in assuming that the pluractional morpheme in English is zero-marked. As a result, the single *string* in (77) may have both of the LFs in (78).

(78) a. [PAST [$_{VP}$ Leyla bike to work]]
b. [PAST [PLUR [$_{VP}$ Leyla bike to work]]]

The formula for (78a) is in (79). It straightforwardly locates an event of Leyla biking to work at a time before *now*. When PLUR is present, however, the result is that *multiple* events of Leyla biking to work are located in the past. This is in (80). With PLUR present, we are locating a plural event (e in the formula) in the past, and this plural event is constituted of n-many events of Leyla biking to work. I assume for now that the English pluractional operates exclusively on temporal traces to simplify discussion.

One major difference between the English simple past case and the Chechen example is that the English case seems to demand fairly large temporal gaps between each event composing the plurality. If the scenario is that Leyla kept having to go back and forth from work and home on a single day, the sentence in (77) doesn't seem like a felicitous description. One solution to this is to follow the insight of Henderson (2012) and build an additional condition into the betweenness condition. I will set this consideration aside, but I will note that we could impose a temporal constraint on t in a slight modification of Lasersohn's formula, requiring that it be of some size or other.

(79) $[\![\text{PAST [VP]}]\!]^{g,c} =$

$$\lambda w \exists e[\tau(e) = g(i) \wedge [\textit{bike-to-work}(e,w) \wedge Ag(e,w) = \text{leyla}]], g(i) < \textit{now}$$

(80) $[\![\text{PAST [PLUR [VP]]}]\!]^{g,c} =$

$$\lambda w \exists e.[\tau(e) = g(i) \wedge \text{Card}(e) \leq n \wedge$$
$$\forall e', e'' \leq_{atomic} e[\neg\tau(e') \circ \tau(e'') \wedge \text{bike-to-work}(e', w) \wedge Ag(e', w) = \text{leyla} \wedge$$
$$\exists t[\text{between}(t, \tau(e'), \tau(e'')) \wedge$$
$$\neg\exists e'''[t = \tau(e''') \wedge \text{bike-to-work}(e''', w) \wedge Ag(e''', w) = \text{leyla}]]]],\ g(i) < now$$

Finally, it's worth noting that, as was discussed in the last chapter, this account of pluractionality still suffers from an inability to capture activities, as activity events will trivially satisfy this definition. This problem will not be solved until chapter 4, so we'll stick with accomplishment predicates for the time being.

We will now see that when PLUR encounters PROG the habitual-like interpretations of progressive sentences are yielded.

2.4.2 Habitual progressives: PROG meets PLUR

Now that we have our parts, PROG and PLUR, I will argue that we can get quite far in explaining habitual progressives by considering the composition of these two elements. Pluractionality contributes simple event plurality, a necessary component of habitual meaning. As we saw in the simple past case in the last section, this is covert in English in the sense that PLUR is zero-marked. The *modal* aspects of habituality are contributed by the progressive. These modal aspects have a surprising source, however. I will argue that the notion of *event stagehood* is the crucial component of the progressive for generating the *habitual* interpretation of progressives. The interaction of event plurality and event stagehood is responsible for a variety of nuances in the interpretation of habitual progressives.

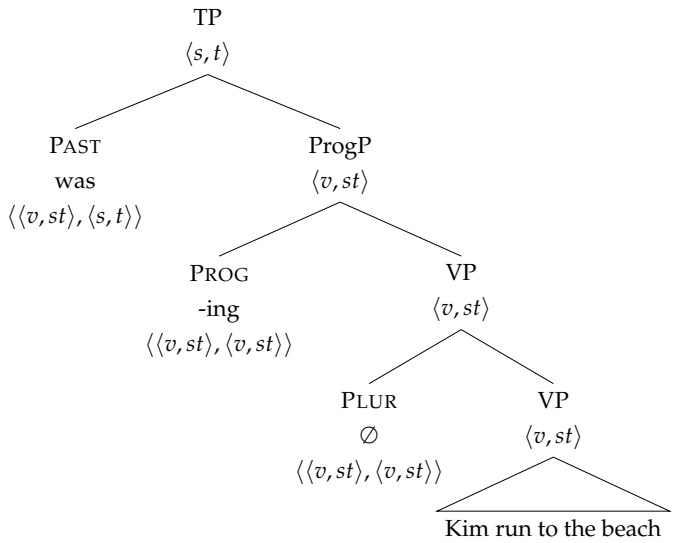
2.4.3 How it works

I will show how the presence of PLUR with the progressive results in a habitual reading, in contrast to the single episode reading that is obtained in its absence. Our base case will be a habitual reading of the sentence from (67), repeated below as (81) with a context to make the habitual interpretation clearer. Because PLUR is zero marked, this string is ambiguous between an LF with PLUR and without it. We have already seen how the single episode reading is generated without PLUR, and here we will see how PLUR generates the habitual reading.

(81) *Context: What was Kim's exercise regimen?*
Kim was running to the beach.

I will assume that PLUR composes with the VP before PROG (or other aspectual operators generally). I will continue to assume that tense follows aspect. Thus the LF for (81) when PLUR is present will be as follows:

(82)



Thus the LF for the single episode reading differs from this only by the presence of PLUR. This is clear when the two are side-by-side, as in (83). Again, the single string in (81) is ambiguous between the two structures.

(83) a. Habitual:
[PAST [PROG [PLUR [$_{VP}$ Kim run to the beach]]]]
b. Episodic:
[PAST [PROG [$_{VP}$ Kim run to the beach]]]

The denotation of the VP remains the same as in the single episode case, repeated below in (84). This denotes the set of events of Kim running to the beach. For now we will assume that this set denotes atomic eventualities, though I return to this point later on.

(84) $[\![\text{VP}]\!]^{g,c}$ =

$$\lambda e \lambda w.[\text{run-to-beach}(e, w) \wedge Ag(e, w) = \text{Kim}]$$

We are now in a position to see how the presence of PLUR generates these multi-episode readings. It will first compose with the VP and yield a set of events (type $\langle v, st \rangle$), the same type as the VP. However, we now have a set of *plural* events. In essence, it bundles the events denoted by the VP into pluralities of events with a cardinality greater than some pragmatically fixed number. The subevents of this plurality are all events satisfying the VP. Additionally, the subevents must all have non-overlapping temporal traces. The result of applying PLUR to (69) is in (85).

(85) $[\![\text{PLUR [VP]}]\!]^{g,c}$ =

$$\begin{aligned}
&\lambda e \lambda w.[\text{Card}(e) \leq n \wedge \\
&\quad \forall e', e'' \leq_{atomic} e[\neg\tau(e') \circ \tau(e'') \wedge \\
&\quad \text{run-to-beach}(e', w) \wedge Ag(e', w) = \text{Kim} \wedge \\
&\quad \exists t[\text{between}(t, \tau(e'), \tau(e'')) \wedge \\
&\quad \neg\exists e'''[t = \tau(e''') \wedge \text{run-to-beach}(e''', w) \wedge Ag(e''', w) = \text{Kim}]]]]
\end{aligned}$$

This says that there is some plural event with a cardinality greater than some pragmatically specified number n and the subevents of the plurality are all events of Kim running to the beach. These subevents must be non-overlapping. In total, this would mean that there

is some plural event with n subevents satisfying $[\![\textit{Kim run to beach}]\!]^{g,c}$, and these subevents are temporally non-overlapping.

PROG is set to enter the picture. Unlike the episodic case which does not have PLUR, in this case PROG composes with a set of *plural* events of Kim running to the beach. Naturally, this move has major consequences. Recall that Landman's analysis of the progressive involves identifying events that are *stages* of VP events. These events are such that we *recognize* them as the larger event at an earlier stage of development. In some sense, they provide evidence that a VP event is in progress. We said earlier that an episodic reading of (81) could have event stages that, e.g., are events of Kim running halfway to the beach. We can point to that event and describe it using the sentence in (81). It clearly resembles a culminating event of Kim running to the beach, and tracing the development would led us to an event of Kim going to the beach, as long as we can zap away any interruptions. Let's now consider what happens when we apply PROG to the pluractional (85) as in the formula in (86).

(86) $[\![\text{PRES [PROG [PLUR[VP]]]}]\!]^{g,c} =$

$$\begin{aligned}
&\lambda w.\exists e_1[\tau(e_1) = g(i) \wedge \\
&\quad \exists e_2, w'[\langle e_2, w'\rangle \in \text{Cont}(e_1, w) \wedge \\
&\quad \text{Card}(e_2) \leq n \wedge \forall e_3, e_4 \leq_{atomic} e_2[\neg\tau(e_3) \circ \tau(e_4) \wedge \\
&\quad \text{run-to-beach}(e_3, w') \wedge Ag(e_3, w') = \text{Kim} \wedge \\
&\quad \exists t[\text{between}(t, \tau(e_3), \tau(e_4)) \wedge \\
&\quad \neg\exists e_5[t = \tau(e_5) \wedge \text{run-to-beach}(e_5, w') \wedge Ag(e_5, w') = \text{Kim}]]]], \; g(i) < \textit{now}
\end{aligned}$$

When PROG applies to (85), as in (86), we are now looking for the stages of *plural* events. I argue that the stages of plural events are quite different than the stages of singular events. The primary way that stages of plural events differ from stages of singular events is that they suggest or give an indication of their plurality *per se*. In other words, the event stage

must be recognizable specifically as part of a *series* of events. They have to indicate that multiple events described by the VP are forthcoming.

This is where the *habitual* interpretation comes from and where a kind of modality sneaks in. This is most evident when we consider the gaps, or pauses, between subevents. An empirical fact about habitual progressive constructions, and habitual constructions generally, is that they can be used to describe a time when the habit is not being instantiated. In other words, we can point to a time when Kim is not running, maybe she is at work or even sleeping, and we can truthfully say of that time that "Kim is running to the beach (these days)". As we saw in the episodic case, Landman provides for pause stages. A pause stage is flanked by process stages. In the case of a plural event, a process stage is simply one of the subevents of the plurality. For a pause stage in this case to resemble the plural event, it has to resemble in some way this plural event. How does a pause stage do this? By involving a *habit* that persists through the pause stage. Habits, and intentions and inclinations more generally, are the best indication that we are in the middle of a plurality of events when no event is actually on-going. It is in this way that modality sneaks in.

Let's return to our example in (81), which has the truth conditions in (86). Much like in the episodic case, this says that there is some event occurring some time in the past. It differs from the episodic case in that it applies to a set of plural events. Each of these plural events is composed of subevents that are each events of Kim running to the beach and, by the reasoning above the events that make up this plurality are distributed across time. The anchoring event e, located in the actual world, must have in its continuation branch one of these plural events. For one of these plural events to be in e's continuation branch, e must be a stage of this event.

Let's assume the reference time for the sentence in (81) is in-between events of Kim

running to the beach, like the time that the speaker last saw Kim. This would be a *pause* in the plural event; none of the subevents truly temporally overlaps with the reference time. This means that at that time we have to identify a pause stage that has a plural event of Kim running in its continuation branch. I posit that if Kim still intends to continue running to the beach for exercise, then this event counts as a pause stage of a plural event of Kim running. The basis for the speakers assertion of (81) might be that Kim told the speaker that that's how she exercises, it might be that speaker has encounter Kim on a run to the beach before and Kim had sandy running shoes near her front door at the reference time, or it could be that someone else told the speaker Kim had this exercise regimen. What matters, though, is that Kim did have this intention. What would make (81) false? Kim does not have such an intention or inclination to run to the beach any further. Perhaps she keeps telling herself that she is going to run to the beach, but never actually follows through. This would not count as a pause stage of a plural event of Kim running; consistently failing to follow through on one's plans to run does *not* resemble a plural event of running.

Finally, it's worth considering the role of Landman's modal algorithm. In this proposal, the role of the modal algorithm is solely to zap away potential interruptions. It does not factor into the habitual reading of the progressive *per se*. It works essentially the same as in the episodic case. Assuming that we meet an interruption, and the plural event fails to develop for whatever reason, we proceed through the algorithm, hopping worlds where appropriate. Thus it works just as it does in the episodic case, which accounts for the fact that the habits described by habitual progressives may be interrupted, and there are normality constraints.

2.4.4 Lexical cumulativity and ellipsis

Up until this point, I have taken for granted that verbal plurality is actually introduced through PLUR. I have assumed that verbs denote solely in the atomic domain and it's only when an operator like PLUR is applied to a VP that we get a predicate that can denote event sums. One consequence of this is that I've argued that episodic and habitual interpretations of a single progressive string are due to two different LFs, one with PLUR and one without PLUR.

On the other hand, however, it has been argued on the basis of cumulative interpretations that verbs are actually plural *by default* (Krifka 1992; Landman 1996; Kratzer 2007). That is, verbs may denote both atoms and sums inherently, or as Kratzer (2007) puts it, verbs are born as plurals. Consider the inferential pattern in (87). Given (87a) and (87b), (87c) holds as well.

(87) a. Leyla ran to the school.
b. Kim ran to the beach.
c. Leyla and Kim ran to the school and to the beach.

Kratzer argues that patterns like this are explained if verbs and thematic roles are cumulative in that they are *closed under sum formation*. This means that verbs denote not only atomic events, but all possible sums of those atoms as well. If our model contains exactly two events of running, Leyla's run e_1 and Kim's run e_2, then the cumulative version of $[\![run]\!]$, which she notates with Link's (1983) *-operator, is in (88). The cumulative denotations of the agent and goal theta roles are in (89) and (90), using ordered pairs to represent the functions. Because the verb and thematic roles are cumulatively closed, the inferential pattern in (87) is captured. Given that e_1 verifies (87a) and e_2 (87b), it follows that their sum $e_1 \oplus e_2$ verifies (87c).

(88) $[\![*run]\!] = \{e_1, e_2, e_1 \oplus e_2\}$

(89) $[\![*Ag]\!] = \{\langle e_1, \text{Leyla}\rangle, \langle e_2, \text{Kim}\rangle, \langle e_1 \oplus e_2, \text{Leyla} \oplus \text{Kim}\rangle\}$

(90) $[\![*Goal]\!] = \{\langle e_1, \text{school}\rangle, \langle e_2, \text{beach}\rangle, \langle e_1 \oplus e_2, \text{school} \oplus \text{beach}\rangle\}$

This story, in combination with the story I am suggesting for habitual progressives, would suggest that we don't need PLUR at all. We get much of the contribution of PLUR for free by virtue of lexical cumulativitiy. Verbs are plural by default, and any given progressive construction can hold of atomic or plural eventualities. On this story, there would not be two separate LFs for habitual and episodic progressives, but just one.

While lexical cumulativity may be necessary to account for patterns like that in (87), I reject this hypothesis in the case of habitual progressive readings. I argue that habitual readings of the progressive really are due to a covert pluractional operator. I use ellipsis to demonstrate this, as Kratzer (2007) uses in her paper to demonstrate the necessity of lexical cumulativity. If the episodic reading and the habitual reading were attributable to a single LF where the VP itself denotes both atomic and plural events, then we should be able to mix and match episodic and habitual readings of the progressive under ellipsis. This is not the case. Consider the three contexts for (92) below:

(91) a. *Context 1: Both Leyla and Kim were in the pool swimming laps. Both intended to swim 30 laps.*

b. *Context 2: Both Leyla and Kim have been swimming 30 laps as part of an exercise regimen. Neither was, at the reference time, in the pool swimming.*

c. *Context 3: Leyla was in the pool attempting to swim 30 laps for the first time, and Kim, not in the pool at reference time, had an exercise regimen where she swims 30 laps.*

(92) Leyla was swimming 30 laps and Kim was too.

Only the first two contexts in (91) are licit contexts for (92). In both cases, the two clauses have the same interpretation. The first is a episodic reading and the second is a habitual reading. The third context mixes readings, and this context is illicit. This suggests that the

habitual reading of the progressive has a different LF than that of the episodic reading. I argue that that difference is attributable to the pluractional operator in the LF of the habitual reading.

Relatedly, there is additional evidence that lexical cumulativity is insufficient to account for iterative of *for* adverbials. The iterative reading of a *for* adverbial is shown in (93b), with the continuous reading of the same base predicate being preferred in (93a). Deo & Piñango (2011) provide experimental results showing that iterative readings of *for* adverbials incur a higher processing cost than continuous readings. Champollion (2013) argues that this processing cost is due to the presence of an zero-marked operator ITER, analogous to my PLUR, in the iterative case that is not present in the continuous case. This incurs a processing cost because the reader must insert the operator after backtracking.

(93) a. Kim ran for two months (for exercise).
b. Kim ran for twenty minutes.

This still leaves the question of cumulative inferences of the kind in (87). That data suggests we do need some notion of lexical cumulativity. The question is why we see it only in cases where nominals require cumulativity but not in the case of iterativity generally. It is not self-evident to me why this would be so. One lead might be that notionally plural nominal arguments like *Leyla and Kim* with inherently distributive predicates, or PLUR, *require* plural eventualities while, e.g., a sentence without such a nominal or pluractional operator does not. In any case, I leave that to future work. Assuming that it can be constrained in such a way, we can still assume lexical cumulativity, as Henderson (2012) does in his analysis of Kaqchikel pluractionals, but that habitual readings of progressive (and iterative readings generally) require PLUR in the LF to filter out atomic eventualities. In fact, we will assume exactly this in chapter 4.

2.4.5 This proposal and other accounts of the progressive

It is important to note that the key component of this proposal is the sense of modality relevant to habitual readings sneaks in *via* the stage-of relation, and not the modal algorithm Landman sets forth. As a result, it is important to note that any theory of the progressive that makes use of, or is enhanced with, this special parthood relation can be substituted in place of Landman's theory. Thus this theory does not depend on a theory of the progressive involving a possible worlds semantics. This is a pleasant upshot for the theory in that it allows us to avoid debate about the ontological commitments of the progressive (cf. Szabó 2008; Wulf 2009; Silk 2014; Varasdi 2014) as long as the stage-of relation can be sufficiently implemented in the chosen theory of the progressive.

This doesn't mean, however, that just any theory of the progressive can be ported in without issue. Notably, the theory in Parsons (1990) doesn't work out-of-the-box. This is related to a problem with his theory that we saw in the last chapter. Zucchi (1999) notices that Parsons' theory fails in the following scenario: Gianni is traveling by train from Milan to Florence. He gets stopped in Piacenza due to a railroad worker strike and never makes it to Florence. The event e describes this train ride and t is the time he reaches Piacenza. On Parsons' theory e will have to both Hold and Cul at t. This means that the sentence "Gianni went to Florence" will turn out true on Parsons' theory because e satisfies Cul for "Gianni went to Piacenza". Because Hold and Cul are properties of events and times, "Gianni went to Florence" is predicted to be true because e culminates for one leg of the trip but holds for the other leg. It turns out that this same reasoning applies to plural events and their subevents. Briefly, if we think of the subevent of a plural event as the first leg of the trip and the plural event as the whole trip from Milan to Florence, we can apply similar reasoning to show that a single event for a VP would satisfy Cul, and therefore also satisfy Cul for

a sentence with a pluractional version of that VP. Zucchi's fix for Parson's theory, which involves "Landmanizing" the Hold relation by giving it a continuation branch semantics, applies just as well here. I refer the reader to Zucchi (1999) for details.

The key takeaway is that this theory is not wedded specifically to Landman's continuation branch semantics or to a possible worlds semantics of the progressive generally. It does, however, depend on his stage-of relation.

2.5 Comparison to GEN and simple present

Habitual readings of the progressive may, at first glance, appear similar to those of the simple present in English. Compare the multi-episode reading of the progressive sentence in (94a) to the simple present version of the sentence in (94b). Both suggest habits of Kim running.

(94) a. Kim is running to the beach.
b. Kim runs to the beach.

On an influential account of the simple present, the habitual reading of the present tense sentence in (94b) is due to the presence of a covert quantificational adverb GEN (Carlson 1977; Farkas & Sugioka 1983; Krifka et al. 1995). GEN generates habitual readings, but in a different way than I've argued PROG and PLUR do. Where PLUR generates habitual readings of the progressive by virtue of event plurality, GEN generates these readings by virtue of (quasi-)universal quantification over situations. These are fundamentally different mechanisms.

In this section, I compare the account of multi-episode progressives in this paper to that of simple present sentences with GEN. First I will describe GEN and its role in simple present sentences. Then, we will see that the two accounts predict subtle differences in

meaning between habitual progressive sentences and simple present tense sentences. In addition, we will see that multi-episode progressives and sentences with GEN come apart quite widely in their behavior with bare plurals and indefinite singulars, as well as with so-called dispositional readings.

2.5.1 GEN

Simple present sentences in English have what are called characterizing uses, which is an umbrella term for what may be a variety of readings. For instance, they may describe a habit as in “Mary smokes" or they can describe an ability as in”Mary runs four minute miles". An influential tradition is to treat simple present sentences as having a covert quantificational adverb GEN that has a meaning akin to *generally*.

One of the core reasons for assuming that a covert quantificational adverb is present in simple present sentences is that, like overt quantificational adverbs like *always*, simple present sentences allow for restriction by *if* and *when* clauses, as in (95b). This sentence seems to mean that every time the cowboy is anxious, he smokes, just as the sentence in (95b) means. Also, like overt quantificational adverbs, they allow for non-existential readings of singular indefinites and bare plurals, as in (96). That is, it looks like the variables introduced by these indefinites are bound by a quantificational adverb.

(95) a. The cowboy smokes when he is anxious.
b. The cowboy always smokes when he is anxious.

(96) a. A cowboy/cowboys always smoke(s)
≈ All cowboys smoke.
b. A cowboy/cowboys smoke(s).
≈ All cowboys smoke.

On this account, GEN is a dyadic quantifier consisting of a quantifier GEN which has (essentially) universal force, a restrictor, and a nuclear scope (Farkas & Sugioka 1983; Krifka

et al. 1995; Chierchia 1995). As a quantificational adverb, GEN can bind variables associated with indefinites and bare plurals, incorporating them into its restrictor.[5].

In addition to these properties, it may also bind free temporal interval variables. Binding of free temporal interval variables is what makes simple present sentences habitual. Thus the sentence in (97a) has the (simplified) LF in (97b). In general, a time when the cowboy is stressed is one in which he smokes.

(97) a. The cowboy smokes when he is anxious.
b. $\text{GEN}_t[\textit{stressed(t, c)}][\textit{smokes}(t, c)]$

Two further clarifications are in order. First, habitual simple present sentences often lack an overt restrictor. Second, the generic, while universal, is also modal, making it better able to accommodate exceptions than adverbs like *always*. GEN also has, as part of its restriction, a variable ranging over contextually salient times, C. As such, C constrains quantification to those times which are relevant, allowing us to ignore those that aren't. As such, I assume that GEN has the definition in (98), where C represents this covert restrictor. In a sentence like (97a), t will be bound existentially, and an additional requirement may be imposed on t such that it is a sufficiently long span of time, like say the subject's lifetime. This full formula, then, says that for every world w' accessible from the actual one and every contextually relevant time, there is some event overlapping with that time that is a P event in w'.

(98) $[\![\text{GEN}_{t,w}\ [\text{C}][\text{P}]]\!]^{g,c} =$

$$\lambda t \lambda w. \forall w', t'[t \circ t' \wedge Acc_w(w') \wedge C(w', t) \rightarrow \exists e[t' \circ \tau(e) \wedge P(e, w')]]$$

Let's now turn to a concrete example. The sentence in (99a) will yield the formula in (99b). This simply says that for every accessible world and every event in the existentially

[5]One such way of doing this is in Chierchia (1995). See also Diesing (1992), Kratzer (1995).

bound situation involving Brace that's contextually relevant, that event is an event of Brace smoking. For any given utterance of (99b), it may be difficult to spell out what these events may be. It might include a number of smoking-appropriate situations (perhaps after dinner events or smoke breaks), while situations where he is asleep or at the doctor's office would be excluded.

(99) a. Brace smokes.
b. $\exists t \forall t', w'[t \circ t' \wedge Acc_w(w') \wedge C(w', t) \rightarrow \exists e[t' \circ \tau(e) \wedge smokes(b, w', e)]]$

This results in a kind of unboundedness. Assuming that s is sufficiently long, as the generic seems to imply, then universal quantification takes place over a significantly long period of time, say, one's lifetime. This results in a tendential stability. Over potentially his entire lifetime, every time Brace is in one of these salient situations, he smokes. This correctly implies that Brace smokes often, and not just out of mere happenstance. Brace is, in other words, a smoker. Critical to the GEN is the permanence it implies. It's not that Brace has smoked a few cigarettes lately by, say, bumming them off of a friend. She has a smoking habit, and this habit is likely to persist indefinitely.

2.5.2 Comparison of GEN and habitual progressives

2.5.2.1 Singular indefinites

One of the key motivations for assuming that simple present sentences involve a covert quantificational adverb is that, like overt quantificational adverbs, they show universal(ish) readings of singular indefinites. If GEN is analyzed as a covert quantificational adverb present with simple present sentences, we can explain these readings just as we can with overt quantificational adverbs.

On the other hand, I am arguing that habitual readings of progressive sentences are due

to the presence of a pluractional morpheme, *not* a quantificational adverb like GEN. This account predicts that habitual progressive sentences, then, should not permit non-existential readings of singular indefinites. As was already shown in data in section 2 repeated in (100), this is true. The indefinite in (100b) *only* has an existential reading.

(100) a. A cowboy carries a gun (these days). [all cowboys]
b. A cowboy is carrying a gun (these days). [a specific cowboy]

This is completely expected if the first sentence with the simple present has GEN, but the second sentence with the progressive has a different source for the habitual reading, namely PLUR. GEN, being a quantificational adverb, may "catch" singular indefinites, incorporating them into its restrictor. PLUR is not such an adverb and does not do so.

2.5.2.2 Dispositional readings

Simple present sentences also do not need to actualize, in a sense, an event of the kind denoted by the VP. They allow for so-called dispositional readings, which describe a kind of potentiality. This can be seen in the sentences in (101), both from Krifka et al. (1995). (101a) can be true without Sally having sorted mail from Antarctica in the past or in the future. It's essentially a job description. Similarly, (101b) can be true as long as the machine *can* crush oranges; it need not ever crush one. Readings of this sort are anticipated if GEN is modal. The actual world may not contain any *mail-sorting* or *orange-crushing* events, but other possible worlds might.

(101) a. Sally sorts the mail from Antarctica.
b. This machine crushes oranges.

As we saw in section 2 above, habitual progressives are much less permissive of these kinds of readings. The sentence in (102a) on its multi-episode reading can't simply describe

a job that Sally has. It's outright weird to use this sentence out of the blue if Sally has never and likely will never sort mail from Antarctica. Similarly, (102b) can't be used, out of the blue, to describe a never-to-be-realized ability of the machine. Both of these sentences seem to suggest that there already has been or already will be a *mail-sorting* or *orange-crushing* event.

(102) a. Sally is sorting the mail from Antarctica.
b. This machine is crushing oranges.

This is predicted by the analysis of habitual progressives outlined above. Progressive sentences are anchored to events in the actual world. For these sentences to be true, there must be, in the actual world, some event that is a stage of a (potential) plural *mail-sorting* event or a (potential) *orange-crushing* event. What counts as an event stage of these kind? The simplest answer is prior events of *mail-sorting* or *orange-crushing*. Recall that on Landman's theory, pause stages, the stages most relevant for habitual readings of progressives, must be flanked by process stages. This fact nets the imperfective paradox for episodic uses of the progressive. Dispositional readings of the sentences in (102) fail in this regard as there are no process events, which for habitual progressives are the subevents composing the plurality.

However, these sentences do admit non-actualized readings like those in (101) with the right contexts. It seems that when there is some explicit change in duty, (102) can be used to describe this. Consider a scenario where Sally's boss says to her "The mail from Antarctica is under your purview now" and then hands her the key to the box that mail would be stored in. It seems that (102a) *can* be used in this scenario, despite it still being unlikely any mail ever comes in. Similarly, assume that a restaurant just obtained a new orange-crushing machine, despite never having need for one in the past and it being unlikely to be used

in the future. It seems that the head chef unboxing it and setting it up in the proper place could give license to say (102b) to his sous-chefs.

This account correctly predicts that in these special contexts these readings should be available. These events may count as *planning stages* of the relevant plural event, which would make them essentially futurate habitual progressives. Even though, by assumption, the events are unlikely to be realized, the context makes clear that there is sufficient possibility that mail-sorting and orange-crushing events may in fact happen in the future, suppressing the assumption that it is in fact unlikely they will occur. Additionally, because the cardinality restriction on PLUR is contextually determined, this context may reduce the number of subevents required down to a very small number, say two or three.

2.5.2.3 Habituality

Finally, this account predicts that habitual progressive sentences express contingent habits while simple present sentences, utilizing GEN, express more timeless properties of individuals. GEN is a (quasi-)universal quantifier. Over essentially the subjects entire lifetime, every contextually relevant situation should be one in which the VP holds of the subject. On the other hand, habitual readings of the progressive should be contingent. They merely suggest that there be a (contextually specified) number of events of the VP. For habitual progressive sentences, then, all that matters is that a certain number of events be realized. There is no contextual restriction on when or where they should be located in time. Thus the habits that habitual progressives describe are delimited, while those expressed by the simple present are not.

Indeed, habitual progressive sentences do express contingent habits, while simple present habituals do not. Consider the examples in (103), from Boneh & Doron (2012). There

is a sense that the use of the simple present sentence in (103a) describes a skill of John's. He is a good paper writer; it's what he does. On the other hand, the progressive sentence in (103b) expresses a kind of contingency. Perhaps John has been writing good papers lately, and possibly it may continue, but it also may not last. It's transitory.

(103) a. John writes good papers.
b. John is writing good papers.

This example illustrates that habitual progressives must merely meet the cardinality restriction on PLUR. Perhaps John is a student in a class, the speaker has had him in class before, and his paper-writing in the past was merely perfunctory. However, the past two papers of John's have been fairly good. Assuming that we are between essay assignments, i.e., we are in a pause stage, we merely need to be in a pause stage that suggests that we are between a few more events of John writing good papers. If it seems like John has truly improved as a writer or that he's excelling with this particular subject matter, we may be in such a pause stage. In any case, however, all that matters is that we see a few more events of John writing good papers on the horizon.

With the simple present sentence with GEN, however, the expectation is much greater. Assuming that C, the contextually supplied restriction, consists of every occasion where John writes a paper, then every paper that John writes must be a good one. We expect him to write a good paper for every paper assigned in this class, and even beyond this far into the future. In fact, given the scenario above, where John didn't use to write good papers, the sentence in (103a) may be downright infelicitous. John's ability is newfound and may only last contingently, but GEN requires that the habit last potentially over John's entire lifetime.

So while both GEN and PLUR with PROG yield habitual readings, they get there in very

different ways different ways. PLUR and PROG merely suggest multiplicity of action, and not much more. However, it doesn't have to suggest a robust tendency that persists over a subject's lifetime, as in the case in (103b). This is not the case with GEN. With GEN, we expect that any time we encounter a contextually relevant scenario, that scenario includes an event of the kind described by the predicate.

2.5.2.4 Individual-level predicates

Finally, it's worth noting that only the simple present is compatible with individual-level predicates like *tall* or *knows French*. These predicates are not compatible with the progressive on either an episodic or a habitual reading, though it is, in fact, difficult to distinguish the two here given the general incompatibility. It is rather straightforward to account for why the account of habitual progressives proposed here does not predict the felicity of individual level predicates in the progressive.

Following Magri (2009), individual level predicates are homogeneous over a subject's lifetime. As long as the subject lives (excusing someone's childhood, say) the individual-level predicate applies to them. If I am tall, say, I am tall my entire life. The definition of PLUR supposed here requires that there be some interval of time between subevents where the VP is not ongoing. That would mean that tallness would have to apply intermittently to a subject over time, but this runs counter to the homogeneity of tallness. As a result, we get infelicity with habitual progressives for free by virtue of this property of PLUR.

Notably, an account for the infelicity of episodic progressives with individual-level predicates is still forthcoming. There are a number of potential avenues here. For example, they may lack a Davidsonian argument as in Kratzer (1995), or they may be inherently generic either in the sense of Chierchia (1995) or Magri (2009). In any case, this is beyond

the scope of this dissertation, but the important point here is that this account does not inadvertently predict felicity with individual-level predicates, and in fact completely precludes their felicity when PLUR is present.[6]

2.6 Conclusion

In this section, I have argued that we can account for the habitual readings of the English progressive by assuming that these readings arise predictably from the composition of Lasersohn's (1995) pluractional and and Landman's (1992) progressive. The covert pluractional yields plural events with a pragmatically determined number of temporally distinct subevents. The progressive describes a stage of one of these plural events. This stage-of relation holding between an event, which may be a pause event, and a plural event is where the modal component usually associated with habituality is located. To be a stage of a plural event the pause must somehow provide for this plurality; a habit is generally the best indication that a plural event is on-going.

In comparison to simple present habitual sentences, this account shows that habitual progressives are more temporally delimited and that dispositional readings are possible, but require specific contexts. Additionally, this account predicts that universal(ish) readings of singular indefinites, the hallmark property motivating an account of the simple present with the quantificational adverb GEN, are not present with habitual progressives.

This account shows that habitual readings may have two sources: the progressive with event plurality introduced *via* a pluractional operator, and a generic operator GEN. Thus, in a single language, we see that both strategies are active.

In the next chapter, we turn to Balinese, a language with both an overt pluractional and

[6]We will see that Balinese complicates this picture somewhat, and a more adequate definition of PLUR will be necessary to fully capture the behavior of i-level predicates with pluractionality.

a progressive. We will see that this picture, where habitual readings may be generated by PROG+PLUR and GEN, is complicated by the facts in Balinese. We will therefore revise the theory presented in this theory in chapter 4. The result will be a more nuanced picture, where languages may make use of a number of discrete operators to generate a variety of readings, constrained by certain semantic and morphological properties. In chapter 5, we will see that this may even hold for sign languages, which arguably have alternative means of satisfying certain constraints.

Chapter 3

Complicating the picture: the view from Balinese

3.1 Introduction

In the last chapter, I argued that the composition of a pluractional VP with a progressive operator gives rise to a particular kind of habitual reading in English. Further, the pluractional operator is covert in English, meaning that a single progressive string can have both pluractional and non-pluractional LFs. We saw that this theory can account for the nuanced differences in the readings of habitual progressive sentences and habitual readings of the simple present, which have a covert GEN operator.

In this chapter, I turn to Balinese. Balinese has both a progressive construction and an overt pluractional. This allows us to test the hypothesis in the last chapter with overt morphological reflexes. Based on newly collected fieldwork data, I show that a pluractional VP with the progressive does not give rise to habitual readings, despite the fact that the Balinese pluractional on its own is compatible with habitual readings. Instead pluractional

VPs in the progressive only give rise to simple iterative readings: readings where the subevents happen on a single occasion. This is problematic for the theory advanced in the last chapter for obvious reasons: pluractionality and progressivity alone do not necessarily give rise to habitual readings. This will prompt a reworking of the theory in the last chapter which I present in the next chapter. I will argue in that chapter that the grammatical device responsible for futurate readings in the English progressive is also what enables habitual readings of the progressive with pluractional VPs. As we will see, the Balinese progressive disallows futurate readings, and so the grammatical device necessary for habitual readings of the progressive with pluractional VPs is unavailable.

In addition, I intend this chapter to serve as a micro-grammar for the tense and aspect system of Balinese, which lacks a robust description in the extant literature. In that way, much of this chapter stands alone, in particular section 4. Of further note to the Balinese researcher, section 5 provides further data illustrating the semantic variation in pluractional reduplication as I find many divergent results from those reported in the survey of Balinese pluractionality in Arka & Dalrymple (2017).

This chapter will proceed as follows. First, I provide an overview of Balinese. Next, I discuss the methodology used in data collection. In section 4, I provide description and theoretical analysis of the tense and aspect system in Balinese. This includes discussion of bare sentences and the progressive. In section 5, I provide a description of pluractional reduplication. In section 6, I show that pluractional reduplication does *not* generate habitual readings in combination with the progressive. Instead, it generates iterative readings. I conclude this chapter in section 7.

3.2 Overview of Balinese

Balinese is a Malayo-Polynesian language in the Austronesian family of about 3.3 million speakers who are mostly located on the island of Bali in Indonesia (Eberhard, Simons & Fennig 2021). While Balinese is generally described as an SVO language (Udayana 2013; Arka & Dalrymple 2017, a.o.), it has a complex voice system like other Austronesian languages. There are four voices: Agentive Voice (AV), Undergoer Voice (UV), Middle Voice (MID), as well as a Passive Voice (PASS) (Artawa 1998; Arka 2003; Udayana 2013). The Agentive Voice is marked by a homorganic nasal prefix and shows SVO word order. Undergoer Voice, which is zero-marked, shows OVS word order. These are shown below in (104).

(104) (Artawa 2013: 5)

a. *Agentive voice*
   Tiang ngodot be.
   1SG AV.cut meat
   'I cut some meat.'

b. *Undergoer voice*
   Be-ne godot tiang.
   meat-DEF UV.cut 1SG
   'I cut the meat.'

The Middle Voice warrants discussion, as a few examples that appear in this dissertation involve this voice and the term can be somewhat of a misnomer. It is marked with a prefix *ma-*. Udayana (2013) divides middle-marked forms into two categories: monadic and dyadic. The monadic middle verbs do not have corresponding AV forms. They fall into two broad semantic classes: unergative manner of motion verbs like *jalan* 'walk' and emotive speech verbs like *suryak* 'MID-shout'. Generally, these are translated actively in English and do not really resemble canonical middle constructions. Further, it seems to

be a lexical matter whether an intransitive manner of motion verb takes MID or AV. Some unergative manner of motion verbs, like *ngelangi* 'AV.swim', take AV but do not have MID forms (Artawa 1998; Arka 2003). In this sense, the AV and MID-marked unergative manner of motion verbs are in complementary distrubtion (Artawa 1998). I follow Artawa (1998) and Arka (2003) in assuming that this variety of MID marked form is merely a variant of the AV marked form, and does not involve valence reduction as middles often do. This means that these forms, despite having apparent MID morphology, are really active verb forms. These are the vast majority of MID marked forms appearing in this dissertation.

The second class of middle, which Udayana (2013) terms dyadic, is more complicated. This class consists of inherent reflexives like *baseh* 'wash oneself', verbs of exchange like *beli* 'buy', naturally reciprocal verbs like *diman* 'kiss', and nominally derived verbs of possession like *ma-batis* 'have legs'. Except for the last category, these all have AV forms as well. Udayana (2013) argues that these, unlike the monadic middles, represent a mismatch between the dyadic semantics of these verbs (verbs that generally involve two thematic roles) and their monadic syntax.

Balinese also displays a speech-level system. This is similar to the *tu / vous* distinction in the Romance languages where word choice reflects relative social status of speech participants. For the purposes of this dissertation, the key point is that there are words that may look different on the surface but are variants of the same thing. There are two speech levels, or registers: high and low, reflecting higher and lower status of the speaker relative to the addressee respectively. A pair of words like *numbas* and *meli* may mean the same thing, 'AV.buy', but be register variant, the former high and the latter low. This extends to functional words as well. For example, *sing* and *tan* are the high and low register variants of negation. A more detailed examination of speech levels in Balinese can be found in Arka

(2005).

3.3 Methodology

All of the Balinese data in this chapter is newly reported fieldwork data unless otherwise noted. This data was elicited from one native Balinese speaker between February 2020 and January 2021. Because of the COVID-19 pandemic, the vast majority of the data reported here was collected over online video calls on the video conferencing software Zoom.

Elicitation tasks generally consisted of translation tasks and grammaticality and felicity judgments. In the translation task, the speaker was asked to translate a sentence of English. In the gammaticality/felicity judgment task, the speaker was presented with a scenario or context, and asked whether a particular sentence would be acceptable in that context.

One idiosyncrasy my consultant displayed was the occasional mismatch of speech registers in translation tasks. This meant that he would occasionally mix and match words of different register. Sometimes in felicity judgment tasks, he would pick up on these mismatches. In these cases, sometimes he would pick up on mismatches from a sentence he produced in a translation, or he would pick up on a mismatch that I introduced by accident in constructing target sentences.

3.4 Tense and aspect in Balinese

Balinese has a limited inventory of tense and aspect markers. It lacks tense markers altogether, making it what is sometimes called a tenseless language. It does, however, have a limited number of aspectual markers. I outline tense first, and aspect second.

Let's briefly review the overarching framework of tense and aspect I adopt, the neo-

Reichenbachian framework of Klein (1994). Like Reichenbach (1947), Klein distinguishes between three parameters. First, there is the utterance time (or speech time), the time the utterance is produced. Then we have the topic time (or reference time), which is the time that the sentence is "about". Finally we have the eventuality time (or situation time), the time that the event denoted by the predicate takes place.

Tense is a relation between the utterance time and the topic time. For example, present tense indicates that the topic time is also the reference time, and past tense indicates that the reference time precedes the utterance time.

Aspect (or viewpoint aspect) on the other hand is a relation between the topic time and the eventuality time. Here we have the distinction between *imperfective* and *perfective*. The former locates the topic time within the event time; the latter locates the event time within the topic time. The *perfect* locates the event time before the topic time. Comrie (1976) further divides, e.g., the imperfective into *habitual* and *continuous*, and then continuous into *non-progressive* and *progressive*. I include these latter kinds of distinctions in the broad category of aspect as well.

3.4.1 Tense in Balinese

Balinese is a tenseless language in the sense that there is no dedicated morphology for temporal reference, though temporal adverbials and context may serve to disambiguate sentences as past or present. In this way, Balinese resembles St'at'imcets (Matthewson 2006), Paraguayan Guarani (Tonhauser 2011), Mandarin (He 2020), and several other languages. For example, the Balinese sentence below is neutral with regard to temporal reference. It may be interpreted as past or present, depending on the context.

(105) Ayu ngajeng biu
Ayu AV.eat banana
"Ayu ate bananas." or "Ayu is eating bananas."

Some tenseless languages seem to have their temporal reference in part influenced by the properties of the predicate, usually in out-of-the-blue contexts. Lin (2003) suggests that, in Mandarin, out-of-the-blue temporal reference is suggested by telicity. Telic sentences are generally interpreted as past tense, and atelic ones as present tense. In general, I find that Balinese sentences do not display any kind of "default" behavior with respect to temporal reference and predicate telicity. Progressive sentences marked with *sedeng* tend to have present temporal reference out-of-the-blue, but past reference is easily possible in the appropriate contexts. However, I share concerns expressed by Matthewson (2004), Deal (2015), and Tonhauser (2015) that this apparent tendency is empirically troublesome—e.g., the behavior of decontextualized sentences should not constitute the empirical base of a theory of meaning (cf. Tonhauser & Matthewson 2015)—and do not further analyze this tendency.

I outline my theoretical assumptions about tense below. Before doing that, we will consider how futures and futurates work in Balinese.

3.4.2 Futurates and future *jagi*

Like the previously mentioned tenseless languages, past and present reference is privileged over future reference. Unmarked sentences may describe future events in canonical *futurate* contexts. In a futurate construction, a non-future marked imperfective sentence describes a future event, so long as that future event is *plannable* (Dowty 1979; Copley 2002; Copley 2009). This plannability constraint distinguishes futurates from "true" futures. This is evident in the canonical examples below, modified from Lakoff (1971).

(106) a. The Kansas City Royals are playing tomorrow.
b. The Kansas City Royals play tomorrow.
c. #The Kansas City Royals are winning tomorrow.
d. #The Kansas City Royals win tomorrow.

The first two sentences in (106) involve the verb "play" and imply that there is some kind of plan in place such that the Royals will play tomorrow. The second two sentences, by contrast, involve the verb "win" and are strange as they, too, imply a kind of plan. That is, (106c) and (106d) imply that someone can and will see to it that the Royals win tomorrow. Generally the outcome of a baseball game is not something that can be planned as such (unless, of course, the game is rigged).

These, in fact, contrast with true futures *will* and *gonna* in English, where the "win" cases suggest a prediction on the part of the speaker. A prediction about the outcome of a baseball game is not so odd, and thus the sentences in (107) sound fine.

(107) a. The Kansas City Royals will win tomorrow.
b. The Kansas City Royals are gonna win tomorrow.

Two Balinese futurates are presented in (108) and (109). Here, the event time is set to occur in the future. Like English futurates, future-oriented adverbs bring out these interpretations more easily.

(108) *Context: Bima entered a three-day long competition. Bima is signed up to compete tomorrow. Someone asks: "When does Bima compete?"*
Bima milu lomba bin mani
Bima AV.join competition tomorrow
"Bima is competing tomorrow."

(109) *Context: Your friend thinks you are in Denpasar today, but you will actually be there tomorrow. He calls and asks you if you can meet up.*
Tiang me-jalan ke Denpasar benjang
1SG MID-walk to Denpasar tomorrow
"I am going to Denpasar tomorrow."

Like English, Balinese futurates appear to involve plans as well. We see a similar contrast between true futures marked a particle *jagi* and futurates in the case of competition outcomes that we saw in English. The case with *jagi* is acceptable, while the case without is unacceptable.

(110) *Context: There is a tournament that's taking place over the next few days. Your friend asks you what you think will happen.*

a. #Ayu me-nang bin mani
   Ayu MID-win tomorrow
   Intended: "Ayu will win tomorrow."

b. Ayu jagi me-nang bin mani
   Ayu FUT MID-win tomorrow
   "Ayu will win tomorrow."

That plannability itself is involved is evident from the difference between (110a) and (108) further above. Joining a competition is plannable, but winning is not. This mirrors the contrasts in (107).

Futurates are further constrained in that they are unavailable with the progressive marker *sedeng* (unlike English). This is discussed further below. I delay an analysis of futurate constructions to chapter 4, where they will become important in explaining the interpretation of pluractionals. For now, I assume that futurates are the result of an operator lower than TP that is not the reflection of any specific "tense".

As was shown above, Balinese also has a future marker *jagi*. While it is translated as "will" in (110b), its interpretation differs slightly from English *will*. *Will* can have present epistemic uses that *jagi* cannot. The English example in (111), for example, shows that *will* can be used to describe the speaker's epistemic state regarding an event happening at utterance time. This is not a possible use of *jagi*, as is shown in (112).

(111) *Context: Bima is always home by 9pm, and it's 9pm now. Someone asks: "Where is Bima?"*
If it's nine o'clock, Bima **will** be at home.

(112) *Context: Bima is always home by 9pm, and it's 9pm now. Someone asks: "Where is Bima?"*
#Yening jam sia, Bima jagi di jumah
if hour nine Bima FUT at home
Intended: "If it's nine o'clock, Bima will be at home."

Future markers are cross-linguistically diverse and may encode a variety of modal meanings, including the epistemic use that we see here in English (Dahl 1985; Bybee, Perkins & Pagliuca 1994). The range of meanings of *jagi* is beyond the scope of this dissertation and I leave it to further study, but I will provide a basic analysis of the particle later on that should be revised in light of further study.

While in general it appears that *jagi* requires future orientation of some kind, it is evidently not a future *tense* marker. There is some data at least that suggests that *jagi* merely places the event time in the future relative to the *reference time*, not the utterance time. The reference time itself may be in the past. Udayana (2013) presents examples with English free translations suggesting past prospective meaning in embedded contexts. These are in (113), where the example in (113b) involves *lakar*, the low-register counterpart of *jagi*. Of course, this data is merely suggestive—it is presented without context, and the past prospective meaning is gleaned only by the free translation—and we should not conclude much from it. It could be, e.g., some kind of quotation-like construction. More fieldwork on *jagi* is required in any case.

(113) a. (Udayana 2013: 196)
Idai nganikang raganne sareng sami **jagi** merika.
3SG AV.say self-LK.3POSS with all FUT go.there
'(S)he said that they would go there.'

b. (Udayana 2013: 200)
Iai percaya [awaknei **lakar** menang].
3SG OV.believe self.3POSS FUT OV.win
'(S)he believed that (s)he would win.'

I provide an analysis of *jagi* in the next section.

3.4.2.1 Theoretical assumptions

Tonhauser (2015) claims there are two general analyses of tense in tenseless languages. The first is a tensed analysis. On this analysis tenseless languages *really do* have tense represented syntactically and semantically *via* a phonologically null tense morpheme. On this analysis, tenseless languages are underlyingly similar to tensed languages, we just don't see this fact reflected in the morphology. A tenseless analysis of tenseless languages, however, maintains that there is no TP projection in the sentences of these languages and no operator that determines temporal reference. However, as Tonhauser (2015) points out, temporal reference is just as specific as temporal reference in tensed analyses. The difference is that this reference is not the contribution of a dedicated T node, but is instead contributed by context, adverbials, or other factors. Tonhauser (2015; 2011) argues that tenseless analyses are preferable to tensed analyses because, all else being equal, they require fewer assumptions and are therefore more parsimonious.

As far as this project is concerned, it is beyond the scope of this dissertation to adjudicate between these two general analytical pathways for Balinese. I do not find conclusive evidence one way or another. While the parsimony argument given by Tonhauser (2015) is well-taken, I opted for a tensed analysis of Balinese in this dissertation. Primarily, I opt for this argument for expository clarity. Later, when we compare English and Balinese, it will ease exposition to assume that their tense systems are underlyingly similar and hopefully make the analysis clearer in the end. I don't believe that anything in this dissertation hinges on this point, however. Whether temporal reference is contributed by dedicated morphology or other factors is irrelevant here, since, as Tonhauser (2015) points out, temporal reference is just as specific in either case.

Further, I assume that Balinese involves two phonologically-null tenses: the past and

present, not a single non-future tense morpheme (Matthewson 2006). Again, I make this choice for expositional clarity. As is shown in He (2020), the empirical coverage of these two possible analyses is largely the same, and I do not believe the choice of one or the other matters for the rest of the claims made in this dissertation. Again, adjudicating between these two analyses would take us too far afield.

Thus, I assume that Balinese has the two tense operators in (114), both of which are phonologically null. They presuppose that the reference time precedes the utterance time and that it is equal to the reference time. They contribute the reference time. Following Taylor (1977) and many others, I assume that the utterance time is instantaneous.

(114) a. $[\![\text{PAST}_i]\!]^{g,c}$ is only defined if $g(i) < now$, where *now* is the utterance time.
If defined, $[\![\text{PAST}_i]\!]^{g,c} = g(i)$

b. $[\![\text{PRES}_i]\!]^{g,c}$ is only defined if $g(i) = now$, where *now* is the utterance time.
If defined, $[\![\text{PRES}_i]\!]^{g,c} = g(i)$

Following Abusch (1998); Condoravdi (2002), Matthewson (2006), and many others, I will also assume that *jagi* and futurate readings do not involve the realization of future tense *per se*. Instead, non-tense operators contribute future event realization in these constructions and that tense is contributed independently. *Jagi*, then, is the realization of a modal operator independent of tense that conveys prospective meaning. I'll assign it the semantics in (115) based on Tonhauser (2011), where the exact nature of the accessibility relation depends on the range of modal meanings that *jagi* exhibits. The reader is invited to pick their favorite non-tense analysis of the future.

(115) $[\![\text{jagi}]\!]^{g,c} =$
$\lambda P \lambda t \lambda w \forall w' [w' \in Acc(w,t) \wedge \rightarrow \exists t' [t < t' \wedge P(t')(w')]]$

In the next chapter, I will use the analysis of futurates in Copley (2018). The key point at this juncture is that futurate meaning is also attributable to a operator independent of tense.

3.4.2.2 Interim summary

I've shown in this section that Balinese is a tenseless language. Like other tenseless languages, it privileges past and present interpretations over future ones. I assume that Balinese has two covert tenses: past and present. I further take the privileged nature of the past and present as evidence that future interpretations are not really the result of tense *per se*, but instead the result of the combination of one of these two tenses with a future-oriented modal auxiliary *jagi* or another non-tense operator that generates futurate readings to be detailed further in chapter 4.

3.4.3 Aspect in Balinese

Unlike tense, a limited selection of aspectual particles are available in Balinese. Aspectual particles are not obligatory, though, and bare sentences—sentences without any aspectual particles—may convey a wide range of aspectual interpretations. Balinese also has an overt progressive auxiliary *sedeng*. While previous literature sometimes assumes that Balinese has overt perfective particles as well, I argue that these particles—*suba* and *taen*—are not in fact perfective. They mean *already* and the (experiential) perfect respectively. I find no evidence of any other perfective markers in Balinese. First I outline the various readings of bare sentences, then I discuss the progressive *sedeng*, and finally I discuss putative perfective markers *suba* and *taen*.

3.4.3.1 Bare sentences and non-culmination

Bare sentences in Balinese may have a number of interpretations. First, they may be interpreted as past or present. The sentence in (116) for example may be interpreted as either an event that occurred in the past or an event that is presently ongoing at utterance

time. This was explored in detail in the section above.

(116) Ayu ngajeng biu
Ayu AV.eat banana
"Ayu ate bananas." or "Ayu is eating bananas."

Bare sentences in Balinese also display futurate readings. This was witnessed in examples (108) and (109) in the section above. These are analyzed further in chapter 4.

Bare sentences in Balinese have a number of aspectual readings. In particular, they display event-in-progress readings, generic and habitual readings–commonly associated with imperfectivity–and perfective readings, which do not require culmination. In general, the aktionsart class of the VP or the verb does not constrain these aspectual readings. Similarly, I see no "default" behavior of the aspectual interpretation of bare sentences for different predicate types in out-of-the-blue contexts (Bohnemeyer & Swift 2004).

Bare sentences in Balinese thus seem to be "neutral" in the sense of Smith (1997). They are neither perfective nor imperfective and bear zero aspectual morphology. We will now cover these readings in detail.

3.4.3.1.1 Event-in-progress reading These readings resemble the common core of progressive readings. Namely, bare sentences may be used to describe a single event that is in progress. This use was already shown above in (116), where it can describe a single event of Ayu eating bananas that's in-progress at utterance time. She may, in fact, continue eating bananas.

As might be expected, bare sentences with accomplishment predicates can describe situations that have yet to culminate. For example, (117) below describes an event of "Ayu swimming to the island" that has yet to culminate. Ayu hasn't reached the island.

(117) *Context: Ayu is halfway to the island.*

Ayu ngelangi ke pulaune
Ayu AV.swim to island-DEF
"Ayu is swimming to the island."

With achievements, bare sentences tend to be interpreted perfectively in out of the blue contexts. With supporting context, however, bare sentences with achievements may also be used to describe the immediate run-up to the achievement event. This is shown in (118). These resemble the use of the progressive in English with achievements, as in the free translation.

(118) *Context: You are on the phone with your friend, and you say "I gotta go…"*
Tiang neked di umah Bima
1SG arrive at house Bima
"I am arriving at Bima's house."

3.4.3.1.2 Generic and habitual reading Bare sentences in Balinese are also used to describe habits and generalities. This is illustrated in (178a) below, which has a habitual reading without any aspectual morphology or reduplication.

(119) *Context: Someone asks: what does Ayu do for exercise?*
Ayu ngelangi ke pulau-ne
Ayu AV.swim to island-DEF
"Ayu swims to the island."

Additionally, it has more dispositional readings as well, where the sentence in (120) suggests that Ayu herself has an adeptness at writing lontar.

(120) *Context: Ayu has the ability to write good lontar (palm-leaf manuscripts)*
Ayu nulis lontar becik pisan
Ayu AV.write lontar good very
"Ayu writes very good lontar."

Coming back to the Balinese sentence in (116), this sentence has an additional reading in that it can be used to describe a particular property of Ayu's, namely that she eats bananas

(she's not allergic, doesn't have an extreme distaste for them, etc.). She doesn't need to be engaged in a banana-eating event or have a plan to eat bananas. It has a meaning similar to that of the English simple present sentence "Ayu eats bananas".

3.4.3.1.3 Perfective readings Perfective readings of bare sentences are those that describe an event that takes place within a reference time. This is shown in (121). This sentence is interpreted as past tense, and the running to school event is interpreted to have culminated.

(121) *Context: Ayu ran to school an hour ago. Her friend comes asking where she is.*
Ayu me-laib ka sekolah.
Ayu MID-run to school
"Ayu ran to school."

We also see inceptive readings of bare sentences with adverbial *when*-clauses, which matches the behavior of perfectives but not imperfectives (Smith 1997). On these readings, the event described in the matrix clause is interpreted to begin after the event of the subordinate clause. This is shown in (122).

(122) *Context: Bima started cooking after you arrived.*
Dugas tiang neked, Bima masak.
when 1SG AV.arrive Bima cook
"When I arrived, Bima cooked."

3.4.3.1.4 Analysis of bare sentences Balinese bare sentences may have one of two covert aspectual operators: a progressive operator PROG$_{neut}$ and the generic operator GEN. The event-in-progress and perfective readings are attributed to PROG$_{neut}$, which, following Altshuler (2014), is a "neutral aspect" in the sense that it may hold of non-proper event stages. This is discussed in the next section. Finally I attribute generic readings to a covert generic operator GEN.

3.4.3.1.4.1 Event-in-progress and perfective readings Bare aspect in Balinese resembles the "neutral" aspects in that it has both imperfective and perfective characteristics. For episodic cases, I follow Altshuler (2014) in supposing that neutral aspect represents a parameterization of Landman's (1992) *stage-of* relation. I will return to generic/habitual bare sentences later in chapter 4. Here we account for only the progressive-like and perfective interpretations of bare sentences. This section is thus a first pass of a subset of the interpretations of bare sentences, the full paradigm being made clear in the next chapter.

Recall that the stage-of relation is a special type of parthood relation on events. On Altshuler's (2014) analysis, the stage-of relation is parameterized as to whether it requires, first of all, a *proper* stage or not, and further whether it requires a *maximal* stage or not.

Altshuler argues that the English progressive requires a proper event stage. Thus the English progressive picks out a proper part of a culminating VP eventuality. If the VP is ⟦*Gunnar bike to campus*⟧, for example, the progressive picks out proper parts of these events, none of which can be in the denotation of that VP.

By contrast, he argues that the Russian imperfective involves a *non-proper* stage-of relation. It may pick out events that culminate as VP events. It could pick out an event that is actually in the denotation of ⟦*Gunnar bike to campus*⟧.

The result of this move, for Altshuler, is that explains culmination entailments of achievements like *arrive* in the Russian imperfective and the lack thereof in the English progressive. Assuming that achievement events lack proper parts (or stages) due to their near-instantaneous nature, following Rothstein (2004), coercion takes place with English achievements in the progressive because it requires proper stages. On the other hand, Russian imperfectives entail culmination of achievements. This is because they may pick out the culminating achievement event itself. It needn't pick out a proper stage of an

achievement event (which again, doesn't have proper stages), so no coercion takes place.

Finally, Altshuler proposes that there are some neutral aspects, as in Hindi, that require *maximal stages*. The maximal stage requirement picks out events that either culminate for the VP or cease to develop further in the actual world. The upshot of this is that neutral aspects with this requirement may not describe events that continue to develop in the actual world, but they also needn't culminate. This prevents these aspects from having progressive-like interpretations where the event is interpreted as ongoing.

Balinese bare aspect is not maximal, as it allows for usual progressive-like interpretations. Because it also allows for perfective interpretations, I argue that it is like the Russian imperfective in requiring non-proper stages of VP-events. I delay more formal analysis of this progressive operator, which I will call PROG$_{neut}$, until the next section but I summarize the key point of the analysis of progressive and perfective readings of bare sentences in (123).

(123) PROG$_{neut}$: The stage-of relation is non-proper.

One obvious difference between the Russian imperfective and Balinese bare sentences is that Balinese bare sentences allow for "coerced" readings of achievements, though they are dispreferred. As Altshuler tells it, we do not expect these readings because there is nothing about a non-proper definition of stagehood that coerces these readings. I attribute these readings not to the progressive itself but rather to the same mechanism permitting futurate readings in general.

3.4.3.1.5 Generic/habitual readings I attribute generic and habitual readings of bare sentences *without pluractional reduplication* to the covert generic operator GEN in (124).

(124) $[\![\text{GEN}_{t,w}\ [\text{C}][\text{P}]]\!]^{g,c} =$
$\lambda t \lambda w. \forall w', t'[t \circ t' \wedge Acc_w(w') \wedge C(w', t) \rightarrow \exists e[t' \circ \tau(e) \wedge P(e, w')]]$

This formula says that for every world w' accessible from the actual one and every contextually relevant time in w', there is some event overlapping with that time that is a P event in w'.

This does not capture habitual readings of bare sentences *with* pluractional reduplication. These will be accounted for in the next chapter on a par with habitual readings of English progressives.

3.4.3.2 The progressive: *sedeng*

The progressive construction in Balinese is formed with a preverbal auxiliary *sedeng* (Artawa 1998; Arka 2003). An example from Artawa (1998) is in (125)

(125) (Artawa 1998: 98)
Ia **sedeng** nulis surat dugas tiang kemo
3SG PROG AV.write letter when 1SG there
'S/he was writing a letter when I went there.'

Like bare sentences, progressive sentences are neutral with regard to tense, allowing both past and present interpretations depending on the context:

(126) a. *Context: Someone asks "where is Ayu?" when she is in the water halfway to the island.*
Ayu sedeng ngelangi ke pulaune
Ayu PROG AV.swim to island-DEF
"Ayu is swimming to the island."

b. *Context: You saw Ayu swimming to the island earlier in the day, and now your friend is asking you if you've seen Ayu.*
Ayu sedeng ngelangi ke pulaune
Ayu PROG AV.swim to island-DEF
"Ayu was swimming to the island."

In (126a), the natural interpretation is a present one, while a past interpretation is available in (126b). In general, my consultant interprets progressive sentences as being present tense in out of the blue contexts.

Important to the next chapter, *sedeng* does not have a futurate interpretation, unlike the progressive in English. The example below serves as a minimal pair for the futurate reading of the bare sentence in (108).

(127) *Context: Bima entered a three-day long competition. Bima is signed up to compete tomorrow. Someone asks: "When does Bima compete?"*
#Bima sedeng milu lomba bin mani
Bima PROG AV.join competition tomorrow
Intended: "Bima is competing tomorrow."

This is shown further in (128), where the context involves an actual preparatory process of the building event. Not only is the house building planned in this case, Ayu is actively working to beginning the event. This sentence without *sedeng* is fine, though in this case the use of *jagi* is actually preferred.

(128) *Context: Ayu is buying lumber to build a house.*
#Ayu sedeng ngabangun umah
Ayu PROG AV.build house
Intended: "Ayu is building a house."

It is worth noting that this progressive does not require culmination either, though this is difficult to distinguish given the non-culminating interpretations of bare sentences. For now we will assume that *sedeng* has the same semantics we have posited for the English progressive. On this first pass, *sedeng* has the same semantics of the English progressive: the stage-of relation is proper.

Importantly, given the discussion of bare sentences above, we would assume that this definition should allow for non-culminating readings of *sedeng* with achievements. The proper stage-of relation, on Altshuler's (2014) story, should coerce achievements into having accomplishment-like readings. This is, of course, not the case, as we see from the data in (129), which is fine without *sedeng*. I relate this fact to the fact that Balinese also lacks

futurate readings in the progressive.

(129) Ayu sedeng neked bin duang jam.
Ayu PROG AV.arrive in two hour
Intended: "Ayu is arriving in 2 hours."

3.4.3.3 *Suba* and *taen*

Balinese has two particles that are sometimes described as perfective: *suba* and *taen*.[1] Here, I argue that these particles are not in fact perfectives. I argue that *suba* means 'already' and *taen* is a perfect marker. This analysis is reflected in the free translations of the sentences below in (130) and (131).

(130) *Context: Ayu just left the house, and someone comes asking where Ayu is.*
Ayu **suba** me-laib ka sekolah.
Ayu already MID-run to school
"Ayu is already running to school."

(131) Ayu **taen** ke Denpasar
Ayu PRF to Denpasar
"Ayu has been to Denpasar (before)."

First, I will show that *suba* and *taen* are not perfectives. I follow this by arguing they are best analyzed as 'already' and the perfect, respectively. Because these particles are neither perfective nor imperfective, they are not part of the true aspectual system in Balinese.

3.4.3.3.1 *Suba* While the particle *suba* is sometimes referred to as a perfective particle (Artawa 1998; Udayana 2013), it is not really a perfective particle as such. Neither is it a perfect. Rather, its behavior is more in line with the claim in Purnawati & Artawa (2018) that *suba* is an adverb meaning 'already'. I will show that *suba* is not a perfective marker by showing that the events they describe need not fit within some topic time.

[1]There is a third particle *bakat* also discussed as a perfective particle (Artawa 1998). However, this particle is semantically restricted and is more like a *get*-passive than a "true" aspectual particle. I don't discuss it further here.

Let's first take a working definition of perfectivity. A typical analysis of perfectivity is one where a described event takes place within some topic or reference time. Kratzer (1998) provides a popular denotation of this analysis, presented in (132). This says that for a topic time t, there is a P-event e that is temporally contained in t.

(132) *Perfectivity:*
$\lambda P \lambda t \exists e[P(e) \wedge \tau(e) \subseteq t]$

An immediate consequence of this definition is that we can test for perfectivity by holding t, the topic time, constant and determining whether the runtime of the eventuality is constrained to occur within that topic time. There are two ways to do this. First, we can use the present tense to fix the topic time to an instant corresponding to utterance time. Second, we can use a frame adverbial to fix the topic time.

The present tense is famously incompatible with the perfective crosslinguistically. This has generally been explained as the result of the instantaneous nature of the present tense. Because the perfective fixes the eventuality within the topic time, if the present tense fixes this topic time at an instant, the eventuality will have to be instantaneous as well. Events, unlike states, are never instantaneous. They take some time. Consequently, the perfective of an eventive predicate should never occur in the present tense.

Balinese has no overt past or present tense morphology. Following He (2020), we can invoke the present tense using adverbs like 'now' and certain sentence contexts. First, attempts to use adverbs to nail down the present tense encountered a confound. Namely, there was a perceived redundancy when the adverb was used with *suba*.

(133) *Context: Someone comes to see Ayu, and asks "Is Ayu home?". She just left for school.*
?Ayu suba me-laib ke sekolah mangkin
Ayu already MID-run to school now
Intended: "Ayu is already running to school now." (Speaker comment: "I would get rid of *mangkin* here. It seems redundant.")

We could trace this weirdness this to two factors. First, we could trace it to an inherent incompatibility between *suba* and *mangkin* 'now' alone, which itself may be the result of *suba* being perfective. A second possibility, given the speaker's comment, we could trace it to an incompatibility between *suba* and the context, which itself suggests a present tense and renders *mangkin* redundant. Because *suba* resists being used out-of-the-blue in general (likely related to its hypothesized status as a marker meaning 'already' which similarly resists out-of-the-blue use), it will be difficult to test an adverb meaning *now* with *suba* in the absence of a context already suggesting the present tense. In any case, the adverbial test is inconclusive.

However, present tense contexts on their own can help us determine whether *suba* is perfective. We find that in contexts that would normally require the present tense, *suba* can be used felicitously. First, the sentence in (133) is actually felicitous without *mangkin*. If the confound in (133) is a conflict between a present tense context and a redundant present-tense fixing adverbial, then the fact that the sentence without the adverbial is felicitous is an indication that *suba* is in fact compatible with the present tense. Turning to more tested methods, (Reis Silva & Matthewson 2007) provide a context that they use to successfully diagnose the present tense in Blackfoot.[2] In this context, a friend calls and asks you to meet with them right at that moment. The target sentence is then supposed to provide an explanation as to why the speaker can't meet with them at that time. This discourse thus fixes the topic time to the utterance time, i.e. the function of the present tense. An illustration of the use of this 'telephone context' is in (134), from Blackfoot (Reis Silva & Matthewson 2007). Here, we see that the imperfective is fine in this context but the (unmarked) perfective is not.

[2]He (2020) had similar success in using these contexts to diagnose present tense in Mandarin.

(134) *Context: Your friend calls you on the phone and asks you to meet with her right now. You respond by saying 'I can't meet with you right now because…'*

a. nitáihkiita
nit-a-ihkiita
1SG-IMPF-cook
'I am cooking.'

b. #nítsskiita
nit-ihkiita
1SG-cook
'I cooked.'

Using this context with *suba* results in a felicitous sentence, showing that *suba* is compatible with present tense contexts. The translation in (135) makes clear that the travel event is ongoing. This suggests that *suba* is not a perfective, since a perfective is expected to be incompatible with a present tense context.

(135) *Context: A friend calls you and asks if you can go to the beach right now. You are* en route *to Denpasar, and reply:*
Sing nyidang, cang suba me-jalan ke Denpasar.
NEG AV.can 1SG already MID-walk to Denpasar
'I can't, I'm already going to Denpasar.'

One could uphold a perfective analysis in the face of this data by supposing that the tense system in Balinese doesn't involve two covert tenses, past and present, but rather a single non-future tense, as suggested for St'a´t'imcets in (Matthewson 2006). This tense, rather than presupposing that the topic time precedes the utterance time or that is equal to *now*, simply presupposes that none of the topic time overlaps with any time later than the utterance time. Because the non-future tense doesn't require an instantaneous eventuality to satisfy it, we expect no incompatibility between a perfective and a non-future tense (Reis Silva & Matthewson 2007).

First, it's worth noting that St'a´t'imcets bare sentences are curiously imperfective-like. In cases where they have present interpretations, they seem to have progressive-like

interpretations. This is shown in (136) from Bar-El, Davis & Matthewson (2005), which doesn't entail culmination.

(136) ma'ys-en-as ta ka'oh-a kw s-Bill
fix-DIR-3ERG DET car-DET DET NOM-Bill
'Bill is fixing the car.'

While Matthewson (2006) does not provide an analysis of St'a´t'imcets itself, she points to Bar-el (2005) which provides a similar analysis of unmarked sentences in the related Salish language Skwxwu7mesh. Bar-El explains that the unmarked sentence in Skwxwu7mesh is perfective because 1. there is a general imperfective and a progressive form already in the language, making an imperfective analysis of bare sentences unattractive, 2. with a frame adverbial like "when the phone rang", bare sentences have perfective-like readings that indicate the onset of the VP event must be within the time denoted by the adverbial, and 3. it is not redundant to follow the bare sentence with an assertion that the event is continuing. However, we might follow He (2020) in supposing that bare sentences involve an imperfective "neutral" aspects in the sense of Altshuler (2014) and these properties arise as a result of pragmatic competition with other more straightforward imperfective operators. It may be, then, that a two-tense system is in fact a viable alternative for both Skwxwu7mesh and St'a´t'imcets.

Second, even if Balinese has a single non-future tense contrary to supposition, the next test works independently of these two analyses of tense. In this test, we fix the reference time overtly with an adverbial, so it doesn't rely on a particular analysis of tense.

A second diagnostic we can use to diagnose perfectivity is the behavior of *suba* with temporal adverbials. This test is similar to the present tense test in that we're fixing the topic time and determining whether the target eventuality is constrained to occur within that time frame. In this case, the topic time is fixed by the adverbial. If *suba* is perfective, it

shouldn't be possible to locate the time period denoted by the frame adverbial properly within the runtime of the *suba*-marked predicate. To see this principle in action, contrast the simple past in English with the past progressive in (137). The (perfective) past tense doesn't tolerate an interpretation where the predicate is contained within the *when*-adverbial. The only interpretation of (137a) available is one where the cooking event promptly follows the arrival, a reading unsupported by the context.

(137) Leo cooked from 9am to 4pm. I arrived at 11am.

a. #When I arrived, Leo cooked.
b. When I arrived, Leo was cooking.

This contrast is not exhibited in Balinese with *suba*, which is acceptable in a context where the *suba*-marked predicate describes an event that extends beyond the interval of time denoted by a *when*-clause. In this case, *suba* gets translated as 'already'. This is shown in (138).

(138) Bima cooked from 9am to 4pm. I arrived at 11am.

a. Dugas tiang neked, Bima masak.
when 1SG arrive Bima cook
'When I arrived, Bima was cooking.'
b. Dugas tiang neked, Bima **suba** masak.
when 1SG arrive Bima already cook
'When I arrived, Bima was already cooking.'

In this case, it is clear that the arrival is squarely within the cooking event temporally.

Based on these diagnostics, I conclude that *suba* is not a perfective. To show that *suba* means 'already' and isn't an aspectual particle at all, we still need to distinguish it from a perfect marker, which I do later on. Next I show that *taen* is also not a perfective.

3.4.3.3.2 ***Taen*** Like *suba*, *taen* has been discussed as a perfective marker (Artawa 1998). Also like *suba*, *taen* is not a perfective marker. Rather, I argue that it is a marker of perfect

aspect. I will first show that *taen* is not a perfective particle. Like *suba*, I will show that it is compatible with present tense contexts. Because of the anterior nature of *suba*, the frame adverbial test will actually be used to distinguish it from the perfective in a slightly different way than *suba*. Finally, *taen* has a passing resemblance to some kind of past tense marker; I will show that this is not the case either.

First, we will deploy the telephone context developed by Reis Silva & Matthewson (2007) as with *suba*. This context fixes the topic time to the utterance time, just as a present tense marker would do. If *taen* were a perfect, it should be infelicitous in this context. As we can see from the example in (139), however, the *taen* sentence is felicitous. Notice that the English free translation uses the present perfective.

(139) *Context: An artist has an exhibit where people are only allowed to view the exhibit once. Your friend calls and asks if you want to go right now.*
sing nyidang cang (suba) **taen** kema
NEG AV.can 1SG already PRF there
I can't, I have already been there.

Here, we see the anterior nature of *taen*. While it is compatible with present tense contexts, the runtime of the VP eventuality is in fact wholly anterior to utterance time. That is, my having been to the exhibit has occurred and is over by utterance time. However, the point here is that the sentence with *taen* is still compatible with the present tense, which it should not be if it were a perfective.

This anteriority property, however, can be used to demonstrate a further property that distinguishes *taen* from a perfective. What distinguishes perfective sentences from imperfective sentences is that the former advance time, while the latter do not (Dowty 1986; Deo 2015a). *When* eventive clauses introduce a constraint on the temporal ordering of the events described by two clauses (Kamp & Reyle 1993: 656). The event in the matrix clause

overlaps with the event in the subordinate clause in the case of the imperfective or follows the event in the subordinate clause in the case of the perfective. This is demonstrated with English in (140), where (140a) is perfective and (140b) is imperfective (progressive).

(140) a. When Harry arrived, I packed my bags.
b. When Harry arrived, I was packing my bags.
c. When Harry arrived, I had packed my bag.

Following Chen (2017), we can use this property to distinguish *taen* from a perfective. If *taen* were a perfective, the VP eventuality should either temporally overlap with the event described by the subordinate clause or else directly precede from it. What it should *not* do is describe an event taking place properly *before* the event in the subordinate clause, which is what the perfect does in (140c). However, this is exactly what *taen* can describe, as in (141a). This contrasts with the behavior of the sentence without *taen*, in (141b), which can have either an overlapping or inchoative meaning but not the anterior one.

(141) a. Dugas tiang neked, Bima **taen** ngigel.
when 1SG AV.arrive Bima PRF AV.dance
"When I arrived, Bima had danced (before)."
b. Dugas tiang neked, Bima ngigel.
when 1SG AV.arrive Bima AV.dance
"When I arrived, Bima was dancing/started dancing."

Finally, because of the anterior nature of *taen*, we might hypothesize that it is actually a remote or existential past tense marker. Both the perfect and the past describe events that take place prior to the reference time. It is straightforward to show that *taen* is not a marker of past tense of any kind. If *taen* were some kind of past tense marker, it would be incompatible with the future or possibly result in a counterfactual reading like *would* has in English (von Fintel & Iatridou 2008). This diagnostic is used by Chen et al. (2020) to show that hypothesized existential past markers in Javanese and Atayal (Austronesian; Taiwan),

semantically similar in many ways to *taen*, are not perfects. They are incompatible with the future tense or generate counterfactual readings. In fact, *taen* is perfectly compatible with the future and does not generate counterfactual readings. This is shown in (142). In this example, the future, marked by *jagi*, places the reference time in the future, namely March. The event described by the base predicate must be anterior relative to that reference time but still takes place in the future relative to the utterance time. It is best translated by the English future perfect. It orients neither reference time nor event time in the past relative to utterance time, which is what a past tense marker is expected to do.

(142) *It is November. Your uncle is planning to visit you in March. Your 21st birthday is in December, when you plan to have your first beer. He calls you and tells you that he wants to take you out for your first beer when he visits. You respond:*
Yening ragane mai tahun depan, tiang jagi (suba) **taen** nginem bir
if 2SG come year next 1SG FUT already PRF AV.drink beer
"When you visit next year, I will already have had a beer."

This shows that *taen* is neither a perfective marker nor a marker of some kind of past tense. Next I will argue that *suba* means 'already' and *taen* is a perfect.

3.4.3.3.3 *Suba* is 'already', *taen* is a perfect We have shown that *suba* is not a perfective, but in order to show that *suba* means *already*, we need to further show that it is not a perfect marker. We also need to show that *taen* is a perfect marker. In this section, I use diagnostics developed in Klok & Matthewson (2015) to argue that *suba* means *already* and *taen* is a perfect.

As Klok & Matthewson (2015) show, there is a great deal of overlap in use between a perfect and *already*, and this overlap may lead to misanalysis. For one, the two can both be used to refer to situations that happened at an unspecified time prior to the reference time. Klok & Matthewson (2015) show this with the following in Javanese, where *wes* is the

Javanese equivalent to *already*. The English translations further make clear the similarity of the perfect and *already*.

(143) *Context: Bu Z. talking to Bu S. about Jozi's background.*
Wes belajar nek Jogja nem ulan.
already study at Jogja six month
'She **has studied** in Jogja for six months.'
'She **already** studied in Jogja for six months.'

Further, the two are compatible with a number of the same contexts. Where the perfect can be used with recent past, result, and experiential contexts, so can *already*. The following are from (Klok & Matthewson 2015).

(144) Recent past: (Context: Jordan left at 8p.m. It is now 8:10p.m.)
a. Jordan has (just) left.
b. Jordan already left.

(145) Result:
a. Andrea has arrived in London.
b. Andrea already arrived in London.

(146) Experiential:
a. Bethany has visited Edinburgh (before).
b. Bethany already visited Edinburgh (before).

Klok & Matthewson (2015) develop five diagnostics for distinguishing *already* from perfect aspect:

1. Truth-conditional equivalency in interactions with negation.

2. "Earliness" implication.

3. Inchoative interpretation with stative predicates.

4. Compatibility with adverbs specifying a past time interval.

5. "Extended Now" interpretation.

In the following, I use these tests to diagnose the status of *suba* and *taen*. However, I set aside the final two tests, because these tests really rely on overt tense marking, which Balinese does not have.

3.4.3.3.3.1 Truth-conditional equivalency in interactions with negation An important property of *already* is that it forms a dual with *still* in interactions with negation. That is, internal negation of one is equivalent to external negation of the other, in the same way that $\neg\exists x(P(x))$ is equivalent to $\forall x(\neg P(x))$. Löbner (1989; 1999) shows, for example, that this holds between *schon* 'already' and *noch* 'still' in German. In particular, this dual regards not the truth of the proposition itself but rather whether a state held at a previous time or not. In (147a), this conveys that the light was not on at some previous time. This is reversed in (147b), where it's implied that the light was on previously, but is now out. The English free translations show that this is the case for *already* and *still* as well.

(147) a. Ist das Licht **schon** an? - Nein, das Licht ist **noch** aus.
Is the light already on? - No, the light is still out.
b. Ist das Licht **noch** an? - Nein, das Licht ist **schon** aus.
Is the light still on? - No, the light is already out.

For one pair, internal negation of *suba* and external negation of *enu* 'still', we see this same equivalence in Balinese. This is shown in (148). Both imply that the chair had legs, and those legs were removed.

(148) *Context: The chair's legs were removed.*
a. kursi ento **suba** sing ma-batis
chair DEM already NEG MID-leg
"The chair already doesn't have legs."

b. kursi ento sing **enu** ma-batis
chair DEM NEG still MID-leg
"The chair doesn't still have legs."

With *taen*, it turns out that the best way to convey that the chair's legs were removed is to use simply the positive version of the sentence. This is because *taen* asserts that the state held prior to the reference point and implies that the state no longer holds, similar to the implication in the English free translation with the perfect. This is in (149).

(149) *Context: The chair's legs were removed.*
kursi ento **taen** ma-batis
chair DEM PRF MID-leg
"The chair had had legs."

It is not possible to test the reverse case with external negation of *suba* and internal negation of *enu* because external negation of *suba* is not accepted at all by my consultant. This is possibly not surprising given that external negation of *already* in English isn't very good either, possibly due to suppletion. In Javanese, too, Klok and Matthewson claim external negation of *wes* 'already' is in fact suppletive. We might wonder if such a suppletive form also exists in Balinese. An initial investigation of this shows that *tonden* 'not yet', may be such a form, but I leave that for future work.

3.4.3.3.3.2 "Earliness" implication With *already*, but not with the perfect, there is an implication that the predicate holds at a time that is somehow earlier than expected. This is evident in the contrast in (150) between the perfect aspect and *already* in English. In the sentence with *already* there is a sense that the cooking was expected to occur sometime after my arrival. This does not arise with the sentence in (150b) with the perfect.

(150) a. When I arrived, Jose was *already* cooking.
b. When I arrived, Jose had been cooking.

This is also the case for *suba*. For example, the sentence in (151b) is natural in a context where the baby is only a few months old and is not expected to be walking at that age. By contrast, the minimal pair (151a) without *suba* doesn't convey this sense of surprisal.

(151) a. Bayi-ne bisa me-jalan
baby-DEF can MID-walk
"The baby can walk."

b. Bayi-ne **suba** bisa me-jalan
baby-DEF already can MID-walk
"The baby can already walk."

Taen not only doesn't have this sense of surprisal associated with it, it implies that the baby can no longer walk. This is shown in (152).

(152) Bayi-ne **taen** bisa me-jalan
baby-DEF PRF can MID-walk
"The baby had walked/used to walk."

This shows, again, that *suba* patterns like *already*, and *taen* like a perfect.

3.4.3.3.3.3 Inchoative interpretation with stative predicates *Already* and the perfect further differ in what they imply when combined with stative predicates. *Already*, but not the perfect, implies that the state denoted by the predicate had been changed in to. Put another way, *already* implies that the state denoted by the predicate did not always hold.[3] As might be expected, then, there is a contrast with *already* between individual-level states, which hold more or less permanently, and stage-level states, which may be temporary. We would not expect a contrast with the perfect.

The following English example adapted from Klok and Matthewson make this contrast between *already* and the perfect clear.

(153) a. The man has been tall / intelligent / fat.

[3]This is merely an implicature, and in certain contexts, this implicature is cancelable.

b. The man is already tall / intelligent / fat.

The *already*-sentences in (153b) are strange. They seem to imply that the man entered into the state described and that the property didn't always hold of him. By contrast there is no such interpretation for the perfect sentences in (153a). In fact, the sentences in (153a) seem to imply that the state no longer holds.

Likewise, *suba* also carries this same inchoative interpretation. The sentence below in (154b) is strange because it implies that the man didn't always have legs. My consultant mentioned that this would be okay in a context where the man has been fitted with a prosthetic leg, for example. The sentence without *suba*, in (154a) carries no such interpretation. The *taen* sentence in (154c) actually implies that the man lost his legs, perhaps in an accident, and no longer has them.

(154) a. Anak ento ngelah batis
man DEM AV.have leg
"The man has legs."

b. #Anak ento **suba** ngelah batis
man DEM already AV.have leg
"The man already has legs."

c. #Anak ento **taen** ngelah batis
man DEM PRF AV.have leg
"The man had had legs."

Thus, again, the two particles pattern as hypothesized, with *suba* corresponding to *already* and *taen* to the perfect.

3.4.3.3.4 Interim summary I argued in this section that particles *suba* and *taen*, though sometimes discussed as perfectives, are not perfectives in Balinese. I further argued that they mean 'already' and the perfect, respectively. I have further argued that *suba* means *already* and *taen* is a perfect. Because these particles are not perfective, I leave further study

of these particles to future work.

3.4.4 Interim summary

In this section, I provided description and analysis of the tense and aspect system in Balinese. The primary concerns of this thesis are the readings of bare sentences and the progressive. Bare sentences may have event-in-progress, perfective readings, and habitual readings. I attributed the event-in-progress and perfective readings to a progressive operator that doesn't require proper stagehood, following Altshuler (2014). I attributed the habitual readings to GEN. I said that, for now, we can think of the progressive auxiliary *sedeng* as having a similar analysis to the English progressive in that it requires proper stages. However there are important empirical differences. Unlike the English progressive, *sedeng* does not permit futurate readings.

We now turn to a description of pluractional reduplication in Balinese.

3.5 Pluractionality in Balinese

Pluractionality in Balinese is indicated through reduplication of the verbal root (Arka 2003; Arka & Dalrymple 2017). There are substantial differences between my consultant's idiolect and descriptions of verbal reduplication in the literature. Throughout this section I will note where my consultant differs from these reports. It is worth belaboring these differences because few descriptions of verbal reduplication in Balinese exist in the first place. It should therefore be clear to researchers of Balinese the range of variation within the language regarding reduplication, something I have not seen mentioned in the literature. Further, certain phenomena reported in these descriptions—in particular those in Arka & Dalrymple's (2017) robust semantic study—may have major consequences for the analysis

posited here. The Balinese in those studies may likely require a different analysis that the one presented here. Because my consultant does not accept much of that data, I make no claims about how to account for it, though I may speculate. It would therefore not be surprising if a different speaker's intuitions differ from my consultant's. In general, my consultant's idiolect displays a subset of the phenomena reported in Arka & Dalrymple (2017). Throughout, I will use "Balinese" to refer to my consultant's idiolect, and specify otherwise.

3.5.1 Repeated actions by a single participant

Reduplication may indicate repeated actions by a single participant. It may be interpreted *iteratively*, where a number of actions are done in a limited time period and has a meaning similar to "repeatedly". It may also have *habitual* interpretations, where the actions are spaced quite far apart and may even suggest a disposition. In this way, reduplication is unspecified for the number of events that occur and the distribution of those events over time or space. This use of reduplication is the primary focus of this dissertation. For example, (155) is compatible with both a rapid banana-eating pace, where the banana-eating events follow one another in close succession, or it can be used to address the question "what does Ayu usually eat?", where it suggests that Ayu's preferred or favorite food is bananas, and there may be significant temporal gaps between banana-eating events.

(155) Ayu ngajeng~ajeng biu
Ayu AV.eat-REDUP banana
"Ayu is eating bananas."

This latter interpretation shows that reduplication is may be interpreted habitually. Two more pieces of data, (165) and (166), demonstrate this further.

(156) *Context: Ayu's main form of exercise is swimming, and she swims once a day. Someone asks, "What does Ayu do for exercise?"*
Ayu ngelangi~langi ke pulaune
Ayu AV.swim-REDUP to island-DEF
"Ayu swims to the island."

(157) *Context: Ayu's fiance lives in Denpasar, she visits him: for one day with a week between visits / ? for one week with a month between visits / # for one month with a year between visits*
Ayu ma-jalan~jalan ke Denpasar
Ayu MID-walk-REDUP to Denpasar
'Ayu visits/goes to Denpasar repeatedly.'

The context in (166) shows that the frequency and distribution of visits may be somewhat constrained. Reduplication indicates that the event occurs at a somewhat high frequency, even on its habitual reading. Notice, though, that the temporal gaps between events may still be quite large, a few days in this case.

My consultant's idiolect differs significantly from the data reported in Arka & Dalrymple (2017) in this way. They report that the frequency repeated events and length of temporal gaps may be indicated through morphological means. In particular, their data shows that reduplication may target different parts of the stem, and that different targets have different semantic consequences. The verbal stem *keplug* 'explode' is a so-called bound root and must occur with the middle voice prefix *ma-* when not reduplicated. With reduplication, *ma-* is optional, and, when the prefix is present, may or may not be targeted for reduplication, as is evident in the distinction between (158b) and (158c). The more material there is, the longer the temporal gaps are interpreted to be.

(158) From Arka & Dalrymple (2017), p. 293.
a. *keplug~keplug* 'successive explosions, almost no temporal gaps'
b. *makeplug~keplug* 'successive explosions, with recognizable temporal gaps'
c. *makeplug~makeplug* 'repetitive explosions, with long temporal gaps, possibly as long as a day or two'

While this pattern is rather interesting, I was unable to replicate it with my consultant. The middle prefix *ma-* may never be reduplicated in his idiolect. In general, my consultant targets only the root for reduplication. The active voice prefix *N-* is sometimes reduplicated as well when the initial consonant of the root undergoes nasalization. There seems to be some optionality here, as occasionally, for example, *ngajeng~ajeng* above may show up as *ngajeng~ngajeng*. There appears to be no difference in meaning between these forms, as reported in Arka & Dalrymple (2017).

3.5.2 Participant plurality

Like other pluractionals, reduplication may also indicate participant plurality. This is especially the case with individual level predicates like 'tall', which can be used as tests for this kind of pluractionality (Cabredo Hofherr & Laca 2012). Because individual-level predicates hold throughout one's lifetime, there's no way for the predicate to hold repeatedly of a single individual. A person can't be 'tall' repeatedly (except, possibly, in some very special context). When reduplication applies to individual-level predicates, then, the result is participant pluractionality; the predicate must apply to multiple individuals. This is shown below.

(159) a. #Ayu tegeh~tegeh
Ayu tall-REDUP
Intended: "Ayu is tall."

b. anak muani-ne tegeh~tegeh
person male-DEF tall-REDUP
"The boys are tall." (NOT: "The boy is tall.")

Because Ayu is one person, there's no way to make sense of the sentence apart from a bizarre scenario where a person's height is a mutable quality that changes occasionally over time (in fact, my consultant laughed when I presented him with the sentence in

(159a)). By contrast, (159b) is fine. Nominals in Balinese, without overt plural marking, are ambiguous between singular and plural reference. In this case, though, *anak muanine* must be interpreted as plural. It indicates that most of the boys are tall, and there's no suggestion that this quality holds only intermittently for each boy as in the first case.

As reported in Arka & Dalrymple (2017), though, there appears to be a dispreference for verbal reduplication to indicate participant pluractionality if plural marking on the nominal, e.g., nominal reduplication, has the same result.

3.5.3 Associative readings

Reduplication in Balinese also displays what Arka & Dalrymple (2017) call associative pluractional readings, analogous to associative plurals in the nominal domain. Arka & Dalrymple (2017) describe these readings of reduplicated verbs as "[referring] to a complex event with subevents that are associated by a pragmatically salient relation" (324). As the free translation in (160) indicates, the associative plural reading of *pules~pules* 'sleep' suggests several events that are not themselves denoted by the base predicate but are related by convention.

(160) (Arka & Dalrymple 2017: 324)
Nyoman pules~pules-an ditu.
Nyoman sleep-REDUP-LOC there
'Nyoman relaxes there by sleeping and doing other relaxing activities.'

Sentences with these readings permit the usual iterative or frequentive readings, as well. This is shown in (161).

(161) (Arka & Dalrymple 2017: 324)
I Bapa (ma-)jalan~jalan di/ke Jakarta.
ART father (MID-)walk-REDUP to Jakarta
1. 'Father walked around in/to Jakarta.'

2. 'Father went for a tour to Jakarta (i.e., not simply walking around but also doing related activities such as shopping and sightseeing).'

In this case, the reduplicated verb can have a simple 'walk repeatedly' meaning or a reading that implies that something other than walking was done, e.g., sightseeing.

While my consultant does not admit reduplication of the middle voice prefix, Arka & Dalrymple (2017) report that these associative readings are not available when the entire stem is reduplicated, nor when causative or applicative morphology is present.

(162) (Arka & Dalrymple 2017: 326)
I Bapa majalan~majalan ke/di Jakarta
ART father MID.walk-REDUP to/in Jakarta
'Father walked around (repeatedly) in Jakarta.' [Not: 'Father went for a tour to/in Jakarta.']

Arka & Dalrymple (2017) report that these associative readings are not fully productive, and are limited to a small number of verbs. This is confirmed by my speaker, who accepts only a couple of the associative pluractional sentences presented in Arka & Dalrymple (2017).

3.5.4 Unattested readings and *pa-*

The literature reports a few other uses of reduplication that were not attested by my consultant. First, I found no evidence that verbal reduplication contributed any kind of intensification as reported in Barber (1977). Second, Arka & Dalrymple (2017) detail a "manner pluractionality" reading of reduplication, which would mean something like "to do something in various ways". These are morphologically different than the forms of reduplication presented above; the vowel in the reduplicated stem changes. I was also unable to elicit pluractionality of that type, though it does apparently exist in some set phrases like *bolah~baleh* 'back and forth'.

Finally, Arka & Dalrymple (2017) also report a non-reduplicative pluractional prefix *pa-*. This is used to indicate that multiple participants simultaneously did something. Because this can only be used for participant plurality, I set it aside in this dissertation.

3.6 The progressive and pluractional reduplication do not permit habitual readings

For English, we hypothesized that the composition of a pluractional VP with progressive aspect generated the habitual readings of the progressive. Intuitively, we would expect, then, that a language with overt pluractionality and an overt progressive should be able to combine them, and the result would allow for habitual or generic readings. As the argument went, under the right constraints of the pluractional, the plural eventuality that the pluractional generates and the event parthood and modal properties of the progressive result in a kind of habitual reading.

As I laid out the previous sections, Balinese has overt pluractionality *via* reduplication and a progressive auxiliary *sedeng*. Naturally, we might hypothesize that the combination of the progressive and pluractional reduplication would be a generic or habitual reading. **This hypothesis turns out to be wrong. Pluractionality and progressivity do not result in generic or habitual readings in Balinese.** What we find instead enriches the problem: pluractionality under the progressive in Balinese results only in iterative readings. What this tells us is that *event plurality and the progressive can compose, but the result need not be habitual/generic*. In the rest of this section, I lay out the empirical details of pluractionality under the progressive.

3.6.1 No habitual/generic reading

First, the progressive and the pluractional can't felicitously be used to describe habitual scenarios. This is shown in (163) and (164), contrasting with the sentences without *sedeng* in (165) and (166) below. We see here that the addition of *sedeng* renders these sentences infelicitous in these habitual contexts. Reduplication on its own, however, is fine.

(163) *Context: Someone asks "What does Ayu usually eat?"*
#Ayu **sedeng** ngajeng~ajeng biu
Ayu PROG AV.eat-REDUP banana
Intended: "Ayu is eating bananas often/repeatedly."

(164) *Context: Ayu's fiance lives in Denpasar, she visits him for one day with a week between visits.*
#Ayu **sedeng** ma-jalan~jalan ke Denpasar
Ayu PROG MID-walk-REDUP to Denpasar
Intended: "Ayu is going to/visiting Denpasar."

(165) *Context: Someone asks "What does Ayu usually eat?"*
Ayu ngajeng~ajeng biu
Ayu AV.eat-REDUP banana
"Ayu is eating bananas often/repeatedly."

(166) *Context: Ayu's fiance lives in Denpasar, she visits him: for one day with a week between visits / ? for one week with a month between visits / # for one month with a year between visits*
Ayu ma-jalan~jalan ke Denpasar
Ayu MID-walk-REDUP to Denpasar
'Ayu visits/goes to Denpasar repeatedly.'

The progressive construction in Balinese doesn't appear to permit habitual interpretations, regardless of predicate choice or the presence of reduplication. Habitual readings (unsurprisingly) don't arise with unreduplicated predicates and *sedeng* either. In (167), we see that the bare sentence in (167a) and the sentence with reduplication in (167b) are both compatible with a habitual context. However, the sentence with *sedeng* in (167c) is not compatible with this context regardless of the presence of reduplication.

(167) *Context: Ayu swam for exercise in the past, but now she has started running for exercise.*

a. pidan Ayu ngelangi~langi ke pulaune nanging jani Ayu ma-laib~laib
past Ayu AV.swim-REDUP to island-DEF but now Ayu MID-run-REDUP
"In the past, Ayu was swimming to the island, but now she runs."

b. pidan Ayu ngelangi ke pulaune nanging jani Ayu ma-laib
past Ayu AV.swim to island-DEF but now Ayu MID-run
"In the past, Ayu swam to the island, but now she bikes." (SC: you could say that, not my first choice though.)

c. #pidan Ayu ngelangi(~langi) ke pulaune nanging jani Ayu **sedeng** ma-laib(~laib)
past Ayu AV.swim(-REDUP) to island-DEF but now Ayu PROG MID-run(-REDUP)
Intended: "In the past, Ayu was swimming to the island, but now she is running."

This shows that, to some degree, *sedeng* actually blocks habitual readings of reduplication.

3.6.2 Associative readings

We might wonder whether reduplication is simply banned (for whatever reason) under the progressive in general. However, this is not the case. First, the progressive is perfectly compatible with associative pluractionality. As this minimal pair demonstrates, the usual frequentive or habitual meaning of reduplication is lost in the presence of *sedeng* and instead we get an idiomatic reading of the reduplicated verb.

(168) a. Ayu me-jalan~jalan ke Denpasar
Ayu MID-walk-REDUP to Denpasar
a. 'Ayu goes to Denpasar.' (To visit her fiance once every week or so)
b. 'Ayu is sightseeing in Denpasar.'

b. Ayu **sedeng** me-jalan~jalan ke Denpasar
Ayu PROG MID-walk-REDUP to Denpasar
Only: 'Ayu is sightseeing in Denpasar.'

This shows that reduplication in general is permitted with *sedeng*. Given the limited distribution of associative readings, however, it may still be contended that this variety of reduplication isn't productive and so this does not demonstrate that the progressive is composing with 'real' verbal reduplication. The following two sections rule this contention out.

3.6.3 Iterative readings

Second, and perhaps most importantly, the progressive does tolerate simple *iterative* readings of the progressive. These are readings that are best translated by an adverb like 'repeatedly' in English. So while the progressive-less sentence in (169a) has both a generic/habitual reading and an iterative reading, the sentence in (169b) *only* has the iterative meaning.

(169) a. Ayu nginem~nginem teh
Ayu AV.drink-REDUP tea
"Ayu drinks tea." or "Ayu is drinking tea repeatedly."

b. Ayu **sedeng** nginem~nginem teh
Ayu PROG AV.drink-REDUP tea
Only: "Ayu is drinking tea repeatedly."

Further, we do get a kind of distinction within iterative readings between the progressive and bare sentences. Namely, where a bare sentence with reduplication doesn't seem to care where we "are" in the series of repetitions, the progressive does. This is shown in (170). If we think of a series of postcard writing events and the pauses that naturally arise between the writing of each post card, the bare sentence in (170a) is naturally uttered even at the pauses. On the other hand, the progressive sentence in (170b) is most naturally uttered only when the writer is putting pen to paper.

(170) *Context: What kind of writing has Ayu done today?*

a. Tuni Ayu nulis surat, nanging jani Ayu nulis~nulis kartu pos.
past Ayu AV.write letter but now Ayu AV.write-REDUP card post
"Earlier, Ayu wrote a letter, but now she is writing postcards." (She might be on a break between writing postcards.)

b. Tuni Ayu nulis surat, nanging jani Ayu **sedeng** nulis~nulis kartu pos.
past Ayu AV.write letter but now Ayu PROG AV.write-REDUP card post
"Earlier, Ayu wrote a letter, but now she is writing postcards." (She must currently be writing a postcard.)

This "gap tolerance", or lack thereof in this example, may be an artifact of the way this data was elicited, as the two were elicited one after another. It's not necessarily the case that the progressive with iterative reduplication is completely gap intolerant. When I asked the consultant if (169b) could be uttered if Ayu was between cups of tea, he indicated it was fine, so long as it seemed like Ayu would get another cup. This illustrates, however, a different way of thinking about the problem. Why does the progressive tolerate gappiness in some cases (so-called "iterative" readings) but not others (habitual readings)?

Finally, iterative readings of the progressive seem to be somewhat constrained temporally. The sentence in (164) is infelicitous, for example, but seems to be because the time between events is fairly long. Shorter events that may happen with shorter gaps between them like drinking tea or writing post cards are more amenable to reduplication under the progressive.

3.6.4 Durative adverbials

Durative adverbials (or measure adverbials) reveal that pluractionality is actually necessary for a class of progressive sentences to receive iterative interpretations. A well-known property of a class of measure adverbials like English *for one hour* is that they are infelicitous with telic sentences. This is in contradistinction to a second class of measure adverbials like

in one hour, which are okay with telic sentences but infelicitous with atelic sentences. This is evident in the four way contrast in (171).

(171) a. Will drove for an hour.
b. #Will drove to work for an hour.
c. #Will drove in an hour.
d. Will drove to work in an hour.

However, it's also been noticed that *for*-adverbials may be acceptable with telic predicates *as long as they are interpreted iteratively*. This is shown in (172a) below. Notice that all that's changed here is the time span of the measure adverbial. It is much more likely that multiple events of driving to work take place within three years than one hour, naturally suggesting the iterative reading. This is more stark with an achievement like *find*. In (172b) below, the only real interpretation is one involving multiple "finding" events. Finally, these readings are not limited to telic sentences; atelic sentences may well have iterative readings too, as is clear in (172c). In what follows, I will call the non-iterative readings *continuous* and the iterative readings, well, *iterative*.

(172) a. Will drove to work for 3 years. (E.g., driving was how he got to work.)
b. Will found his garage defaced by graffiti for 3 years.
c. Will drank coffee for a year (but had to give it up.)

Balinese is slightly different than English in this domain. First, Balinese seemingly has one measure adverbial, introduced by *pang*, that is agnostic to predicate type. It can modify atelic and telic predicates. It's worth bearing in mind that Balinese has no (apparent) perfective marking, and bare sentences may in general receive both imperfective (atelic) and perfective (telic) interpretations. The continuous use of the measure adverbial for both telic and atelic predicates is illustrated in (173). The sentence in (173b) could also receive a progressive interpretation, where he walked for two hours, but didn't arrive at the beach.

(173) a. *Context: Bima walked continuously for two hours.*
Bima me-jalan pang duang jam
Bima MID-walk for two hour
"Bima walked for two hours."

b. *Context: It took Bima two hours to walk to the beach.*
Bima me-jalan ke pasih pang duang jam
Bima MID-walk to beach for two hour
"Bima walked to the beach for two hours."

Bare sentences may also have the iterative readings that we see in English. While pluractional reduplication is not required for these readings, it does force them. These two iterative readings are illustrated below.

(174) *Context: For his exercise for a month, Bima walked to the beach most days of the week.*

a. Bima me-jalan ke pasih pang abulan
Bima MID-walk to beach for month
"Bima walked to the beach for a month"

b. Bima ma-jalan~jalan ke pasih pang abulan
Bima MID-walk-REDUP to beach for month
"Bima walked to the beach for a month."

When *sedeng* enters the picture, the interpretations become more constrained. Without pluractional reduplication, only the continuous readings of *pang* adverbials are available, even where the context would clearly suggest an iterative reading. This is apparent in the difference between the sentences below in (175). The difference in this minimal pair is the presence of pluractional reduplication. Pluractionality is necessary for generating the appropriate iterative reading.[4] The sentence in (175b) actually suggests that Bima is running continuously for a week straight, which is decidedly incompatible with our world knowledge.

[4]Note that, as Mittwoch (1988) points out, progressive sentences with *for* adverbials in English are often degraded when the *for* adverbial takes narrow scope with respect to the progressive. These cases are ameliorated, however, when there is some kind of plan that the eventuality take as long as whatever time is denoted by the adverbial. The context in (175) carries with it a kind of plan, a training regimen. In any case, the sentence in (175a) is fine, while the minimal pair without reduplication in (175b) is not.

(175) *Context: Bima is training to compete in an Ironman competition. Someone asks: "What is Bima doing to train?"*

a. Bima sedeng me-**laib~**laib ke pasih pang aminggu
Bima PROG MID-run-REDUP to beach for one.week
"Bima is running to the beach for a week."

b. #Bima sedeng me-laib ke pasih pang aminggu
Bima PROG MID-run-REDUP to beach for one.week
Intended: "Bima is (repeatedly) running to the beach for a week."

This shows that not only is pluractional reduplication compatible with *sedeng*, it is sometimes required to force a contextually requisite iterative reading.

3.6.5 Amelioration with the causative

Finally, there is evidence that habitual-like readings of reduplication under the progressive are okay as long as they are mediated by a causative. In the following, the context makes clear that the driving is done occasionally over the course of a month, i.e. habitually. The causative suffix *-in* is present on the reduplicated verb. This is shown in the sentences in (176) below, where the progressive is actually okay with a habitual-like reading. In fact, the fact that the sentence in (176b) is acceptable came as a surprise to my consultant, as it came after he rejected a few sentences with *sedeng* in other habitual scenarios.

(176) *Context: Bima was driving the car last month (to keep it running). And Ayu is doing it this month.*

a. mobil-e jalan~jalan-*in* ajak Ayu
car-DEF walk-REDUP-CAUS by Ayu
"Ayu drives the car."

b. mobil-e **sedeng** jalan~jalan-*in* ajak Ayu
car-DEF PROG walk-REDUP-CAUS by Ayu
"Ayu is driving the car."

We will see why this might be the case in the next chapter.

3.6.6 Interim summary

In sum, here are the facts that need to be explained:

1. Habitual readings of verbal reduplication are possible in bare sentences.

2. Habitual readings of reduplication are not possible with the progressive (though see 6.).

3. Associative readings of reduplication under the progressive are possible.

4. Iterative readings of reduplication under the progressive are possible.

5. Pluractional reduplication is necessary for iterative readings of the progressive with durative adverbials.

6. Causative verbs ameliorate habitual readings of reduplication under the progressive.

Let me reiterate why this data is a problem for the theory presented in chapter chapter 2. **The progressive and verbal plurality (contributed by pluractionality) do not, on their own, lead to habitual or generic interpretations empirically**. The analysis presented in 2, and any analysis where plurality alone distinguishes generic/habitual and episodic readings of imperfectives, thus fails to explain why pluractionality fails to contribute habituality in the scope of the progressive. We may be tempted to find the locus of this problem in pluractional reduplication, but in bare sentences, it can be interpreted habitually without issue, showing that the lack of habitual readings with the progressive can't be traced to the progressive alone. The progressive also doesn't simply ban composition with plural eventualities, since it allows iterative readings of the pluractional.

3.7 Conclusion

In this chapter, I provided data from Balinese, a language with a progressive and overt pluractionality, showing that pluractionality and the progressive alone do not generate habitual readings. This is problematic for the theory of English laid out in chapter 2 which argued that habitual readings of the English progressive were the result of the combination of a pluractional VP with the progressive operator. Instead the progressive with a pluractional VP in Balinese allows only an iterative reading.

In the next chapter, I argue that the decompositional view of habitual progressives should be maintained, but the picture is more nuanced. First, I will argue that, when we consider *temporal gaps* between sub-events and the different kinds of gaps at play between iterative and habitual scenarios, we can understand why pluractional VPs with the progressive in Balinese lead to iterative readings but not habitual ones. To account for habitual readings of the English progressive, I argue we need an additional grammatical device that cooccurs with the pluractional: dispositional causation (Copley 2018). Originally proposed to account for futurate readings of the progressive, I argue this same device is necessary to account for habitual readings of the progressive as well. The Balinese progressive lacks both futurate readings and habitual readings, because it may not compose with the dispositional causative.

Chapter 4

Rethinking progressivity and pluractionality

4.1 Introduction

In chapter 2, I laid out the hypothesis that habitual readings of English progressives can be captured by positing the presence of a covert pluractional operator under the progressive operator. In the last chapter, however, we examined Balinese, a language with overt pluractionality and progressivity, and found that the combination of these two elements did not yield a habitual reading. Instead, this combination lead only to *iterative readings*, where the subevents of the plural event are fairly bunched up temporally. Additionally, bare sentences in Balinese with pluractional reduplication may have *both* an iterative reading and a habitual reading. These contrasts are repeated in the data in (177), which shows that reduplication in bare sentences is compatible with both kinds of readings while the progressive is compatible only with the iterative reading, here indicated with "repeatedly" in the translation. This sentence can be used if the drinking events occur over the course of

an hour or two on one day.

(177) a. Ayu nginem~nginem teh
Ayu AV.drink-REDUP tea
"Ayu drinks tea." or "Ayu is drinking tea repeatedly."

b. Ayu **sedeng** nginem~nginem teh
Ayu PROG AV.drink-REDUP tea
Only: "Ayu is drinking tea repeatedly."

In addition to this, bare sentences may also have habitual readings, in addition to progressive-like event in progress readings. This is shown again in (178), where the habitual reading is in (178a).

(178) a. *Context: Someone asks: what does Ayu do for exercise?*
Ayu ngelangi ke pulau-ne
Ayu AV.swim to island-DEF
"Ayu swims to the island."

b. *Context: Ayu is halfway to the island.*
Ayu ngelangi ke pulaune
Ayu AV.swim to island-DEF
"Ayu is swimming to the island."

We now have the puzzles that this chapter addresses: Why does the Balinese progressive have iterative but not habitual readings of pluractional VPs? Why does pluractional reduplication actually *permit* habitual readings in bare sentences? Why does the English progressive, in contrast to the Balinese progressive, allow for habitual readings?

I suggest that the key to answering this lies in looking where the subevents of a plural event aren't: the gaps. A canonical property of habitual sentences is that they can be true when the reference time lies between events instantiating the habit. By paying close attention to the properties of gaps, or pauses, I motivate the key difference between English and Balinese.

I will argue that, first, the composition of a progressive operator with a pluractional VP

only generates habitual readings. To show this, I make use of the refinement of Landman's (1992) theory of the progressive in Landman (2008). Happily, this theory gives us a tool that we need for a new theory of pluractionality, one that overcomes the deficiencies that previous theories (Lasersohn 1995; van Geenhoven 2004; Henderson 2012) have with activity predicates.

Second, I will argue that habitual readings of progressives require an additional grammatical device to mediate between the progressive and the pluractional VP: dispositional causation (Copley 2018). This device is responsible for futurate readings of the English progressive, readings which the Balinese progressive lacks. I trace this to the limited ability for the progressive to accept stative predicates, which the Balinese progressive may not do.

This sets up a number of happy knock-on effects. I show that this theory explains additional nuances in the differences between habitual constructions in English and Balinese. Further, this sets up a typological prediction that at least tentatively appears to be on the right track: Habitual and futurate readings of progressive should highly correlate.

In section 2, I shift gears to a different problem concerning temporal gaps that will help us understand iterative readings of the progressive. This concerns a major empirical difference between activity predicates and stative predicates. Activity predicates tolerate gaps, but stative predicates do not. This sets up a reanalysis of the progressive in Landman (2008). In section 3, I return to pluractionality and revisit the problem that activities pose for theories of pluractionality. Using the new tools developed for the progressive in the previous section, I provide a new analysis of pluractionality that can account for these problems. I show how the interaction of this pluractional and the progressive yields iterative readings of the progressive in Balinese. In section 4, I account for habitual readings of the progressive. Here I argue that dispositional causation generates both futurate and habitual readings of

the progressive. After discussing the consequences and predictions of this, I conclude this chapter in section 5.

4.2 Incremental homogeneity, or: the problem of temporal gaps

What iterative and habitual readings of present progressive sentences share, in addition to describing multiple events, is that they can be true even if the present time sits between two subevents—in other words, if the present tense sentence is uttered during a gap. That is, "I am driving to school repeatedly today" and "I am driving to school these days" can both be true even if I am not presently on my way to school. One way of thinking about the difference between the two is that the gaps involved between subevents in an iterative scenario are relatively shorter than the gaps in a habitual one. An iterative event has temporally bunched up subevents, while a habitual one involves subevents that may take place quite far apart from one another. Using this intuition we can reframe one of our puzzles in the following way: why does the Balinese progressive with a pluractional VP tolerate shorter gaps but not longer ones? In this section, I answer this question.

Gaps are a problem for the progressive elsewhere as well. In particular, it appears that present tense progressives can be true if the utterance time occurs during the gap in an *activity event*, but not a *state*. Thus the progressive tolerates gaps in activity predicates but not stative predicates. Imagine someone, let's call her Siobhan, biking along a bike trail. She may bike for 3 miles and then stop at a bend overlooking a lake. She gets off their bike and then sits on a bench, checks her phone, and so on. This lasts, say, ten minutes. Then she gets back on her bike and continue along the trail. I am inclined to say that, despite that break, this was exactly one bike riding event, and further, that this bike riding event held *even during this break*. Thus I can truthfully utter the sentence in (179a) *while Siobhan is on*

this break.

On the other hand, the stative predicate *sit on her bike* cannot be uttered with the present tense progressive during a gap in her sitting. Thus if Siobhan is taking this breather and has dismounted from her bike, (179b) *cannot* be felicitously uttered.

(179) a. Siobhan is riding her bike.
b. Siobhan is sitting on her bike.

Landman (2008) illustrates this differently using the following dialogue, where B challenges A's use of various stative predicates in light of pauses in the state, prompting A to revise his predicate choice.

(180) A. I was in Amsterdam from January to June.
B. But I saw you at a conference in Paris in March.
A. I meant, I was **living** in Amsterdam from January to June.
B. But I visited you in the apartment you rented in Brussels for three weeks in May.
A. Yes, I meant, I was **domiciled** in Amsterdam from January to June.

This is in distinction to similar dialogue with activity predicates in (181). Here, the pause does not prompt A to chose a different predicate.

(181) A. I waltzed the whole time the orchestra played.
B. But I saw you standing still in middle for a whole stretch.
A. You do, when you waltz.

This difference between the two kinds of predicates is a problem because the progressive is stativizing and can therefore be true at moments. This allows it to compose felicitously with the present tense, which is also true at moments (namely utterance time) (Taylor 1977; Dowty 1979). Thus we need to understand how (179a) can be true at the moment of utterance when the activity does not literally hold, but (179b) fails to be true when the state does not hold. I elided this discussion in chapter 2 because it turns out that this property is not properly captured by the theory in Landman (1992), but here we must take this problem

seriously. The question, then, is why can progressive sentences in the present tense be uttered felicitously during a gap for an activity predicate but not a stative predicate?

This difference in gap tolerance between activity predicates and stative predicates motivates Landman (2008) to distinguish between *segmental homogeneity*, the usual kind of homogeneity defined at all points along an interval familiar to us as the subinterval property, and *incremental homogeneity*, which is defined in terms of incrementally bigger events. Before we acquire the formal tools to understand these concepts, let's revisit the subinterval property, and then look at a visual illustration of the conceptual difference between these two kinds of homogeneity.

First, let's consider the subinterval property, which will be analogous to segmental homogeneity, the kind of homogeneity property that stative predicates have. Say we've got a series of points, $t_1 \ldots t_6$, that are linearly ordered like in the diagram in Figure 4.1. The boxes represent the intervals where Siobhan is sitting on her bike. Let's consider a version of the subinterval property, *a la* Bennett & Partee (2004). A predicate P is segmentally homogeneous iff, for an interval I satisfying P, every subinterval of I also satisfies P. It's a given that the stative predicate $[\![\textit{Siobhan sit on her bike}]\!]$ holds true of $[t_1, t_2]$ and $[t_5, t_6]$. Stative predicates like $[\![\textit{Siobhan sit on her bike}]\!]$ have the subinterval property. This means that t_1, t_2, t_5, and t_6 individually are also in $[\![\textit{Siobhan sit on her bike}]\!]$. But this *also* means that $[t_1, t_6]$ is *not* in $[\![\textit{Siobhan sit on her bike}]\!]$. This is because $[t_3, t_4]$ and its subintervals are not in $[\![\textit{Siobhan sit on her bike}]\!]$. While segmental homogeneity will not be defined in terms of a particular predicate, the intuition here is that states are completely divisible in this way. States do not have the kinds of temporal gaps that $[t_3, t_4]$ represent.

Now to see incremental homogeneity, we will take a different approach. To put it in terms of temporal intervals, we check *incremental* homogeneity, the intuition is not that we

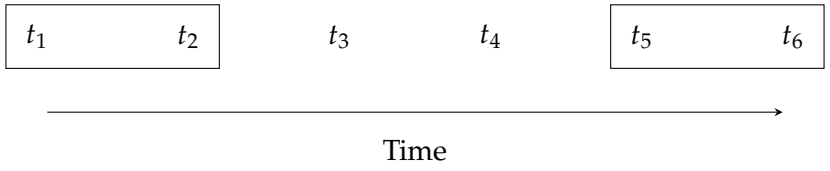


Figure 4.1: Depiction of a scenario of Siobhan riding her bike. The boxes represent intervals of time where Siobhan is actively riding her bike.

take each subinterval on their lonesome, but rather we check to see *how they contribute to what came before them*. We check whether P holds for some initial interval of I and each incremental addition to that initial interval up to I. To take the situation in Figure 4.1, we do not look at, say, t_3 alone but rather the contribution of t_3 to the interval that came before it, t_1, t_2. Thus we check $[t_1, t_2]$, $[t_1, t_3]$, $[t_1, t_4]$, and so on, but *not* t_3 alone. This, Landman claims, allows us to "escape" pauses. Unlike segmental homogeneity, we aren't looking just at the particular slice in time where the pause occurs, but rather that moment in time plus the previous developments of the eventuality.

Before we press on, let's start with a visual illustration of what we mean. Figure 4.2 is adapted from Landman. At the top of the figure, $I_{1+2+3+4+5+6}$, is a full interval of Siobhan riding her bike, though there's a pause in the middle. The intervals below it represent the subintervals of that interval. At the base are the individual segments or moments. First let's say that an activity like bike riding is true only for intervals and never points. Thus I_{1+2} below constitutes a bike riding interval, or, in other words, $[\![\textit{ride-bike}]\!](I_{1+2}) = 1$. Then we encounter a "pause" in the bike riding event, represented by the segments I_3 and I_4. These pause segments have a red dotted line under them. We can imagine this as a period where Siobhan stops to admire the lake (for the sake of illustration, we're compressing time substantially here). After that, we get a true bike riding interval again in I_{5+6}. Since we are in a context where I_3 and I_4 constitute a momentary blip in Siobhan's bike riding (i.e., she

hasn't doffed her helmet, her foot is on the pedal, she's taking a breather), then that pause *continues* the bike riding event based on what came before it. Importantly, what constitutes a pause is subjective and contextual, but we will return to this point later. More relevant to us now, I_3 and I_4 do not, on their own, belong to $[\![$*ride-bike*$]\!]$. However, *as increments to the prior interval* I_{1+2}, they do count as $[\![$*ride-bike*$]\!]$ intervals. Thus I_{1+2+3} and $I_{1+2+3+4}$ are intervals of $[\![$*ride-bike*$]\!]$. In the figure below, the $[\![$*ride-bike*$]\!]$ intervals are highlighted in the blue box. It's in this way that activities are homogeneous according to Landman. It's not whether each subinterval individually counts as a P interval on its lonesome, but rather, whether each subinterval can be grafted on to an immediately prior P interval and remain a P interval. To see the homogeneity of activity predicates, we look to the incremental axis, the nodes on the left side of the triangle, not the segmental one along the bottom of the figure as we do states. This axis represents spans of time with I_{1+2} as the initial subinterval up to $I_{1+2+3+4+5+6}$. So if we want to check the incremental homogeneity of $I_{1+2+3+4+5+6}$, we look only to the intervals that are within the ellipse in the figure. This means that we are not looking at, say, I_4 alone, but rather I_4 plus what came before it, which in this case is $I_{1+2+3+4}$. We see that while I_4 itself is not in $[\![$*ride-bike*$]\!]$, the larger interval $I_{1+2+3+4}$ *is*. Thus the bike riding event *continues* through the pause. Activities are homogeneous in this way, where we look to incremental *developments* of an event, not the individual slices in time.

While this is phrased here in terms of temporal intervals for easy comparison to segmental homogeneity, we will adopt Landman's formulation using events instead of intervals. The idea here is that we are building the *events* incrementally and check these increments are P events. If we encounter a pause, and there was enough "schwung" to the event before the pause, to borrow Landman's terminology, the event may continue to count as a P event through the pause. The key word here is "continues". If we look at the pause segmentally,

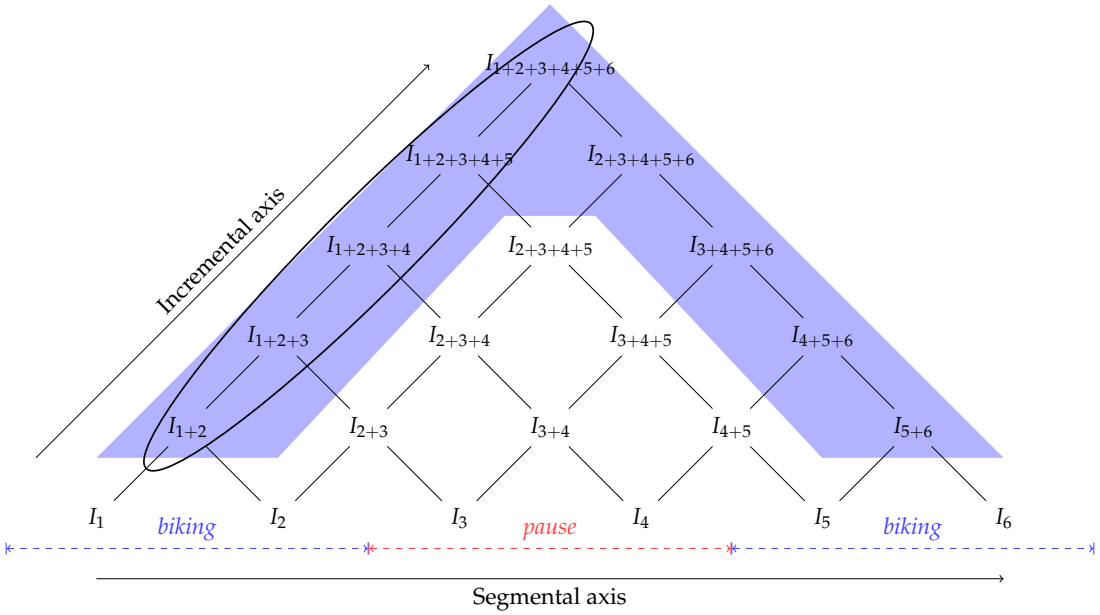


Figure 4.2: Depiction of a scenario of Siobhan riding her bike displaying the structure of intervals of time. The ellipse includes intervals that factor into the calculation of incremental homogeneity. The blue box represents the cross-temporal identity relation.

i.e., we look just at that slice of time, we don't see a P event, but when we look at it *as a part of what came before*, we would recognize it as part of a larger P event.

The progressive of an activity predicate then should concern incremental homogeneity in this way. If we utter the present progressive during the gap in an activity, we check to see if that gap is a continuation of what came before it. With stative predicates, however, we merely check *at that moment in time* whether the state holds.

At this point, it should be somewhat clearer why we need to think about pauses in progressivized activities at the same time we are thinking about pluractionality in the progressive. Pluractionals generate plural events that may (or even must, in some languages) have substantial gaps between subevents, and the present tense progressive may felicitously be uttered during these pauses similar to how the present tense progressive can be uttered in the gaps of an activity. But, as Balinese shows us, the size of the gap may be constrained. Balinese progressives are felicitous only on an iterative reading of the pluractional and

not a habitual one. Again, the question, then, is why the progressive in Balinese tolerates the smaller gaps in the events germane to an iterative scenario, but not the larger gaps in a habitual one. Before we do this, we need to (re)build some formal notions for proper definitions of incremental homogeneity and the progressive.

4.2.1 Event stages and cross-temporal identity

To define incremental homogeneity, Landman (2008) first defines a series of relations on eventualities. First, some preliminaries. Following, Landman (2008) I assume a domain of atomic eventualities EV, which we can further subdivide in to the set of EVENTS and the set of STATES. we need a part-of relation $\sqsubseteq$ which is a partial order on EV, as well as a special case of the part-of relation, the initial part-of relation $\sqsubseteq_i$, which holds if one event is part of another and is realized at the initial subinterval of that event. Finally we have the relation $+$, which represents the fusion of two events. I will get to event plurality in section 3, so for now we assume that events can only be singular.

Now we need an equivalence relation on events $\sim$ Landman calls *cross-temporal identity*. Say we've got an activity event e of $[\![$*ride-bike*$]\!]$ that lasts two hours (with no pauses). Our model might contain subevents of e: e_1, which lasts the first hour, and e_2, which lasts the second hour. As far as our model is concerned, e_1 and e_2 are two distinct events; they are atomic events in their own right. But as we are concerned when we're counting the number of times Siobhan biked, clearly they do not "count" as different events. We can't say of e_1 and e_2 that "Siobhan biked twice". She biked once, and only once. The intuition, then, is that two events are cross-temporally identical when they count as the same event for purpose of enumerating events. As Landman puts it: "[T]he notion of cross-temporal identity, as understood here, concerns what we are willing to regard, in a context, as the

same event for the purpose of expressing how often something happened." (p.7) I thus follow Landman (2008), Landman & Rothstein (2010), and Landman & Rothstein (2012) in assuming (182). It's worth pointing out that for Landman cross-temporal identity is a primitive, and as such, (182) is not a definition *per se*.

(182) $e1$ is cross-temporally identical to $e2$: $e1 \sim e2$ iff $e1$ and $e2$ count as 'one and the same event', i.e. for counting purposes $e1$ and $e2$ count as *one* event.

Landman (2008) provides some additional constraints on cross-temporal identity. One that will be important for us is the following: each equivalence class of cross-temporally identical events has some maximal element, as defined in (183).

(183) *Maximal element:* $\forall x \exists y : x \sim y \wedge \forall z[z \sim y \rightarrow z \sqsubseteq y]$

With this notion of cross-temporal identity Landman redefines event stagehood. In Landman (1992), the idea behind one event being a stage of another was that one event was, in some sense, the *same* event but in an earlier stage of development. Here, he captures this intuition more clearly with cross-temporal identity. An event is a stage of another if it is a cross-temporally identical part of it. Furthermore, he defines an *i-stage-of* relation, which substitutes the part-of relation with the initial part-of relation. These are defined below.

(184) *Stage-of* ($\preceq_e$): $\lambda e1 \lambda e2.e1 \sqsubseteq e2 \wedge e1 \sim e2$

(185) *I-stage-of* ($i\text{-}\preceq_e$): $\lambda e1 \lambda e2.e1 \sqsubseteq_i e2 \wedge e1 \sim e2$

One additional notion that will be useful is that of the onset of a stage. This can be defined as the minimal i-stage of an event, which is to say the smallest event that's a cross-temporal initial part of that event. We will call the onset function O.

We're now ready for formal definitions of segemental and incremental homogeneity. Segmental homogeneity is defined in (186). This says that for some state realized at an interval i, all of the subintervals of i correspond to a *cross-temporally identical part* of s.

(186) *Segmental homogeneity of states:*
Let $s \in$ STATE and $\tau(s) \neq \perp$.
$\{\tau(s_1) : s_1 \preceq s\} = \{i : i \subseteq \tau(s)\}$

By contrast, incremental homogeneity is defined in (187). This says that activities are homogeneous in that the temporal traces of *initial* stages of an activity event e are identical to the *initial* subintervals of e up to the onset of e. The idea is that we're building the events incrementally, segment by segment. We are *not* looking at the segments individually, only their contribution to some larger stretch of time.

(187) *Incremental homogeneity of activities:*
Let $e \in$ EVENT and $\tau(e) \neq \perp$.
$\{\tau(e1) :$ **i-stage-of(e1,e)**$\} = \{j : \tau(O(e)) \subseteq_i j \subseteq_i \tau(e)\}$

In addition, Landman assumes that activity verbs are closed under cross-temporal identity. This is in (188). Essentially, what this says is that if an event is crosstemporally identical with another and belongs to an activity predicate, then that event is also in the activity predicate. Like the activity postulate in Landman (1992), this is necessary for the imperfective paradox. It ensures that a cross-temporally identical part of an activity event itself belongs to the activity predicate.

(188) *Activity verbs are closed under cross-temporal identity:*
Let α be an activity verb and let $[\![\alpha]\!] \subseteq$ EVENT be the interpretation of α.
If $e_1 \in [\![\alpha]\!]$ and $e_1 \sim e_2$ then $e_2 \in [\![\alpha]\!]$.

Now we will return to the illustration in Figure 4.2 in light of our new formal tools. Because we are now dealing with events instead of intervals, we need to briefly rethink what our figure represents. In Figure 4.3 we have an eventive version of Figure 4.2. The topmost node $e_{[1,6]}$ represents our entire biking event. Because events must be larger than a point, the segments representing the base before now represent our temporal axis. The dotted lines from subevents to segments $t_1 ... t_6$ are merely meant to visually connect the

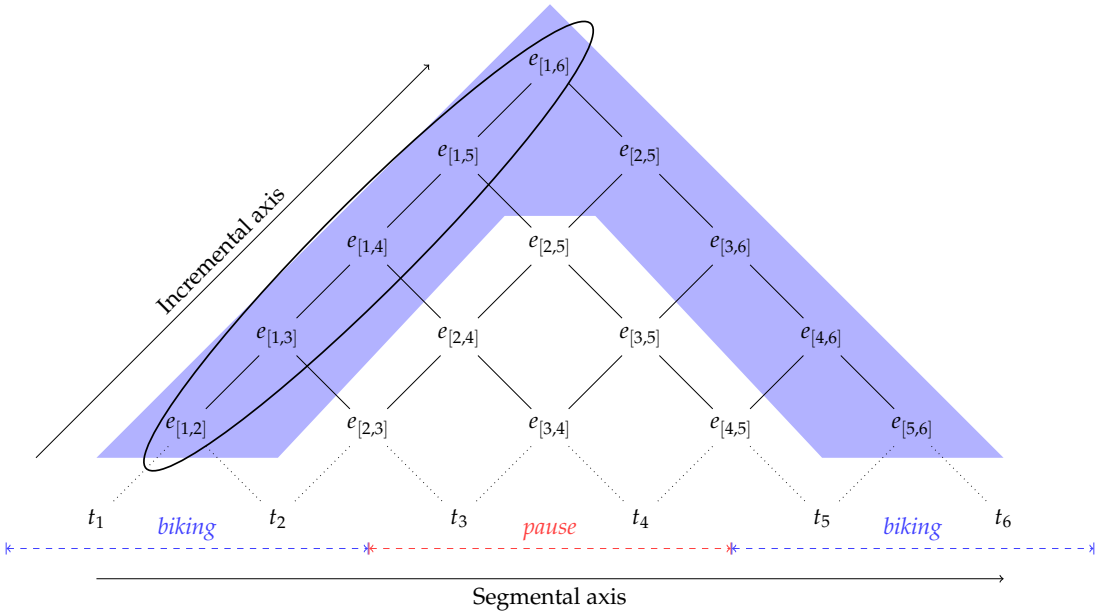


Figure 4.3: An eventive version of Figure 4.2.

events to the points of time the occur in. The subevents below $e_{[1,6]}$ are parts of $e_{[1,6]}$ across different intervals of time. The recognizable start of $e_{[1,6]}$, or the *onset* of $e_{[1,6]}$, $O(e_{[1,6]})$, then, is $e_{[1,2]}$. Again, because events must be larger than a segment, $e_{[1,2]}$ is the smallest initial part of $e_{[1,6]}$. It follows that $e_{[1,2]} \sim e_{[1,6]}$, and $e_{[1,2]} \sqsubseteq e_{[1,6]}$. Being the onset, $e_{[1,2]}$ is also an i-stage of $e_{[1,6]}$. In addition, we recognize $e_{[5,6]}$ as a cross temporal part of $e_{[1,6]}$. It is the same event as $e_{1,2,3,4,5,6}$, albeit a smaller part. By (184), it is a stage of $e_{[1,6]}$. Note that $\sim$ is an identity relation, making it transitive. Thus $e_{[1,6]} \sim e_{[1,2]} \sim e_{[5,6]}$. Also note that while $e_{[1,2]}$ and $e_{[5,6]}$ are stages of $e_{[1,6]}$, they are not stages of one another. They aren't parts of one another.

We are now ready to think about gaps in activity events, which will be very similar to the way we think about gaps between the subevents of a plural event. It seems intuitive that $e_{[3,4]}$ isn't cross-temporally identical to $e_{[1,6]}$. This follows from the closure of activity verbs under cross-temporal identity. If $e_{[3,4]}$ were cross-temporally identical to $e_{[1,6]}$, we would be in trouble because then $e_{[3,4]}$ would be in $[\![$*ride-bike*$]\!]$. Of course, our premise is that these *aren't* events in $[\![$*ride-bike*$]\!]$. The pause alone does not count as an event of Siobhan riding her

bike. However, if we think about them as increments to what came before, namely $e_{[1,2]}$, we do get events that are cross-temporally identical to $e_{[1,6]}$. These increments of $e_{[1,2]}$ are $e_{[1,3]}$ and $e_{[1,4]}$. Furthermore, they're *i-stages* of $e_{[1,6]}$, since they are both cross-temporally identical to and parts of $e_{[1,6]}$. The cross-temporally identical parts of $e_{[1,6]}$ are highlighted in the blue box in Figure 4.3. Again, because activity verbs are closed under cross-temporal identity, these are also in $[\![\textit{ride-bike}]\!]$. The events that we'd check to determine incremental homogeneity of $e_{[1,6]}$ are in the ellipse in the figure. We can see from this that $[\![\textit{ride-bike}]\!]$ is incrementally homogeneous. As we build segments onto the onset $e_{[1,2]}$ we continue to get cross-temporally identical parts of $e_{[1,6]}$.

A question immediately arises: when do gaps count as a continuation and not an end to an event? When does a "pause" become too long to count as a pause? This is both *contextual* and *subjective*. We come back to Landman's "schwung". As he puts it for a waltzing activity (emphasis my own): "The idea, then, is that the constraint on waltz is that as soon as an event has enough 'schwung' to count as waltzing, it continues to count as waltzing, for *as long as we are willing to count what we find as the same event* (cross-temporally)." In some way, the event and the gap itself has to write us an I.O.U. for the resumption of the activity after the pause. This is ultimately a subjective and contextual decision. Leading naturally to our discussion of pluractionality, Landman & Rothstein (2012) put it the following way for the activity reading, i.e., the iterative reading, of the semelfactive 'knock':

> "The requirement of contextual coherence tells us that the decision to generate more cross-temporally identical stages – in particular inertia stages – is a contextual decision: *you* decide that, even though there haven't been knocks for a while, the knocking isn't over yet, and *your* patience or impatience decides when the pause stretch is getting too long: if it is, you want another knock, or else you will terminate the cross-temporal identity, and put an end to what you count as one single knocking process." (p. 107)

It's worth remembering that cross-temporal identity is about what we count as a single

event for the purpose of counting. A series of knocks may count as a single event in this way. If a solicitor for a notorious cult makes several individual knocks on your door, you report that event to your friend by saying: "A cult member knocked on my door once." Even though there were several individual knocks, they cohered into a single event. This isn't to say that we can't also distinguish the individual knocks for the sake of counting. Our friend could felicitously reply with: "How many times did they knock? If it was four times, you are fine. But if it was seven times, you could be in trouble." The question isn't whether it *has to* be conceptualized as one event, but whether it can be for the sake of counting. Again, context and subjectivity play a role here. Before we get to iterative readings properly, however, let's briefly revisit the progressive in light of the above discussion.

4.2.2 The progressive again

This system lets Landman capture the fact that present progressive sentences can be uttered truthfully in the gaps of an activity event. In Landman (1992), he had to assume that, for the sake of the progressive, events, as stages, had to "squeeze into" moments to be true in the present tense. Given the longstanding assumption that the present tense is only true of moments of time and that events can never be instantaneous—they can never fit into a moment—this assumption regarding stages is problematic.

Instead, Landman proposes that the progressive is stative in that it projects from incremental stages of events to the endpoint of the stage. The endpoint of an event is a point, thereby a moment, and can hold of the present tense.

The definition of the English progressive is in (189).[1] This says that there is an i-stage e of an event e_1 that is a P event in the continuation branch of e, which is the modal relation

[1]Landman actually splits up the projection step (the stuff involving i) into its own operator. Because he stipulates that the progressive always comes with this operator, I've combined the work of that operator into the progressive here, and set aside some elements of his definition that we aren't concerned with here.

defined in Landman (1992), which we saw in chapters 1 and 2. The output is a set of intervals that correspond to the endpoint of e. Since the endpoint is a point, so too are these intervals. This corresponds to the i variable in the definition below. Thus this progressive is a function from sets of events to sets of points in time. Following Altshuler (2014), we will assume that the i-stage-of relation in English requires *proper* parts.

(189) $[\![\text{PROG}]\!]^{g,c} =$

$$\lambda P \lambda i \lambda w. \exists e[i = \text{end}(\tau(e)) \wedge \exists e_1, w_1[i\text{-}\prec_e(e, e_1) \wedge \langle e_1, w_1 \rangle \in \text{Cont}(e, w) \wedge P(e_1, w_1)]]$$

$$\text{Where } i\text{-}\prec_e = \lambda e1 \lambda e2[e1 \sqsubset_i e2 \wedge e1 \sim e2]$$

Let's now see how this definition allows present progressive sentences to hold true in the gaps in an activity event. We'll use the sentence in (190) for our example. Our scenario is the one depicted in Figure 4.4, which is just a repeat of Figure 4.3 with some additional annotations. The intervals $[t_1, t_2]$ and $[t_5, t_6]$ are the intervals where Siobhan is actively riding her bike. The interval $[t_3, t_4]$ represents the gap in between the true bike-riding intervals where Siobhan is taking a breather. The circled segment t_4 is the utterance time—the point where (190) is uttered. Thus the sentence in (190) is uttered during the pause. The structure for (190) is in (191), and the meaning is in (194). The meanings of the VP and the progressive applied to the VP are in (192) and (193), respectively.

(190) Siobhan is riding her bike.

(191) [PRES [PROG [$_{VP}$ *Siobhan ride her bike*]]]]

(192) $[\![[_{VP}\textit{Siobhan ride her bike}]]\!]^{g,c} =$

$$\lambda e \lambda w.[Ag(e, w) = \text{Siobhan} \wedge \textit{ride-bike}(e, w)]$$

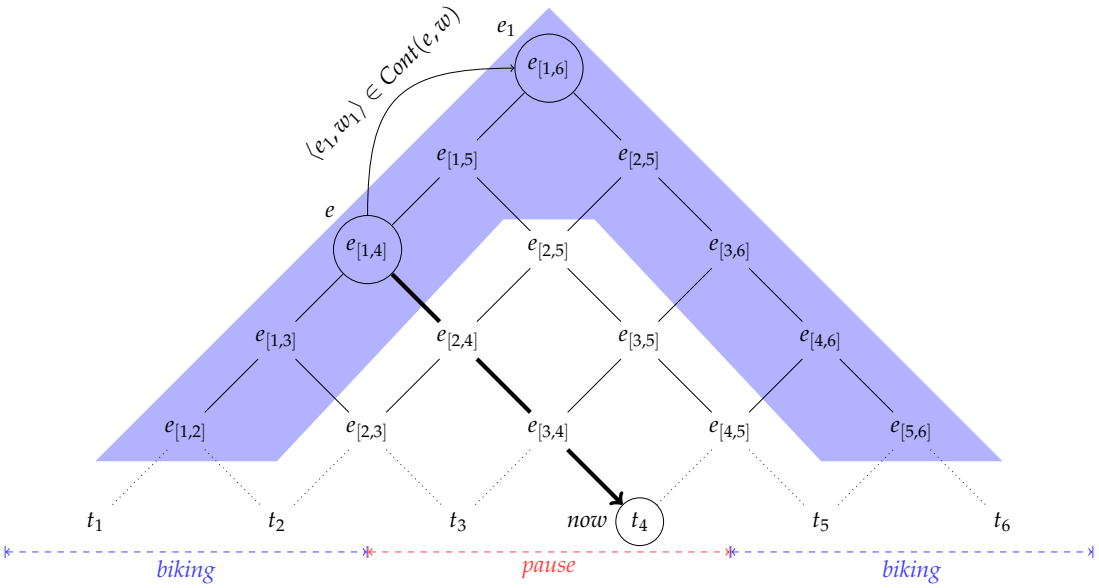


Figure 4.4: A version of Figure 4.3 showing the contribution of the progressive. The utterance time in the figure is t_4. The progressive checks if that time is the endpoint of an event that is cross-temporally identical to $e_{[1,6]}$ and has $e_{[1,6]}$ in its continuation branch.

(193) $[\![[\text{PROG}[_{VP}\textit{Siobhan ride her bike}]]]\!]^{g,c} =$

$$\lambda i \lambda w.\exists e[i = \text{end}(\tau(e)) \wedge \exists e_1, w_1[i\text{-}\preceq_e(e, e_1) \wedge \langle e_1, w_1 \rangle \in \text{Cont}(e, w) \wedge Ag(e_1, w_1) = \text{Siobhan} \wedge \textit{ride-bike}(e_1, w_1)]]]$$

(194) $[\![(190)]\!]^{g,c} =$

$$\lambda w.\exists e[g(i) = \text{end}(\tau(e)) \wedge \exists e_1, w_1[i\text{-}\preceq_e(e, e_1) \wedge \langle e_1, w_1 \rangle \in \text{Cont}(e, w) \wedge Ag(e_1, w_1) = \text{Siobhan} \wedge \textit{ride-bike}(e_1, w_1)]]],\ g(i) = \textit{now}$$

The formula in (194) says that there is some event e with an endpoint corresponding to $g(i)$—*now*—such that e is an initial stage of an event e_1 and a world w_1 in the continuation branch of e and w and e_1 is an event of $[\![\textit{ride-bike}]\!]$ in w_1 with Siobhan as its agent. Let's now look at the diagram, which omits the modal details for clarity. As before, cross-temporal identity is indicated by the blue box. The circled segment t_4 is the segment corresponding to *now*, which also corresponds to $g(i)$. Let's look at the event $e_{[1,4]}$. This is the event

corresponding to e in the formula. First, notice that the endpoint of its temporal trace is also t_4. This projection from the event to the endpoint of its temporal trace is indicated by the southeastward pointing arrow. From this diagram, we get a sense of this projection operation. We take an event on the incremental axis (the left edge of the pyramid), and project down the right edge of that event to find its endpoint. $e_{[1,4]}$ is an i-stage of $e_{[1,6]}$, as it is cross-temporally identical to and an initial part of $e_{[1,4]}$, and $e_{[1,6]}$ is an event of $[\![\textit{ride-bike}]\!]$. Note that t_4 represents a pause in the biking activity. The fact that the utterance time of (190) occurs during this pause isn't a problem because that pause, incrementally speaking, continues the event that came before. As an *endpoint* of a larger eventuality that develops, the pause doesn't pose a problem.

As far as the imperfective paradox is concerned, there is again no issue. The imperfective paradox concerns a difference between activity predicates and accomplishment predicates under the progressive. Past progressive sentences of activity predicates entail simple past versions of those sentences. As an activity, $[\![\textit{ride-bike}]\!]$ is closed under cross-temporal identity. Since $e_{[1,6]}$ is in $[\![\textit{ride-bike}]\!]$, $e_{[1,4]}$, being a stage of $e_{[1,6]}$, is also in $[\![\textit{ride-bike}]\!]$. If, on the other hand, our predicate were an accomplishment holding of $e_{[1,6]}$, the closure rule wouldn't apply and there's nothing providing that the accomplishment predicate also hold of $e_{[1,4]}$. The progressive sentence would still be true in this case, though, because $e_{[1,4]}$ is an i-stage of $e_{[1,6]}$ and $e_{[1,6]}$ is in the continuation branch of $e_{[1,4]}$.

For Balinese, to account for *sedeng*, the progressive auxiliary, and event-in-progress reading of bare sentences, I continue to follow Altshuler (2014) in assuming that the i-stage-of relation is parameterized within Balinese. The progressive *sedeng* is like the English progressive in that it requires proper i-stages. Thus the meaning of *sedeng* is provided in (195). The progressive that generates event-in-progress readings of bare sentences, by

contrast, doesn't require proper stages. This progressive operator is in (196). By virtue of allowing non-proper stages, this gives it a perfective-like meaning as well (Altshuler 2014).

(195) $[\![sedeng]\!]^{g,c} = [\![\textsc{Prog}]\!]^{g,c} =$

$$\lambda P \lambda i \lambda w. \exists e[i = \text{end}(\tau(e)) \wedge \exists e_1, w_1[i\text{-}\prec_e(e, e_1) \wedge \langle e_1, w_1 \rangle \in \text{Cont}(e, w) \wedge P(e_1, w_1)]]$$

(196) $[\![\textsc{Prog}_{neut}]\!]^{g,c} =$

$$\lambda P \lambda i \lambda w. \exists e[i = \text{end}(\tau(e)) \wedge \exists e_1, w_1[i\text{-}\preceq_e(e, e_1) \wedge \langle e_1, w_1 \rangle \in \text{Cont}(e, w) \wedge P(e_1, w_1)]]$$

In the next, section we will consider how plural eventualities compose with the progressive in iterative readings. This will require first redefining pluractionality. Once we do this, we will see that the the progressive treats plural events just like it does activities. This allows the present progressive to hold true when uttered during the gaps of a series of events. I will also show that the cross-temporal identity relation suitably constrains the kinds of plural events the progressive can directly compose with.

4.3 Pluractionality, iterativity, and incremental homogeneity

The problem of pauses in activities, with some additional considerations, extends directly to iterative readings with the progressive. We can, truthfully, utter progressive sentences of iterative predicates even when the utterance time is between the subevents composing the iteration. This is the case in (197), for example.

(197) I am driving to school repeatedly (today, in order to drop off books).

In this section, we will consider iterativity in terms of the contribution of pluractionality. Before we do this, we must reconsider pluractionality. As far as I can tell, one thing that has not been fully addressed in the literature on pluractionality in general is the fact that

we need *parts of atomic events* in our models. This is evident in the contribution of the progressive, which I've argued describes parts of culminating eventualities. As I hinted at in chapter 1, previous theories of pluractionality fail to account for this fact, which is most relevant for activity predicates. Next, I will show why these theories fail to account for activities. I will also argue that, luckily, we already have the tools we need to adequately capture pluractionality in the cross-temporal identity relation. We will use this relation to collect only *maximal* events as subevents composing a plural event.

4.3.1 Pluractionality revisited

Before we address the previous theories of pluractionality specifically, I will describe the general problem that activity predicates pose for a theory of pluractionality. At the heart of this problem is the fact that activity predicates are, at least somehow, homogeneous.[2] Given a large enough event satisfying an activity predicate, the parts of that event may also satisfy that activity predicate. Given this, we can trivially satisfy some definitions of pluractionality using the parts of this larger event. Thus nearly any activity event can trivially satisfy these definitions of pluractionality. Intuitively, we want pluractionals to only count "whole" activity events and not their parts.

Let's go back to our scenario represented by Figure 4.3, where Siobhan bikes for a bit, stops and takes a breather, and then bikes some more. Intuitively, what this situation describes should not satisfy a pluractional. It describes *one* event, despite the fact that there's a pause in the middle. Our model, however, includes several eventualities. It includes $e_{[1,6]}$, the event that is really the "one" the scenario describes. It also includes parts of $e_{[1,6]}$, like $e_{[1,2]}$ and $e_{[5,6]}$, that are cross-temporally identical to $e_{[1,6]}$. We don't *talk* about these as

[2]This was suggested to me by Gennaro Chierchia, p.c.

separate events, but our model includes them as such. Intuitively, these events shouldn't count as separate events for the purposes of pluractionality.

Note that this applies to *any* activity event, not just those with gaps. The parts of complete activity events are themselves activity events. Activities are (partly) homogeneous. If I run (without stopping) from 3pm to 4pm, I also run from 3pm to 3:15pm, from 3:15pm to 4:30pm, and so on. The parts of the run themselves count as running events. For the purposes of pluractionality, however, we don't want to count these parts as potential subevents. Otherwise, almost any activity event would count as multiple events for the purposes of the pluractional.

We can see this principle at work in Balinese. In the example in (198), we have a context where the parts, each lap, of a single larger swimming event are relevant individually, but the pluractional can't be used because it is really a single event.

(198) *Context: Ayu is swimming laps in the pool.*
#Ayu ngelangi~langi
Ayu AV.swim~REDUP
Intended: "Ayu is swimming laps repeatedly."

We could maybe try to find some way to ontologically separate event parts from their maxima, "the" events that we intuitively recognize as individual events. These would be, then, two separate domains of events, and pluractionals would only see the domain of "complete" events. The problem with this is that it would be highly stipulative. As I argued in chapter 1, the parts of "complete" activity events must be able to count as atomic events in their own right. To see this, let's consider an event e which is an event of me walking from my house to the train station. To get there, I go through the market and the park. Let's call the event of me walking through the market e_1, and the event of me walking through the park e_2. The sentence "Gunnar walked from his house to the train station" is true, given

e. So is "Gunnar walked through the park" for e_1 and "Gunnar walked through the market" for e_2. But e_1 and e_2 are parts of e. This means that the parts must be just as available to us for descriptions as much as complete events. As a result, we seemingly have to separate the two domains solely for pluractionality, which is an unappealing move.

I will now show how the accounts of pluractionality we previewed in chapter 1 fail to account for activities. First I discuss the event based theories of Lasersohn (1995) and Henderson (2012). I follow this with discussion of the interval-based theory in van Geenhoven (2004), which fails for slightly different reasons.

4.3.1.1 Event-based pluractionality

The event-based account of pluractionality is best represented by Lasersohn's (1995) seminal account. I will address his theory specifically, but the reasoning applies identically to the theory in Henderson (2012). Recall that for Lasersohn the basic pluractional has the meaning in (199). This says that there is a plural event with n-many subevents, all the subevents satisfy P, and the subevents do not overlap temporally. A note: if the betweenness condition is active, then the rest of the problem discussed here may not apply, but the problem that applies to the theory in van Geenhoven (2004) will apply here as well.

(199) $\textit{V-PA}(X) \Leftrightarrow \forall e, e' \in X[P(e) \wedge \neg\tau(e) \circ \tau(e') \wedge \text{card}(X) \geq n]$

This approach suffers because activities are, in some way, homogeneous. A part of an event satisfying an activity predicate also satisfies that predicate, as we saw above. Thus event-based accounts fail because an individual activity event can satisfy the pluractional trivially. We can take a "whole" activity event and slice it down into parts. Since the parts each satisfy the base predicate independently, they alone can satisfy the definition in (199) assuming that we can slice up a sufficient number of them from the complete event.

This exact problem plagues the theory of pluractionality in Henderson (2012). I will not going into the details here, except to note that Henderson's pluractional differs slightly from Lasersohn's in requiring specifically that the subevents must be atomic in their own right. To head off any claim that this somehow saves theory, I note that the parts of an activity are themselves atomic. Consider the event of me walking to the train station above. It's clear from the discussion of that example that the parts must be atomic in their own right.

Now, again, Lasersohn's betweenness condition can, at first glance, ameliorate this. That condition requires there be temporal gaps between subevents. In this case, not *any* activity event can be sliced up, since it would create temporally adjacent event parts. However, as we have seen in the discussion of incremental homogeneity, individual activity events *may* in fact have temporal gaps. Since this is the central problem for interval-based accounts of pluractionality, I defer the details of this problem to the next section, to which we now turn.

4.3.1.2 Interval-based pluractionality

The interval semantics approach is best represented by van Geenhoven (2004). The central idea behind her proposal is that pluractionals stipulate hiatuses between events denoted by the verb. Ironically, this is motivated by activity predicates. She notes that the Krifka's (1989) definition of frequentive interpretations, provided in (200), comes out trivially true for activity predicates. (200) says that a relation R is iterative if one part of an object x is subjected to two different parts of an event e.

(200) $\forall e, x, R[\text{ITER}(e, x, R) \leftrightarrow R(e, x) \wedge \exists e' \exists e'' \exists x' [e' \subseteq_E e \wedge e'' \subseteq_E e \wedge \neg e' = e'' \wedge x' \subseteq_O X \wedge R(e', x') \wedge R(e'', x')]]$

This is trivially true for activities because parts of an activity event are themselves

events of that activity. This is essentially the critique of Lasersohn's account I just sketched above. For van Geenhoven, however, the problem with (200) is that we need there to be hiatuses, or temporal gaps, between subevents for activities. Thus in her account of the West Greenlandic pluractional marker *-tar-* she builds hiatuses into the meaning directly. Effectively, on her account, there must be an interval of time between subevents where an event of the base verb is not ongoing.

The problem here is that hiatuses are not sufficient for pluractional activities for the same reason that they pose problems for the progressive. As we have seen, a "single" activity event may actually have gaps or pauses where the activity is not, strictly speaking, ongoing. The hiatus condition, therefore, can still be satisfied by activities that we conceptualize as single events, activities which cannot actually be felicitously described using a pluractional.

In our bike riding example, we do have a hiatus between events of bike riding: the pause represented by interval $[t_3, t_4]$. Intuitively, though, this pause continues the bike riding event. We could not really say of $e_{[1,6]}$ that Siobhan rode her bike *repeatedly*. Yet, under van Geenhoven's semantics of pluractionality, this event would satisfy a pluractional. So hiatuses alone are not going to get us what we want. This applies to the betweenness condition that Lasersohn proposes as well.

To summarize, activities are problematic for previous accounts of pluractionality because: 1) activity events are trivially made up of parts that also satisfy the activity verb, rendering some event-based definitions of pluractionality trivially satisfied by activities, and 2) because an individual activity event may have pauses, or temporal gaps, rendering interval-based accounts insufficient for fully ruling these individual activities out as themselves pluractional. What we actually need for activity predicates is a way to demarcate "whole" or "complete" events from their parts. I will argue in the next section that

cross-temporal identity is the tool we need to do this.

4.3.2 A new analysis of pluractionality

In order to capture the interpretation of pluractional activity VPs, we need to collect only "whole" activity events and not their parts. I propose that cross-temporal identity provides exactly the mechanism we need to do this. Recall that one of the properties of cross-temporal identity is that every equivalence class of cross-temporally identical events has some maximal element. This maximal element is the element that includes all other cross-temporally identical events as parts. So in our example represented by Figure 4.3, the maximal element for the equivalence class of, say, $e_{[1,2]}$ for $\sim$ will be $e_{[1,6]}$, the top node. All other cross-temporally identical events of $e_{[1,6]}$ are parts of $e_{[1,6]}$, and it is a part only of itself.

Pluractionals are concerned with maximal events in this sense. A pluractional should be collecting only events like $e_{[1,6]}$ and none of its parts. One additional consideration is that this collection is *relative to the predicate*. Imagine that the biking scenario we have sketched above is merely one leg of an event of Siobhan traversing the trail, which we'll call e_t. She bikes the first half and walks the second half. It stands to reason that $e_{[1,6]}$ is a proper stage of this larger traversal event. As a proper stage of e_t, $e_{[1,6]}$ is a cross-temporally identical event to e_t and a proper part of e_t. This precludes $e_{[1,6]}$ from being the maximal event in the equivalence class outright. However, as an *activity of biking* it is maximal, and for the purposes of pluractionality we would want to treat it as an individual biking event.

I propose that pluractionals involve the following maximality operator, in (201), which is a function from sets of events to sets of events (type: $\langle\langle v, st\rangle, \langle v, st\rangle\rangle$). This says that for some predicate P, return the set of events that are not cross-temporally identical proper parts of any other event in P. This properly gets us $e_{[1,6]}$ but not, say, $e_{[1,2]}$ because $e_{[1,6]}$ is

cross-temporally identical to it without being a part of it.

(201) *Max*:
$\lambda P \lambda e \lambda w . P(e)(w) \wedge \forall e' [P(e')(w) \wedge e' \sim e \rightarrow e' \sqsubseteq e]$

MAX operates as a filter on the kinds of events that pluractionals collect. It rules out the parts of activity events that rendered pluractionality trivial for activities in previous event-based theories. Further, it doesn't rely on temporal contiguity like interval-based accounts do, which is problematic for activities that are not quite homogeneous temporally.

Now we need to introduce event plurality into our system. Following Link (1983), Bach (1986), among many others, I assume that, in addition to singular (or atomic) eventualities, we have a domain of plural events built from *sums* of those atomic eventualities. We enhance our domain EV, the set of atomic eventualities, as EV+, a superset of EV, which we will define in terms of the sum operation $\oplus$. EV+ is built of the sums of the elements in EV. This is in (202), adapted from Bach (1986). EV+ is partially ordered by the *individual part* relation $\leq$. I assume a special version of $\leq$, $<_{AT}$ that holds true only if the first element is an atomic part of the second.

(202) If $\alpha, \beta \in$ EV+, then the sum of α and β, $\alpha \oplus \beta$, is in EV+.

Further, I assume an operator $*$ that closes predicates under sum formation. This is defined in (203). Following Henderson (2012), I assume $*$ applies to a predicate before being fed into the Balinese pluractional. This means that predicates denote atoms and the sums of these atoms. This was discussed in chapter 2, and I briefly address it again below.

(203) Cumulative closure (Link 1983; Krifka 1989): $*P$ is the smallest set P' such that:
a. $P' \supseteq P$
b. $\forall x, y [P'(x) \wedge P'(y) \rightarrow P'(x \oplus y)]$

Now that we have event plurality, I will argue that pluractionality should be defined in terms of MAX. In fact, I propose that our pluractional involves *only* a maximality condition

and a condition insuring that more than one maximal event composes the plural event. I provide the definition of the Balinese pluractional operator PLUR in (204). This will return a set of events with at least n atomic parts that are maximal relative to P. Following Lasersohn (1995), the cardinality restriction n is a number that is provided by the context.[3] Note that this definition of pluractionality, assuming cumulative closure, filters out atomic eventualities from the cumulatively closed denotation of the predicate.

(204) $[\![\text{PLUR}]\!]^{g,c} =$

$$\lambda P \lambda e \lambda w . P(e)(w) \wedge \text{Card}(e) > n \wedge \\ \forall e' [e' <_{AT} e \rightarrow \text{MAX}(P)(e')(w)]$$

Recall that the pluractional meaning associated with Balinese reduplication is quite general. In bare sentences, it has both simple iterative readings where events may occur close together temporally and habitual readings. It also exhibits participant readings. On these readings, multiple entities participate in events of the same kind, potentially concurrently.

Before moving to the interaction of pluractionality with the progressive, I will first show that this proposal can capture both the temporal readings of the pluractional and the participant-based readings of the pluractional.

4.3.2.1 Temporal readings

The key thing to capture with temporal readings is that it actually picks up activity events in the way we intend. Let's consider the example with the swimming event in (198). We'll consider the overall swimming event e and three laps that take place as parts of e, which we'll call e_1, e_2, and e_3. As an activity event, $e \sim e_1 \sim e_2 \sim e_3$. Let's consider their sum

[3] Lee (2016) argues that pluractionals should actually be decomposed such that the cardinality restriction is contributed by a separate operator. This is fitting with the spirit of this proposal, though I do not do so here.

$e_1 \oplus e_2 \oplus e_3$. We can see that this does not satisfy PLUR. While $e_1 \oplus e_2 \oplus e_3$ satisfies $[\![langi]\!]$ 'swim', assuming the cardinality restriction is just 2, the individual parts do not satisfy MAX. Let's consider just e_1. It's true that $e_1 \sim e$, i.e., e_1 is cross-temporally identical with e. However, e is *not* a part of e_1, so e_1 does not satisfy MAX. This same reasoning applies to e_2 and e_3. As such, $e_1 \oplus e_2 \oplus e_3$ does not satisfy PLUR.

The idea that these contiguous events of swimming do not count as individual events on their own right is supported experimentally. Wellwood, He & Farkas (2019) report that the presence of pauses in an event has a significant effect on people's choice to count something as a single event or multiple events. Temporal gaps may be an almost necessary condition, but not a *sufficient* condition as we saw in the case of activity predicates, for the individuation of events for the purposes of pluractionality. Thus this experimental result tracks with the interpretation of pluractionality as well, something that the definition of pluractionality that I provide here accounts for.

Now let's consider a case where there are significant pauses between events, suggesting that the events are maximal in their own right. Let's assume that there is some event e that consists of a one hour period of Ayu swimming, and this is all the swimming Ayu does on that day. It's clear that e is a maximal swimming event, nothing before or after it suggests that this swimming event is part of some larger process. It is not cross-temporally identical with any events of swimming that are not parts of it, and therefore it satisfies MAX. If we collect three events like e occurring over three different days into a sum, this sum would satisfy PLUR. They all satisfy $[\![langi]\!]$ and MAX.

What about an edge case where Ayu swims for a bit, then takes a break for a couple hours before swimming some more? We might expect some variability in this case. Remember that $\sim$ is highly contextual and subjective, and depends on what we consider one event

for the purposes of counting. However, when events get closer and closer temporally, it is more and more likely that we consider them to be one and the same event.

This definition of pluractionality doesn't impose any additional constraints on the temporal relation between subevents. This is good. The Balinese pluractional in bare sentences does not appear to be sensitive to temporal distance in this case.

4.3.2.2 Participant-based readings and i-level predicates

Recall that individual-level predicates like *be tall* yield only the participant-based readings. This is illustrated in (205) repeated from chapter 3.

(205) a. #Ayu tegeh~tegeh
Ayu tall~REDUP
Intended: "Ayu is tall."

b. anak muani-ne tegeh~tegeh
person male-DEF tall~REDUP
"The boys are tall." (NOT: "The boy is tall.")

This account of pluractionality straightforwardly accounts for this. Individual-level statives like *be tall* hold throughout one's lifetime. Tallness doesn't flip on and off; it persists. Given that, for a single individual, a state of tallness will fail to have any temporal gaps (periods where the individual fails to be tall), there is exactly one maximal state where *tall* will hold true for that individual. Therefore, when MAX applies to a predicate like ⟦*Ayu be tall*⟧, it will return exactly one state lasting (almost) Ayu's entire life. It will therefore be impossible to satisfy PLUR, which would require at least two states. This renders individual-level predicates infelicitous with single participants as expected.

On the other hand, there may be multiple states of *boys* being tall, because we can collect a state of tallness from more than one individual boy. Nominals like *anak muanine* 'the boy(s)' are number neutral. It's forced to have a plural interpretation in this case because

there is exactly one maximal state of tallness for each person. Thus for the sentence in (205b) to be true, *anak muanine* must be interpreted as plural.

With an adequate definition of pluractionality in place, let's now turn to the composition of pluractional VPs with the progressive.

4.3.3 Progressivity meets pluractionality

In this section, I explain why pluractional reduplication with the progressive in Balinese has iterative interpretations but not habitual ones. This empirical fact is shown again in the data in (206) repeated from (169) above. I will show that the distinction between these readings falls out naturally from our adopted definitions of the progressive and pluractionality, and is largely traceable to the cross-temporal identity relation. The intuition behind the analysis here is that iterative events lead a double life. At once, they are multiple events: the subevents composing the iterations. At the same time, though, they can be considered a complex event that happens on a single occasion. This is unlike habits which are composed of a series events that occur on multiple occasions and are not conceivable as a single event in progress. The idea behind this section will be that iterative readings maintain cross-temporal identity as they progress, and are therefore incrementally homogeneous like activities are. The kinds of plural events that compose habits, on the other hand, have larger temporal gaps, and cross-temporal identity is not maintained as the plural event progresses. The gaps are simply too large to maintain cross-temporal identity. Thus these plural events with larger gaps *are not* incrementally homogeneous, so the progressive cannot felicitously be used with these kinds of plural events. For habitual readings of the progressive, we need an additional operator, the dispositional causative, to intervene between the progressive and pluractional VPs, and I cover this in the section 4.

(206) a. Ayu nginem~nginem teh
Ayu AV.drink~REDUP tea
"Ayu drinks tea." or "Ayu is drinking tea repeatedly."

b. Ayu **sedeng** nginem~nginem teh
Ayu PROG AV.drink~REDUP tea
Only: "Ayu is drinking tea repeatedly."

The distinction I draw here between iterative plural events which are incrementally homogeneous and habitual plural events that are not actually bears some resemblence to a distinction drawn in Cusic's (1981) landmark study of pluractionality. In that dissertation, Cusic argues for a tripartite distinction in the meaning of pluractionals. As we saw in chapter 1, he argues that there are actually two subcategories of event-external pluractionality. To define this category, he uses the intuitive, though nebulous, notion of an occasion. This is illustrated by example. He says that (207) has two readings, which he characterizes in (208). In the first reading, there is a significant amount of temporal distance between the two doorbell ringing events, potentially an entire day. In the second reading, he, standing at the door, presses the button twice in succession.

(207) The salesman rang the doorbell twice.

(208) a. On two separate occasions he rang the bell once.
b. On one occasion he rang the bell two times.

Using this intuition, Cusic defines the following three kinds of event plurality. In this categorization, what is commonly known as event-external pluractionality is split into the latter two categories. The first of these (209a) corresponds to event-internal pluractionality, and does not concern us here.

(209) Cusic's (1981) tripartite division of event plurality:

a. Plurality is internal to an event if a single event on a single occasion consists of internal phases;

b. Plurality is external to an event but internal to an occasion if a single bounded event (internally plural or not) is repeated on a single occasion;
c. Plurality is external to event and occasion if a single bounded event is repeated on separate occasions.

While subsequent work in pluractionality generally discards this tripartite distinction in favor of a bipartite one where the last two distinctions are collapsed into one (Wood 2007; Henderson 2012), we see evidence of a distinction resembling this again in our Balinese data. The bare sentence may have both the iterative reading (a 'repetition within an occasion' reading) and a habitual one (a 'repetition across multiple occasions' reading), while the progressive sentence may only have the iterative one.

While I do not endorse Cusic's distinction as a subcategorization of pluractional constructions *per se*, I suggest that we do see a distinction in kinds of plural events in their interaction with progressive aspect. Plural events with shorter temporal gaps (plural events like those in the definition in (209b)) combine naturally with the progressive, while plural events with longer temporal gaps (like those in the definition in (209c)) do not.

In particular, I argue that this distinction arises when we consider cross-temporal identity of plural eventualities. In particular, plural eventualities are distinguished by being incrementally homogeneous or not. The progressive can only felicitously compose with predicates of incrementally homogeneous events. Thus the progressive in Balinese can only be used to describe iterative scenarios, where the gaps are not too large and cross-temporal identity can be maintained as the plural event develops. In habitual scenarios, the gaps are too large and the cross-temporal identity fails to be maintained through the gaps. Because cross-temporal identity isn't maintained through the gaps, the progressive can't be used to describe them.

Recall that the definition of the progressive requires that there be an event that is an

i-stage of some VP event in its continuation branch. As we defined i-stage, an event is an i-stage of another if it is an initial part of that event and cross-temporally identical with that event. An event is cross-temporally identical with another when we are willing to count one event as 'one and the same' as another for the purpose of counting. Intuitively, it seems contradictory to apply this principle to plural eventualities. Plural eventualities are plural, after all, so what does it mean for a plural event to *ever* count as one event?

Here I appeal to the double life of iterative events. At once, we can count the eventualities composing the plurality. However, we are also quite capable of describing the *entire iteration* as a single, incrementally homogeneous event. If someone knocks on a door several times, we can count the knocks or count the overall iteration as one event.

In order to see this concept in action, we now simply have to consider what happens when a pluractional VP meets PROG. Immediately when trying to compose the two, however, we encounter a problem. Recall that the present tense progressive can hold true of an event when the utterance time is located in a gap between subevents. When we dealt with this problem with activities, we said that we look at that pause not on its own but *as a part* of what came before it. The problem here is that the pause between subevents *is not* part of the plural event. Let's consider an example to make this clearer. Let's say we've got two events of me drinking coffee: e_1 and e_2 and these events are temporally discontiguous. So, $\tau(e_1) = t_{[1,2]}$ and $\tau(e_2) = t_{[5,6]}$. The gap here is the interval $t_{[3,4]}$. Let's say that there's some event e_w that's an event of me writing that takes place during the gap, so $\tau(e_w) = t_{[3,4]}$. Now, we want to check if the present tense progressive is true for $[\![\text{PLUR}(\textit{Gunnar-drinks coffee})]\!]$, which consists of only $e_1 \oplus e_2$. The utterance time is t_3, during the gap. For the progressive, we want to find an event with the endpoint t_3 and see if it's a stage, which is to say a cross-temporally identical *part*, of the plural event $e_1 \oplus e_2$. Here's the problem: there is no

such part! What we are looking for in this case would be e_1 plus part of the writing event e_w happening during the gap, let's call it e_{w1}. But $e_1 + e_{w1}$ is *not* part of $e_1 \oplus e_2$. The task now, then, is to figure out how e_w is connected to $e_1 \oplus e_2$. More generally, we need a way of joining plural events with the stuff happening in between them.

Put another way, we need to make plural events *temporally convex*. We need to make the plural events temporally contiguous somehow. That iterative processes are temporally convex is argued by Egg (1995). Mirroring in certain ways the homogeneity properties of stative and activity predicates, he notes a difference in the behavior of stative predicates and iterative ones in the presence of *for* adverbials. Modified versions of his examples are in (210) and (211). In (210), the *for* adverbial counts the time Max was in his office. It doesn't count the gaps. This is not the case for the iterative sentence in (211), where gaps are counted for the sake of the *for* adverbial.

(210) *Context: Max was in the office from 8am to noon, and from 2pm to 5pm.*

a. Max was in his office for 7 hours.

b. #Max was in his office for 9 hours.

(211) *Context: Amelie went to the the letter box every 5 minutes, each visit lasting a minute, during a three hour span of time. Thus she spent a total of 36 minutes in front of the letter box.*

a. Amelie visited the letter-box repeatedly for three hours

b. #Amelie visited the letter-box repeatedly for 36 minutes.

The main idea behind the following section is that, to make plural events temporally convex, we graft the subevents with the "gappy" events between them, the stuff that happens between each subevent. We now face a different problem: What are these "gappy" events? What exactly are we sticking between each subevent? To a certain degree, it doesn't matter what they are. It can be anything that takes place between the events we're actually concerned with, the subevents composing the plurality. As far as the progressive is

concerned, the role of the gappy events is to provide us information as to the next occurrence of one of the subevents. I take it that this could be practically anything. What I propose, then, is that we join the events in the plural eventuality with *every event occurring in between them*. To do this, I will make use of Krifka's (1989) fusion (FU) and maximal event (MXT) operators. The fusion operater in (212) returns the supremum of a predicate P, or the event such that all events satisfying P are parts of it. The operator MXT in (213) returns the maximal event at a time t. I modify MXT to define the CONV function in (214). This function returns an event e where, for all intervals of time between the gaps in a plural event, there is some event that is an individual part of e that is the fusion of all events happening at that time. I will call this the converse of the plural event. Here, LEFT is a function returning the earliest point in time of the subevents of a plural event. RIGHT returns the latest point in time of the subevents of a plural event. By joining the converse of a plural event with the plural event itself, we get the temporally convex event we are looking for. This is in (215). Note that CONV is just the identity function if its input is atomic. This means that it applies vacuously to atomic eventualities.

(212) *Fusion (Krifka 1989):*

$$\forall x \forall P[FU(P) = x \leftrightarrow \forall x'[P(x') \rightarrow x' \sqsubseteq x] \wedge \forall x''[\forall x'[P(x') \rightarrow x' \sqsubseteq x''] \rightarrow x \sqsubseteq x'']]$$

(213) *Maximal event at a time t (Krifka 1989):*

$$\forall e \forall t[\text{MXT}(e,t) \leftrightarrow e = \text{FU}(\lambda e[\tau(e) \sqsubseteq t])]$$

(214) *Converse of a plural event:*

$$\text{CNVR} = \lambda e' \lambda e. \forall t[\text{LEFT}(e') < t < \text{RIGHT}(e') \wedge \neg t \circ \tau(e') \rightarrow \exists e'' < e[e'' = FU(\lambda e'''.[\tau(e''') = t])]]$$

(215) *Convex counterpart of a plural event:*

$$\text{CONV} = \lambda e \lambda e'. \begin{cases} \exists e''[e = e' + e'' \wedge \text{CNVR}(e')(e'')] & \text{if } e \text{ is plural} \\ e' = e & \text{if } e' \text{ is atomic} \end{cases}$$

As we trace along these temporally convex events and we hit a gap, we may look to any part of what is happening in the world at that time to determine if we are looking at a cross-temporally identical part of the convex eventuality, i.e., whether that part counts as a continuation of the iterative process. I assume that cross-temporal identity will sufficiently constrain the events that count as cross-temporal identical parts of this convex eventuality. If we take the tea drinking example in (206) and we encounter a gap and look at something happening on the other side of the world, it will technically be a part of this convex eventuality, but it won't be a *cross-temporally identical part* of that eventuality.

By assuming that CONV applies vacuously to atomic eventualities, we can posit that it is always present in the definition of the progressive. However, it only actually *matters* when the progressive meets a plural eventuality. Further, I assume that only the stage-of relation in particular cares about this convex eventuality. The revised definition of the progressive incorporating CONV is in (216). In the formula, e_2 is the convex version of e_1.

(216) *Progressive for convex plural events:*

$$\begin{aligned} [\![\text{PROG}]\!]^{g,c} = \\ & \lambda P \lambda i \lambda w. \exists e[i = \text{end}(\tau(e)) \wedge \\ & \exists e_1, e_2, w_1[i\text{-}\preceq_e(e, e_2) \wedge \text{CONV}(e_1, e_2) \wedge \\ & \langle e_2, w_1 \rangle \in \text{Cont}(e, w) \wedge P(e_1, w_1)]] \\ \text{Where } i\text{-}\prec_e &= \lambda e1 \lambda e2[e1 \sqsubset_i e2 \wedge e1 \sim e2] \end{aligned}$$

Just to reiterate, we need these convex versions of plural events because we need to be able to retrieve what's happening between the plural events as parts of (a version) of these plural events. The plural events alone do not give us this, but these convex versions of them do.

Let's consider what happens when a progressive meets a (convex) plural eventuality. The important piece is the i-stage-of relation, in particular the notion of cross-temporal identity. This relation says that one event is an initial part of that event and is cross-temporally identical with it. First we'll illustrate a scenario using Figure 4.5. We'll assume that we have three "full" activity events, labeled in the diagram with subscripts α, β, γ. We'll say they are in the predicate $[\![\textit{ride-bike}]\!]$. Each of e_α, e_β, and e_γ satisfy MAX. Each of these activity events can further be broken down into parts, labeled e_1, e_2, etc., which is indicated by the dotted lines. These maximal events form the sums indicated above them, with the sum of each maximal event being $e_\alpha \oplus e_\beta \oplus e_\gamma$. Between each of the maximal activity events, we also have the *pause events*, p_3 and p_6 taking place between each one. These pause events as the fusion of everything going on while the subevents of $e_\alpha \oplus e_\beta \oplus e_\gamma$ aren't happening. This picture is simplification in this regard. The pause events are very dense in the sense that they have as parts everything happening in the time between the subevents of the plurality. As far as $[\![\textit{ride-bike}]\!]$ goes, however, the parts of p_3 and p_6 that really *matter* are things like Siobhan's actions. These are the kinds of events that tell us if the plural event "continues" through the pause. By applying CONV to the topmost node, the plural event $e_\alpha \oplus e_\beta \oplus e_\gamma$, we get the event e_{conv} which is the fusion of the plural event with the pause events. Again, the dotted lines show that all of the events along the bottom axis are material parts of this convex event.

In order to understand how cross-temporal identity works for this convex plural eventuality, we turn to the Figure 4.6. First, notice that $e_{[1,2]}$, $e_{[4,5]}$, and $e_{[7,8]}$ are the atomic subevents of the plural event $e_\alpha \oplus e_\beta \oplus e_\gamma$. These subevents are surrounded by dotted circles in the figure. Notice also that there is no event here directly corresponding to $e_\alpha \oplus e_\beta \oplus e_\gamma$. The topmost node of this convex event includes as parts p_3 and p_6, and the plural event does

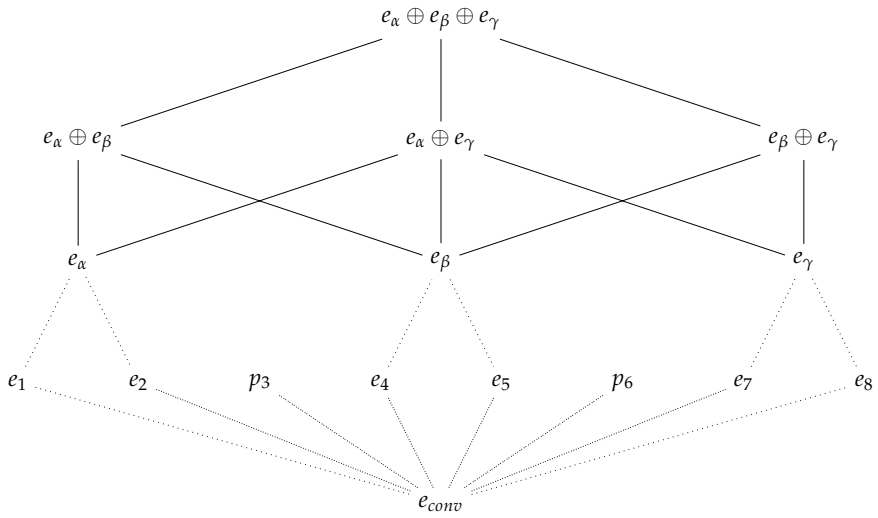


Figure 4.5: The parthood structures for events e_α, e_β, e_γ. The top node represents their sum: a plural event. The bottom node is the convex version of that sum: the plural event fused with the events happening in-between them.

not. This is what makes it convex.

To establish the cross-temporal identity relation in this case we need to first establish the onset of e_{conv}. To be a cross-temporally identical part of an iterative event like e_{conv}, the onset must carry some import of its iterativity. I suggest that the first moment at which an iterative event is recognizable as iterative is somewhere in the initial pause. This is the soonest that "schwung" can be established, where an event reveals itself to part of a series. The onset of e_{conv}, then, is $e_{[1,3]}$, the first event plus the pause, and is surrounded in the figure with a dashed box. This is the smallest event in this case where we know we are dealing with something iterative. Notice that this also holds for $e_{[4,6]}$ as well. I take it that the end of one subevent, the pause, and the beginning of another subevent are also good candidates for cross-temporally identical events; events built from these are highlighted with a dotted pattern in the figure. Notice that events starting with the pauses, e.g., $e_{[3,5]}$ and onward, are not licit onsets. The onset has to at least begin with some part of a plural subevent. In some circumstances or for some speakers, events like $e_{[2,3]}$ may even be cross-temporally

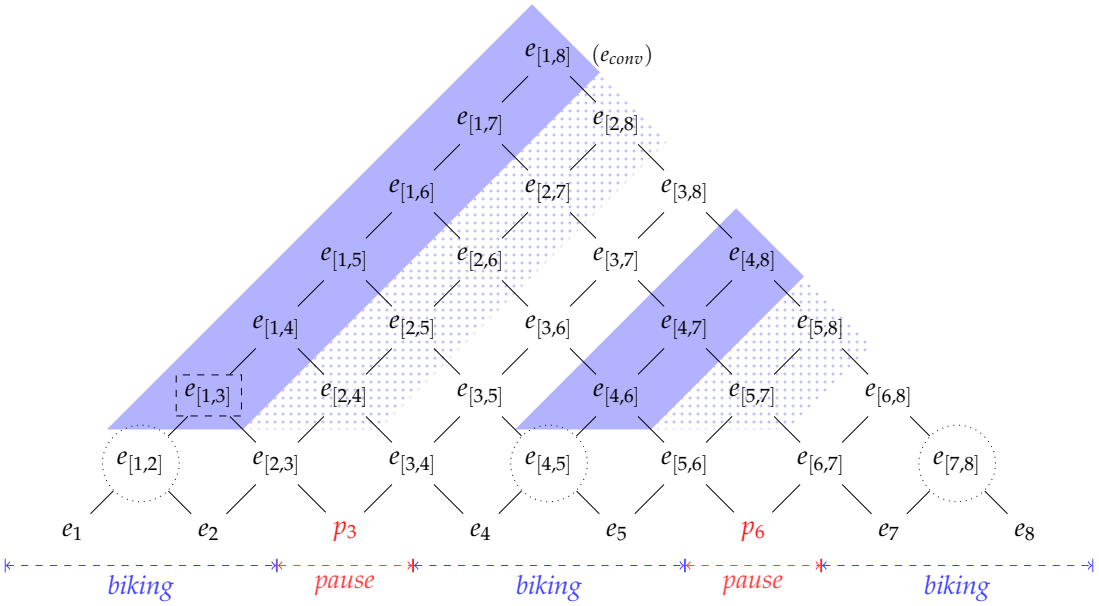


Figure 4.6: A depiction of the convex plural event e_{conv}, the top node. The subevents composing the plural event satisfying the pluractional are enclosed by a dotted circle. Cross-temporal identity with $e_{[1,8]}$ is represented by the blue boxes.

identical. I leave this aside in the figure.

Once the onset has been established, the progressive works just as it does in the activity case. What the progressive cares about is not the segmental axis around the bottom, but the incremental axis along the left edge of the figure. If the reference point is situated at a pause, say the endpoint of p_3, we don't look to p_6 itself but rather p_6 plus the event that came before it, which in this case is $e_{[1,6]}$. In this way, p_6 merely continues the iterative event.

Let's consider the truth conditions for the Balinese sentence in (206b). We'll adopt the scenario in Figure 4.6 as Figure 4.7. In this scenario, we have three MAXimal events of Ayu drinking tea, $e_{[1,2]}$, $e_{[4,5]}$, and $e_{[7,8]}$. The plural event satisfying PLUR in this case will actually be $e_{[1,2]} \oplus e_{[4,5]} \oplus e_{[7,8]}$. Each of these maximal events are events that are not themselves part of any larger event satisfying $[\![$*Ayu drink tea*$]\!]$. The figure represents the convex version of this event, the fusion the subevents with everything going on in between them, p_3 and p_4. The utterance time is the endpoint of p_6, which places the utterance time in the gap

between subevents. Because we're simplifying things somewhat here, the endpoint of p_6 is really part of the pause only by a razor-thin margin. It would be the moment *right before* the subsequent subevent e_7 begins. However we will think of it as part of the pause. In a more fine-grained scenario, we would like to split p_6 into further subevents and use the endpoint of one of these. For space and simplicity, we do not do this here. The result of composing PLUR with the VP is in (217). We will assume that the tense operator PRES is covertly present (see chapter 3 for details). Thus the meaning of (206b) is in (218).

(217) $[\![\text{PLUR } [_{VP} \text{ Ayu drink tea}]]\!]^{g,c} =$

$$\lambda e \lambda w.[\text{Ag}(e) = \textit{Ayu} \wedge \textit{drink-tea}(e)(w) \wedge \text{Card}(e) > n \wedge \forall e'[e' <_{AT} e \rightarrow \text{MAX}([\![\textit{Ayu drink tea}]\!]^{g,c})(e')(w)]]$$

(218) $[\![\text{PRES } [\text{PROG } [\text{PLUR } [_{VP} \text{ Ayu drink tea}]]]]\!]^{g,c} =$

$$\lambda w.\exists e[g(i) = \text{end}(\tau(e)) \wedge \exists e_1, e_2, w_1[i\text{-}\prec_e(e, e_2) \wedge \text{CONV}(e_1, e_2) \wedge \langle e_2, w_1\rangle \in \text{Cont}(e, w) \wedge \text{Ag}(e_1) = \textit{Ayu} \wedge \textit{drink-tea}(e_1)(w_1) \wedge \text{Card}(e_1) > n \wedge \forall e_3[e_3 <_{AT} e_1 \rightarrow \text{MAX}([\![\textit{Ayu drink tea}]\!]^{g,c})(e_3)(w_1)]]]], g(i) = \textit{now}$$

The formula in (218) says that there is some event e where the final point of its temporal trace is equal to *now*, $g(i)$. Further, there is an event e_1 that is a plural event of Ayu drinking tea and its atomic subevents satisfy MAX for $[\![\textit{Ayu drink tea}]\!]$. There is also an event e_2 that is a convex version of e_1, and e is a stage of e_2 and e_2 is in the continuation branch of e.

In the model, e is $e_{[1,6]}$. Its endpoint is the endpoint of the pause p_6. This will be equivalent to *now*. Notice that as part of what came before it, namely $e_{[1,5]}$, the pause continues this convex event. This is what it means for $e_{[1,6]}$ to be cross-temporally identical to $e_{[1,5]}$. Additionally, $e_{[1,6]}$ is in the continuation branch of $e_{[1,8]}$, which is e_2 in the formula, the convex version of e_1.

Now we can see why this limits the Balinese progressive to iterative readings. The

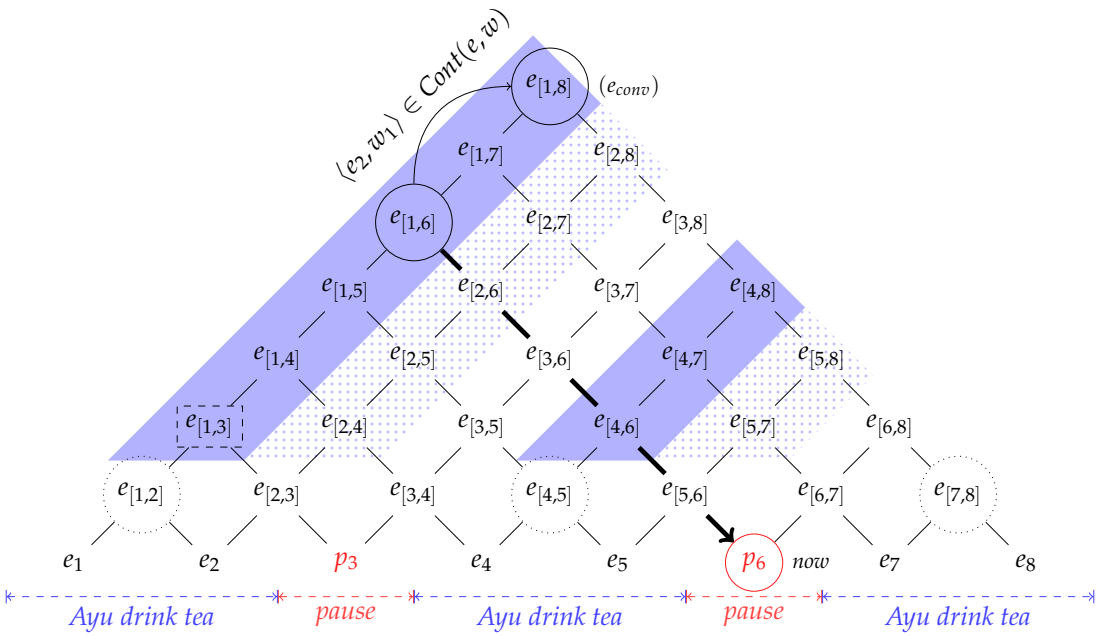


Figure 4.7: A depiction of the progressive applied to the scenario in Figure 4.6. The utterance time is p_6.

notion of cross-temporal identity constrains the kinds of plural events that we are willing to "continue" through the gaps in the subevents. Like in activities, if the pause gets too long, we may "cut off" cross-temporal identity; the event is no longer considered to be continuing through the pause. The pause writes us an I.O.U. that says the there's another subevent in the plurality coming shortly. When we encounter another event in the plurality, this I.O.U. gets renewed, and we continue through the next pause until we encounter another event in the plurality, or the pause gets too long and cross-temporal identity gets terminated.

Let's entertain a model where the middle event is missing so the gap is particularly long between subevents. If this is so, cross-temporal identity doesn't persist through the gap. This is depicted in Figure 4.8. If we are being charitable, cross-temporally identity may extend through the very first part of the pause, but then we decide we are no longer looking at the same event as $e_{[1,3]}$ so we terminate cross-temporal identity. We've decided that there's not some larger event that $e_{[1,3]}$ is developing into. This is shown by the smaller

blue box. Notice that it doesn't extend to the top node. The formula in (218) will *not* be true in this scenario because $e_{[1,6]}$ is not cross-temporally identical with, and therefore not a stage of, $e_{[1,8]}$. It is part of a gap that is simply too large to maintain cross-temporal identity.

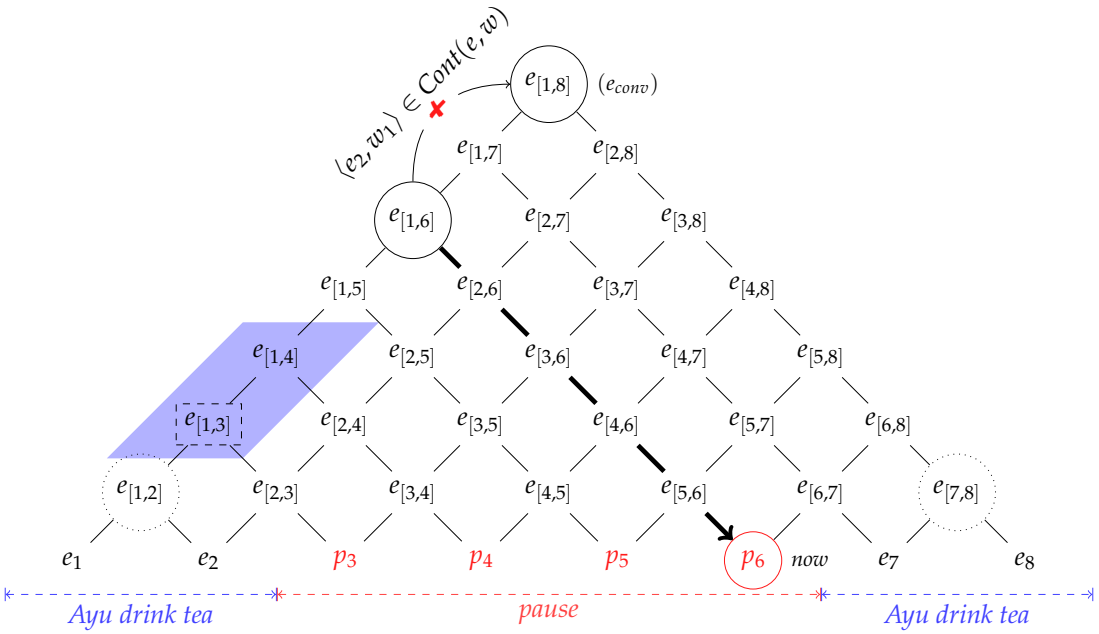


Figure 4.8: A demonstration of the failure of the progressive to apply to plural events with gaps that are too large. Cross-temporal identity fails to maintain incrementally and so the progressive fails to hold.

This is why the progressive in Balinese yields only iterative readings of pluractional reduplication and never habitual ones. The subevents of a habit are temporally more spread out, more disparate, and the gaps between them are less recognizable as the continuation of a plural event on their own to count as one and the same concatenated plural eventuality. We do not recognize the subevents of a habit as *one event* for the purposes of counting and therefore these plural events fail to have incrementally homogeneous convex counterparts. This is not so for iterative events, which lead the double life discussed earlier. We *can* recognize them as one event, and their convex versions are incrementally homogeneous. Thus the gaps in these events are recognizable continuations of the iterative events. For the

plural event composing a habit, we terminate cross-temporal identity long before we get through the pause. The pauses involved in a habit are thus quite different from that in an iteration in this regard. This account properly picks up this difference between iteration and habituality.

Now, this proposal applies just as well to English. English has the same essential parts, pluractionality and progressivity. However as we have seen, English also *does* permit habitual readings of the progressive. In the next section, I pick this back up. I will argue that habitual readings of the progressive involve a third operator in addition to PROG and PLUR. This operator introduces a special kind of causative relation called *dispositional causation* (Copley 2018). Originally proposed to account for futurate readings of the progressive, I will argue that it is also responsible for habitual readings of the progressive in English and of bare sentences with reduplication in Balinese. This operator is unavailable with the Balinese progressive, and therefore this progressive does not display habitual readings.

4.4 Habitual readings

In this section, I account for habitual readings of both the English progressive and Balinese reduplication in bare sentences. Recall that the Balinese progressive differs from both the English progressive and Balinese bare sentences in that it doesn't permit futurate readings. This is shown in the contrast below. Notice that the English free translation is a licit futurate reading of the English progressive.

(219) *Context: Bima entered a three-day long competition. Bima is signed up to compete tomorrow. Someone asks: "When does Bima compete?"*

a. Bima milu lomba bin mani
Bima AV.join competition tomorrow
"Bima is competing tomorrow."

b. #Bima sedeng milu lomba bin mani
Bima PROG AV.join competition tomorrow
Intended: "Bima is competing tomorrow."

In this section, I argue that the mechanism that is responsible for futurate readings in Balinese bare sentences and the English progressive is the same mechanism that, in combination with pluractionality, generates habitual readings in these same sentence types. This mechanism is *dispositional causation* (Copley 2018), a special kind of causative relation. In the next section, I review the work on futurate readings generally in Copley (2002; 2008; 2009; 2014; 2018).

In chapter 2, I argued that the *stage-of* relation on its own snuck in the kind of modality we normally associate with genericity. As we have seen above, this is not a tenable view. The *stage-of* relation of a plural event in fact leads only to iterative readings, not habitual ones. In this section, I will argue that this modal meaning is in fact contributed by dispositional causation. Thus a special kind of causative relation between a state and a plural event is where the generic component is located.

4.4.1 Futurates

In a series of works, Copley (2002; 2008; 2009; 2014; 2018) develops a syntax and semantics of futurate constructions. Earlier works (Copley 2002; Copley 2009) give futurates a modal semantics, while later works (Copley 2014; Copley 2018) ascribe futurate meaning to a causal chain introduced by a special causative operator. While I adopt the latter approach, where futurate readings are due to a causative relation, many of the insights of the earlier works inform the later works. Central to all of these works is the notion of a plan and a director.

The idea that futurates involve plans is informed by the data in (220). This contrast is

explained in terms of planability. The *playing* of a game can be planned, but the *winning* cannot be (assuming, again, the game isn't rigged).

(220) a. The Kansas City Royals are playing tomorrow.
b. #The Kansas City Royals are winning tomorrow.

In the next section, we will see Copley's precisification of this idea.

4.4.2 Plans and directors

Copley (2008; 2009) argues that futurates involve *plans*, and these plans have *directors* that bear a certain relationship to the plan and its contents.

Intuitively, a futurate construction involves a plan that provides for the base proposition P. Copley (2008; 2009) shows that this notion is not enough on its own to account for futurates. First, if we assume that futurate constructions assert the existence of a plan, then we expect the sentence in (221) to be true if there is no plan either way for the Royals to play tomorrow, but in fact it seems to have a stronger interpretation, namely that the plan provides for not P. On the other hand, if futurate constructions presupposed that there is some plan for P, we run into problems as well. The sentence in (221) would presuppose that the Royals are playing the Giants tomorrow.

(221) I doubt the Kansas City Royals are playing the San Francisco Giants tomorrow.

This leads Copley to account for futurates in terms of the *director* of the plan. Plans are the result of an entity bearing a relationship to a proposition. Directors of plans have the ability to realize plans, that is, bring about the proposition. If they commit to realizing the plan, the plan is realized and P is brought about. In the basic case of a futurate, the director is so committed to the plan. Thus Copley argues that the presupposition for a futurate construction is that the director d, who may or may not be the subject of the sentence,

has the ability to bring about P or *direct* P. Futurates then presuppose that directors are committed to P.

In Copley (2008; 2009), she couches this formally in a possible worlds semantics. The definition in (222) says, effectively, that d directs P at t in w when the metaphysically accessible worlds line up with the directors metaphysically-accessible commitments. In other words, if the director has the ability to bring about P or $\neg P$ and is committed or not committed to P, then P will or won't happen, respectively. The presupposition and assertion of a futurate, then, are in (223) and (224). Thus if a futurate is negated, it's asserted that the director is not committed to P, and due to the presupposition, it follows that P won't happen.

(222) Definition of *directs*:
An entity d directs a proposition P in w at t iff:
$\forall w'$, d has the same abilities in w' as in w:
[$\forall w''$ metaphysically accessible from w' at t and consistent with d's commitments in w' at t:
[$\forall w'''$ metaphysically accessible from w at t:
$[\exists t' > t\text{: } [P(w'')(t')] \Leftrightarrow [\exists t'' > t\text{: } [P(w''')(t'')]]]]]$

(223) Direction presupposition:
d directs P in w at t.

(224) Commitment assertion:
d is committed to P in w at t.

Two outstanding questions remain. First, what does the syntax-semantics interface look like for futurates? Futurates of both simple presents and progressives are possible in English (details of the semantic differences are outlined in Copley (2009)), so ideally, these readings have the same source. Second, the notion of plannability sketched in this section suggests that all futurates involve a kind of animate director. However, this is not the case. Futurates may also arise in cases where we have natural tendencies. This is evident in cases

like the following:

(225) a. The sun rises at 6 tomorrow.
b. %The sun is rising at 6 tomorrow.

Both of these[4] show that futurates are not limited to events that are planned, strictly speaking, or even have a director. Rather they point to a tendency of the sun to rise at particular times. In the next section, I present Copley's revised analysis of futurates, which is couched in terms of dispositional causation rather than the modal analysis presented here. This provides a framework for answering both of these questions.

4.4.3 Dispositional causation

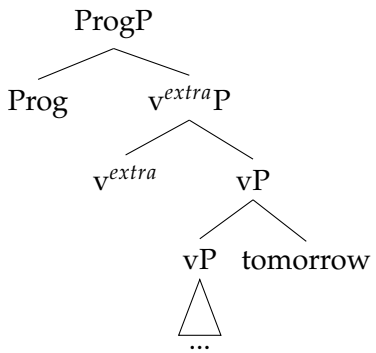
The view advanced in Copley (2014; 2018) is that futurate readings are due to a causative head that says that some state causes the *P* event. Here I explain the nature of this state and how it accounts for both the planned and natural futurates above. First, it will be helpful to spell out the basic structure of this causative construction.

4.4.3.1 Structure of a futurate

Following Copley (2018), I assume that there is a single causative head that introduces an eventuality that causes the VP eventuality. This causative structure does not introduce an additional causer argument, unlike other causative structures (Pylkkänen 2008). This is above vP, but below the projection that the progressive is introduced at. This leads to the structure in (226) for a basic progressive futurate sentence. Adopting the notation in Copley (2018), the causative head is introduced in vP^{extra} as v^{extra}.

[4]The progressive futurate in (225b) is reported by Copley as being acceptable to some speakers but not others. To my ears, it is perfectly acceptable. The "%" indicates this variation.

(226)



The takeaway from this structure for now is that, syntactically, the head that introduces the "plan" eventuality is introduced below progressive aspect but above vP. This will put the causative head between the pluractional VP and PROG.

4.4.3.2 Meaning of a futurate

The causative head in (226) introduces a relation between eventualities which I'll call CAUS_{disp}. The vP, as usual, denotes a set of eventualities. The causative head then takes this set of eventualities, the *caused* eventualities, and outputs the set of eventualities, *causer* eventualities, that bear this particular causative relationship to the vP eventualities. These causer eventualities are then fed into the progressive.

The intuition behind this theory is that the causer eventuality denotes, in some sense, the plan for the VP eventuality. This plan, then, exists prior to the caused VP eventuality. That the plan is represented in the clause as a Davidsonian eventuality is supported by the fact that it is possible to modify the plan eventuality with adverbial modifiers. Copley shows that the plan has a separate Davidsonian existence than the planned eventuality as they may take contradictory modifiers.

(227) a. Yesterday, John was playing football tomorrow.
b. Secretly, John is performing his one man play in public tomorrow.

(228) #In the car, John is performing his one man play tomorrow.

On the other hand, like stative eventualities, they resist locative modifiers, as in (228). Being a plan, which doesn't have a spatial reality, Copley concludes that the causer eventuality is a state rather than an event.

So what is the meaning of CAUS_{disp} and how does it come to encode plans? To answer this question, we first need to consider in detail the causer eventuality.

The causer eventuality is the "disposition", which, as we have seen, is argued to be a state. Effectively, Copley argues there are two kinds of dispositions, and these different kinds of dispositions correspond to the two kinds of futurates we see, plans involving a director and natural tendencies. We will first handle the "normal" plan-oriented futurates, and then natural futurates.

The first kind of disposition is intentional. It is the *plan* or *intentional state* that was outlined above. Thus in this case the eventuality refers to a intentional state bearing the relation between the director and her intention or preference for bringing about an event. While the role of the director is crucial in understanding, ontologically, what exactly a plan is, in Copley (2018) the director herself is only implicitly available. The causer eventuality simply refers to the plan or disposition, and, because plans and dispositions have some kind of director, it is understood that there is an entity directing the plan.

Copley argues that the relation this plan or intention bears to the caused eventuality is one of *direct causation*, i.e., the plan or intention directly causes the VP event. We might wonder if it is too strong to say that the plan directly causes the VP event. After all, if the director of the plan differs from the agent of the VP event, it intuitively seems that the event is actually directly caused by the agent, and indirectly caused by the intention. Copley argues that direct causation is actually less fine-grained than this. She points to a study by Wolff (2003) that shows that intermediate causers may be suppressed for the purposes of

direct causation in lexical causatives when the intermediary is considered to be enabling the result and the initial causer is sentient and intends the result. She argues, then, that the agent of the VP event is merely an enabler in this sense and does not interrupt the causal chain. She further argues that the senses of authority, ability, and control are the direct result of this causative relationship. For an intention or plan to directly cause an event, the director or intender must have control over that event.

Turning to natural causatives, Copley argues that we are dealing with a different kind of disposition. An intentional or plan-based disposition will not do for these futurates because there is no director. There is no-one coordinating the Sun's rising tomorrow. It will rise simply because that's *what the sun does*. The sun has a physical tendency to rise at a particular time in the future. Thus Copley extends the nature of the dispositional state to include physical properties that may have a causal nature as well. While she says it is difficult to put our finger on what exactly these kinds of states might be, they are rare and relate to largely predictable tendencies like the sun rising and the timing of the tides.

Now that dispositional causation has been explained, we can see it in action with the progressive. This is in the next section.

4.4.3.3 Two futurate derivations

Now I will provide two derivations for futurates, one for English, and one for Balinese. This will illustrate how dispositional causation works in tandem with our progressive semantics.

For English, we have to make a revision of the definition of the progressive to account for states. As pointed out by Dowty (1979), the progressive does tolerate some stative verbs, which he calls stage-level statives. For example, the sentences in (229) are perfectly fine progressive sentences despite the underlying predicates being stative.

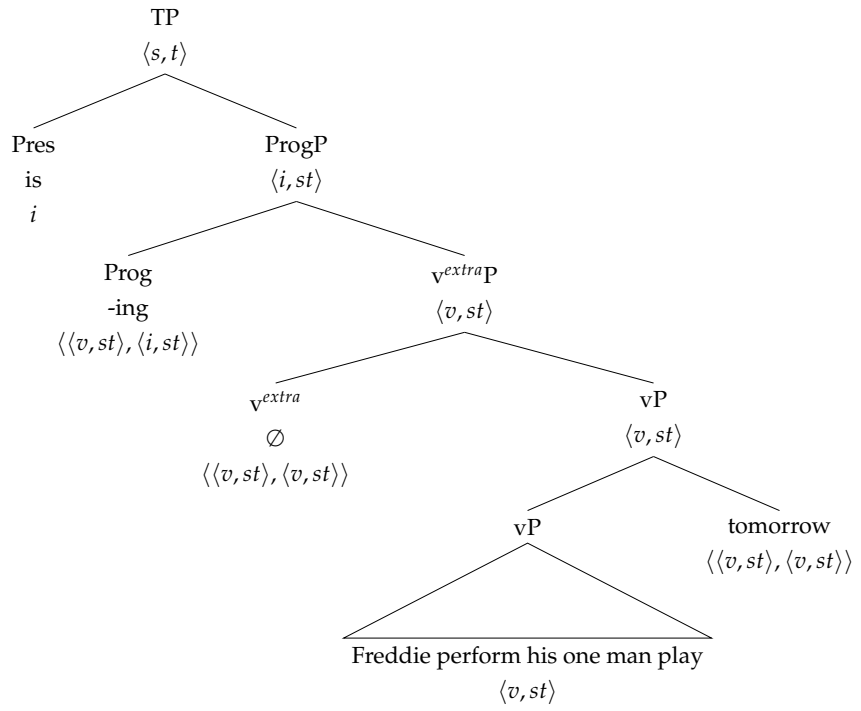
(229) a. The sock was lying under the bed.
b. Tony is being nice.

I suppose, then, that we take the moniker that Dowty (1979) applies to these predicates seriously: stage-level statives do in fact have stages. The stage-of relation for stage-level states works just as it does for events. A state is a stage of another if it is a part of that state and is cross-temporally identical with it. The difference between states and activities as far as the English progressive is concerned, then, is that states are truly homogeneous in that they have the subinterval property and do not therefore permit gaps, while activities are merely incrementally homogeneous. It follows from this that we can't use the progressive for states when there is a temporal gap between realizations of the state. This appears to be true. We can't say "The sock is on the floor" if someone has just picked it up, even if they clearly intend to immediately put it down again.

For futurate readings, then, the causer eventuality is a stage-level state. As a stage-level state, it may serve as input to the progressive. Let's look at the example futurate sentence in (230). The structure of this sentence is in (231), notated with the corresponding types of each node to make the composition clearer. For the sake of clarity, we'll use the version of the progressive without CONV since there is no plural event here and its contribution would be vacuous.

(230) Freddie is performing his one-man-play tomorrow.

(231)



The full LF is in (232).

(232) $[\![\text{TP}]\!]^{g,c} =$

$$\lambda w.\exists s[g(i) = \text{end}(\tau(s)) \wedge \exists s_1, w_1[i\text{-}\prec_e(s, s_1) \wedge \langle s_1, w_1\rangle \in \text{Cont}(s, w) \wedge \exists e_1[\text{CAUS}_{disp}(s_1, e_1) \wedge \textit{Freddie-perform-OMP}(e_1, w_1) \wedge \textit{tomorrow}(e_1, w_1)]]]],$$
$$g(i) = \textit{now}$$

This says that there is some eventuality s which has an endpoint corresponding to *now*, and is a stage of some eventuality s_1. To be a stage of s_1 it must be a cross-temporally identical part of s_1; it has to be large enough that we recognize it as the *same* state at a different point in time. Further, s_1 is in the continuation branch of s. The futurate meaning enters in the next step: s_1 is a disposition that causes an event e_1 which is an event of Freddie performing his one man play, and e_1 occurs tomorrow.

The future component of the futurate is introduced by the temporal mismatch between the anchoring state s and the future orientation of e. The endpoint of s occurs today (actually, utterance time), but the event e occurs tomorrow. What is the time span of s_1? Copley

argues that it at least completely overlaps with the future-oriented event. In the intentional case, the intention should hold at the time of the effect, the caused event. So while *s* ends before *e*, the larger state of which it is a stage actually overlaps with *e*.

Further, Copley explains that the near-obligatoriness of the future oriented adverbial is related to this temporal mismatch. Given that the dispositional causative is not marked, any given progressive string has two possible structures: one with the causative and one without. The one without is simpler and will be preferred. The adverbial, however, forces an interpretation with the causative structure, because otherwise there is would be a temporal mismatch.

The plan or intention is introduced by this dispositional state. It refers to the plan that causes the VP eventuality. In this case, the director is the subject of the sentence, Freddie. Sometimes, however, the director isn't a participant in the VP event. In the baseball examples, for instance, the team is merely an enabler for the event occurring. They do not schedule the games; the MLB does. Further, as we have seen in the natural futurate case, there may not be a director at all. Cases like these are why there is no director specified in the logical form of the sentence.

One point I want to make here is that the continuation branch, as was explained in chapter 1, has a normative component. It cares about what is normal *on the basis of what is internal to s*. In the case of events, we used this to ignore things going on outside of the immediate participants of the event, like a parade of trucks coming for someone crossing the street. For a dispositional state, this must be the other attitudes and mental states of the holder of the disposition. In the same way we don't care about external interrupters in the crossing the street case, we don't care about external interrupters in these cases. What *internal* interrupters might matter here? It's difficult to say for certain, but we may

expect some mental states that make carrying out plans difficult or impossible to count as interrupters. These cases should differ from normal interruption cases in that the progressive sentence shouldn't be acceptable at all. If someone is, say, using a psychoactive drug which inhibits their ability to seriously make plans that persist beyond the time the drug is active, we might expect a futurate progressive to be infelicitously used to describe the plan, even when the content of the plan is totally reasonable. For me at least, this seems to be true for (233). If he were not on a painkiller or if he had made the plan before taking the painkiller, the sentence in (233) is totally fine.

(233) *Context: Tim took a strong painkiller after having his wisdom teeth removed and is now saying that he plans to cook a rib roast on Saturday. He had no plans to cook a rib roast before taking the drug.*
?Tim is cooking a rib roast on Saturday.

The Balinese futurate is nearly identical semantically. It is structurally the same as in the English case so I omit it. The full LF for this sentence is in (235).

(234) Bima milu lomba bin mani
Bima AV.join competition tomorrow
"Bima is competing tomorrow."

(235) $[\![(234)]\!]^{g,c} =$

$$\lambda w.\exists s[g(i) = \text{end}(\tau(s)) \wedge \exists s_1, w_1[i\text{-}\preceq_e(s, s_1) \wedge \langle s_1, w_1\rangle \in \text{Cont}(s, w) \wedge \exists e_1[\text{CAUS}_{disp}(s_1, e_1) \wedge \textit{Bima-milu-lomba}(e_1, w_1) \wedge \textit{bin mani}(e_1, w_1)]]]], g(i) = \textit{now}$$

The reasoning for this example works just as it does in English, as described above.

A key difference that I posited between the progressive operator that appears in Balinese bare sentences and the English progressive is that the Balinese one doesn't require the anchoring event to be a *proper* part of the culminating event (Altshuler 2014). This allows the anchoring event to be identical to the culminating one, generating perfective readings

of bare sentences. This difference actually washes out in the futurate case. What permits the futurate reading is a mismatch between the endpoint of the anchoring eventuality and the time that the VP event occurs, where the endpoint of the anchor precedes the time of the VP event. If the anchoring eventuality were the entire dispositional state, there can be no mismatch. The VP event must be temporally contained within the dispositional state. This means that the endpoint of the entire dispositional state is either equivalent to the endpoint of the VP event or later than it. The only way to generate a futurate, then, is if the anchoring eventuality is truly a proper part of the entire dispositional state.

4.4.4 Deriving habitual readings from dispositional causation and event plurality

In this section, I will argue that dispositional causation in combination with event plurality is what yields habitual readings of progressives. We saw in section 3 that progressives in Balinese allow iterative readings but disallow habitual readings because the cross-temporal identity relation involved in the definition of the stage-of relation requires coherence between the subevents of a plural event. When gaps between subevents get too large, the plural event becomes too incoherent and the cross-temporal identity relation between event parts and the large plural eventuality gets terminated. A simple iterative event has shorter gaps than the events composing a habit and are therefore more coherent as a single event for the purpose of counting. Of course, the English progressive *does* permit habitual readings. In essence, I propose that in these cases, the progressive describes a part of a *dispositional state* that causes a plurality of VP events. This dispositional state is contiguous and temporally overlaps the entire event plurality. Thus the *state* persists even through the gaps. Habitual progressives therefore decompose into three essential parts: progressivity,

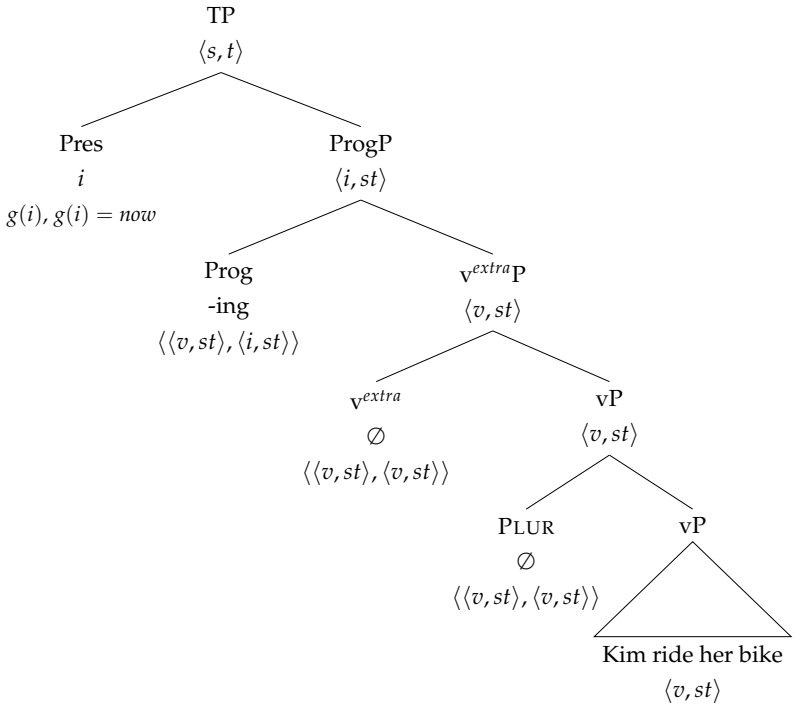
pluractionality, and dispositional causation.

Let's first consider a simple example to see how these parts work in tandem to generate habitual progressives. I will then describe some beneficial knock-on effects of this proposal and certain predictions that follow.

The structure of the habitual progressive sentence in (236) is in (237). It has the truth conditions in (238).

(236) *Context: Someone asks: "How is Kim getting to work?"*
Kim is riding her bike.

(237)



(238) $[\![\text{PRES}\ [\text{PROG}\ [\text{CAUS}_{disp}\ [\text{PLUR}\ [_{VP}\ \text{Kim ride her bike}]]]]]\!]^{g,c} =$

$$\begin{aligned}
&\lambda w.\exists s[\tau(s) = g(i) \wedge \exists s'[\tau(s) = \text{end}(\tau(s'))\wedge \\
&\quad \exists s_1, s_2, w_1[i\text{-}\prec_e(s', s_2) \wedge \text{CONV}(s_1, s_2) \wedge \langle s_2, w_1\rangle \in \text{Cont}(e, w)\wedge \\
&\quad \exists e[\text{CAUS}_{disp}(s_1, e)\wedge \\
&\quad \text{Ag}(e) = \textit{Kim} \wedge \textit{ride-bike}(e)(w_1) \wedge |e| > 2 \wedge \\
&\quad \forall e'[e' <_{AT} e \rightarrow \text{MAX}([\![\textit{Kim ride her bike}]\!]^{g,c})(e')(w_1)]]]]], g(i) = \textit{now}
\end{aligned}$$

The formula in (238) says that there is some eventuality s' which has an endpoint

corresponding to *now*, and s' is a stage of some eventuality s_2. s_2 itself is the CONVex counterpart of s_1. Because s_1 isn't a plural event, CONV is vacuous and $s_1 = s_2$. For s' to be a stage of s_2, s' must be a cross-temporally identical part of s_2. We have to be able to recognize it as the *same* state at a different point in time. s_2 and some world w_1 must also be in the continuation branch of s' and w. The causative relation CAUS_{disp} says that s_2 is a dispositional state that causes some event e. Satisfying the pluractional VP, e is a plural event, with each subpart being a MAXimal event satisfying $[\![$*Kim ride her bike*$]\!]$ in w_1. Thus the dispositional state s_2 is the plan or intention providing for the plural event e.

The dispositional state s_2 will temporally include the entire plural event e. It will overlap with all of its subevents. Unlike activity events, which are only incrementally homogeneous, this state is segmentally homogeneous; it has no gaps. The plural event may have gaps, but the dispositional state that covers them does not. The plan or intention persists even when there is a gap in the plural eventuality. This means that the cross-temporal identity relation is not disrupted by the gaps between events. Any part of s_2 cross-temporally identical with s_2.

It is important to recognize here that the sense of temporal delimination of progressive habitual constructions still originates in pluractionality as argued for in chapter 2. The pluractional simply requires that there be a pragmatically fixed number of subevents. Again, this is in contrast to the generic operator, which requires that every relevant situation is one containing a VP event. I refer the reader to that chapter for details. The dispositional state in this case temporally overlays this limited number of events and bears a causal relationship to them. It need not extend beyond the plural event. Thus the disposition is only temporary, lasting just as long as it temporally overlaps with the plural event generated by the pluractional.

While often the disposition for a habitual progressive will refer to an intention or plan, there are many cases where the kind of disposition relevant to natural futurates plays a role in habitual progressives as well. Recall that natural futurates involve a physical tendency. In the futurate case, this tendency had to cause the event to happen at particular time. For example, the disposition involved in the futurate sentence "The sun is rising tomorrow at 6am" has to be one that causes the sun to rise at a particular time. In the progressive case we are dealing with a property that more entities are likely to have. These dispositions cause plural events, but these plural events need not be located at a particular time. This is a much easier threshold for a physical property to breach. In these cases, however, the disposition is only recognizable when several events of the predicate have already been realized. The past events are inertial in the sense that they suggest that such a dispositional state exists in the past and will continue to exist at least for some time in the future. This is how we explain the reading of the sentence in (239), repeated from chapter 2. There is a sense that the sentence in (239a) requires at least two, and maybe more, events of John writing good papers. This is not the case for (239b), which can be true if we've read merely one paper of John's and determined he has a preternatural writing ability. Writing good papers is, quite unfortunately, not something that someone can plan, in the same way one can't plan the winning of a game. This means that (239a) can only be true if there are enough instances of John writing good papers in the past to establish that there is some tendency that will last long enough to cause a number of events of good paper writing that can satisfy PLUR.

(239) a. John is writing good papers.
b. John writes good papers.

In the Balinese case, the progressive does not have habitual readings, only iterative ones. This is because *the progressive in Balinese may not compose with stative eventualities generally*.

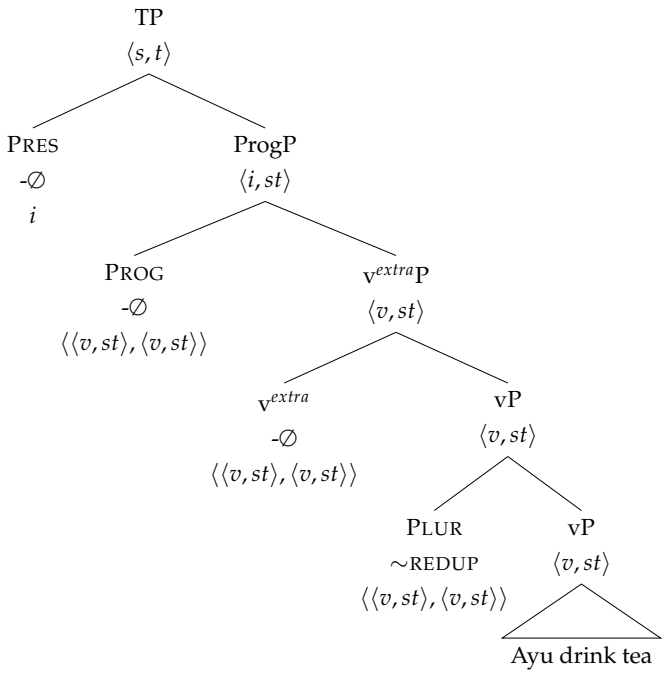
Where the English progressive does permit composition with some stative predicates, *sedeng* in Balinese does not (Udayana 2013). Because dispositional causation involves stative eventualities, it is not possible to compose it with the *sedeng*. This is the same reason that *sedeng* does not have futurate readings. Both originate in dispositional causation, which is an operation unavailable under *sedeng*. The only way that pluractional reduplication can compose with *sedeng*, then, is in the way discussed in section 3, which yields iterative readings.

On the other hand, futurate readings *are* available for bare sentences in Balinese. I argued that in this case, futurate readings are the result of composing the VP with dispositional causation with the zero-marked progressive operator responsible for the progressive readings of bare sentences.

This suggests that progressivity, dispositional causation, and pluractionality can coexist in bare sentences. In fact, I argue that this is precisely the configuration that yields habitual readings of reduplication in bare sentences. The progressive and dispositional causitive are zero-marked in this case, leaving pluractionality the only component with a morphological reflex, namely verbal reduplication. The end result of this is that habitual readings of bare sentences with reduplication have essentially the same analysis as habitual readings of the English progressive. This is shown for the sentence in (240), which has the structure in (241) and the truth conditions in (242).

(240) Ayu nginem~nginem teh
Ayu AV.drink~REDUP tea
"Ayu drinks tea." (or maybe more accurately: "Ayu is drinking tea (these days).")

(241)



(242) $[\![\text{PRES}\ [\text{PROG}\ [\text{CAUS}_{disp}\ [\text{PLUR}\ [_{VP}\ \text{Ayu drink tea}]]]]]\!]^{g,c} =$

$$\lambda w.\exists s[\tau(s) = g(i) \wedge \exists s'[\tau(s) = \text{end}(\tau(s')) \wedge$$
$$\exists s_1, s_2, w_1[i\text{-}\prec_e(s', s_2) \wedge \text{CONV}(s_1, s_2) \wedge \langle s_2, w_1\rangle \in \text{Cont}(e, w) \wedge$$
$$\exists e[\text{CAUS}_{disp}(s_1, e) \wedge$$
$$\text{Ag}(e) = \textit{Ayu} \wedge \textit{drink-tea}(e)(w_1) \wedge \text{Card}(e) > 2 \wedge$$
$$\forall e'[e' <_{AT} e \rightarrow \text{MAX}([\![\textit{Ayu drink tea}]\!])(e')(w_1)]]]]],\ g(i) = \textit{now}$$

Finally, we still have to account for habitual interpretations of Balinese bare sentences without reduplication. I suppose that as in the English simple present, these readings are due to a covert generic operator GEN. As a result, we should see similar contrasts between habitual readings of bare sentences and habitual readings of bare sentences with reduplication. This is largely true, but harder to see. I discuss the empirical details of this in the next section.

The end result of this proposal is that English and Balinese have effectively identical analyses. Aspectually, they both make use of the same grammatical resources, PROG, PLUR, CAUS_{disp}, and GEN. Superficially, they look very different because of the grammatical

reflexes of these devices. More substantially, they do differ parametrically in the progressive. The English progressive permits composition with stative eventualities while the (overt) Balinese progressive does not. This turns out to have cascading effects. Because dispositional causation is a predicate of stative eventualities, the Balinese progressive may not compose with it, precluding it from having both futurate and habitual readings. We can therefore explain what looks to be substantial variation between languages with a single parameter.

The tables below summarize the available constellations of grammatical devices and their morphological reflexes in English and Balinese.

Table 4.1: Constellation of grammatical devices and their morphological reflexes in English.

Morphology	LF	Interpretations
/-s/	GEN	Generic/habitual
	CAUS*	Futurate
/-ing/	PROG	Episodic
	PROG+PLUR	Iterative
	PROG+CAUS	Futurate
	PROG+CAUS+PLUR	Habitual

Table 4.2: Constellation of grammatical devices and their morphological reflexes in Balinese.

Morphology	LF	Interpretations
∅	GEN	Generic/habitual
	PROG$_{neut}$	Episodic(+perfective)
	PROG$_{neut}$+CAUS	Futurate
V-RED	PROG$_{neut}$+PLUR	Iterative
	PROG$_{neut}$+CAUSE+PLUR	Habitual
sedeng	PROG	Episodic
sedeng V-RED	PROG+PLUR	Iterative

4.4.5 Consequences and predictions

4.4.5.1 Habitual expressions in Balinese

I am arguing that in Balinese bare sentences without reduplication involve a generic operator and bare sentences with reduplication involve the same constellation of operators as the habitual reading of the English progressive. Thus, like in the English case, we expect to find nuanced differences in these two kinds of habitual readings. We saw in chapter 2 that the most straightforward evidence of this difference in English is in the behavior of singular indefinites. Singular indefinites in simple present sentences have generic readings, while habitual progressive sentences do not. In Balinese, this test does not apply in the same way because Balinese does not have a singular indefinite and Balinese nominals are in general number neutral.

However, there is evidence that Balinese bare sentences with reduplication describe delimited habits. Take the example below in (243), repeated from (167) in the last chapter. Because this describes a habit that has ended relative to another, the sentence in (243a) is preferred to that in (243b).

(243) *Context: Ayu swam for exercise in the past, but now she has started running for exercise.*

a. pidan Ayu ngelangi~langi ke pulaune nanging jani Ayu ma-laib~laib
past Ayu AV.swim~REDUP to island-DEF but now Ayu MID-run~REDUP
"In the past, Ayu was swimming to the island, but now she runs."

b. pidan Ayu ngelangi ke pulaune nanging jani Ayu ma-laib
past Ayu AV.swim to island-DEF but now Ayu MID-run
"In the past, Ayu swam to the island, but now she bikes." (SC: you could say that, not my first choice though.)

In general for past habits that have ended, the reduplicative form seems to be preferred over the unreduplicated form. This is also true of the sentences in (244), where the topic is what habits Bima had in the past and it's not expected that the habit persists to now.

(244) *Context: You don't know if Bima swims anymore. Someone asks: "What did Bima like to do at university?"*

a. Bima ngelangi~langi
Bima AV.swim~REDUP
"Bima was swimming."

b. ?Bima ngelangi
Bima AV.swim
"Bima swam."

In general, the nuanced differences are hard to pick up on in a fieldwork context. Even in English, there is significant amount of overlap between scenarios where simple present and habitual progressive sentences are felicitous. In contexts where one is preferred, the other is usually not fully infelicitous or unacceptable.

For example, the other place that the difference between habitual progressives and simple presents was clear was in the differing behavior of dispositional readings. Dispositional

readings of simple presents are largely fine out of the blue, but dispositional readings of habitual progressive require a context making the disposition salient. The problem with this is that, in general in Balinese, habitual readings of bare sentences without reduplication are preferred out of the blue to those with reduplication. Thus to determine if a dispositional reading is available at all for a bare sentence with reduplication, I would have to establish a context that will end up making the disposition salient anyway, and the sentence acceptable.

We also see some variability in the number of realizations of the event that are required between bare sentences with and without reduplication. The sentence in (245a) without reduplication suggests that Ayu has the ability to write good lontar, and while it does seem to imply she has written some in the past, it's unclear how many. By contrast, the sentence in (245b) requires that there already be a number of instances of good lontar writing, reflecting the translation he offered in the free translation. This is not unlike the case of *John writes good papers*, discussed above.

(245) a. *Context: Ayu has the ability to write good lontar (palm-leaf manuscripts)*
Ayu nulis lontar becik pisan
Ayu AV.write lontar good very
"Ayu writes very good lontar."

b. Ayu nulis~nulis lontar becik pisan
Ayu AV.write~REDUP lontar good very
"Ayu is continuing to write good lontar."

We also expect the possibility of futurate habitual readings of bare sentences with reduplication but not bare sentences without reduplication. In this case, the relevant reading is one where the relevant habit is set to begin in the future. While I unfortunately have not collected the full paradigm, we do see at least the futurate habitual readings of bare reduplication, as in (246).

(246) *Context: Ayu starts her exercise regimen tomorrow.*

Ayu ngelangi~langi bin mani
Ayu AV.swim~REDUP tomorrow
"Ayu is swimming tomorrow."

Finally, we see some evidence for this broader proposal, the habitual readings of progressives require a causative element to mediate between pluractional VPs and the progressive, in the interpretation of causatives in Balinese. In (247), repeated from chapter 3, we see that *sedeng* can seemingly have habitual readings, as long as it is paired with a causative morpheme *-in*.

(247) *Context: Bima was driving the car last month (to keep it running). And Ayu is doing it this month.*

a. mobil-e jalan~jalan-*in* ajak Ayu
car-DEF walk~REDUP-CAUS by Ayu
"Ayu drives the car."

b. mobil-e sedeng jalan~jalan-*in* ajak Ayu
car-DEF PROG walk~REDUP-CAUS by Ayu
"Ayu is driving the car (this month)."

Similar to the dispositional causative relation, causatives are relations between events (Pylkkänen 2008). As such, the progressive in this construction may see a predicate of events that cause plural VP events. These causer events may be singular, and thus the progressive in this case may not encounter problems with cross-temporal identity. While I leave further investigation of this construction to future work, it is unclear for example how we might expect this overt causative to differ from the covert one, it further demonstrates the validity of the approach taken in this chapter where an intervening causative is necessary for habitual readings of the progressive.

4.4.5.2 Habitual readings of stative predicates

An important property of habitual progressives that we were not able to account for was the behavior of progressives with some stage-level stative predicates. There we saw a difference between the sentences in (248) if the state holds intermittently in time and does not hold at reference time.

(248) a. ??The sock is lying on the floor (these days).
b. Gil is lying on the lounge chair (these days).

We can now explain this fully. Because habitual readings of the progressive rely on a dispositional state, the infelicity of (248a) can be traced to the fact that there is no disposition providing for the sock to lie on the floor. This is not so for (248b), where Gil has a disposition providing for him to lie habitually on the lounge chair, namely his intentions.

4.4.5.3 Dispositions

This theory cashes out a somewhat vague intuition regarding English habitual progressives and dispositional sentences that we had in chapter 2. We said there that the English progressive can have dispositional readings, but these readings require more specific contexts than the simple present. The disposition itself has to be made relevant. This is shown in (249), repeated from (50) in chapter 2.

(249) a. *Context: The head chef at a restaurant unboxes two machines and sets them side-by-side. He says to the rest of the staff:*
This machine is crushing oranges (and this one is crushing apples).
b. *Context: Mary's boss says that Mary is in charge of mail from Antarctica, of which there is none. Someone missed the announcement and asks a coworker what happened. She replies:*
Mary is handling the mail from Antarctica.

We now see more specifically why this is the case. Habitual readings of English progressives involve reference to the disposition as a Davidsonian argument of the sentence. Thus the context identifies such a disposition which at the utterance time may serve as the stage of a larger disposition which may cause multiple instances of the base predicate. Without such a context, the simple present is a natural way to describe dispositions because it does not contain Davidsonian argument referencing a disposition.

We see further evidence of these specific dispositions when we consider cases where the disposition itself is unrealized. Consider the following scenario. Kim has developed a computer program that will randomly pick a route for her to run each day. The program does not create a preset plan but chooses the route right before Kim runs. Kim's friend wants to know where Kim might end up running in the future. In this context, Kim's friend can felicitously ask the question in (250a) but not (250b).

(250) a. Does Kim run to the beach?
b. #Is Kim running to the beach?

The progressive habitual fails to serve as a felicitous base for this question because there is no disposition that Kim run anywhere in particular. The computer chooses randomly right before Kim runs. As such there is never any plan in place, before the program runs anyway, that Kim run anywhere. The question in (250a) does not make reference to any disposition.

4.4.5.4 Near-obligatory adverbial

There is a sense that habitual readings of progressives are most accessible with an adverbial like *these days* in the absence of a strongly habitual context. This proposal suggests that the reason for this is the same as in the case of futurate progressives. The adverbial forces a

kind of mismatch between the requirements of the progressive and the spreading out of events over a wide, amorphous span of time. It thus forces the choice of the structure with the causative over the one without it.

4.4.5.5 Stativity and the progressive

One outstanding question here is what the progressive itself contributes when dispositional causation is present. Because dispositional causation is stative, and the present tense may only apply to statives, the progressive component of the present tense progressive contributes little with dispositional causation. So what, exactly, does the progressive tense *do* in this case that the present tense does not?

This is a good and difficult question, and it extends beyond dispositional causation to the progressive's ability to combine with stative predicates generally. With some stative predicates, the difference between the simple present version of the predicate and the progressive one is that the former implies a (semi-)permanent state while the latter describes a temporary state. This is evident in Dowty's (1979) examples involving *lay*. The sentence in (251a) with the simple present is okay because cities don't generally change locations, but (251b) is strange because it implies that New Orleans might move. But there are plenty of cases where a state is almost never expected to persist indefinitely yet nevertheless can be used in the progressive, e.g., statives like *see* or *hear*. For example, in (252) it's very difficult to identify a difference between the simple present and progressive versions of the sentence, and thereby identify the contribution of the progressive. Dispositional causation introduces a state like *hear* and *see*, where the contribution of the progressive is difficult to identify.

(251) a. New Orleans lies on the Mississippi.
b. ??New Orleans is lying on the Mississippi.

(252) a. I hear a buzzing sound.

b. I'm hearing a buzzing sound.

Relatedly, there is also a kind of capriciousness to the kinds of statives that the progressive may apply to. For example, the progressive may apply to *think* but really resists applying to *believe*, despite the clear semantic similarity between the two. It is again unclear to me why the progressive is so selective in this way.

In any case, these problems concern the progressive more broadly, and I do not attempt to solve them here.

4.4.5.6 Typology of progressive and habitual constructions

One prediction of this proposal is that the availability of habitual and futurate readings of the progressive is directly tied to the ability of the progressive construction to compose with stative eventualities. Both futurate readings and habitual readings are linked to dispositional causation, an operation referencing dispositional states. The English progressive has the (limited) ability to compose with statives, while the Balinese progressive does not. This precludes the Balinese progressive from having both futurate and habitual readings.

This proposal therefore predicts that the availability of futurate and habitual readings of progressives is tied to their ability to compose with statives. This is in line with Copley's (2018) claim that she has yet to find a language with a progressive that can accept some stative predicates yet lacks futurate readings. Additionally, this would predict that habitual and futurate readings of the progressive should be highly correlated. An informal survey suggests that, while this is true in some languages, like Mandarin and Turkish, this correlation fails to hold in southern Romance languages like Italian and Spanish.

Mandarin and Turkish present compelling cases for the extension of this proposal cross-linguistically. On one end of the spectrum, Mandarin has a progressive, *zai*, that

lacks habitual readings (Yuyin He, p.c.), but also lacks futurate readings and the ability to combine with stative predicates. These last two properties are exemplified in the data in (253) and (254) respectively, from He (2020).

(253) (He 2020: 52)
*Yuehan henkuai zai jian Mali
John soon PROG see Mary
'John is meeting with Mary soon.'

(254) (He 2020: 49)
*Wo xianzai zai lei
1SG now PROG tired
Intended: 'I am now being tired.'

Turkish is a more English-like case, where the progressive, *-(I)yor* has habitual readings, futurate readings, and the ability to compose with stative predicates (Yavaş 1982; Lewis 2000; Göksel & Kerslake 2005). These three uses are exemplified in (255). Further, it has a so-called aorist aspectual marker that describes more generic-like properties, properties that are timeless. Compare the habitual progressive sentence in (255a) to the aorist version of this sentence in (256), where the habit in the progressive sentence is delimited while that with the aorist is not. Finally, the aorist allows for generic readings of nominals while the progressive does not, as in (257). This suggests an English-like system where the progressive composes with other operators to produce its various readings while the aorist construction involves a generic operator.

(255) a. *Habitual* (Göksel & Kerslake 2005: 290)
O zaman-lar-da Mehmet çok sigara iç**-iyor**-du
3SG time-PL-LOC Mehmet very cigarette smoke-PROG-PAST
'At that time, Mehmet was smoking a lot.'

b. *Futurate* (Göksel & Kerslake 2005: 287)
Yarın Londra'ya gid**-iyor**-uz.
tomorrow London-DAT go-PROG-2PL
'We're going to London tomorrow.'

c. *Stative* (Göksel & Kerslake 2005: 291)
Yemek-te Tülay yan-ım-da otur**-uyor**-du
dinner-LOC Tülay side-1SG.POSS-LOC sit-PROG-PAST
'Tülay was sitting beside me at dinner.'

(256) (Göksel & Kerslake 2005: 290)
O zaman-lar-da Mehmet çok sigara iç**-er**-di
3SG time-PL-LOC Mehmet very cigarette smoke-AOR-PAST
'At that time Mehmet smoked/used to smoke a lot/Mehmet was a heavy smoker.'

(257) (Göksel & Kerslake 2005: 296)

a. Kaplumbağa yavaş yürü**-r**
tortoise slowly walk-AOR
'A tortoise walks slowly.'

b. Kaplumbağa yavaş yürü**-yor**
tortoise slowly walk-PROG
'The tortoise walks/is walking slowly.'

In Italian and Spanish, the situation is quite different and the argument made here would not extend to their progressive constructions. In these languages, habitual readings of the progressive are possible but futurate readings are not, and additionally, these progressives can't compose with stative predicates (Gennaro Chierchia, p.c.). So the story laid out in this chapter ostensibly does not extend to these languages, because these progressives may have habitual readings without also having these two other properties.

To determine whether this represents a true counter-example to the typological picture that this account draws, we would need to have a better idea of the aspectual systems of these languages internally. For example, like in the English case, the Spanish progressive construction is formed *via* a periphrastic construction involving a copula plus a gerund verb form. A major difference between these two, however, is that Spanish has two copulas, one specialized for individual-level predicates, *ser*, and the other specialized for stage-level predicates, *estar*. On one formulation of the difference between these, the copula specialized for stage-level properties, *estar*, has a presupposition that requires there to be alternative

circumstances of evaluation where the predicate could be false, while *ser* has no such presupposition (Deo, Sanchez-Alonso & Pinango 2017). It is exactly this copula with the presupposition that is used to form the progressive. Furthermore, Fuchs (2020) argues that this presupposition, in addition to other functional properties of the progressive, drives variation and change in habitual readings of the progressive across varieties of Spanish. Given these properties of the Spanish progressive, more investigation needs to be done to determine how the account I sketch for English might play out in Spanish, as the situation isn't directly analogous.

If these do turn out to be true counter-examples, one possibility consistent with this account would be that Spanish and Italian speakers are systematically more permissive of longer gaps in maintaining the cross-temporal identity relation. If this were the case, no dispositional causation would need to intervene between PLUR and PROG. It is not totally clear to me what the consequences of this would be.

Finally, I note that it appears that habitual constructions within a language may differ largely on the availability and shape of dispositional readings. For example, in Tlingit, it appears that a major empirical difference between the general imperfective construction and the habitual construction, aside from the availability of episodic readings, lies in the possibility of describing non-actualized habits, i.e., dispositions (Cable 2020). The imperfective can describe habits that have yet to be instantiated. By contrast, the habitual construction, which may be in the perfective or imperfective, only permits dispositional readings in the imperfective. This means that the availability of dispositional readings relates to the interaction of aspect and habitual morphology. Without speculating too much about the right analysis of the Tlingit data, my account provides a toolbox for addressing these facts. In this particular case, we should also add perfectivity to our toolbox. In general,

perfectivity, stativity, and present tense interact in complex ways that differ substantially across languages (Smith 1997). We might therefore want to investigate perfectivity and stativity in Tlingit, and on the basis of those facts, determine how we would expect the perfective to interact with the stativizing dispositional causative.

In any case, much more work will need to be done to determine the applicability of this account cross-linguistically.

4.5 Conclusion

In this chapter, I have argued that habitual readings of English progressive sentences actually decompose into a number of grammatical devices: progressive, pluractional, and dispositional causative. These may have different morphological reflections in different languages, as we see in Balinese, with many of the elements being covert and evidenced in a number of nuanced readings. Additional parameterization of these elements, in particular the progressive, further constrains their composition. Balinese progressives do not admit composition with stage-level statives and may not compose with the dispositional causative, and as such do not yield habitual or futurate readings.

Functionally speaking, habitual progressives are distinguished from habitual readings generated by a generic operator by being temporally delimited. This delimination comes about by virtue of pluractionality. Habitual progressive need only describe a dispositional state that causes a plural event with a certain number of subevents determined *via* the context. This differs from the generic operator, which maintains that an event satisfying the predicate should be realized in every accessible world and every contextually relevant situation in that world for a very long time, potentially a lifetime.

In the next chapter, we turn to American Sign Language (ASL), where I attempt to

extend the system worked out here to an additional language. ASL is argued to signal properties of event structure *iconically*, where event structure mirrors the phonological properties of the signs themselves. This presents an alternative to the decompositional view of the expression of habituality I've argued for in this chapter, and therefore an interesting challenge to the extension of this account into different modalities.

Chapter 5

Event plurality and iconicity in American Sign Language

5.1 Introduction

In the previous chapters, we saw that one of the primary interpretive differences that arise from different configurations of modular operators—progressive, pluractional, and dispositional causative—is temporal in nature. The progressive on its own describes an episodic scenario, a progressive with a pluractional describes iterative scenario, and a progressive with a dispositional causative and a pluractional describes a habitual scenario. These are distinguished from the generic operator in that the generic operator describes more timeless generalizations, whereas the habitual reading of the progressive is more delimited. Thus different configurations of operators may serve different *communcative functions* in describing these different flavors of event multiplicity.

Sign Language differs from spoken language in that it in principle has a way of fulfilling these functions using alternative means than a number of discrete grammatical operators.

American Sign Language (ASL) in particular is argued to connect the temporal structure of the sign as it is produced to the temporal structure of the event it describes (Wilbur 2003; Wilbur 2008; Kuhn & Aristodemo 2017; Kuhn 2017). Thus the form of the sign maps to the interpretation of the sign non-trivially. In this case, it would mean that the form of the sign itself corresponds to aspects of the events they describe. This property is called *iconicity*. Like Balinese, ASL is purported to have pluractional reduplication. *Unlike* Balinese, the *relative frequency* of subevents corresponds to the *relative speed* at which the repetitions in the sign are produced (Kuhn & Aristodemo 2017). In other words, the *form* of the sign maps to the *meaning* of the sign. In particular, the *temporal* properties of the sign are argued to correspond to the *temporal* strcture of the event. This differs from the spoken languages we discussed in the last few chapters where interpretive differences arise from different combinations of discrete operators, which are themselves arbitrarily mapped to their morphological forms.

In principle, the ability for ASL to represent some properties of event structure iconically could obviate the need for an architecture of grammatical operators that forms the basis of the last chapter. Because the temporal constitution of an event can be captured iconically in ASL, there may be no reason for ASL to deploy the same grammatical operations that English and Balinese do. To a degree, this is already suggested to be the case, where the repetition used to describe habitual scenarios is quicker and involves shorter movements than the repetition used to describe iterative scenarios (Fischer 1973; Rathmann 2005). Already however, this reveals that form may underdetermine interpretation. We could imagine iterative scenarios being signed with quicker repetition than habitual scenarios, as the events are (generally) closer together temporally.

Iconicity may also obviate the need for only *certain* grammatical elements that we

identified as being necessary for habitual readings of progressives. For example, the need for dispositional causation may be lessened if iconicity itself serves to make a disparate plural event more coherent as a single whole. In the last chapter I argued that event gappiness constitutes a constraint on the interaction of progressives and pluractionals. This was expressed in terms of cross-temporal identity. The progressive holds for a part of a larger culminating event as long as this part is cross-temporally identical with the larger event. When there is a "gap", a slice of time where the VP is not actually going on, cross-temporal identity can be maintained as long as the gap is not too large. That is, we recognize this gap plus the event that came before it as a cross-temporally identical part of the larger event. With a plural event, then, when we encounter a gap, we have to be able to recognize it as part of a single larger eventuality. When a gap becomes too large, the plural event loses coherence, and we may fail to see this gap plus what came before it as part of this larger eventuality. This constraint is evident in Balinese where pluractionality under the progressive results in an *iterative* reading as opposed to a habitual one. In English, as well as Balinese bare reduplicative sentences, another piece of the grammar is necessary to generate habitual readings from the progressive and pluractional. I argued that this piece is *dispositional causation*, which is the same grammatical mechanism that generates future readings. Importantly, the cross-temporal identity relation is affected by context. We may be willing to maintain cross-temporal identity as we track the development of an event as long as the context supports it. We've seen that the necessary context can be provided by other elements of the sentence, including durative adverbials, as they can make gappy plural events more coherent.

However, iconicity provides an alternative avenue of making gappy events more coherent. By virtue of iconically representing the temporal constitution of a (plural) event,

temporal gaps become less of an obstacle to overcome for the sake of coherence. The mere act of depicting a disparate plural event *as a disparate plural event* using iconic manipulation serves to present it as a single whole, gappy though it may be.

At the same time, however, grammatical aspect is not well understood in ASL. While potential perfective and perfect markers have been identified (Rathmann 2005), the imperfective space has yet to be fully mapped. No general progressive marker has heretofore been identified in the literature. This represents a methodological difficulty in investigating the expression of different kinds of habitual or iterative scenarios in ASL. As we've seen in the last few chapters, in order to understand the contribution of pluractionality, we also have to understand the contribution of grammatical aspect more generally.

In this chapter, I do two things. First, I present novel data on the expression of habituality in ASL. To collect this data, I created a production survey that is designed to elicit descriptions of delimited habits in contrast to extensive habits and single episodes in ASL. This comparison is important because it allows us to control for aspect. I find that reduplication is used consistently in both pluractional (including habitual) scenarios and episodic scenarios, and that reduplication occurs on objects and adverbial elements in the sentence. Second, I show that theories of the iconic encoding of event structure in ASL cannot fully account for this data. While more work is needed to draw specific theoretical conclusions regarding the semantic contribution of reduplication in ASL, I argue that the most plausible analysis of reduplication is that it is an imperfective marker.

In section 2, I review the literature on pluractionality and event structure generally in ASL. In section 3, I discuss the study conducted to collect novel data. I then discuss the results of this study in section 4. There, I entertain four hypotheses we might make about this data based on what has been said before about event structure in ASL. I show that these

hypotheses aren't quite able to capture what we see in this data and provide an alternative hypothesis that reduplication in ASL is really a general form of imperfective marking. I conclude in section 5.

5.2 Events in ASL

In this section, I review the literature on pluractionality and reduplication in ASL. Much of this discussion centers on the iconic properties of reduplication, how the production of the sign reflect the temporal constitution of subevents. I then follow this with a broader discussion of the encoding of event structure in ASL and its relation to iconicity.

5.2.1 Pluractionality and reduplication

Previous findings in the study of pluractionality and reduplication in ASL have largely fallen along two lines. The first involves identifying, descriptively, the forms and functions of verbal reduplication, which in general has a pluractional function, broadly construed. In the second case, authors analyze the connection between form and function in relation to reduplication. The second discussion will lead us to a more general discussion of the role of iconicity in the expression of events in ASL.

Descriptively, two kinds of verbal reduplication have been identified. Fischer (1973) referred to them as 'fast' and 'slow', corresponding to the speed at which the cycles of repetition are signed. Slow reduplication further involves a circular motion of the sign over the course of one cycle of repetition. Semantically, Fischer finds that slow reduplication expresses iterativity and continuativity, which can be paraphrased in English as "keep doing X". Fast reduplication, by contrast, conveys habituality or distributivity over participants.

Rathmann (2005) finds a similar pattern. He argues that there are two markers that

he calls 'iterative' and 'habitual'. He argues these are aktionsart modifiers rather than grammatical aspect markers. The iterative, which is formed by reduplicating the verb sign, has a meaning like "repeatedly" and coerces predicates into activities. The habitual is much like the iterative phonologically. It is formed the same way, but the movement is repeated in "quicker and shorter cycles" relatively. In contrast to the iterative, it has a characterizing reading that Rathmann says is similar to the contribution of *usually*. Rathmann identifies two additional markers of habituality. First bare sentences can have habitual readings, though he says these are dispreferred. Second, he identifies a marker TEND, which conveys a habitual meaning and may be present with the habitual without any change in meaning.

Klima & Bellugi (1979) and Wilbur (2009) take a more discrete approach. Klima & Bellugi (1979) break categories like iterative and continuative down into a set of phonological features. Wilbur (2009) adopts a similar ethos and identifies a set of phonological features that may combine to form different types of reduplication.

Wilbur motivates this under what she calls the Event Visibility Hypothesis (EVH) (Wilbur 2003; 2008; 2009). The EVH states: "In the predicate system, the semantics of the event structure is visible in the phonological form of the predicate sign." In other words, the *form* of ASL verbs reflects *event structure*. This can be seen in reduplication itself in that the Base (the first syllable of reduplication) represents the first event, and the Copy (the second syllable of reduplication) represents the second event. One such feature, [3d], introduces movement "perpendicular to the plane of the [direction] movement of the sign." For a sign like LOOK-AT, this means that the reduplicated sign is formed by moving the hand in its appropriate handshape in a circle perpendicular to the front of the body. Wilbur argues [3d] means 'over time, involving extended time', and it can be seen with the iterative, the durative, and the continuative. The durative and continuative are formed by small and

large continuing circles respectively, while the iterative involves slowed movement at the starting point in the circle. The size of the circle reflects the relative amounts of time an event takes, while the slowed movement of the iterative reflects multiple events.

Kuhn & Aristodemo (2017) argue that the iconic component of reduplication is actually *gradient*, and cannot be captured by Wilbur's feature based approach. At the same time, they recognize that pluractional reduplication in ASL is not unlike pluractionality in the spoken modality. Thus their proposal is that ASL reduplication has two parts, and these parts interact in surprising ways. First, they argue reduplication in ASL has a standard Lasersohnian (1995) meaning component. It applies to a predicate of events and yields a set of plural events. Second, they argue that reduplication also has an iconic meaning component, and importantly, this iconic meaning is at-issue and interacts with the composition of the pluractional. Focusing primarily on distribution of events over participants, they argue that the pluractional can take scope at different levels. They show that the interpretation of the iconic component of reduplication is affected by the logical scope of the pluractional.

They claim that ASL and LSF have two different pluractional operators. One, dubbed /-alt/, involves alternating motion of the two hands in signing the verb. The other, dubbed /-rep/, involves exact redupulication of motion of the sign. The first of these, /alt-/, has a distribution-across-participants reading. Like other pluractionals with this meaning, it is infelicitous with singular arguments, as they can't be distributed across subevents. The second has a distribution-across-time reading. It is quite general, having a 'repeatedly'-like meaning.

They argue that these are scope-taking operators. Their evidence for this is that, with some distributive elements in the sentence, the contribution of the pluractionals may be trivial. This is shown for /-alt/ in (258). The presence of /-alt/ has no apparent semantic

effect in this case. Further, EACH distributes events down to atomic individuals, so it is initially surprising that /-alt/, which requires plural individuals, is felicitous here at all. This same effect can be seen with /-rep/ and adverbials like EVERY DAY, where only one event need happen each day.

(258) BOY EACH FORGET-alt BRING CAMERA.
'Each boy forgot to bring a camera.'

On their analysis, what is going on in this case is that the pluractional operators scope above the distributive operators EACH and EVERY DAY, allowing them to apply to the plurality of events that the operators distribute over.

They also show that these signs have an at-issue iconic component. Essentially, the speed at which the repetitions of the signs occur corresponds to the relative frequency of the events. If a sign is repeated quickly, the events are interpreted to occur quickly. This is gradient in the sense that acceleration of deceleration of repetitions corresponds to increasing and decreasing frequency of events, and changes in velocity may distributed throughout the timecourse of the sign. This frequency effect is at issue and can be targeted by other operators. This is shown in (259) where the contribution of iconicity is targeted by negation.

(259) JOHN NOT PAPERS GIVE-alt-speeding-up. IX PAPERS GIVE-alt-slowing-down.
'John didn't give papers at an accelerating rate. He gave papers at a decelerating rate.'

They follow Kuhn (2017) in proposing that this iconicity is structural, and built into the denotation of the pluractionals themselves. They support this with evidence that the interpretation of the iconic meaning itself tracks the scope of the pluractional. For example, in cases where a distributive operator forces wide scope of the pluractional, the iconic meaning applies to the frequency of the total eventuality, not local subdivisions of the event.

They provide the example in (260). In this case, it can't be that each time a boy presents me with a book, he presents them slowly. It has to mean that the frequency of times that a boy gives me books is low.

(260) EACH-a BOY BOOK a-GIVE-1-alt-slow.
'Each boy gave me books, which happened slowly from a global perspective.

The key takeaway from this proposal is that in one sense, ASL has pluractionals that work just as pluractionals do in spoken languages. The difference is that certain parameters, like frequency of the subevents, are iconic in nature and this iconicity is gradient. They argue, however, that the iconic nature of pluractionals is loose in certain respects, e.g., the number of signed repetition need not correspond to the number of subevents.

5.2.2 Event structure and iconicity

Reduplication and pluractionality is one piece of a larger puzzle in the expression of events in ASL. While Wilbur argues that the EVH described above applies to reduplication, she argues that it applies more generally to event structure as a whole. For example, Wilbur (2003; 2008) claims that for ASL *telicity* is witnessed in the phonological form of the verb. The presence or absence of an eventive telos corresponds to the presence or absence of a morpheme on the verb that she calls EndState, which is characterized phonologically by an abrupt stop. Thus telic eventualities have this marker and atelic eventualities do not. She extends the EVH further to *duration*, arguing that a phonological path is a realization of a morpheme that reflects the durativity of an event. The first of these, telicity, has garnered the most attention, with much of this discussion focusing on iconicity.

While there is substantial evidence that EndState doesn't correspond to telicity *per se*, the possibility remains open that it does mark *perfectivity*, which like telicity conveys a

kind of boundedness (Davidson et al. 2019). This is important for this chapter because this introduces the possibility that grammatical aspect, including progressivity, is expressed iconically ASL.

Kuhn (2017) makes this connection explicit. He argues, as in Kuhn & Aristodemo (2017) above, that the interpretations of predicates in ASL depends *gradiently* on the way those signs are produced. Acceleration, deceleration, starts, and stops in the production of a sign are reflected in the way the event described develops. On this view, interpretation is determined by a mapping from the way the sign is produced to the *development of an event* along a scale associated with the verb, a proposal he calls *structural iconicity*. If a signer pauses the production of the sign briefly before resuming, the event described must also "pause" its development in the middle of its run-time. Further, a sign that reaches its canonical endpoint, e.g., making contact with another part of the body, signals the event reaches its endpoint, the endpoint of the scale, as well. Let's consider an example. The verb DIE in ASL is formed by turning one hand palm-up to palm-down, while the other hand does the reverse, turning palm-down to palm-up. The signer may "pause" the sign by holding the hands steady momentarily in the middle of flipping the palms over before resuming. The interpretive effect is that the subject's health is interpreted to have declined at first before steadying off and then declining again until death. If the signer pauses the sign multiple times in the course of signing it, it indicates that the health of the subject declined intermittently, eventually resulting in death. However, if the signer doesn't completely turn the sign over, it indicates that the subject almost died, but ultimately may not have. The incompletely produced sign mirrors non-culmination in the event. Note that these changes are gradient, as most clearly evidenced by the behavior of pauses. The number and temporal location of pauses has a direct effect on interpretation.

Kuhn argues that all verbs have this iconic component built into their truth conditions. This means that all verbs in ASL map the temporal stucture of the form to the temporal structure of the event described. This applies to verbs that do not have canonical endpoints as well, as the mapping of an endpoint in the form to an endpoint of the event is only one aspect of this theory.

Importantly, a sign that does not reach its canonical endpoint can be used to describe an event that doesn't reach its endpoint, though it does not entail the endpoint wasn't eventually reached. He points out that this is not unlike a progressive aspect marker in spoken language. Progressive markers describe parts of larger events and fail to entail culmination. The difference is that this is achieved iconically in ASL. These incompletive signs, in some sense, make reference to a *complete* sign. It is by virtue of this reference to a would-be complete sign that incompleteness, and thus modality, is introduced. By contrast, spoken language progressives are modal in that they are, by many accounts, argued to involve quantification over possible worlds.

It is worth noting that there are further compositional differences between this iconically-introduced progressivity and spoken language progressives. First, by making reference to a "completed" sign, this can only apply to signs that have a canonical phonological endpoint. This would exclude activity signs, which on Kuhn's thesis do not have such endpoints, and couldn't have these iconic progressive forms. This constraint doesn't apply to spoken language progressives, which are not generally constrained by the phonological properties of the base verb and may apply freely to activities. Further, by virtue of being iconic, it is unclear how it could compose with other iconically introduced interpretations. For example, it is unclear how the iconic component of reduplication composes with the iconic component of the verb itself, though there are many ways we could imagine such an

interaction.

Further, while Davidson et al. (2019) show that boundedness itself may not be encoded iconically in ASL,[1] it remains an open question whether other properties of event structure are encoded iconically in ASL. For example, Wilbur's (2008) claim that temporal extent is associated with a phonological path is still plausible. Further, this mapping may be gradient in the way Kuhn & Aristodemo (2017) describes: longer path motion may correspond to longer events.

Finally, iconicity in sign language may have subtle effects on pragmatic interpretation. Certain accomplishment predicates behave slightly differently between English and ASL. These predicates, which Wright (2014) terms *flexible accomplishments*, give variable results of telicity tests in English and strongly imply that their endpoint is reached. These predicates in ASL, however, don't carry this strong implication. For example *John drank a cup of coffee* in English strongly implies that John finished the entire cup of coffee. The ASL translation of this sentence, however, does not. Wright (2014) argues that these predicates are special in that they have natural endpoints but only strictly entail that some *minimal atomic event* hold, like a sip of coffee in the above case. The fact that no strong culmination implication exists in ASL he claims is due to the iconic nature of the sign for DRINK in ASL, which iconically resembles taking a sip from a cup. The iconic nature of the sign makes the minimal atomic event it represents more salient, diminishing the importance of the endpoint. Thus the truth conditional semantics of the ASL and English predicates may be the same, but the iconic nature of the ASL signs may have a significant influence *pragmatically* on interpretation.

[1] Though Kuhn et al. (2021) show that there still may be a non-trivial connection between form and meaning in this domain.

5.2.3 Interim summary

As far as this chapter is concerned, we have seen that reduplication is crucial in the expression of habituality and iterativity and event structure may be affected in a variety of ways by the iconic nature of sign language. Analyses of reduplication depart from one another somewhat in how they connect form to meaning. On the one hand, the form-meaning mapping may be arbitrary just as generally assumed in spoken language. On the other, the meaning may crucially depend on slight modulations in form. Particularly, temporal extent and event frequency may be signaled iconically, which would make ASL, and potentially sign languages generally, significantly different than spoken languages. In the last chapters, I argued that spoken languages must graft together a variety of independent grammatical mechanisms to describe delimited habits and to make temporally disparate events more coherent. By virtue of the visual modality, ASL has the potential to iconically indicate the relative lengths of habits with shorter or longer path motion. It may also make potentially disparate events coherent as a single whole by virtue of signaling temporal properties iconically. It would make the disparate events salient as a single coherent event, not unlike Wright's (2014) proposal for flexible accomplishments.

5.3 Study

As discussed in the previous section, previous studies on the event structure of ASL suggest that ASL may iconically signal some temporal properties of a plural event in the production of reduplicated verbs. This is of interest to us because the theory set forth in the last chapter argued two things 1. that different combinations of operators functionally describe multiple events with different temporal extents, and 2. that pluractionals under the progressive were

constrained by how coherent the plurality was as a *single* event. These two facts may play out differently in ASL because it has the potential to represent certain nuances of event structure iconically.

First, it seems that one of the primary uses of habitual progressives in spoken languages is to indicate that a habit may be temporally delimited, in contrast to more generic habitual constructions. In ASL, however, iconicity itself could be used to delimit habits. Longer, more numerous repetitions could signal longer habits, and shorter reduplications short habits. Alternative repetitions along a longer path may signal longer temporal extent, while shorter paths may signal shorter temporal extent. In this way, a single iconic expression in ASL could serve the functional purpose of habitual progressives, eliminating the need for the combination of pieces that give rise to the reading altogether.

Second, in the spoken domain, the events composing a habit are argued to be too incoherent to form a single recognizable event on their own and need to be wrapped up in a dispositional state. Coherence is ultimately a contextual notion, and disparate events can be made more coherent when certain contextual factors, like the presence of a durative adverbial, provide for it. Unlike spoken languages, ASL introduces another way that event coherence can be introduced: iconicity. Because the time between gaps can be conveyed overtly, temporal gaps themselves may not be a limiting factor in ASL. As Wright (2014) proposes for the saliency of endpoints for flexible accomplishments in ASL, the difficulty that temporal gaps pose for habitual interpretations of reduplication may be lessened by virtue of the fact that they may be presented iconically.

From this, we form two hypotheses. First, ASL may not have two habitual constructions because the function of a habitual progressive is served by gradient iconic manipulations. Second, if it does have an additional construction involving progressivity and reduplication,

they may be able to compose without an intermediary like a dispositional state. The events composing the habit can be made coherent iconically so such an intermediary may be unnecessary.

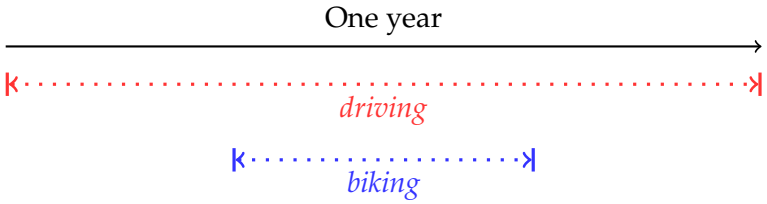
A third hypothesis is that habituality in ASL is, to some degree, signaled through temporal adverbials. van Boven & Oomen (2021) find that in Sign Language of the Netherlands (NGT), the most prevalent strategy for describing habituality in a naturalistic corpus was the use of adverbs like ALWAYS. While these do co-occurr with reduplication, they find that 67% of habitual sentences in the corpus are signed with a temporal adverb compared to the 46.2% with reduplication.

One potential difficulty in investigating habitual constructions in ASL is that grammatical aspect in general is not well understood. While potential perfective markers have been identified in ASL (Rathmann 2005; Davidson et al. 2019), the status of individual imperfective markers is less clear. The literature does not, for example, identify any marker that can be identified as a *progressive* marker, for example. Other than the special conative marker—meaning approximately "about to"—identified by Rathmann (2005), Davidson et al. (2019) note the possibility that reduplication may actually be used to mark imperfectivity, as described for a form of WRITE above. This observation will be shown to be in line with the results we find in this study.

In order to investigate subtle distinctions in the expression of habituality in ASL, I created a production survey. The particular question the survey seeks to answer is how delimited habits are expressed in ASL compared to longer habits. The intuition behind the survey is that if the speaker is asked to describe two temporally overlapping habits where one is temporally delimited, the difference in temporal extent should marked somehow. This can be seen in habitual progressives and simple presents with *while*-clauses in English.

Take the scenario in (261), where each dot represents a biking or driving event spread out over the course of a year. The more numerous series takes place over the entire year, while the shorter series takes place only over part of it. Given the two options in (261a) and (261b), only the first is a pragmatically acceptable way to describe the scenario.

(261)



a. While Kim is biking to campus, Gil drives to campus.

b. ??While Kim bikes to campus, Gil is driving to campus.

I operationalize this intuition in the production survey. The survey asks speakers to describe scenarios depicting one set of events that are temporally contained in another. By contrasting habits of different temporal constitutions, we are more likely to see the effect of iconic manipulation. As Kuhn (2017) points out, iconic manipulations are ultimately relative. A "slower" repetition is only slow relative to some other repetition.

One upshot to this format is that it further allows us to attempt to control for (im)perfective aspect. Perfective and imperfective clauses have specific temporal interactions when connected by a *when*-clause. In particular, when an imperfective clause and a perfective clause are connected by a *when*-clause, the event described by the perfective clause must be completely temporally included within the event described by the imperfective clause regardless of which clause is subordinate or matrix (Kamp & Reyle 1993; Bonomi 1997). Thus we can extend the case where one habit is temporally contained within another to single episodes, where one single event is temporally contained within another. We thus expect the larger episodes, the episode temporally including the smaller episode, to be described with imperfective marking, and the smaller episodes to be

described with perfective marking.

By including the contrast with episodic scenarios in the study, we also make the encoding of habituality itself more salient. Because the signer is contrasting the two types of scenarios, the signer is more likely to use grammatical devices that are unambiguously habitual in nature in the habitual context. This similarly holds for the episodic scenarios.

Further, because iconicity is argued to interact with telicity in ASL and progressivity interacts with telicity in general, we look at four aktionsart classes: activities, accomplishments, achievements, and semelfactives.

5.3.1 Methodology and materials

There are three conditions to our study. The first condition is event type. I test both habitual cases and episodic cases. The second condition is the temporal relation, whether the target event is temporally included within the "dummy" event, the scenario we compare our target scenario to. The third condition is aktionsart class, of which I test four: activities, accomplishments, achievements, and semelfactives. This yields a 2x2x4 design for a total of 16 scenarios.

The four predicates selected were *run* (activity), *run to beach* (accomplishment), *win game* (achievement), and *knock* (semelfactive). These were each paired with a non-target predicate which provides an opposing habit or event.

The scenarios themselves were depicted in two sets of images. The first set was episodic. It depicts a timeline over the course of a single day. The events were represented as colored bubbles overlaying the timeline, with the colors corresponding to the event type. An example of one of these scenarios is in Figure 5.1. The second set depicted the habitual scenarios. These likewise depicted a timeline, though in this case the timeline represents a

year. The habits were represented by individual colored "ticks" across the timeline, where each tick is meant to represent a single event. An example of this scenario is provided in Figure 5.2. In order to reduce the possibility that the signer would indicate the timecourse of the event using specific adverbial descriptors, images were used to represent time of day or time of year.

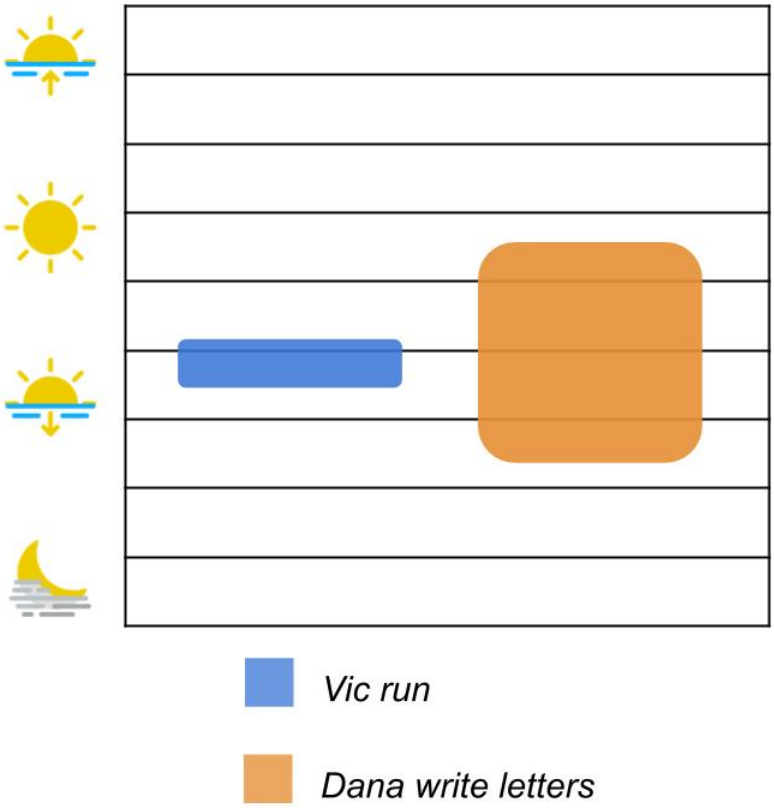


Figure 5.1: Episodic survey stimulus. The target predicate *run* is paired the color of a corresponding bar. The bar represents the time over which the event takes place. It is temporally included in the non-target scenario *write letters*.

These images were integrated into a survey created through Google Forms. After a brief introduction, two examples, one for each event type, are presented with possible English descriptions of these scenarios. Each scenario is presented individually in its own section, and the participant must click a button on the page to advance to the next scenario. The

Figure 5.2: Habitual survey stimulus. As in the episodic case, the target predicate *run to beach* is paired with a color, in this case corresponding to a series of tick marks. Each tick mark represents an event occurring over the course of a year. The overall series temporally includes the series of non-target *bake cookies* events.

signer was instructed to record themselves providing a description of the scenario in ASL.

I asked one native signer of ASL, a researcher naive to the goals of this study, to participate in the survey. The initial survey contained a duplicate and left one image out, so the signer gracefully provided a description of this image two days after completing the initial survey.

The resulting videos were processed with ELAN (Wittenburg et al. 2006), software that facilitates linguistic annotation of video data. I annotated the video with glosses with the assistance of online dictionaries at the ASL Signbank (Hochgesang, Crasborn & Lillo-Martin 2020) and SpreadTheSign[2], with much helpful input from Kathryn Davidson. It is important to note that only manual marking, signs produced with the hands, was glossed in this study. Non-manual marking, which includes things like eye-gaze and facial expression, was omitted for the purposes of this study. The video data can be downloaded in the DASH[3] repository associated with this thesis, which can be found by searching the title or author of the dissertation at https://dash.harvard.edu/. The glosses for all pieces of data are included in the appendix with additional survey materials.

5.3.2 Results

The study found that verbal reduplication was used in all conditions except for the achievement condition, where the results are more complicated and discussed in further detail below.[4] For activities, accomplishments, and semelfactives, verbal reduplication was used regardless of whether the scenario was episodic or habitual or whether the target scenario was temporally contained in its scenario pair. For example, habitual and episodic scenarios

[2]https://www.spreadthesign.com/en.us/

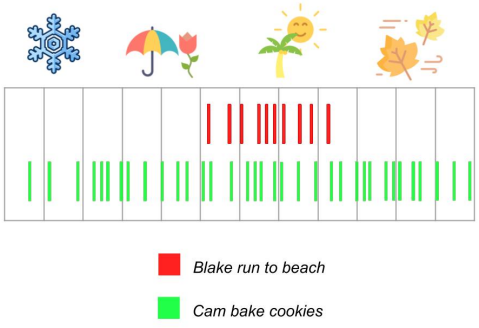
[3]Digital Access to Scholarship at Harvard.

[4]While many papers in sign linguistics provide helpful pictures depicting the forms of particular signs, it is much harder to depict the relevant forms of reduplication using static images. Instead, I encourage the reader to watch the video of the data provided in the DASH repository as described above.

for the achievement *run to beach* had the descriptions in (262).[5] I provide the stimulus that the sentence corresponds to, and the description of that condition in brackets. These indicate the aktionsart class of the target predicate, the event type of the scenario (habitual or episodic), and whether the target eventuality temporally includes the non-target eventuality (*temporally including*) or not (*temporally included*). I underline the portion of the gloss corresponding to the target predicate, and I put in **boldface** elements in the predicate that contained repetition. To make the glosses more readable, I provide a free translation with each sentence. Importantly, these free translations were not, e.g., English sentences that the participant translated into ASL. They are not meant to carry theoretical import. I chose to translate the sentences universally with the English progressive, but the ASL sentences do not necessarily involve progressive constructions themselves.

As we can see in the data in (262), reduplication of both the verb RUN and its object, BEACHarm, is found in both habitual and episodic scenarios.

(262) a. *[Accomplishment, habitual, temporally included]*



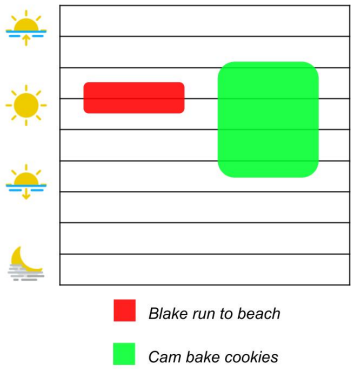
FS(Cam) BAKE COOKIE ABOUTb, FS(Blake) **RUNasym[+] BEACHarm[+]** END-OF **SPRING[+]** END-OF **SUMMER[+]** TIME-SPAN

"Cam was baking cookies that year while Blake was running to the beach through

[5]In reporting these results I use the sign language glossing conventions in Hochgesang (2020). Importantly, the use of "[+]" represents reduplication of the sign it's appended to. The reader may also be unfamiliar with "[_]", which indicates that a sign has been held longer than it usually is. Where possible, I also use searchable ID glosses from the ASL Signbank (Hochgesang, Crasborn & Lillo-Martin 2020). In addition, I use the notation [i] for signs that have inherent repetition in their form. A form with inherent repetition that was realized with more cycles of repetition than in the citation form was marked with [+] instead of [i].

the end of Spring to the end of Summer."

b. *[Accomplishment, episodic, temporally included]*



FS(Cam) BAKE COOKIE ALL-DAY, BLAKE **RUNasym[+]** **BEACHarm[+]** ALL-DAY

"Cam was baking cookies all day while Blake was running to the beach."

Episodic and habitual scenarios were largely distinguished through the use of adverbials and the presence of the sign TEND. The use of adverbials can be seen in (262) above. Habitual scenarios involved explicit reference to the seasons over which the habit occurred, or, if the habit lasted the entire year, the use of a sign ABOUTb, which in this case meant something like "all year". Sometimes the habit was also marked by TIME-SPAN, which iconically reflects the time an event takes. It is signed by holding two hands in parallel. The further apart the hands, the longer the habit lasts. In the episodic case, the use of a sign ALL-DAY was used. ALL-DAY depicts the motion of the sun across the sky over the course of a day. The sign is formed by creating an arc with the forearm in front of the body. The signer can choose to sign any part of this full motion, reflecting the time of day that the event occurs over. The sign TEND was sometimes used in habitual scenarios, consistent with Rathmann's (2005) description. It always co-occurred with verbal reduplication.

In the case of RUNasym, there was some evidence of a difference in the quality of repetitions between the habitual and episodic cases. The habitual cases were signed with quick repetitions and shorter movements. The episodic cases had more repetitions (four

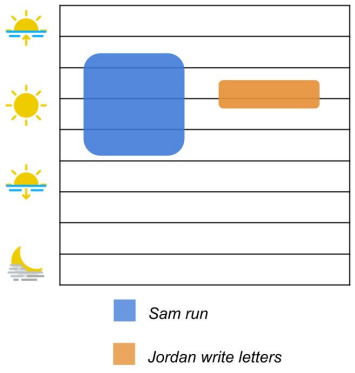
as opposed to two) that were performed more slowly. The habitual case resembles the habitual that Rathmann (2005) describes, while the episodic case is reminiscent of the "slow" reduplication that Fischer (1973) identifies. Though I do not indicate these differences in the notation of the glosses, I provide the sentences they occur in below in (263). It's worth noting, however, that the RUNasym BEACHarm case, the accomplishment case, which was signed with the same verb, resembles the quick habitual case across both episodic and habitual scenarios.

(263) a. *[Activity, habitual, temporally including]*

FS(Sam) TEND **RUNasym[+]** WINTER SPRING SUMMER AUTUMN[i] ABOUTb **TIME-TO-TIME[+]** FS(Jordan) WRITEbo[i] STAMPth[+] SPRING SUMMER[+] TIME-SPAN

"Sam was running in Winter, Spring, Summer, and Autumn while Jordan was writing in the Spring and Summer."

b. *[Activity, episodic, temporally including]*



FS(Sam) **RUNasym[+]** ALL-DAY APPROXIMATE TIME-SPAN, FS(Jordan) WRITEbo STAMPth[+] ALL-DAY

"Sam was running all day, while Jordan was writing letters."

The temporal relation between events was largely described with adverbials in the habitual case by listing the seasons over which the habit lasts. Compare (262a) to (264) below, where the longer habit is paired with an adverbial ABOUTb, meaning something like "all year", and the shorter habit has adverbials listing the seasons over which the habit occurs. The temporal relation in the episodic case was captured iconically through the use of the sign ALL-DAY. We did not find manipulations of reduplication specifically to play any role in describing the temporal relation.

(264) *[Accomplishment, habitual, temporally including]*

ABOUTb FS(Jess) TEND **RUNasym[+] BEACHarm[+][_]**, FS(Alex) TEND BAKE COOKIE WINTER SPRING TIME-SPAN

"That year, Jess was running to the beach while Alex was baking cookies in Winter and Spring."

Somewhat surprisingly, reduplication was also found with other constituents of the sentence, in particular adverbials and goals of motion. In the habitual scenarios, SPRING, SUMMER, and AUTUMN were often reduplicated, as seen in (262a) and (264). These signs appear without reduplication as well, and sometimes non-reduplicated and reduplicated season adverbials appear at the same time. In the scenario with the target *run to the beach*, we find that BEACHarm was consistently reduplicated across both episodic and habitual contexts. In addition, in the non-target predicate WRITEbo STAMPth, we see STAMPth with

reduplication, as in (263), and without reduplication, as in (265). At the same time, some object constituents were never reduplicated. For example, DOORb in KNOCK DOORb, which has inherent repetition in the citation form, was never reduplicated, nor was COOKIE in the non-target predicate BAKE COOKIE.

(265) *[Activity, habitual, temporally included]*

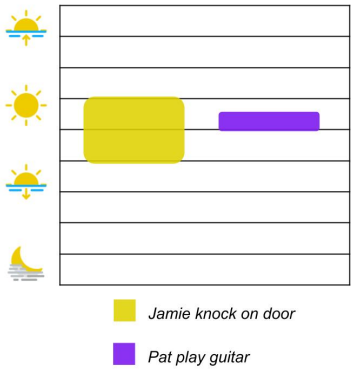
FS(Dana) WRITEbo[i] STAMPth ABOUTb SPRING[+] TO AUTUMN[i], FS(Vic) TEND **RUNasym[+][_]** BEGINNING **SPRING[+] SUMMER[+]** TIME-SPAN
"Dana was writing letters in the Spring and Autumn while Vic was running in the Spring and Summer."

One caveat with this data is that because repetition in general was so pervasive, it is difficult to establish the base form of the sign, so it is possible that some of the signs that I have glossed with a [+] are inherently repetitive in the signer's lexicon. For example, BEACHarm always contained repetition, but the possibility remains open that this signer always produces repetition with this sign even though the citation form produced in online dictionaries does not display any repetition. In the case of BEACHarm, we do see differences in the *degree* of repetition, however, where the habitual, temporally including case has additional cycle of repetition than the other cases.

In two sentences, we find discontiguous reduplication of the verb. These both occur in episodic scenarios where the event it describes temporally contains the other. These are in (266). This is possibly a topicalization construction. Note that the both instances of

KNOCK in (266a) show reduplication on their own, with the second instance involving approximately eight instances of repetition compared to the first one's three. Similarly the second instance of DRAW in (266b) contained a number of internal repetitive motions.

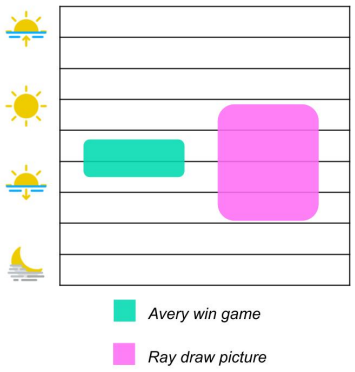
(266) a. *[Semelfactive, episodic, temporally including]*



FS(Pat) PLAY[i] GUITAR[+] ALL-DAY, FS(Jamie) **KNOCK[+]** DOORb[i] **KNOCK[+]** ALL-DAY

"Pat was playing guitar while Jamie was knocking on doors."

b. *[Achievement, episodic, temporally included]*



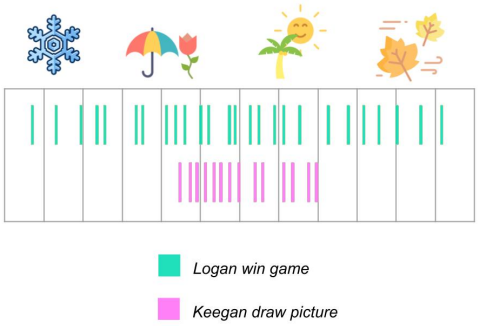
FS(Ray) DRAW PICTURE DRAW[+] ALL-DAY APPROXIMATE, FS(Avery) IX WIN **GAME[+]** ALL-DAY APPROXIMATE

"Ray was drawing pictures while Avery was winning the game."

The achievement condition showed more variability than the other aktionsart classes. First, verbal reduplication was present only in the habitual case where the target habit temporally contained the non-target habit. This is shown in (267a). In the scenario where the target sentence did not contain verbal reduplication, we see reduplication of the season

adverbials, shown in (267b).

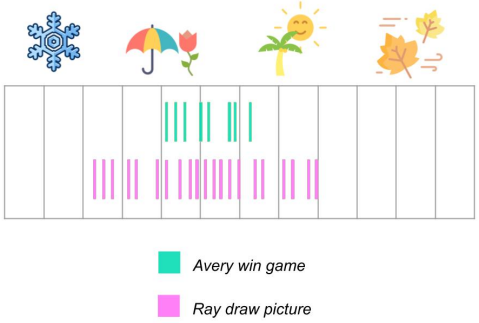
(267) a. *[Achievement, habitual, temporally including]*



FS(Logan) **WIN[+]** GAME[i] **TIME-TO-TIME[+]** ABOUTb FS(Keegan) DRAW PICTURE TEND SPRING[+] SUMMER[+] TIME-SPAN.

"Logan was winning games that year while Keegan was drawing pictures in the Spring and Summer."

b. *[Achievement, habitual, temporally included]*



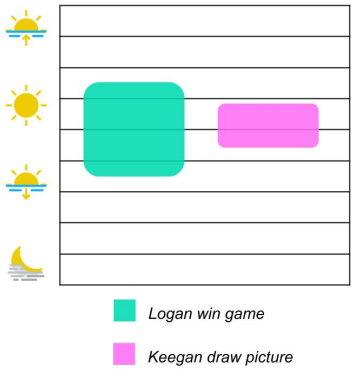
FS(Ray) DRAW PICTURE[_] END-OF WINTER EARLY-TIME SPRING[+] THROUGH END-OF SUMMER[+] TIME-SPAN, FS(Avery) WIN GAME[i] **SPRING[+]** END-OF **START[+]** **SUMMER[+]** TIME-SPAN

"Ray was drawing pictures from the end of Winter to the end of Summer while Avery was winning games from Spring until Summer."

In the episodic cases, we do not see any verbal reduplication, but we do see reduplication of GAME in the case where the target-scenario is temporally contained in the non-target scenario. This sentence is in (266b) above. In the episodic scenario where the temporal relations are reversed, we don't see reduplication of GAME but we do see reduplication of PICTURE in the non-target scenario. This is the only instance were PICTURE is reduplicated.

This case is also unique in that it's the only one with a subordinating adverbial and the use of TIME-SPAN for an episodic scenario. Finally, both GAME and PICTURE were held for an usually long amount of time.

(268) *[Achievement, episodic, temporally including]*



ALL-DAY TIME-SPAN FS(Logan) WIN GAME[i][_], WHILE ALL-DAY APPROXIMATE FS(Keegan) DRAW PICTURE[+][_].
"Logan was winning the game while Keegan was drawing pictures."

5.4 Discussion

We hypothesized that reduplication would be used to encode habituality and that iconic manipulation of the signed repetitions would be used, in some form, to convey subtle distinctions in habitual scenarios. However, our results show that reduplication *cannot* be the primary marker of habituality, as it appears consistently in episodic scenarios. It may be a *necessary* component of habitual expression in certain cases, but the fact it appears consistently in episodic scenarios suggests it's not a good way to convey that a scenario is habitual rather than episodic. This represents a difficulty for evaluating our hypothesis. If reduplication is not specific to habitual constructions, we have to step back from the idea that it encodes pluractionality *per se*, as it is used in many cases not obviously analyzed as involving event plurality.

The core difference between habitual and episodic scenarios appears to be the presence of adverbials like SUMMER and the particle TEND 'tend to'. There were no habitual cases where an adverbial did not appear. It appears that ASL may be like NGT in this regard, where van Boven & Oomen (2021) find that adverbial marking was overall the most prevalent strategy of conveying habituality in a naturalistic corpus.

Though the unexpectedly pervasive use of reduplication ultimately introduces a confound for our hypotheses, it's possible that the use of reduplication still represents an iconic strategy for marking event structure generally. Iconicity underdetermines interpretation in the sense that a single sign could conceivably resemble many real world scenarios. To take a simple example, consider the sign DRINK. The sign DRINK represents someone taking a sip from a receptacle. However, the sign underdetermines what is being drunk and what the form of the receptacle actually is. Because event structure and temporal constitution are abstract, there are potentially many ways for the iconic properties of a sign to map to them. In the next section, I investigate three possible arguments in favor of an iconic analysis of reduplication. Ultimately, I will argue that all of these iconic hypotheses suffer deficiencies and that the most parsimonious analysis of reduplication in ASL is that it is a general marker of *imperfectivity*.

5.4.1 Four hypotheses

In this section, I entertain four possibilities for an analysis of reduplication we see in this data. First, we will look at the view that reduplication represents an independent morpheme encoding some aspect of the event structure of the verb *a la* Wilbur (2003; 2008). Then we examine the structural iconicity hypothesis in Kuhn (2017) and Kuhn & Aristodemo (2017). Third, we look at the possibility that reduplication simply represents a way to iconically

encode temporal measure. Finally, we will see how the atomic minimal event proposal in Wright (2014) bears on this case.

5.4.1.1 Telicity and duration

One possible set of analyses comes to us from Wilbur (2003), Wilbur (2008). Wilbur proposes that event structural notions of telicity and duration are encoded as discrete morphemes in ASL verbs. These individual morphemes reflect operators that contribute telic result states and duration. For example, Wilbur proposes that the encoding of telicity is characterized by an abrupt stop phonologically, a marking she calls EndState. On her argument, if a verb is marked with EndState, it is telic, and if it doesn't have EndState it is atelic. Wilbur argues that duration is similarly encoded, though this time as phonological movement along a path, which Wilbur analyzes as a morpheme she calls Extent. If a verb is signed with path movement, the verb is durative, while if path movement is absent, the verb is punctual. Additionally, Extent can phonologically resemble reduplication in that the path movement can be expressed circularly perpendicular to the body. While the data we see does not quite fit either of these descriptions, we will now explore the possibility that reduplication is a discrete morpheme encoding some feature of the event structure of the verb. In particular, we will focus on atelicity and durativity, two features that Wilbur posits are encoded as individual morphemes in ASL.

One possibility is that reduplication represents the atelic counterpart of EndState. That is, reduplication encodes atelicity while EndState encodes telicity. The way this story might go is that verbs are "born" unmarked for telicity in ASL but get marked with reduplication or EndState depending on the kind of event described. The accomplishment data represents a serious problem for this story. Reduplication is always used in the RUNasym BEACHarm

condition. Though it is conceivable that the signer interpreted the scenario atelically, i.e., with a meaning more similar to *run towards beach*, this is unlikely given that reduplication was used in both episodic conditions. When the running scenario is temporally included in the non-target scenario, it suggests that the endpoint is reached before the event in the non-target scenario terminates. We also do not see reduplication with some predicates like BAKE COOKIE, which we would expect if reduplication encoded atelicity.

The second possibility is that reduplication simply encodes durativity. That is, the reduplication that we see in episodic contexts is really a form of Extent, which encodes durativity. This shows up in both episodic and habitual contexts because both are, in some sense, durative. The achievement data might support this hypothesis. In our data, we see WIN repeated only in one habitual case. Despite being associated with an event with duration—the game—the predicate itself is punctual. Winning happens instantaneously at the end of the game. The other target predicates are reduplicated in the episodic cases, then, because they are durative (semelfactive KNOCK may still be pluractional as well). One problem here is that some non-target predicates aren't marked with reduplication or path movement despite describing clear durative scenarios. BAKE, for example, is never reduplicated and never has path movement. But BAKE COOKIES is not like WIN GAME; it is not punctual. Baking events are durative almost by default. Thus the idea that reduplication encodes Extent fails to explain why BAKE is not signed with either reduplication or path movement.

5.4.1.2 Structural iconicity

The structural iconicity approach to the encoding of event structure in ASL advanced in Kuhn (2017) does not capture the data we see in this survey. Kuhn (2017) proposes that all

verbs in ASL have an iconic function built into their truth conditions. This function maps the development of an event over time to the phonological progress of the sign. When the production of the sign pauses, i.e. the hands pause in the middle of a canonical full production of the sign, the event is interpreted as pausing too. This is gradient in that, e.g., the timing and number of pauses reflects the timing and number of pauses in the event itself. Multiple pauses in the production of a sign must correspond to multiple pauses in the development of an event over time.

Setting aside the habitual cases for now, because episodic sentences were signed with significant amounts of repetition, it is difficult to see how this approach could apply to this data. Kuhn's proposal depends crucially on some base form of the sign, and though this base form is not accessible to us directly, we can establish some relative differences using RUNasym. Both the activity case and the accomplishment case involve the verb RUNasym. Between the two conditions, we find significant differences in the way that RUNasym is signed. In the activity case, where RUNasym appears without a goal denoting object, RUNasym is repeated with four slow repetitions in both temporal conditions. By contrast, in the accomplishment condition, RUNasym is signed with two quick cycles in both cases. Despite depicting essentially the same scenarios, the relative forms of the verb are quite different in terms of the speed and number of repetitions.

If we assume conservatively that the sign's base form is inherently repetitive, i.e., the sign always involves at least two cycles of repetition for this speaker, it is unclear on Kuhn's proposal how additional repetitions signed at a slower pace map to event structure. We can speculate, of course, but it just isn't spelled out in the theory how structural iconicity works with inherently repetitive signs. It is possible, for example, that slower repetitions would correspond to the slower progress of an event over time. It is also conceivable that additional

repetitions would correspond to temporally longer events. Neither of these explains the data we see for RUNasym. In this data, the difference is one of *telicity*. The activity case is atelic and the accomplishment case is telic. First, it is unclear how number and speed of repetitions would corresponds to the presence of a natural endpoint, BEACHarm in this case. The events are otherwise alike; the only difference is that one has an explicit goal and the other does not. One possibility is that the quicker accomplishment sign is actually the incompletive sign, akin to a progressively marked sign as described in section 2 above. The longer activity version of the sign would then be the base form. This would be surprising because it's not clear why this form, but not the activity form, would be progressively marked and because it would not resemble the citation form of RUNasym in any resource I have seen. Second, the habitual activity forms of RUNasym closely resemble the accomplishment episodic forms of RUNasym, which is unexpected if number and speed of subevents corresponds to telicity. The habitual activity case is doubly atelic in the sense that neither the habit nor the subevents have natural endpoints. Of course, pluractionality may be interfering in the habitual scenarios. This leads us to the second proposed locus of structural iconicity.

For pluractionality in ASL, Kuhn & Aristodemo (2017) propose that reduplication is structurally iconic. The rate of repetition in the form of the reduplicated sign corresponds to the rate at which corresponding events occur in time. The faster the repetition, the more frequent the events occur. This iconic mapping function is built into the meaning of the pluractional morpheme. The data we collected does not bear on this question. In general, the rate at which the events were depicted to occur was kept largely constant across all scenarios. As such, this proposal predicts that we would not see noticeable differences in the rate of repetition of reduplicated verbs in habitual scenarios. Indeed, we did not see

modifications in the velocity of repetition. Thus structural iconicity in the habitual domain can't be ruled out.

5.4.1.3 Iconic measure

A third possibility is that reduplication is used simply to indicate the duration of an event iconically. On this hypothesis, reduplication of a sign simply provides a way to make the production of the sign longer so that additional iconic manipulations can be used to signal the relative length of events or habits. That is, reduplication itself is just a way of adding duration to a *sign*. It follows from this hypothesis that we expect reduplication to be paired with additional iconic manipulation indicating temporal extent. For example, the longer the (reduplicated) sign takes to produce, the longer the event it describes would be. Another possibility is that reduplication is used to extend the length of the sign so that path movement can be added, and the relative length of path movement indicates relative duration of the event. These processes would be general in that they could apply in both habitual and episodic scenarios, indicating the length of a habit or single event respectively.

Our data shows that reduplication was not paired with additional iconic manipulation which might indicate temporal extent. Number of repetitions didn't track the relative length of events. For example, as was discussed above, number of repetitions didn't track temporal length of the scenario. There did not appear to be path motion of any kind, which, as discussed in section 2, Wilbur suggests is one way of marking temporal extent.

We did see, on the other hand, iconic manipulations of other elements of the sentences which did perform this function. For example, the sign glossed as TIME-SPAN is formed by holding hands parallel in front of the body. The signer used the relative distance of the hands in this sign to indicate the relative temporal extent of the habit or event. The further

apart the hands, the longer the event or habit.

5.4.1.4 Minimal atomic events

Perhaps the most plausible explanation we kind find in the existing literature comes to us from Wright (2014). He proposes that so-called flexible accomplishment verbs in ASL denote minimal atomic events. For a verb like DRINK, the smallest event that "counts" as a drinking event is someone, say, taking a sip of something. In ASL, the verb DRINK resembles the act of someone taking a sip from a beverage. Thus it iconically depicts the kinds of minimal events that count as drinking. Wright argues that this property makes these minimal atomic events more salient, and thus these verbs are less likely to be interpreted as telic in ASL. The minimal events that count as drinking are more salient than the overall culminating drinking event.

This theory would allow us to explain verbal reduplication in episodic sentences as *real* pluractional reduplication but in the domain of minimal atomic events. Consider a minimal atomic event of running. This would be something like taking a step or two forward. In a single extended episode of running, like running to the beach from one's house, there are many of these atomic minimal events. We could explain the use of reduplication here as multiplicity of atomic minimal events in this way, where multiple atomic minimal events make up a full (single) episode. This is supported by data Wright reports. He claims that the most typical way to describe accomplishment events in ASL is to reduplicate the main verb and overtly include a result state marker like END. He provides the data points in (269) to illustrate this. In these sentences, '+' represents repetition of a sign, '#' indicates fingerspelling, and the overbar with '*t*' represents a non-manual marker indicating topicalization. Here we see the use of reduplication of the verb paired with result state

markers. These don't describe multiple events of eating or reading that are separated by significant amounts of time. Rather, on Wright's story, there are multiple minimal events of eating pizza—single bites of pizza—and multiple minimal events of reading a book—the reading of a single page.

(269) a. _____t _____t
PIZZA, CL_{round}, #RAY EAT++, NOT-A-TRACE.
'Ray ate the whole pizza.'

b. _____t
BOOK, #RAY READ++, END.
'Ray read the book to the end.'

In the achievement case, with WIN, we do not see reduplication in the episodic case. This is unsurprising if reduplication in the accomplishment case describes a plurality of minimal atomic events. Achievements are punctual and are not composed of multiple minimal atomic events in the way that accomplishments are. As such, we would not expect to find verbal reduplication, and indeed we do not.

This theory faces the same difficulty that other theories encounter in failing to account for reduplication of objects like BEACHarm and GAME in the episodic cases, however.

5.4.2 An alternative: imperfective marking?

Now that a variety of iconic proposals have been entertained and found wanting, I propose that reduplication may actually be a marker of imperfectivity. The idea that reduplication expresses imperfectivity in ASL is not new; this is suggested briefly in Davidson et al. (2019) regarding two forms of the verb WRITE. However, this data lends further credence to this idea. A consequence of this would be that sign language turns out to look more like spoken language in the aspectual domain than generally assumed. ASL would have the same aspectual devices that spoken languages have, supporting the idea that such devices are

universal.

While the temporal condition was designed to control for grammatical aspect by way of temporal containment, it turns out that all of the scenarios are alike in that they describe *overlapping* eventualities. Thus regardless of which eventuality is temporally contained in the other, they temporally overlap. In spoken language, *when*-clauses with progressive aspect in both the matrix and subordinate clauses are the best way to describe temporal overlap. This is evident in (270). This sentence can be true if the running event is properly contained in the baking event, and it can be true if this situation is reversed and the baking event is properly contained in the running event.

(270) Felix was running to the beach when Alex was baking cookies.

It's possible, then, that imperfective aspect marking could be used in all of the scenarios in the survey, as they all display simple temporal overlap. I posit, then, that reduplication is one way of marking sentences with imperfect aspect. This would explain why reduplication appears in both episodic and habitual cases: they both describe scenarios of temporal overlap of events or habits. As overt imperfective marking, reduplication may appear in both cases.

Thus reduplication is simply *one strategy* of marking imperfective aspect in ASL. It's important to keep in mind that ASL is like Balinese in that unmarked sentences are *aspectually neutral*. They may have both imperfective (progressive and habitual) and perfective interpretations (Rathmann 2005). As such, reduplication coexists with this zero-marking, which may itself be interpreted imperfectively. Thus the fact that we do not see reduplication in every single case doesn't represent a counter-example for this theory. It is common for languages with neutral aspect to have additional imperfective morphology. As we saw in chapter 3, Balinese is one such case. As in Balinese, there may be subtle differences between

sentences marked with this imperfective reduplication and zero-marked sentences. More work is needed to suss these differences out.

I posit one additional enhancement to this theory. The achievement cases with WIN may represent, at first glance, a difficulty for this theory. We only see reduplication of WIN in the habitual case, as expected if reduplication is a more limited process describing some variety of plural event. First, it's possible that reduplication is in fact *possible*, but not necessary in this case, and it so happens that we don't see it here. More data, especially grammaticality judgments, need to be collected. However, I argue that the imperfective reduplication is witnessed in the episodic case with the reduplication of GAME. That is, imperfective reduplication may be realized on non-verbal elements of the sentence. It is for this reason that we see also reduplication on elements like BEACHarm and season-denoting adverbials. These non-verbal elements are reduplicated as a reflection of imperfectivity, and do not reflect plurality of whatever they denote. This properly captures why GAME and other elements that do not seem plural are reduplicated as well. There is still some question of *why and how* imperfective reduplication spreads to other elements of the sentence. This remains unclear, but I do note that we see a similar phenomena in the morphological realization of quantificational elements in sign languages generally. In Russian Sign Language, for example, a distributive marker can attach to a variety of elements in the sentence, including verbs, nouns, numerals, pronouns, and lexical quantifiers like EVERY (Kimmelman & Quer 2021). However, it is unclear if these different morphological realizations reflect semantic differences.

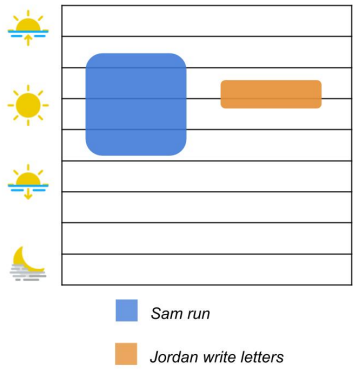
An important question here is how the realization of imperfective reduplication is constrained. We see reduplication of some elements, like RUNasym, but not others, like BAKE. Constraints on imperfective reduplication may come from multiple sources. First,

we don't wish to rule out the case that reduplication can be used pluractionally as well as imperfectively. As seen in section 2, much prior literature supports the idea that one of the primary functions of verbal reduplication is to describe multiple eventualities. However, if verbal reduplication is homophonous between pluractionality and imperfectivity, and both categories are generally optional, a signer must make a complex decision as to whether to employ reduplication or not. Many factors may go into this decision, including the use of adverbials. This decision concerns not just verbal reduplication, but reduplication of other elements of the sentence as well. Iconicity may be a factor in these constraints as well. To get an idea of what this might mean, lets consider the metaphorical use of sign. Meir (2010) argues that metaphoric extension can be blocked by the iconic properties of signs. The verb EAT in Israeli Sign Language (ISL), for example depicts someone putting something in their mouth. While in English we can use *eat* metaphorically, as in *the acid ate the iron key*, these uses of EAT in ISL are blocked. While there is not enough data in this case to make any definitive claims, it's possible that the appearance of reduplication on BEACHarm is acceptable because it is consistent with waves crashing against a beach. On the other hand, reduplication may be blocked with something like BAKE because it depicts someone putting something into an oven, and reduplication may suggest someone putting multiple things in the oven in short sequence, which is not what our scenarios depicted.

The activity case of RUNasym may be a case in point of these considerations overall. In the episodic cases, we see RUNasym reduplicated slowly with more cycles of reduplication than the other forms of RUNasym, including the episodic accomplishment cases with BEACHarm. This data is shown below in (271), where the realization of RUNasym in (271a) displayed this slower reduplication with additional cycles. This difference may be explained by the lack of additional elements in the clause. In the habitual case in (271b) and

the accomplishment case in (271c), reduplication appears in other elements of the clause: the adverbials SPRING and SUMMER in the habitual case, and the object BEACHarm in the accomplishment case.

(271) a. *[Activity, episodic, temporally including]*



FS(Sam) **RUNasym[+]** ALL-DAY APPROXIMATE TIME-SPAN, FS(Jordan) WRITEbo STAMPth[+] ALL-DAY

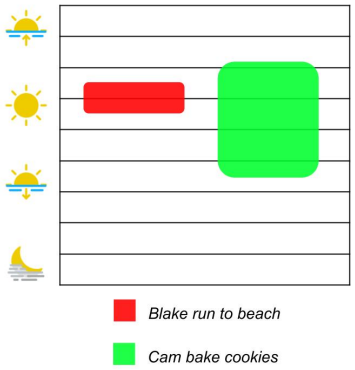
"Sam was running all day, while Jordan was writing letters."

b. *[Activity, habitual, temporally included]*

FS(Dana) WRITEbo[i] STAMPth ABOUTb SPRING[+] TO AUTUMN[I], FS(Vic) TEND **RUNasym[+]**[_] BEGINNING **SPRING[+] SUMMER[+]** TIME-SPAN

"Dana was writing letters in the Spring and Autumn while Vic was running in the Spring and Summer."

c. *[Accomplishment, episodic, temporally included]*



FS(Cam) BAKE COOKIE ALL-DAY, BLAKE **RUNasym[+] BEACHarm[+]** ALL-DAY

"Cam was baking cookies all day while Blake was running to the beach."

A great deal of work needs to be done to further investigate this theory. In particular, future study should focus on cases where reduplication is used to describe episodic scenarios. What this chapter demonstrates, however, is that an alternative analysis of reduplication in ASL, where reduplication is a grammatical marker of imperfectivity, not unlike imperfective markers in spoken language, is worth pursuing.

Finally, I close noting that the behavior of reduplication in ASL that we see here compared to the prior analyses of reduplication may represent an ongoing diachronic change in the function of reduplication. In spoken language, pluractional reduplication often develops into either a progressive marker or a habitual marker, and then from there into a general imperfective form (Bybee, Perkins & Pagliuca 1994: 170–1). The data we see here in ASL may be a reflection of this diachronic pathway, where what started as an iterative, developed into a habitual, and is now beginning to function as an imperfective. I leave investigation of this hypothesis to further work.

5.5 Conclusion

This chapter asked whether the modular architecture proposed in the last chapter could be extended to sign language, ASL in particular. We have seen that, through iconicity, ASL ostensibly has the means to perform the functions of this modular architecture without requiring the architecture itself. The novel data presented in this chapter suggests that this is not the case.

What I proposed instead is that reduplication in ASL is really an imperfective marker, a grammatical device found widely in spoken languages. As far as I am aware, this proposal has not been pursued in the literature. While there are many unanswered questions that proponents of this proposal must face, I believe it is worth pursuing. There is still much we do not understand about the encoding of aspect in ASL, even at a descriptive level as the study presented in this chapter makes clear. However, we know much more about aspect in spoken language (though this dissertation is a testament to unanswered questions in this domain as well). Under the hypothesis that ASL has the same aspectual devices available to it as in spoken language, it may be possible to make significant in-roads descriptively and theoretically.

Appendix A: ASL survey

This appendix contains the survey materials and results of the survey described in Chapter 5.

Survey instructions and examples

The following are the instructions and examples that the participant saw as they were presented on the survey.

ASL Survey

In this survey, we ask you to **describe how different activities relate in time** in ASL.

We will present you with a picture representing the times that different activities take place.

Your task will be to provide a simple description of these scenarios in ASL. There are 16 scenarios, and the survey should take about 15-20m.

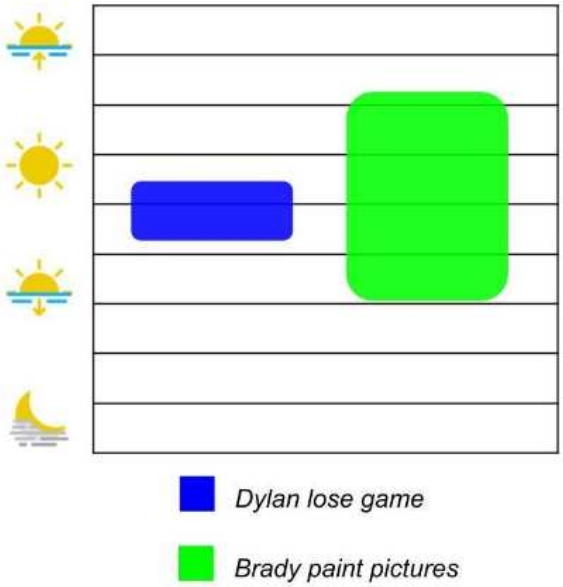
In English, we might describe the two activities with two simple clauses connected by a "when" or "while".

We will now see two examples and explain how we might describe the scenarios in English.

Next

Example 1

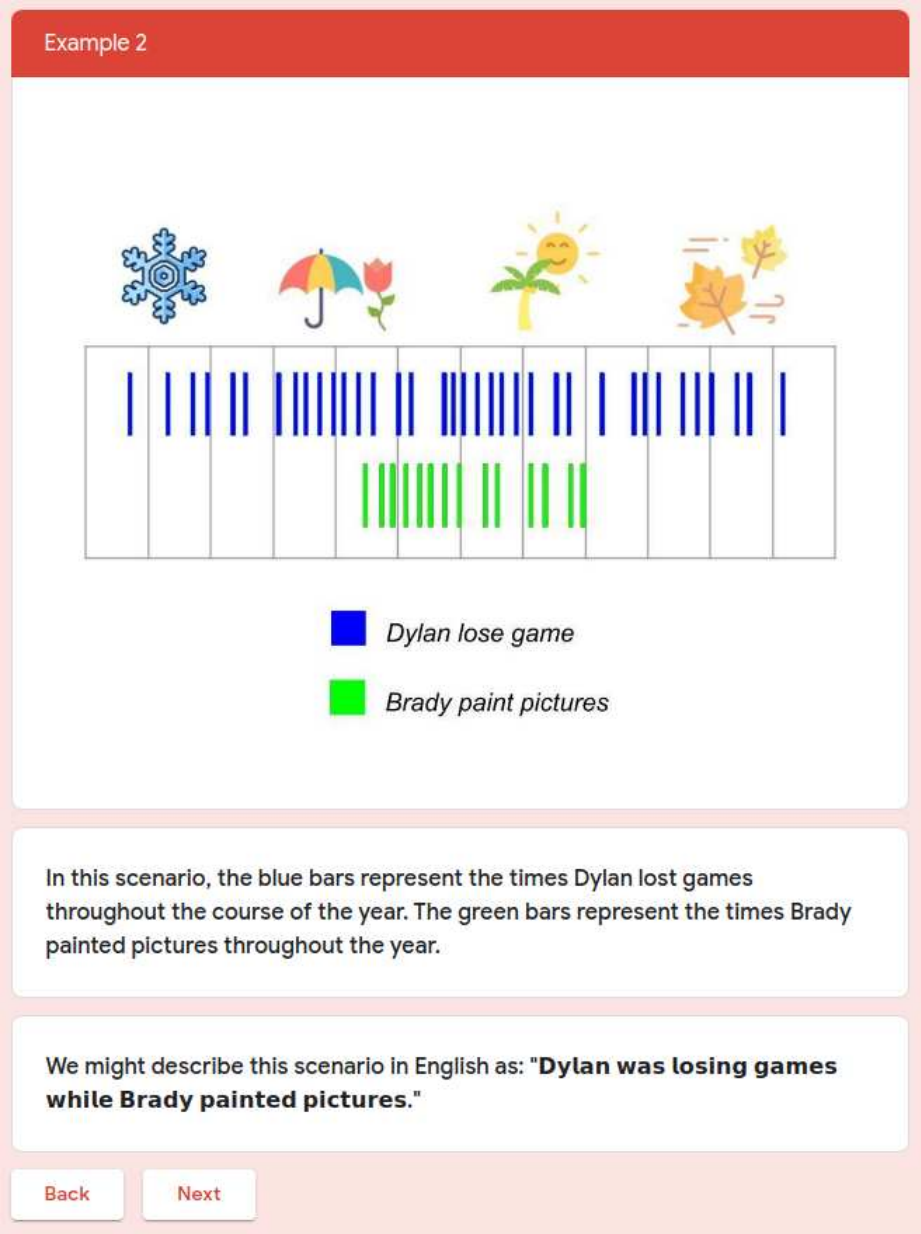
Context: In the afternoon, Dylan played a game that he eventually lost. Brady painted pictures .



In this scenario, the blue bar represents the time Dylan spent playing the game, which he eventually lost. The green bar represents the time Brady spent painting pictures.

We might describe this scenario in English with: "**Dylan lost a game while Brady was painting pictures.**"

Back Next

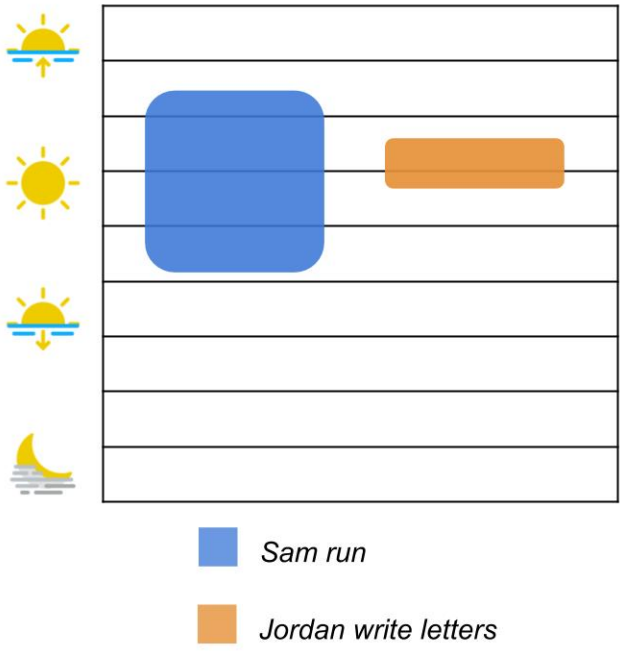


Stimuli

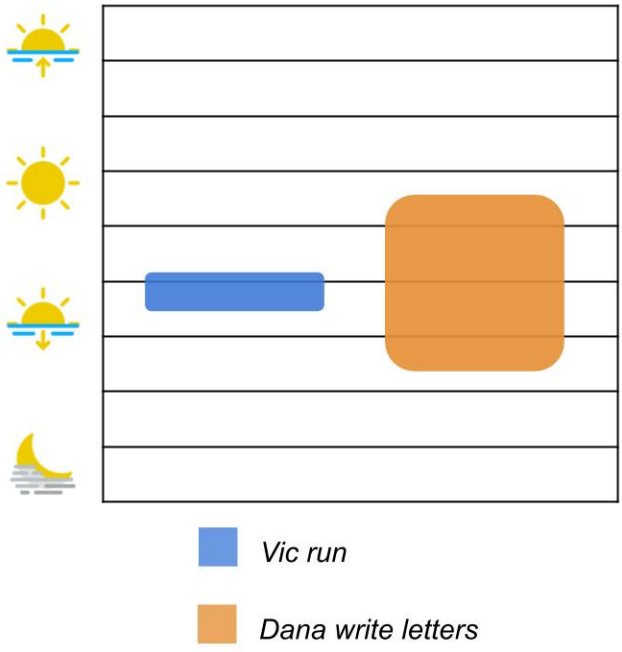
The stimuli presented below are sorted first by aktionsart class of the target predicate: activity, accomplishment, achievement, and semelfactive. Within each category are *episodic* scenarios, which depict a single event occuring over the course of a day, and *habitual* scenarios, which depict multiple events spread out over the course of a year.

Activity: ***run***

[Activity, episodic, temporally including]



[Activity, episodic, temporally included]

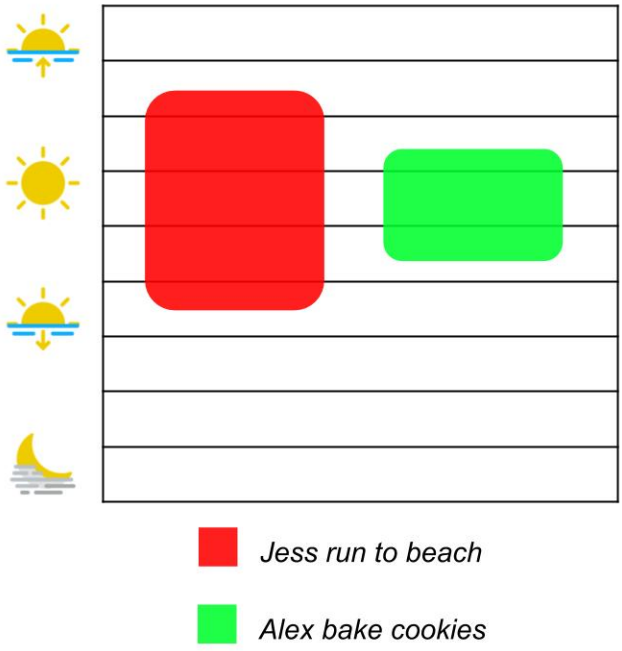


[Activity, habitual, temporally including]

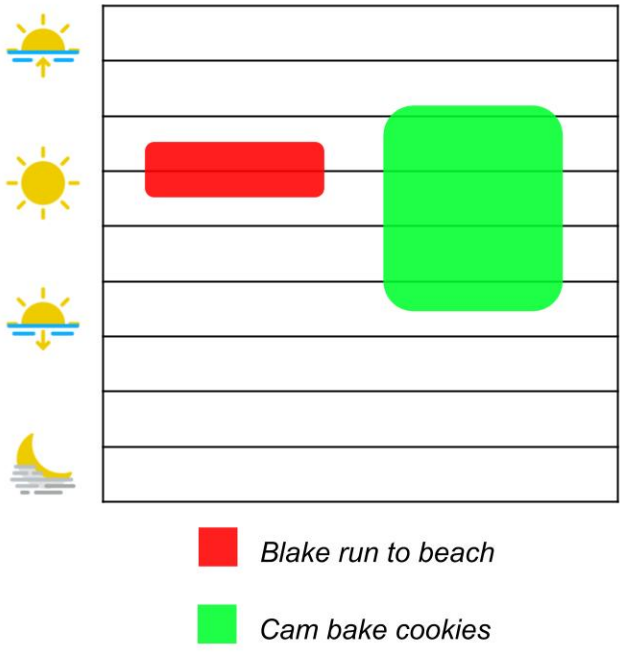
[Activity, habitual, temporally included]

Accomplishment: ***run beach***

[Accomplishment, episodic, temporally including]

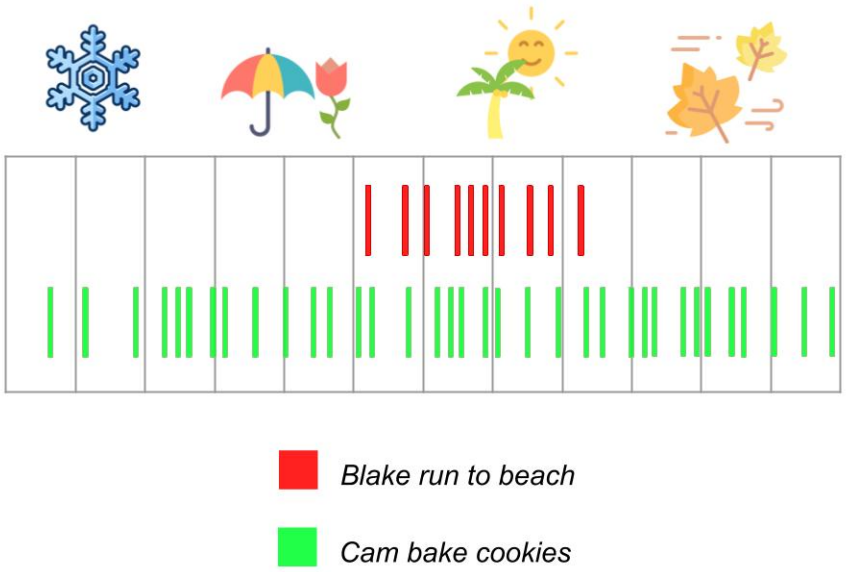


[Accomplishment, episodic, temporally included]



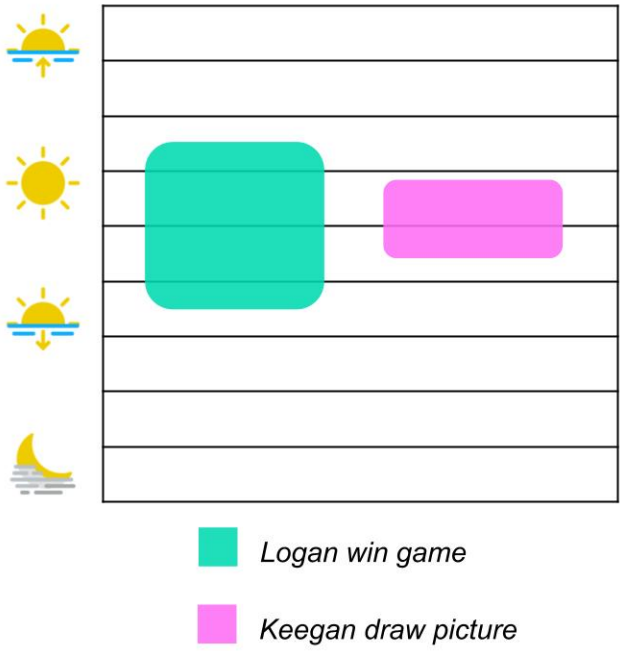
[Accomplishment, habitual, temporally including]

[Accomplishment, habitual, temporally included]

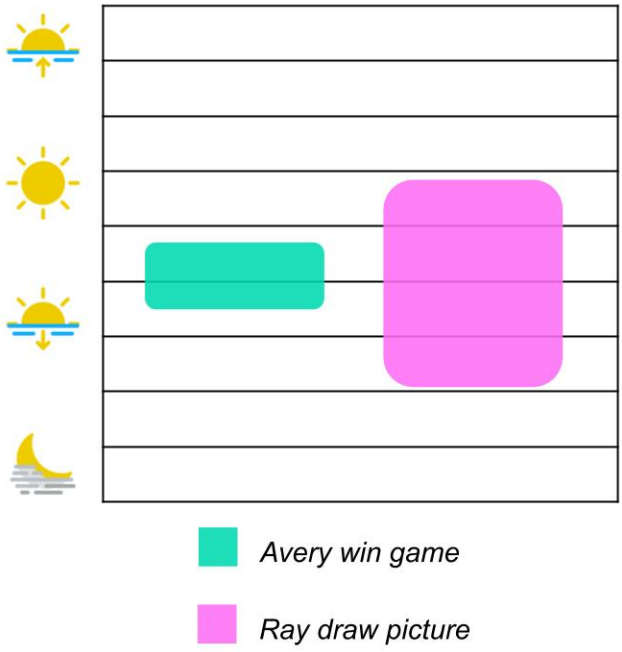


Achievement: ***win game***

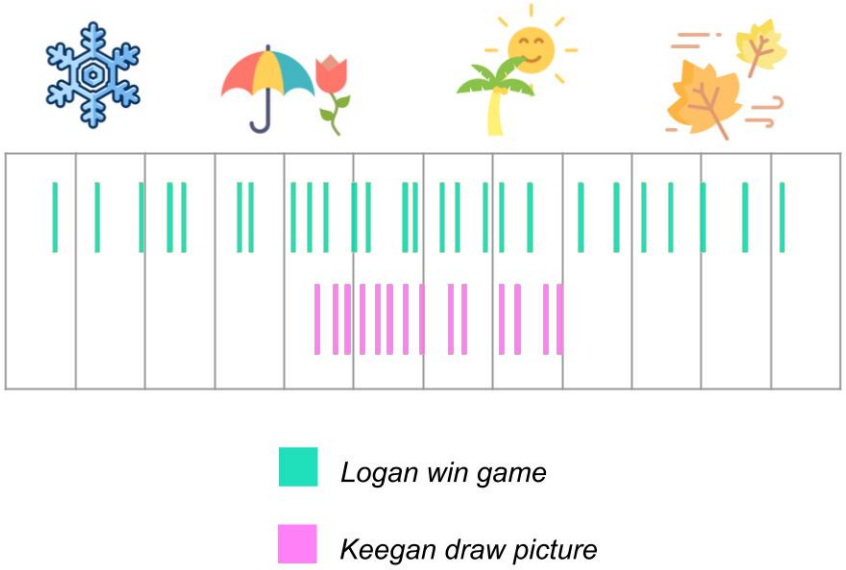
[Achievement, episodic, temporally including]



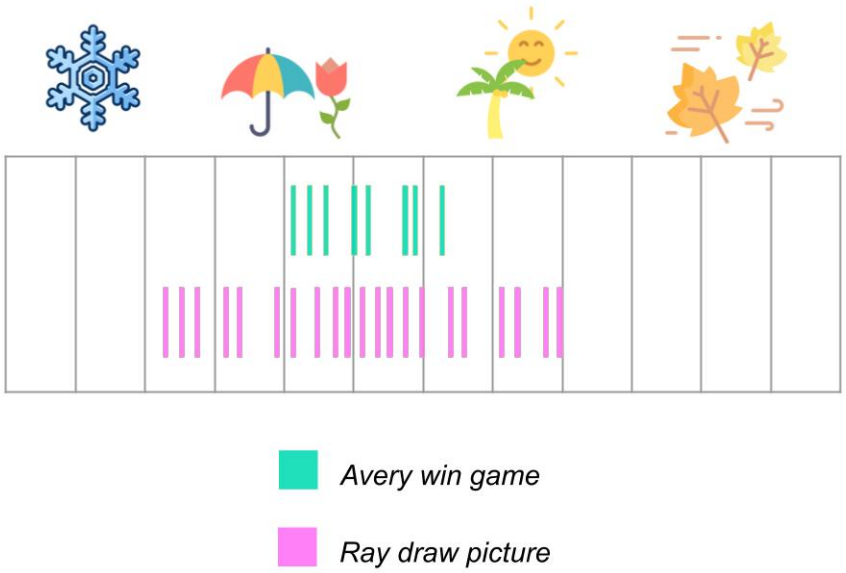
[Achievement, episodic, temporally included]



[Achievement, habitual, temporally including]

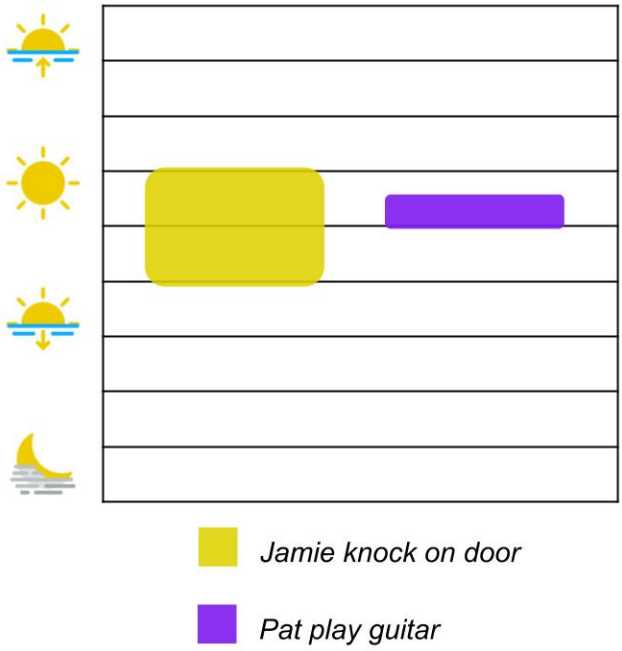


[Achievement, habitual, temporally included]

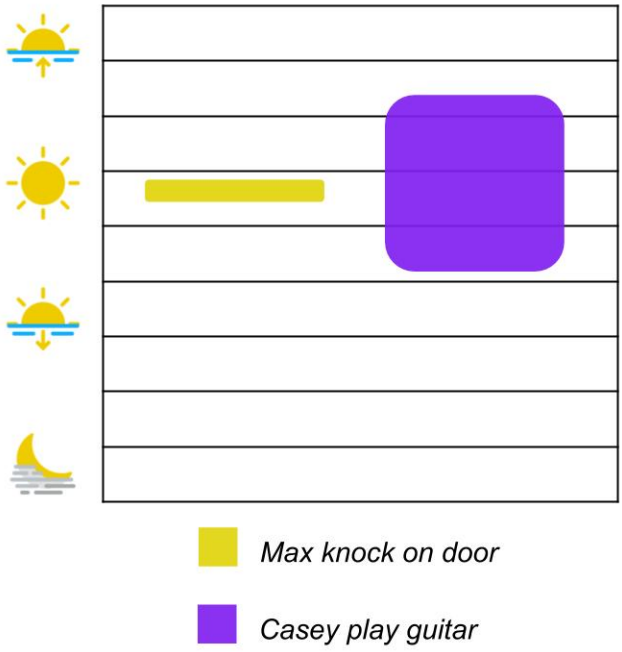


Semelfactive: *knock door*

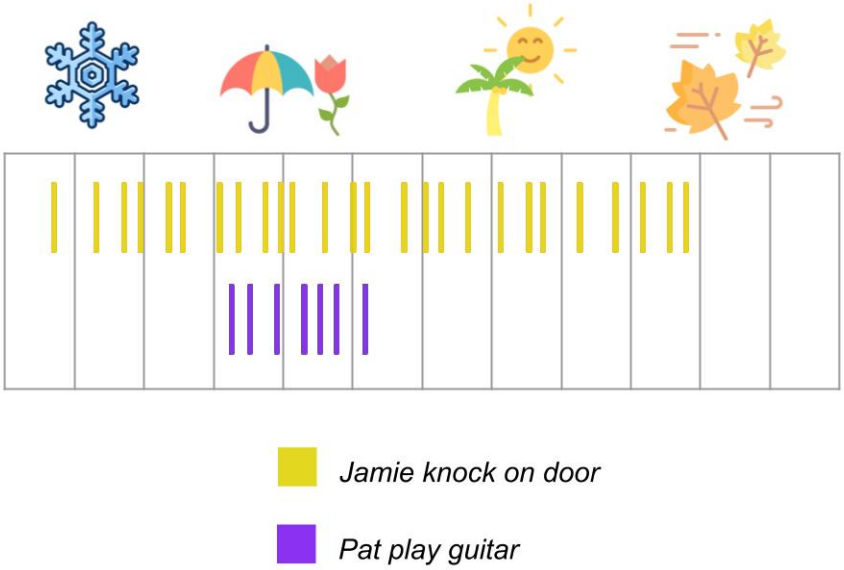
[Semelfactive, episodic, temporally including]



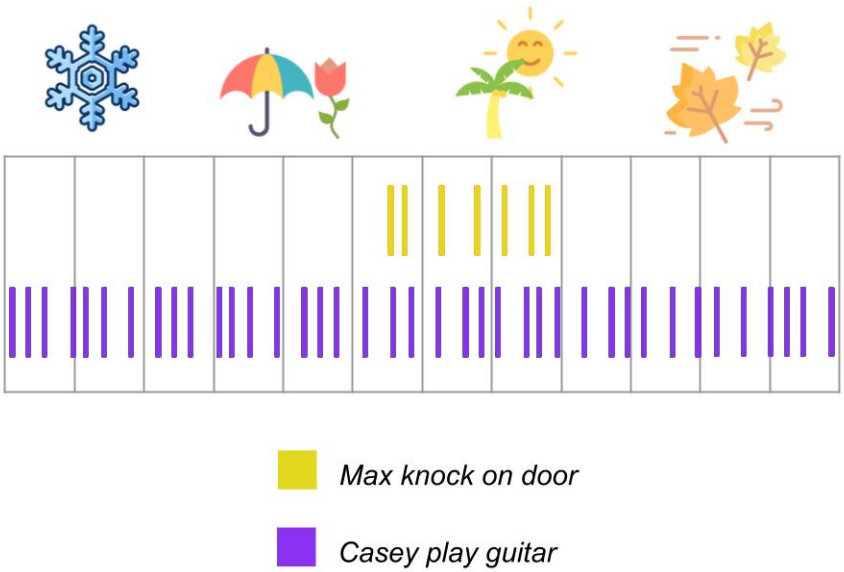
[Semelfactive, episodic, temporally included]



[Semelfactive, habitual, temporally including]



[Semelfactive, habitual, temporally included]



Results

The results of the survey are presented below. The glossing methodology and conventions are described in section 3 of chapter 5.

Activity: *run*

(272) [Activity, episodic, temporally including]
FS(Sam) RUNasym[+] ALL-DAY APPROXIMATE TIME-SPAN, FS(Jordan) WRITEbo STAMPth[+] ALL-DAY
"Sam was running all day, while Jordan was writing letters."

(273) [Activity, episodic, temporally included]
AFTERNOON FS(Vic) RUNasym[+] FS(Dana) WRITEbo[i] STAMPth[+] ALL-DAY
"Vic was running in the afternoon while Dana was writing letters."

(274) [Activity, habitual, temporally including]
FS(Sam) TEND RUNasym[+] WINTER SPRING SUMMER AUTUMN[i] ABOUTb TIME-TO-TIME[+] FS(Jordan) WRITEbo[i] STAMPth[+] SPRING SUMMER[+] TIME-SPAN
"Sam was running in Winter, Spring, Summer, and Fall while Jordan was writing in the Spring and Summer."

(275) [Activity, habitual, temporally included]
FS(Dana) WRITEbo[i] STAMPth ABOUTb SPRING[+] TO AUTUMN[i], FS(Vic) TEND RUNasym[+][_] BEGINNING SPRING[+] SUMMER[+] TIME-SPAN
"Dana was writing letters in the Spring and Autumn while Vic was running in the Spring and Summer."

Accomplishment: *run beach*

(276) [Accomplishment, episodic, temporally including]
FS(Jess) RUNasym[+] BEACHarm[+] GOix ALL-DAY, FS(Alex) BAKE COOKIE ALL-DAY
"Jess was running to the beach all day while Alex was baking cookies."

(277) [Accomplishment, episodic, temporally included]
FS(Cam) BAKE COOKIE ALL-DAY, BLAKE RUNasym[+] BEACHarm[+] ALL-DAY
"Cam was baking cookies all day while Blake was running to the beach."

(278) [Accomplishment, habitual, temporally including]
ABOUTb FS(Jess) TEND RUNasym[+] BEACHarm[+][_], FS(Alex) TEND BAKE COOKIE WINTER SPRING TIME-SPAN
"That year, Jess was running to the beach while Alex was baking cookies in Winter and Spring."

(279) [Accomplishment, habitual, temporally included]
FS(Cam) BAKE COOKIE ABOUTb, FS(Blake) RUNasym[+] BEACHarm[+] END-OF SPRING[+] END-OF SUMMER[+] TIME-SPAN
"Cam was baking cookies that year while Blake was running to the beach through the end of Spring to the end of Summer."

Achievement: *win game*

(280) [Achievement, episodic, temporally including]
ALL-DAY TIME-SPAN FS(Logan) WIN GAME[i][_], WHILE ALL-DAY APPROXIMATE FS(Keegan) DRAW PICTURE[+][_].
"Logan was winning the game while Keegan was drawing pictures."

(281) [Achievement, episodic, temporally included]

a. FS(Ray) DRAW PICTURE DRAW[+] ALL-DAY APPROXIMATE, FS(Avery) IX WIN GAME[+] ALL-DAY APPROXIMATE.

"Ray was drawing pictures while Avery was winning the game."

a. FS(Ray) DRAW PICTURE ALL-DAY FS(late) ALL-DAY DS(interval), IX FS(Avery) WIN GAME[i] ALL-DAY.

"Ray was drawing pictures while Avery was winning the game."

(282) [Achievement, habitual, temporally including]
FS(Logan) WIN[+] GAME[i] TIME-TO-TIME[+] ABOUTb FS(Keegan) DRAW PICTURE TEND SPRING[+] SUMMER[+] TIME-SPAN.
"Logan was winning games that year while Keegan was drawing pictures in the Spring and Summer."

(283) [Achievement, habitual, temporally included]
FS(Ray) DRAW PICTURE[_] END-OF WINTER EARLY-TIME SPRING[+] THROUGH END-OF SUMMER[+] TIME-SPAN, FS(Avery) WIN GAME[i] SPRING[+] END-OF START[+] SUMMER[+] TIME-SPAN
"Ray was drawing pictures from the end of Winter to the end of Summer while Avery was winning games from Spring until Summer."

Semelfactive: *knock door*

(284) [Semelfactive, episodic, temporally including]
FS(Pat) PLAY[i] GUITAR[+] ALL-DAY, FS(Jamie) KNOCK[+] DOORb[i] KNOCK[+] ALL-DAY
"Pat was playing guitar while Jamie was knocking on doors."

(285) [Semelfactive, episodic, temporally included]
FS(Casey) PLAY[i] GUITAR[+] ALL-DAY, FS(Max) KNOCK[i] DOORb[i] ALL-DAY APPROXIMATE
"Casey was playing guitar while Max was knocking on doors."

(286) [Semelfactive, habitual, temporally including]
FS(Jamie) KNOCK[i] DOORb[i] WINTER THROUGH SPRING SUMMER[+] TIME-SPAN EARLY-TIME AUTUMN[i] TIME-SPAN, FS(Pat) PLAY[i] GUITAR[i] SPRING[+] TIME-SPAN
"Jamie was knocking on doors in the Winter, Spring, Summer, and Autumn while Pat was playing guitar in the Spring."

(287) [Semelfactive, habitual, temporally included]
FS(Casey) TEND PLAY[i] GUITAR[+] ABOUTb WINTER SUMMER[+] SPRING FALL[+] TIME-SPAN, FS(Max) KNOCK[i] DOORb[i] BEGINNING SPRING[+] SUMMER[+] TIME-SPAN
"Casey was playing guitar in Winter, Summer, Spring, and Fall while Max was knocking on doors in the Spring and Summer."

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