

Instants and Intervals in the Event/State Distinction

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This paper presents evidence that the difference between stative and eventive predicates is that stative predicates are true at moments, or instants, of time, while eventive predicates are true at intervals. The evidence supporting this proposal comes from parallels in the interpretation and distribution of stative predicates and progressive predicates, and from unexpected disparities in the interpretation and distribution of stative predicates with and without duration adverbials. The pattern established here is that predicates with duration show eventive behavior, and conversely, that non-eventive predicates are durationless. It is therefore not any particular aspectual property *per*

se that characterizes stativity, but the temporal property of durationlessness. Section 1 discusses parallels in the behavior of stative and progressive constructions, not predicted by contemporary analyses of the progressive, as discussed in section 2. Section 3 develops a theory of why these parallels exist, that in section 4 is shown to be corroborated by a variety of facts relating to the interaction of tense, aspect and adverbs of duration.

1 Parallels Between Progressives and States

Leech (1971) points out that progressive and eventive predicates interact differently with point adverbials such as *when*-phrases. Example (1a) asserts that once we arrived, she subsequently made some fresh coffee. Example (1b) asserts that she was already making fresh coffee at the time we arrived. That is, the event described by the eventive matrix predicate *made* is interpreted as following the event described by the *when*-phrase, while the progressive predicate *was making* is interpreted as temporally surrounding the event described by the *when*-phrase.

- (1) Leech (1971):

- a. When we arrived she made some fresh coffee.
- b. When we arrived she was making some fresh coffee.

Vlach (1981) points out that the way progressives interact with point adverbials is common to stative predicates in general. The stative adjectival predicate *be here* is interpreted as temporally surrounding the *when*-phrase event (*when I arrived*) in (2a), just as the progressive predicate *be running* is in (2b) (parallel to (1b)), in opposition to (2c), in which the eventive predicate *ran* is interpreted as temporally following the event described by the *when*-phrase (parallel to (1a)).

- (2) Vlach (1981):
- a. Max was here when I arrived.
 - b. Max was running when I arrived.
 - c. Max ran when I arrived.

Löbner (1989) claims that the adverbs *still* and *already* apply to stative predicates and introduce the presupposition that the state held at a time prior to the reference time (designated by the *when*-phrase in (3)). Accordingly, *still* and *already* are compatible with Vlach's examples (2a) and (2b) above,

but not with (2c), as illustrated below.

- (3) a. When I arrived, Max was still/already here.
- b. When I arrived, Max was still/already running.
- c. *When I arrived, Max still/already ran.

In addition to the way they interact with point adverbials, another defining characteristic of states is that they are blocked from the progressive construction. Vlach (1981) points out that like stative predicates (4a), progressive predicates cannot themselves occur in the progressive form (4b), in opposition to eventive predicates (4c).

- (4) Vlach (1981):
 - a. *Max is being here. [=PROG(be here)]
 - b. *Max is being running. [=PROG(be running)]
 - c. Max is running. [=PROG(run)]

The facts in (4) might alternatively be taken to suggest that predicates headed by the verb *be* are ungrammatical in the progressive, regardless of aspectual type. However, the compatibility with the progressive of what

Wasow (1977) terms ‘transformational passives’ suggests that the ungrammaticality of (4b) falls under the generalization that the progressive is incompatible with states, not—independently—expressions with *be*, and therefore that transformational passives are eventive.

- (5) a. John was being taken to the station. [=PROG(be taken to the station)]
- b. The baby was being fed rice. [=PROG(be fed rice)]

Another parallel between progressives and states that Vlach mentions is an interpretational parallel between progressives (e.g. *Tweetie is flying*) and locative predicates with deverbal nominal complements, such as *Tweetie is in flight*. Assuming that the locative prepositional phrase *be in flight* in (6a) requires a stative semantics, the synonymy with the progressive counterpart in (6b) motivates a stative analysis for the progressive predicate *be flying*. Vlach also mentions, citing Anderson (1973) and Comrie (1976), that cross linguistically, progressive constructions often historically draw on locative morphology, which itself is stative, which circumstantially supports a stative analysis of the progressive.

- (6) Vlach (1981):
- a. Tweetie is in flight.
 - b. Tweetie is flying.

The remarks above summarize Vlach's (1981) arguments in favor of his claim that the progressive morphology is state-deriving. His work preceded Löbner's analysis of *still* and *already*, whose relevance to Vlach's claims is touched on above. A number of other parallels between progressives and states can be enumerated, some of which went unnoticed by Vlach, and others of which stem from discoveries that Vlach's work preceded.

For example, progressive and stative predicates, but not eventive predicates, are semantically uniform in their present and past tense forms in English. The only interpretational difference between the past tense stative predicate in (7a) and its present tense counterpart in (7b) is that the past tense form is said of a past time and the present tense form is said of the utterance time. Similarly, the only interpretational difference between the progressive past tense (8a) and present tense (8b) is that the former is said of a past time while the latter is said of the utterance time. But the difference in temporal interpretation relative to the utterance time is not the only difference

between the eventive past tense expression *Max ran* (9a) and present tense *Max runs* (9b), since *Max runs* does not have the episodic interpretation that is the salient interpretation of *Max ran*. *Max runs* has only a habitual interpretation, a semantic feature that is not imposed on the present tense forms of stative and progressive predicates.¹ I expand on the pattern below in section 4. Its significance for the time being is that it demonstrates that the English present tense is a context in which progressive predicates pattern together with stative predicates, in opposition to eventive predicates.

- (7) a. Max was here.
b. Max is here.
- (8) a. Max was running.
b. Max is running.
- (9) a. Max ran.
b. Max runs. [Habitual reading only]

Progressive and stative predicates also share a variety of other contexts that do not admit eventive predicates. For example, the ECM complement of verbs such as *reveal* and *discover* admits the stative nominal predicate *be a*

liar (10a) and the progressive *be lying* (10b), but does not admit eventive *lie* (10c).

- (10) a. The inspector revealed/discovered Max to be a liar.
b. The inspector revealed/discovered Max to be lying.
c. *The inspector revealed/discovered Max to lie.

Progressive predicates also interact temporally with modal verbs the same way stative predicates do, in opposition to eventive predicates. Condoravdi (2002) points out that for certain modal auxiliaries, the temporal relation between the modal evaluation time and the underlying eventuality time is contingent on the aspectual class of the underlying eventuality. When the underlying predicate is stative, the modal evaluation time is most saliently interpreted as coinciding with the time of the underlying eventuality, a temporal configuration that Condoravdi refers to as the ‘simultaneous reading’. When the underlying predicate is eventive, the modal evaluation time is interpreted as preceding the underlying eventuality time, which Condoravdi terms the ‘future shifted reading’ (the underlying eventuality is future shifted with respect to the modal evaluation time).² For example, the sentence *He might be sick* (to take the example of *might* in (11)), with a stative predi-

cate *be sick*, asserts that the possibility exists now that he is sick now (11a). The sentence *He might get sick*, with an eventive predicate *get sick*, asserts that the possibility exists now that he will get sick in the future (11c). Progressive predicates pattern together with stative predicates in selecting the simultaneous temporal configuration with the modal. *He might be getting sick* asserts that it might be the case now that he is getting sick now (11b).

(11) Condoravdi (2002):

- a. He must/ought to/should/may/might be sick. [simultaneous, epistemic]
- b. He must/ought to/should/may/might be getting sick. [simultaneous, epistemic]
- c. He must/ought to/should/may/might get sick. [future shifted, metaphysical]

Condoravdi points out in addition that the aspectual class of the underlying predicate also influences the kind of modality the modal auxiliary contributes to the sentence. The sentence *He might be sick* asserts that the issue of whether or not he is sick is actually settled in the valuation world. The uncertainty that the modal auxiliary introduces concerns the epistemic state

of the speaker. It asserts that as far as the speaker's knowledge of the world goes, it is possible that he is sick. Condoravdi refers to this interpretation of the modal as the 'epistemic reading'. The sentence *He might get sick* asserts that the issue of whether or not he will get sick is not settled. The uncertainty concerns the actual future state of the world, a reading Condoravdi refers to as the 'metaphysical reading'. It asserts that as far as the current state of the world goes, it is possible that he will get sick. Like stative predicates, progressive predicates select the epistemic reading of the modal. *He might be getting sick* asserts that the issue of whether he is getting sick or not is settled in the valuation world. The uncertainty concerns the speaker's knowledge of the world. Progressive predicates therefore pattern together with stative predicates in selecting the epistemic reading of the modal auxiliary, in contrast to eventive predicates, which select the metaphysical reading.

The interactions with modality described above go beyond modal auxiliaries with non-finite predicates. The same interactions are found in finite complements of certain modal verbs, such as *hope*. Example (12a) asserts that Max hopes now that Moritz is sick now. Similarly, (12b) asserts that Max hopes now that Moritz is getting sick now. But (12c) asserts that Max hopes now that Moritz will get sick in the future. Here too, stative and progressive

predicates pattern together in opposition to eventive predicates.

- (12) a. Max hopes that Moritz is sick. [simultaneous]
- b. Max hopes that Moritz is getting sick. [simultaneous]
- c. Max hopes that Moritz gets sick. [future shifted]

The generalization that eventive predicates are interpreted as following upon the reference time established by *when*-clauses and certain modal terms, while stative predicates overlap with them, arguably falls under the broader generalization discussed by Kamp and Reyle (1993) that eventive predicates advance the narrative reference time in discourse, while stative predicates do not. Kamp and Reyle observe a difference in the way progressive and eventive constructions interact with the reference time established by *A man entered the White Hart* in example (13).

- (13) Kamp and Reyle (1993):

A man entered the White Hart. He was wearing a black jacket. Bill served him a beer.

The *be wearing a black jacket* state is interpreted as framing the *enter the White Hart* event (i.e., he was already wearing the jacket when he entered

the White Hart). The *serve him a beer* event, though, is interpreted as following the entering. Kamp and Reyle argue that this is not just a pragmatic effect (p. 522f). They assume that progressive constructions are stative, and indeed, the temporal schema that yields the judgments in (14), where progressive *be wearing a black jacket* is contrasted with eventive *put on a black jacket* is preserved under replacement of the progressive predicate with a basic predicate adjective, for example *be silent* in (15a), contrasted in (15b) with eventive *fall silent*.

(14) a. #A man entered the White Hart naked. He was wearing a black jacket.

b. A man entered the White Hart naked. He put on a black jacket.

(15) a. #A man entered the White Hart talking. He was silent.

b. A man entered the White Hart talking. He fell silent.

The parallels in interpretation and syntactic distribution between progressive and stative predicates are numerous and seemingly non-coincidental. They suggest that there is something about the meaning of progressive constructions that necessitates these similarities to states. These parallels raise the

question of whether there is a characterization of the meaning of the progressive from which its stativity falls out, that is, that requires progressives to be stative. The following section addresses this question.

2 The Subevent Analysis of the Progressive

Progressive predicates are derived from eventive predicates (Vendler, 1957). Analyses of the progressive seek to relate the meaning of the progressive derivative to the meaning of the eventive base, following the intuition that the progressive derivative describes an ‘in progress’ portion of a larger possible event with the underlying event description. For example, Dowty (1979) proposes that the progressive form of a predicate Φ is true at an interval I and a world w if there is an interval I' containing I , that Φ is true of in an ‘inertia’ world for w . Inertia worlds are worlds in which things develop in the normal way with respect to a certain description.

(16) Dowty (1979):

[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 $w' \in$

$\text{Inr}(\langle I, w \rangle)$, Φ is true at $\langle I', w' \rangle$.

Subsequent analyses have significantly developed the notion of what it means for an event to develop normally. For example, Lascarides (1991) claims that progressive morphology applies only to process predicates (members of the set Pr) (17), but that each telic predicate has a process derivative $\text{PR}_P(A)$ designating the preparatory process associated with A (following Moens and Steedman 1988), which licenses A in the progressive. Like Dowty's analysis, Lascarides' requires the interval the progressive is true at (i) to be a subinterval of the interval that the underlying event predicate (A or $\text{PR}_P(A)$) is true at (j).

(17) Lascarides (1991):

$\text{PROG}(A)$ is true with respect to $\langle M, g \rangle$ at (w, i) if and only if $\llbracket A \rrbracket^{M,g} \in Pr$ and there exists a closed interval j such that i is a proper subinterval of j and A is true at (w, j) ; it is false at (w, i) if either $\llbracket A \rrbracket^{M,g}$ is not a member of Pr , or there is no closed interval j such that i is a proper subinterval of j and A is true at (w, j) ; and otherwise it is undefined.

Landman (1992) expands on the notion of ‘inertia world’, proposing that the progressive is true of an event e and predicate P at a world w and assignment g if P holds of an event f in the ‘continuation branch’ of e . The continuation branch of an event e is the smallest set of event-world pairs that represent a continuation of e , though e may be interrupted in the valuation world. If $\langle f, v \rangle$ is in the continuation branch of $\langle e, w \rangle$, then e is a ‘stage’ of f (see Landman 1992:26 for this and other conditions on ‘continuation branch’).

(18) Landman (1992):

$$\llbracket \text{PROG}(e, P) \rrbracket_{w,g} = 1 \text{ iff } \exists f \exists v : \langle f, v \rangle \in \text{CON}(g(e), w) \text{ and } \llbracket P \rrbracket_{w,g}(f) = 1, \text{ where } \text{CON}(g(e), w) \text{ is the continuation branch of } g(e) \text{ in } w.$$

Portner (1998) proposes that possible culminations for an event e are found in the set $\text{BEST}(\text{Circ}, \text{NI}, e)$, which is the set of worlds in a circumstantial base $\text{Circ}(e)$ that are optimal with respect to an ordering source, here $\text{NI}(e)$, the set of propositions that assert that e does not get interrupted. The proposal is again otherwise similar to Dowty’s in that it requires the possible culmination Φ to hold at an interval i' that includes the interval i , at which $\text{PROG}(\Phi)$ holds.

(19) Portner (1998):

PROG(Φ) is true at a pair of an interval and a world $\langle i, w \rangle$ iff there is an event e in w such that $T(e) = i$ and for all worlds w' in BEST(Circ, NI, e), there is an interval i' which includes i as a nonfinal subinterval, such that Φ is true at $\langle i', w' \rangle$.

Hallman (2009) characterizes the progressive form of Φ as true of a situation in the valuation world when it is a subpart of a possible Φ -situation that is subpart homogeneous (following Mittwoch 1987). That is, as in Lascaride's analysis, progressives impose an activity interpretation on the underlying event predicate. The operator [*telic*] imposes a completive interpretation on the culmination, following Kratzer (2004). R is a contextually determined relevance relation, CUM(Φ) the presupposition that Φ is cumulative.

(20) Hallman (2009):

$$\forall \Phi \subseteq S \llbracket \text{PROG}(\Phi) \rrbracket^w = \lambda s \leq w \exists s' [\text{telic}](\Phi)(s') \wedge s \leq s' \wedge \forall s'' \leq s' R(s'', s') \rightarrow \Phi(s'') / \text{CUM}(\Phi).$$

Though these analyses differ from one another in the constraints they place on the underlying event description and in how that event description is

related to the state of affairs the progressive derivative describes, they are similar to one another in requiring that state of affairs to be a subpart, or stage, in any possible culmination of that state of affairs. This means that expressions of the form $\text{PROG}(\Phi)$ are true or false of, or at, subparts of the kinds of things that expressions of the form Φ are true or false of, or at. This claim makes specific predictions about the aspectual type of progressive constructions.

Activity predicates are subpart homogeneous (Vendler, 1957; Taylor, 1977; Dowty, 1979). They exhibit the property that each subpart is of the same nature as the whole. Any part of a walking event is a walking event, any part of a sleeping event is a sleeping event, any part of a pushing the cart event is a pushing the cart event.³ Consequently, when the underlying predicate in a progressive construction is an activity predicate (and some analyses require it to be), the progressive derivative is predicted to pattern like an activity predicate. If *be walking* is true of a subpart of a (possible) walking event, and every subpart of a walking event is also a walking event, then *be walking* is true of a walking event, just like *walk*. Since *be walking* and *walk* are predicates of the same kinds of things (walking events, a kind of activity), they have the same aspectual type, that of activity. Since activities are

events, progressive derivatives of activity predicates are predicted to pattern like eventive predicates, as opposed to stative predicates.

Therefore, the parallels between progressive and stative predicates discussed in section 1 do not fall out from these analyses of the progressive.⁴ The following section turns to the question of what about the meaning of progressive predicates requires them to be stative.

3 The Temporal Analysis of the State/Event Distinction

The analyses of the progressive mentioned in section 2—that take the a progressive to be a predicate of events or intervals—are historical developments of earlier analyses that take them to be predicates of moments. In particular, Bennett and Partee (1978) define the progressive by example in (21).

(21) Bennett and Partee (1978):

John is building a house is true at I if and only if I is a moment of time, there exists an interval of time I' such that I is in I' , I is not

an endpoint for I' , and *John builds a house* is true at I' .

That is, while the underlying predicate *John builds a house* is true or false at intervals, the progressive derivative *John is building a house* is true or false at moments.⁵ It is clear that subsequent analyses of the progressive such as those cited in section 2 represent a significant improvement over Bennett and Partee's in a certain respect. Bennett and Partee's analysis is purely extensional. Since it asserts that there is an interval at which John builds the house, it does not admit the possibility that John's building of the house might never come to fruition, though the progressive assertion may in fact be true in this case. Subsequent analyses of the progressive have elaborated the conditions under which the present goes on that the progressive describes are related to the possible event or interval that the underlying predicate describes. Such analyses characterize the progressive itself as holding of an event or interval, and in so doing, they beg the question of how progressive constructions come to be stative.⁶

Bennett and Partee's analysis of the progressive as a description of moments is significant in light of remarks in the aspect literature to the effect that since states describe static, not dynamic properties, it is unnecessary to take

more than a single moment into consideration to ascertain whether a certain state holds in the world. For example, ter Meulen (1983), speaking of the ontological status of states, remarks that “there is no conceptual requirement on the duration of states. . . . The important conceptual, and hence semantically relevant property of states is that they do not capture any changes or any movement in the world” (p. 181). In a similar vein, Bach (1986) writes: “States *per se* do not require change. So let us say that events and processes have the property of temporality, states do not. . . . Perhaps it is only states that can be profitably thought of as properties of moments—that is, instants—of time” (p. 588).

I propose that the reason why progressive and stative predicates pattern together is that both types of predicate are true of moments of time, in opposition to eventive predicates, which are true of intervals. Specifically, the interpretation of a stative predicate has the format in (22a). Stative predicates are predicates of moments t , members of the set of moments T , and eventualities e , and assert that t is the time span (or ‘temporal trace’) of e and that e is a Φ -eventuality. Since e is momentary, Φ can only be a description whose value at e can be ascertained at a moment, so it must be a non-dynamic property. An eventive predicate has the format in (22b). Eventive

predicates are predicates of intervals i , members of the set of pluralities of moments ${}^{\circledast}T$, and eventualities e , and assert that i is the time span of e and that e is a Φ -eventuality. The analysis of intervals as pluralities of moments, as opposed to traditional sets of moments, is intended to facilitate the integration of statements about temporality into current lattice theoretic approaches to event structure (e.g. Bach 1986, Krifka 1992, and references on the progressive cited in section 2). The fact that every subpart of an event e has a temporal trace within the temporal trace of e is expressible as a homomorphism between lattices with supremums e and $\tau(e)$. The analysis of events as ‘plurals’ of states also facilitates the statement of the distribution of *for*-adverbials presented in section 5. Following Link (1983), $*P$ denotes the set of sums of the members of the extension of a 1-place predicate P (including the trivial sums, i.e., the atoms in P), and ${}^{\circledast}P$ denotes the set of non-atomic sums in the extension of $*P$ (i.e., the pluralities proper). My use of the variables t for members of T and i for members of ${}^{\circledast}T$ is mnemonic.

(22) For T the set of moments, E the set of possible eventualities, and τ

the function mapping eventualities to their time span:

a. $\llbracket \Phi_{\text{STATE}} \rrbracket = \lambda t \in T \lambda e \in E [\tau(e) = t \wedge \Phi'(e)]$

$$\text{b. } \llbracket \Phi_{\text{EVENT}} \rrbracket = \lambda i \in {}^*T \lambda e \in E [\tau(e) = i \wedge \Phi'(e)]$$

The format of progressive predicates is similar to that of states. Progressive predicates are predicates of moments t and eventualities e such that t is the time span of e and e has a possible Φ -culmination e' . The present study has no contribution to make to the question of how the progressive relates the present going on e to the possible culmination e' , and is not intended to be construed as contradicting previous analyses in this matter. It concerns itself only with the question of why the output of the semantic derivation that the progressive morphology marks is necessarily stative, and is intended to be compatible with various ways of characterizing the modal component of the progressive. The predicate Cul in (23) is intended to be understood as a metavariable for whatever set of circumstances relates the present going on to the possible culmination, which will inevitably involve reference to possible worlds.

$$(23) \llbracket \text{PROG}(\Phi_{\text{EVENT}}) \rrbracket = \lambda t \in T \lambda e \in E [\tau(e) = t \wedge \exists e' \in E \exists i \in {}^*T [\Phi(i, e') \wedge \text{Cul}(e', e)]]$$

This analysis gives progressive and stative predicates the same combinatorial requirements, in opposition to events, and therefore predicts their similar syntactic and semantic behavior. The claim that stative predicates hold only at moments is potentially counterintuitive, since states of affairs like *be sick*, *be here*, *be intelligent*, *understand the problem*, *know the solution*, and so forth all typically last for non-trivial periods of time. However, the analysis formalized in (22) is compatible with this fact about the world. A state of being sick at a given moment may be followed by another state of being sick at the subsequent moment, and so on. Typical sicknesses last longer than a day, and typical states of being tall are permanent. It is for this reason that it is odd to say *John was sick for 30 seconds* or *John was tall for three days*. These judgments reflect our experience with sick things and tall things, not our knowledge of the meanings of the terms *sick* and *tall*, which do not by themselves make assertions of duration, as the fact that the following examples are not contradictory shows, however implausible they may be.

- (24) a. John got sick 30 seconds ago, but now he's fine.
b. John was tall for three days, but now he's quite short.

If the analysis in (22) is correct, the contexts that admit stative and progressive predicates but not eventive predicates are contexts for moment-predicates. There is at least one such context whose analysis as a context for moment-predicates attracts independent support, which in turn corroborates the analysis in (22). That context is the English present tense, discussed briefly in section 1, and elaborated on in the following section.

4 The interaction of tense and duration

The present tense identifies the eventuality time with the valuation time (Montague, 1970, 1973). In terms of the present proposal, in which predicates have a time argument, the present tense feeds the valuation time to the predicate (25). In speech, the valuation time is the time of utterance, which, at the time of utterance, is the time that the indexical expression *now* refers to. Assuming that *now* designates a moment, not an interval, then the analysis in (22) predicts that only stative predicates may occur in the present tense, and not eventive predicates, since eventive predicates hold of intervals, which cannot be identified with the moment *now*. Evidence corroborating the claim that *now* denotes a moment is presented below. The

expression *Max is here*, spoken at the moment *now*, asserts of an eventuality e that its time span is the moment *now* and that it satisfies the description *Max be here* (26a). The expression *Max is running*, spoken at the moment *now*, asserts of an eventuality e that its time span is the moment *now* and that it satisfies the description *Max be running* (26b). The expression *Max runs* (ungrammatical on the episodic reading) is interpreted as a predicate of intervals (the denotation of *Max run*) applied to the moment *now* (26c). This combination cannot proceed, since *now* refers to a moment (by hypothesis), and therefore does not meet the condition on the open argument of *Max run* that it refer to a plurality moments. (26c) is a semantically ill-formed combinatorial mismatch.⁷

$$(25) \quad \llbracket \text{PRES}(\Phi) \rrbracket^t = \Phi(t)$$

- (26) a. $\llbracket \text{Max is here} \rrbracket^{\text{now}} = \lambda e \in E [\tau(e) = \text{now} \wedge \text{here}'(\text{Max}, e)]$
- b. $\llbracket \text{Max is running} \rrbracket^{\text{now}} = \lambda e \in E [\tau(e) = \text{now} \wedge \exists e' \in E \exists i \in$
 $\quad \textcircled{*}T [\text{run}(\text{Max}, i, e') \wedge \text{Cul}(e', e)]]$
- c. $\llbracket \text{*Max runs} \rrbracket^{\text{now}} = [\lambda i \in \textcircled{*}T \lambda e \in E [\tau(e) = i \wedge \text{run}'(\text{Max}, e)]](\text{now})$

The assumption that the utterance time is a moment is supported by the following fact. Though states like *be sick* are compatible with the present tense,

the addition of a duration adverbial to the state precludes its occurrence in the present tense (a class of exceptions to this generalization involving hidden modality is discussed in section 5). The effect is not sensitive to how long a duration is specified. Any specification of duration blocks the state from occurring in the present tense.

- (27) a. Max is sick (*for three days).
b. Max is confused (*for one minute).
c. Max is frightened (*for 30 seconds).

For-adverbials assert of an interval that it is subpart homogeneous with respect to the specified description (Dowty 1979:333f, Richards 1982:96, Moltmann 1991:633f). For example, *Max be sick for three days* asserts of an interval that it has a duration of three days and that Max is sick in each part of that interval. This characterization of duration adverbials suggests an explanation for their incompatibility with the present tense. If the present tense identifies the eventuality time with the moment *now*, then states with duration adverbials, being predicates of intervals (by virtue of the duration adverbial), are incompatible with the present tense because their time argument (the interval) cannot be identified with the moment *now*, just as in the

case of eventive predicates like *Max runs*. A denotation for *for three days* along these lines is fleshed out in (28a). On this analysis, the occurrence of *Max be sick for three days* in the present tense results in a combinatorial mismatch (28b). *For three days* is defined in (28a) for the case when Φ is a stative predicate. In this case, quantification over subparts is restricted to atoms (members of T), to satisfy the type requirements of Φ . The case when Φ is eventive is discussed in section 5.

- (28) a. $\llbracket \text{for three days}(\Phi) \rrbracket = \lambda i \in {}^*T [\text{three days}(i) \wedge \forall t \leq i [t \in T \rightarrow \exists e \in E \Phi(t, e)]]$
- b. $\llbracket * \text{Max is sick for three days} \rrbracket^{\text{now}} = [\lambda i \in {}^*T [\text{three days}(i) \wedge \forall t \leq i [t \in T \rightarrow \exists e \in E [\tau(e) = t \wedge \text{sick}'(\text{Max}, e)]]]](\text{now})$

If stative predicates with duration adverbials are blocked from the present tense because they have duration, and if having duration is what distinguishes eventive predicates from stative predicates, then stative predicates with duration adverbials are predicted to pattern together systematically with eventive predicates with respect to tests for stativity discussed in section 1. As discussed below, this prediction is borne out, with one exception accounted for by an independent factor.

Again, the compatibility of states with duration adverbials (*be sick for three days* in the examples below) with the past tense but not the present is like lexically eventive predicates (*move to Morocco* in the examples below).

(29) a. Max was sick for three days.

b. *Max is sick for three days.

(30) a. Max moved to Morocco.

b. *Max moves to Morocco.

In both cases, the introduction of information that makes explicit the habitual reading that licenses eventive predicates in the present tense also licenses stative predicates with duration adverbials in the present tense.

(31) a. Every winter, Max is sick for three days.

b. Every winter, Max moves to Morocco.

Stative predicates with duration adverbials also interact with point adverbials the same way eventive predicates do. A stative predicate with a duration adverbial is interpreted as holding subsequent to the event depicted by the point adverbial, not as framing it as a stative predicate would. For example,

(32a) asserts that after we arrived, Max was subsequently sick for three days, just as (32b) asserts that after we arrived, Max subsequently moved to Morocco.

- (32) a. When we arrived, Max was sick for three days.
b. When we arrived, Max moved to Morocco.

Stative predicates with duration adverbials are also blocked from syntactic contexts that admit states but not events, such as the complement of verbs like *reveal* or *discover*.

- (33) a. *The inspector revealed Max to be sick for three days.
b. *The inspector revealed Max to move to Morocco.

Stative predicates with duration adverbials also interact semantically with modal auxiliaries the same way eventive predicates do. Just as the sentence (34b) asserts that it is possible now that Max will move to Morocco in the future (the future shifted reading), (34a) asserts that it is possible now that he will be sick for three days in the future (as in *Having drunk all that cheap liquor, Max might be sick for three days*).⁸

- (34) a. Max might be sick for three days.
b. Max might move to Morocco.

More generally, states with duration adverbials advance the narrative as eventive predicates do, in contrast to states without duration adverbials. For example, while (35a), repeated from section 1, is contradictory, because it asserts that the man who entered talking was simultaneously silent, (35b) is felicitous. The latter asserts that the 20 minute silent period follows the entering (and therefore the talking), and therefore patterns like the eventive continuation in (36b) (contrasted there with the progressive).

- (35) a. #A man entered the White Hart talking. He was silent. Bill served him a beer
b. A man entered the White Hart talking. He was silent for 20 minutes. Bill served him a beer.
- (36) a. #A man entered the White Hart naked. He was wearing a black jacket.
b. A man entered the White Hart naked. He put on a black jacket.

States with duration adverbials fail to pattern like events in one respect, but an independent factor excludes these cases. Namely, stative predicates with duration adverbials are no more felicitous in the progressive (37b) than without duration adverbials (37a), in contrast to eventive predicates (37c).

- (37) a. *Max is being sick.
b. *Max is being sick for three days.
c. Max is moving to Morocco.

On all accounts, the progressive morphology relates two eventualities, one of which is identified with the eventuality argument of the underlying predicate. For the progressive morphology to apply to a predicate, the eventuality argument of that predicate must be combinatorily visible to the progressive morphology. But *for*-adverbials bind the eventuality argument in the predicate they apply to, in virtue of the homogeneity assertion they make, and make only their own interval argument visible to their structural context. The eventuality that is asserted to be the culmination of the present goings on cannot be predicated on the underlying interval predicate, as (38) illustrates. The formula in (38) is the result of placing the expression in (28a) (the denotation of a state with a duration adverbial, here with $\Phi = \textit{sick}$) in the

Φ position in the denotation of the progressive in (23). The formula in (38) is ungrammatical because the contribution of the underlying predicate *Max be sick for three days* is unable to apply to the eventuality fed to it by the progressive morphology, since at this point in the derivation it is not a predicate of events, but a saturated proposition. The example in (37b) is therefore a combinatorial mismatch, independently of the aspectual distinction that *be sick for three days* shows vis à vis *be sick*.

$$(38) \quad \llbracket * \text{Max is being sick for three days} \rrbracket = \lambda t \in T \lambda e \in E [\tau(e) = t \wedge \exists e' \in E \exists i \in {}^*T [\text{three days}(i) \wedge \forall t \leq i [t \in T \rightarrow \exists e'' \in E [\tau(e'') = t \wedge \text{sick}(\text{Max}, e'')]]]](e') \wedge \text{Cul}(e', e)]$$

Where independent factors are not involved, stative predicates with duration adverbials pattern like eventive predicates. The significance of this pattern is that it indicates that in conjunction with a stative predicate, duration adverbials do not simply specify the duration of the state, rather they attribute duration to the state, which it does not have in and of itself, and in so doing, they derive a constituent that has the semantic and syntactic behavior of an eventive predicate. This interaction in turn indicates that an eventuality cannot have duration and not behave like an event. In other words, having

duration is a sufficient condition for eventiveness, and therefore states do not have duration. These interactions support the claim that stative predicates (including progressives) are predicates of moments, while eventive predicates (including stative predicates with duration adverbials) are predicates of intervals. Before concluding, I discuss two issues that bear on the discussion of *for*-adverbials above.

5 Additional remarks on *for*-phrases

This section discusses two issues relevant to the bearing of the data in section 4 to the conclusion that stative predicates are predicates of moments, while eventive predicates are predicates of intervals. The first matter concerns a class of exceptions to the generalization that stative predicates with duration adverbials are incompatible with the present tense. The second matter concerns the interpretation of *for*-adverbials with eventive predicates.

5.1 Modality in locative predicates

Stative locative predicates represent a systematic exception to the generalization that states with duration adverbials are barred from the present tense.

- (39) a. Mary is in Paris for a week.
b. Max is at his beachside cottage for the summer.
c. Alice is in jail for five years.

Each of the expressions above can be uttered at a time that falls within the specified interval. In such cases, the portion of the interval that follows the utterance time is unrealized at the utterance time, suggesting that these constructions contain hidden modality, along the lines of a progressive construction. The hidden modality is particularly apparent in the past tense, where the ‘culmination’ can be defeated.

- (40) a. Mary was in Paris for a week, but she had to come home early because of a family emergency.
b. Max was at his beachside cottage for the summer, but unfortu-

nately it burned down the second week he was there.

- c. Alice was in jail for five years, but her lawyer managed to get her out after only three months.

Hence, *Mary is in Paris for a week* asserts that Mary is in Paris and she will have been in Paris for a week. This interpretation appears to be a special reading for locative prepositional phrases in conjunction with *for*-phrases, as formalized in (41), where $\Phi_{\text{LOC-PP}}$ is a locative prepositional phrase (e.g. *in Paris*), $\Psi_{\text{FOR-PP}}$ is a *for*-prepositional phrase (e.g. *for a week*), and FUT_w asserts of a proposition that it holds in all worlds compatible with the projected future of w .

$$(41) \quad [[\Phi_{\text{LOC-PP}} \Psi_{\text{FOR-PP}}]]^w = \lambda t \in T \lambda e \in E [\Phi(t, e) \wedge \exists i \in {}^*T [t \leq i \wedge \text{FUT}_w([\Psi(\Phi)](i))]]$$

5.2 *For*-adverbials with activity predicates

The denotation for phrases like *for three days* stated in (28a), repeated in (42) below, is only interpretable when Φ is a stative predicate, since in this formula Φ is provided with a moment argument t .

$$(42) \quad \llbracket \text{for three days}(\Phi) \rrbracket = \lambda i \in {}^*T [\text{three days}(i) \wedge \forall t \leq i [t \in T \rightarrow \exists e \in E \Phi(t, e)]]$$

However, *for*-adverbials are compatible with eventive predicates as well, though not all eventive predicates. In particular, *for*-adverbials are compatible with activity predicates (43a) but not accomplishments (43b) or achievements (43c) (Vendler, 1957).

- (43) a. He ran for an hour.
 b. *He ran a mile for an hour.
 c. *He reached the top for an hour.

The factor distinguishing activities from other event types is subpart divisibility (Vendler 1957, Taylor 1977, Dowty 1979). (43a) asserts that he ran at each subinterval of an hour long period. (43b) asserts that he ran a mile at each subinterval of an hour long period, and it is the incoherence of this assertion that blocks (43b) and similar examples.

The expression in (42) asserts subpart divisibility of the interval i with respect to the state description Φ . The quantification over subparts in (42) is restricted to moments, to meet the type restriction of the stative predicate

Φ . The fact that activity predicates are also compatible with *for*-adverbials suggests that the restriction on quantification over subparts is flexible, and varies so as to meet the needs of the predicate at hand. I propose that the restriction of the universal quantifier in the denotation of *for*-adverbials is that the value of the variable t falls into the domain of the predicate (so here t may be a moment or an interval), as illustrated in (44), generalized for any predicate of intervals Γ .

$$(44) \quad \llbracket \text{for } \Gamma \Phi \rrbracket = \lambda i \in {}^*T [\Gamma(i) \wedge \forall t \leq i [t \in \text{Dom}(\Phi) \rightarrow \exists e \in E \Phi(t, e)]]$$

6 Conclusion

The proposal that stative and progressive predicates are predicates of moments unifies their syntactic and semantic behavior, a uniformity not predicted by other recent analyses of the progressive, and differentiates them from eventive predicates, which are predicates of intervals. This proposal is supported directly by the fact that states with duration adverbials pattern like events, and circumstantially by the fact that both states and progressives are plausible candidates for durationlessness, since they report static,

not dynamic, processes (as per Bennett and Partee 1978; ter Meulen 1983; Bach 1986).

Notes

¹Note in this connection that the eventive transformational passives mentioned in (5) are incompatible with the present tense on the episodic interpretation. Compare *John was taken to the station* and *The baby was fed rice* with **John is taken to the station* and **The baby is fed rice*.

²To be somewhat more precise, stative predicates are compatible with the simultaneous reading in addition to the future shifted reading; eventive predicates show only the future shifted reading. Hence, *He might be sick now/tomorrow* but *He might get sick *now/tomorrow* (*now* is ungrammatical in the latter example when it refers to the time of getting sick and not to the modal evaluation time).

³Statements of this kind involve a degree of idealization. Activities tolerate what Saurer (1984) calls ‘gappiness’ to varying degrees depending on the predicate and pragmatic context. This fact does not effect the prediction about the aspectual type of progressives being described here.

⁴Vlach, who first observed many of these parallels, stipulates the stativity of progressive constructions in the derivational rule he posits for the construction. His definition for the

progressive operator ((i) below) states that the progressive derivative of a predicate Φ is true whenever a state holds of a process derivative $\text{Proc}[\Phi]$ going on. He defines separately what it means for a process to go on, but the stativity of the progressive is stipulated in his analysis.

- (i) $\text{Prog}[\Phi]$ if and only if $\text{Stat}[\text{Proc}[\Phi]$ goes on]

⁵In Bennet and Partee’s analysis, moments are singleton intervals, i.e., intervals whose first and last moment are identical.

⁶Bennett and Partee’s analysis is itself a development of analyses proposed in Scott (1970:160) and Montague (1970:73), which characterize the progressive as holding at a moment, but also characterize the underlying eventive base as holding at a moment, and therefore do not differentiate eventive predicates from their progressive derivatives in temporal or aspectual terms. As Scott puts it, for example, where I is the set of moments:

- (i) Scott (1970):

$[[\text{PROG } \Phi]]_i = 1$ iff there is an open interval $J \subseteq I$ with $i \in J$ such that $[[\Phi]]_j = 1$ for all $j \in J$.

⁷The English pattern is cross-linguistically unusual. I assume the difference between English and languages that allow eventive predicates in the simple present with an episodic reading is that those languages have an imperfect indicative construction that English lacks, which makes a semantic contribution of its own (see e.g. Cipria and Roberts 2001 on Spanish), which is stativizing. Similarly, the fact that in English, eventive verbs may

occur in the present tense with a habitual reading suggests that the operator that derives the habitual reading (e.g. Carlson’s (1977) *G* or Wilkinson’s (1991) *Gen*) is stativizing. In support of this conclusion, note that in Japanese, habitual sentences share with progressives the suffix *-te iru* (Shirai, 2000), which Clarke (2006) claims is a reflex of stativization. Lastly, the analysis pursued here calls for a type flexible characterization of the past tense, that puts the eventuality time in the past regardless of its status as a member of T or ${}^{\circ}T$, along the lines of (i), where the variable t' ranges over moments and intervals:

$$(i) \quad \llbracket \text{PAST}(\Phi) \rrbracket^t = \exists t' \in {}^*T [t' \prec t \wedge \Phi(t')]$$

⁸In the appropriate pragmatic context, it is not necessary for the entire three day period to follow the modal evaluation time. If Max has been sick for several days, and we are speculating when he might return to work, we can say *He might be sick for a full week*. The full week refers to the total amount of time he will have been sick, including the period he has already been sick at the valuation time. This behavior is similar to eventive predicates, however, such as *He might push the cart all the way to the car*, or *He might cross the entire street*, which can be felicitously uttered in a context in which he is already pushing the cart or crossing the street. It appears that when the focus falls on the telos, as in *for a full week*, *all the way to the car* or *the entire street*, it suffices that the culmination is future shifted with respect to the modal evaluation time, not necessarily the entire event. Stative predicates with duration adverbials pattern like eventive predicates in this respect.

References

- J. Anderson. *An Essay Concerning Aspect*. Mouton, The Hague, 1973.
- Emmon Bach. Natural language metaphysics. In Ruth Barcan Marcus, George J.W. Dorn, and Paul Weingartner, editors, *Logic, Methodology and Philosophy of Science VII*, pages 573–595. Elsevier Science Publishers, Amsterdam, 1986.
- Michael Bennett and Barbara Partee. *Toward the logic of tense and aspect in English*. Indiana University Linguistics Club, Bloomington, Indiana, 1978.
- Greg Carlson. A unified analysis of the english bare plural. *Linguistics and Philosophy*, 1:413–457, 1977.
- Alicia Cipria and Craige Roberts. Spanish *Imperfecto* and *Pretérito*: Truth conditions and aktionsart effects in a situation semantics. *Natural Language Semantics*, 8:297–347, 2001.
- Sarah Clarke. Stative potential “verbs”? Bare roots in Japanese. In Claire Gurski and Milica Radisic, editors, *Proceedings of the 2006 the Canadian Linguistic Association annual conference*. 2006.
- Bernard Comrie. *Aspect*. Cambridge University Press, Cambridge, 1976.

Cleo Condoravdi. Temporal interpretation of modals: modals for the present and for the past. In David Beaver, Stefan Kaufmann, Brady Clark, and Luis Casillas, editors, *The construction of meaning*, pages 59–88. CSLI Publications, 2002.

David R. Dowty. *Word meaning and Montague grammar*, volume 7. Kluwer Academic Publishers, Dordrecht, The Netherlands, 1979.

Peter Hallman. Proportions in time: interactions of quantification and aspect. *Natural Language Semantics*, 17:29–61, 2009.

Hans Kamp and Uwe Reyle. *From Discourse to Logic*. Kluwer Academic Publishers, Dordrecht, 1993.

Angelika Kratzer. Telicity and the meaning of objective case. In Jacqueline Guéron and Jacqueline Lecarme, editors, *The syntax of time*, pages 389–423. MIT Press, Cambridge, Mass., 2004.

Manfred Krifka. Thematic relations as links between nominal reference. In Ivan A. Sag and Anna Szabolcsi, editors, *Lexical Matters*, pages 29–54. Center for the Study of Language and Information, Stanford, California, 1992.

Fred Landman. The progressive. *Natural Language Semantics*, 1(1):1–32, 1992.

Alex Lascarides. The progressive and the imperfective paradox. *Synthese*, 87:401–447, 1991.

Geoffrey Leech. *Meaning and the English verb*. Longman, London, 1971.

Godehard Link. The logical analysis of plurals and mass terms: A lattice-theoretical approach. In R. Baeuerle, C. Schwarze, and Arnim von Stechow, editors, *Meaning, Use and Interpretation of Language*. DeGruyter, 1983.

Sebastian Löbner. German *schon – erst – noch*: an integrated analysis. *Linguistics and philosophy*, 12:167–212, 1989.

Anita Mittwoch. Aspects of English aspect: on the interaction of perfect, progressive and durational phrases. *Linguistics and Philosophy*, 11:203–254, 1987.

Marc Moens and Mark Steedman. Temporal ontology and temporal reference. *Computational Linguistics*, 14(2):15–28, 1988.

Friederike Moltmann. Measure adverbials. *Linguistics and Philosophy*, 14: 629–660, 1991.

Richard Montague. Pragmatics and intensional logic. *Synthese*, 22:68–94, 1970.

Richard Montague. The proper treatment of quantification in ordinary English. In J. Hintikka, J. Moravcsik, and P. Suppes, editors, *Approaches to Natural Language: Proceedings of the 1970 Stanford Workshop on Grammar and Semantics*, pages 221–242. D. Reidel Publishing Company, Dordrecht, 1973.

Paul Portner. The progressive in modal semantics. *Language*, 74(4):760–787, 1998.

Barry Richards. Tense, aspect and time adverbials: part I. *Linguistics and philosophy*, 5:59–107, 1982.

Werner Saurer. *A Formal Semantics of Tense, Aspect and Aktionsarten*. Indiana University Linguistics Club, Bloomington, Indiana, 1984.

Dana Scott. Advice on modal logic. In Karel Lambert, editor, *Philosophical*

- Problems in Logic: Some Recent Developments*, pages 143–173. D. Reidel Publishing Company, Dordrecht, 1970.
- Yasuhiro Shirai. The semantics of the Japanese imperfective *teiru*: An integrative approach. *Journal of Pragmatics*, 32:327–361, 2000.
- Barry Taylor. Tense and continuity. *Linguistics and Philosophy*, 1:199–220, 1977.
- Alice ter Meulen. The representation of time in natural language. In Alice ter Meulen, editor, *Studies in modeltheoretic semantics*, pages 177–191. Foris Publications, 1983.
- Zeno Vendler. Verbs and times. *The Philosophical Review*, 66:143–160, 1957.
- Frank Vlach. The semantics of the progressive. In Philip Tedeschi and Annie Zaenen, editors, *Syntax and semantics, vol. 14: tense and aspect*, pages 271–292. Academic Press, New York, 1981.
- Tom Wasow. Transformations and the lexicon. In Peter Culicover, Tom Wasow, and Adrian Akmajian, editors, *Formal Syntax*, pages 327–360. Academic Press, New York, New York, 1977.

Karina Wilkinson. *Studies in the Semantics of Generic Noun Phrases*. PhD thesis, University of Massachusetts-Amherst, 1991.