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Proportions in time: interactions of quantification and aspect

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Abstract Proportional quantification and progressive aspect interact in English in revealing ways. This paper investigates these interactions and draws conclusions about the semantics of the progressive and telicity. In the scope of the progressive, the proportion named by a proportionality quantifier (e.g. *most* in *The software was detecting most errors*) must hold in every subevent of the event so described, indicating that a predicate in the scope of the progressive is interpreted as an internally homogeneous activity. Such an activity interpretation is argued to be available for telic predicates (e.g. *cross the street*) because these receive a partitive interpretation except in combination with a completive operator, which asserts that the event so described has culminated. The obligatoriness of the completive operator in the preterit is shown to parametrically distinguish those languages that show completion entailments in the preterit, e.g. English, from those that do not, e.g. Malagasy, Hindi, and Japanese.

Keywords Progressive aspect · Proportional quantification · Telicity · Situation theory · Event semantics · Intensionality

1 Introduction

Certain quantifiers support a reading of the English progressive aspect in which the usual entailment from the preterit aspect to the past progressive fails. This paper investigates the construction, identifies the class of quantifiers involved, and presents an analysis of the progressive that unifies the behavior of the construction in question with the behavior of 'typical' progressive constructions (those entailed by

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their preterit counterparts). The central claim is that the English progressive imposes an activity interpretation on the VP to which it applies, following Mittwoch (1988). The aspectual homogeneity that defines activities requires proportions named by quantifiers in VP to iterate in a homogeneous way throughout the event so described, which generally undermines the entailment to the preterit, where no such homogeneity is required.

Section 2 surveys the relevant data and develops the central claim proposed here. Sects. 3 and 4 investigate in greater detail what it means to 'impose an activity interpretation', in particular on a telic VP. The proposal formalized here is that lexical telicity does not manifest itself as a completion entailment except in connection with a completiveness operator, a null counterpart to the progressive morpheme in English. This analysis is essentially the inverse of the more common approach to the analysis of the progressive that takes the progressive operator to remove a completion entailment inherent in its base, but is supported by the interaction of proportionality and aspect described in Sect. 2. Further, the analysis identifies the morpho-semantic origin of a certain typological fact. The presence of the completiveness operator in the preterit parametrically distinguishes English from languages such as Malagasy, Hindi, and Japanese that lack completiveness entailments in the preterit. Finally, Sect. 5 demonstrates that the analysis proposed here relates to a tradition of modal approaches to the progressive, but makes an aspectually defined contribution to the matter of what it means for an event to be 'normal'.

2 Quantifier restriction and proportionality

Verb phrases like *cross the street* become true of an event when the event is completed. Such verb phrases are 'telic', meaning they place conditions on the event's resultant state, in this case that the (entire) street has been crossed. Progressive derivatives of such verb phrases are true at a reference time contained within the duration of an event if the portion of the event leading up to the reference time is 'normal' for the event type named by the underlying verb phrase, where normal initial subintervals are those that develop uninterrupted toward the resultant state described by the underlying verb phrase (Dowty 1979 and others discussed later). The telicity of the underlying verb phrase contributes to the criteria of normalcy, but does not project to the progressive derivative; the progressive makes no commitment to real world developments after the reference time. For this reason, (1b) fails to entail (1a). However, since the normal completion of an event guarantees the existence of normal initial subintervals of that event, (1a) entails (1b).

(1) a. Osbert crossed the street.
b. Osbert was crossing the street.

Some quantifiers interact with the progressive in a way that also removes the entailment from the preterit to the past progressive. As an illustration, consider a factory that manufactures transistors. In this factory, a machine tests the newly manufactured transistors to ensure they work, and sorts them into ‘ok’ and ‘reject’ bins. Now consider two possible transistor sorting scenarios. In one of these the machine continuously rejects one out of three of the transistors it checks, as schematized in (2) (where ‘1’ represents a transistor that tests ok and is kept, and ‘0’ represents one that tests bad and is rejected). In the other scenario it rejects all of the transistors it checks in the first third of the sorting period, but none the transistors it checks in the last two thirds of the sorting period, as schematized in (3). RT designates a reference time.

RT

(2) 0 - 1 - 1 - 0 - 1 - 1 | 0 - 1 - 1 - 0 - 1 - 1 - 0 - 1 - 1 - 0 - 1 - 1 [EVENLY DISPERSED]

(3) 0 - 0 - 0 - 0 - 0 - 0 | 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 [UNEVENLY DISPERSED]

In both situations, the machine rejects one third of the transistors it checks (6 out of 18). I refer to the situation in (2) mnemonically as the ‘evenly dispersed’ situation, since the machine’s rejection decisions are temporally evenly dispersed among its ‘ok’ decisions. This is not the case in (3), which I refer to as the ‘unevenly dispersed’ situation, since all the rejection decisions are temporally contiguous and all the ‘ok’ decisions are temporally contiguous. The preterit expression (4a) is a true description of both situations (2) and (3), indicating that the underlying verb phrase *reject exactly one third of the transistors* describes a resultant state in which exactly one third of the transistors are rejected, which is the case in both situations. The expression in (4b) is false in both situations, indicating that *reject every transistor* describes a resultant state in which every transistor is rejected, which is not the case in either situation above. I refer to the sentences in (4) mnemonically as ‘*PRET+Q*’ sentences, i.e., sentences containing a preterit verb with at least one quantified argument. I refer to (4a) specifically as ‘*PRET+1/3*’ and (4b) specifically as ‘*PRET+EVERY*’. I restrict my attention to the quantifiers *exactly one third* and *every* for the time being and consider others in due course.

(4) a. The machine rejected exactly one third of the transistors. [PRET+1/3]
b. The machine rejected every transistor. [PRET+EVERY]

The progressive derivative of (4a) is expected to describe progress toward the resultant state that (4a) describes. That resultant state obtains in both situations above, and so the progressive form of (4a) is expected to be true during both of the situations described above, in accordance with the entailment pattern in (1). Similarly, the progressive derivative of (4b) is expected to be false in both situations. This expectation is not borne out. Said of the reference time indicated above, (5a)—the progressive form of (4a)—is only true in the evenly dispersed situation

(2), and false in the unevenly dispersed situation (3). (5b)—the progressive form of (4b)—is only true in the unevenly dispersed situation (3), and false in the evenly dispersed situation (2). Again for mnemonic purposes, I refer to the sentences in (5) as '*PROG+Q*' sentences, and to (5a) specifically as '*PROG+1/3*' and (5b) specifically as '*PROG+EVERY*'. For the sake of naturalness, the reference time can be made salient by adding the continuation *when I told the boss it was probably malfunctioning*.

(5) a. The machine was rejecting exactly one third of the transistors. [PROG+1/3]
b. The machine was rejecting every transistor. [PROG+EVERY]

In the situations in (2) and (3), the resultant state is the same, that exactly one third of the transistors are rejected. The difference between them is in the temporal distribution of rejecting events within the transistor sorting scenario as a whole. The semantics of the *PROG+Q* forms in (5) is apparently sensitive to this difference, while that of their *PRET+Q* counterparts in (4) is not. Though the *PROG+1/3* form is false in the unevenly dispersed situation (3), its negation (6a) is true there. And while the *PROG+EVERY* form is false in the evenly dispersed situation (2), its negation (6b) is true there. These facts indicate that the semantic factor that makes *PROG+Q* false with respect to certain event structures is an assertion. Hence, the *PROG+Q* forms make an assertion that their *PRET+Q* counterparts do not, and so are not entailed by their *PRET+Q* counterparts.

(6) a. The machine was not rejecting exactly one third of the transistors; it was rejecting every one.
b. The machine was not rejecting every transistor; it was rejecting exactly one third of them.

The contrast between the sentences in (4) and those in (5) is general for all *PROG+Q* and *PRET+Q* pairs. The quantification in the *PROG+Q* sentences in (7) has the same temporal dimension to its interpretation as found in (5) above, which is not in evidence in their *PRET+Q* counterparts in (8).

(7) a. The fake fire extinguishers were fooling exactly one third of the building inspectors. (=over and over again, one out of three building inspectors were fooled)
b. The police were pulling over exactly one third of the speeders they clocked. (=over and over again, the police pulled over one out of three speeders they clocked)
c. The falling boulder was knocking over exactly one third of the skiers in its path. (=over and over again, the boulder knocked over one out of three skiers that were in its path; it bounced over the others)
d. The committee was accepting exactly one third of the applications. (=over and over again, the committee accepted one out of three applications it considered)

(8) a. The fake fire extinguishers fooled exactly one third of the building inspectors.
b. The police pulled over exactly one third of the speeders they clocked.
c. The falling boulder knocked over exactly one third of the skiers in its path.
d. The committee accepted exactly one third of the applicants.

The quantifier in *PROG+Q* sentences not entailed by their *PRET+Q* counterpart may occur in any grammatical function, such as direct object (above), subject (9a), or indirect object (9b). It must, however, be local to the progressive predicate. (10) does not commit to whether the situation that Osbert was describing to Ingrid was like the evenly (2) or the unevenly dispersed situation (3). The quantifier there behaves as if it is in the context of a preterit verb, in spite of the matrix progressive.

(9) a. Exactly one third of the passers-by were signing Osbert's petition.
b. Osbert was giving exactly one third of the passers-by a free cell phone.

(10) Osbert was telling Ingrid that the machine rejected exactly one third of the transistors.

The evenly dispersed transistor-sorting situation consists throughout of subsituations that instantiate the same proportion of rejection to acceptance events as the whole. Not only is the situation in (2) as a whole one in which the machine rejects exactly one third of the transistors that it tests, but it also consists of subsituations in which the machine rejects exactly one third of the transistors that it tests in *that* subsituation. In this respect, the evenly dispersed situation is internally homogeneous; what can be said of the whole can be said of its (relevant) parts (more on which below). It is in this context that *PROG+1/3* is true. By the same token, while the unevenly dispersed situation in (3) is as a whole one in which the machine rejects exactly one third of the transistors that it tests, it does not consist of subsituations in which the machine rejects exactly one third of the transistors it checks in that subsituation. In this respect, the unevenly dispersed situation is not internally homogeneous. It is in this context that *PROG+1/3* is false. These considerations suggest that the assertion that *PROG+Q* makes that *PRET+Q* does not is that the underlying event is internally homogeneous with respect to its description, here apparently including the proportion named by the quantifier.

Since in the real world, the truth conditions that the progressive imposes apply only up to the reference time of the valuation, the event need not carry on as described after the reference time. The unevenly dispersed situation in (3) is in fact internally homogeneous up to the reference time indicated there, with respect to the description *The machine rejects every transistor*. Each subsituation prior to the reference time is one in which the machine rejects every transistor in *that* subsituation. Hence, *PROG+EVERY* is true at the reference time in the situation in (3), because the portion of that situation that precedes the reference time is internally homogeneous.

The conclusion that the PROG+Q forms require the event they depict to be internally homogeneous (before the reference time) explains the infelicity of cardinal quantifiers like *exactly six transistors* within the scope of the progressive. Though (11a) below is true in both situations (2) and (3), (11b) cannot be said of any reference time in either situation. Hence, (11a) does not entail (11b).

(11) a. The machine rejected exactly six transistors. [PRET+6]
b. #The machine was rejecting exactly six transistors (when I told the boss it was probably malfunctioning). [PROG+6]

Neither situation (2) nor (3) consists of subsituations in which the machine rejects exactly six transistors in *that* subsituation. This makes both situations in (2) and (3) non-homogeneous with respect to the description *The machine rejects exactly six transistors*, which makes PROG+6 (11b) false in both situations, since PROG+Q requires the situation depicted to be internally homogeneous.

Aspectual internal homogeneity is the quality that Vendler (1957) claims characterizes what he terms 'activity' predicates like *run* or *push the cart*. These describe aspectual objects that "go on in time in a homogeneous way; any part of the process is of the same nature as the whole" (p. 146). The data discussed above, then, suggests that there is an activity component to the interpretation of the progressive. Mittwoch (1988) implicates this aspect of the progressive in her discussion of the infelicity of progressive constructions like (11b), specifically those in (12), the latter cited from Declerck (1979).

(12) a. #The level of the lake was rising 10 feet when I arrived.
b. #John was drinking three cups of tea when I arrived.

According to Mittwoch, such examples "provide support for theories that regard base sentences like *John build a house* as having, in addition to its event reading, at least the potential for an activity reading—the activity leading up to the end point—and which regard the progressive as picking out a subinterval of this activity reading. Base sentences like. . . *The level of the lake rise 10 feet, John drink 3 cups of tea* differ from *John build a house* in having no corresponding activity reading. The problem is of course how to characterize the activity situations that are associated with typical event situations" (p. 226).

Mittwoch states the meaning of the progressive as in (13) (her 109, p. 213), which dictates that the underlying predicate be interpreted as a homogeneous situation. Vlach (1981) presents an analysis in this vein as well, cited in (14) (his (14), p. 287).

(13) PROG(A) is true in M relative to (w, i) iff i is a subinterval of an interval j and A is true in M relative to (w, j), where A is interpreted as an activity or state (i.e. homogeneous situation).

(14) PROG[ϕ] if and only if STAT[PROC[ϕ] goes on]

According to Vlach, "*PROC[ϕ]* is that process *P* that leads to the truth of ϕ" (p. 288). Vlach's definition states that the progressive of a sentence ϕ is true if and only if there is a state in which the process *P* that leads to the truth of ϕ goes on. The question that Mittwoch poses of how to characterize the activity situations associated with an event situation is essentially the question of what the relationship is between *PROC[ϕ]* and ϕ, which I claim below is characterizable in event-aspectual terms. This is not the same question as *What is the meaning of the progressive?*, which concerns the relationship between ϕ and *PROG[ϕ]*, which I suspect is best characterized in modal terms, as described in greater detail in Sect. 5.

Vlach does not discuss the conditions under which a process *P* leads to the truth of a sentence ϕ. Lascarides (1991) presents a refinement of Vlach's approach in which *P* is contextually supplied. The progressive does not apply to a telic predicate *A* but to a derived expression $PR_P(A)$ (the process associated with *A*), which is true when the truth of the event-proposition *A* necessitates the truth of the contextually supplied process-proposition *P* leading up to *A*. Mittwoch's data and the data demonstrating the behavior of proportional quantifiers in the progressive suggest that the description ϕ itself makes a compositional semantic contribution to the conditions the progressive imposes on when a process *P* may lead to a result ϕ. In particular, when ϕ expresses a quantificational relationship, that relationship must also hold in the 'bits of process' (to use Bach's 1986 phrase) that make up an event of which ϕ is true. The requirement that a situation or interval of which a predicate ϕ is true must consist of situations or intervals of which ϕ is also true is the 'divisibility' or 'downward closure' condition that is a lexical characteristic of activities (Vendler 1957; Kenny 1963; Taylor 1977; Bennett and Partee 1978; ter Meulen 1983, and others). Mittwoch's observation that the progressive 'picks out' the activity reading of an underlying verb phrase ϕ, then, can be restated as the requirement that whenever ϕ is true of a situation *s*, *s* is divisible with respect to ϕ (Cipria and Roberts 2000 present an analysis of the Spanish Imperfective in this vein).

The requirement that ϕ be true of literally *every* subpart of *s* is in most cases too strong, as Taylor (1977), Dowty (1977), Saurer (1984), Link (1987), Moltmann (1991), Cipria and Roberts (2000) and others discuss at length. For example, even though the data described above point to the conclusion that PROG+1/3 is true in the evenly dispersed situation in (2) because that situation consists of subparts in which the 'one third' proportion reiterates, there are some subparts of that situation in which the proportion does not hold. For example, the subsequence *0-1-1-0* occurs commonly in the diagram in (2), in which exactly one half of the transistors in that subsituation are rejected. Further, the slight variation on (2) in which the initial subsequence is changed, for example, to *0-1-0-1-1-1* supports, in my judgment, the same felicity intuitions as does (2) itself (that the machine is rejecting exactly one third of the transistors), but here we find the subsequence *1-0-1-1-1*, in which the machine rejects exactly one fifth of the transistors in that subsituation. These facts suggest that the assessment of internal homogeneity in activities tolerates a certain coarseness of grain. This coarseness of grain manifests itself in inherently homogeneous lexical activities like *walk* as well, since *John walked for two hours* is judged true even if he occasionally stopped and rested during the two-hour period. That is, *walk* may apply to a situation containing non-walking subsituations. Saurer (1984) refers to this attribute of activities as their 'gappiness' (p. 30). How large the gaps may be is a subjective judgment that depends on the predicate and the pragmatic context, and may be a point of contention in disagreements about the truth of a proposition. In these respects, the coarse universality of downward closure in activities is similar to the exception-prone universality of generic statements. Both constructions permit judged-as-irrelevant instances of the restriction to go uncounted in assessing the truth of the relation, and consequently both constructions serve to define what qualifies as a relevant instance of the restriction. The claim *Birds fly* asserts that non-flying birds do not play a role in defining birdhood. Similarly, *The machine is rejecting one third of the transistors* asserts that subsituations in which one third of the transistors are *not* rejected do not play a role in defining what is going on in that scenario, and therefore that the preponderance of subsituations in which one third of the transistors *are* rejected is non-accidental.

I propose that Mittwoch's observation is captured by the denotation for the progressive in (15). The definition states that the progressive form of a predicate describes a situation s in the valuation world whose every subpart s' "which is related to s in the appropriate fashion R," as Cipria and Roberts (2000: 323) put it, validates ϕ. Here R essentially represents the 'is a relevant subpart of' relation, and so the expression in (15) asserts that subparts of s that do not have property ϕ are not relevant, a point on which $PROG(\phi)$ may be false of s. The definition in (15) takes sentences to denote descriptions of situations, following Barwise and Perry (1983), and situations to be parts of possible worlds, following Berman (1987), Kratzer (1989), Heim (1990), Portner (1992), Zucchi (1993), von Fintel (1994), Cooper (1996), Kratzer (1998, 2002), Elbourne (2005), and others. S is the set of situations.

(15) $\forall \phi \subseteq S\ [\![\text{PROG}(\phi)]\!]^{w} = \lambda s \leq w\ \forall s' \leq s\ \text{R}(s', \text{s}) \rightarrow \phi(s')$

As described previously, what seems to be critical to the difference in felicity between, for example, PROG*+1/3* and PROG*+6* in the evenly dispersed situation is the fact that when evaluating homogeneity, the restriction of the quantifier is interpreted relative to the particular subsituation under consideration at that point in the valuation. PROG*+1/3* is true in the evenly dispersed situation because in every relevant subsituation, exactly one third of the transistors in *that* subsituation are rejected. PROG*+6* is false in that situation because even though exactly six transistors total are rejected, no (proper) subsituation is such that exactly six transistors in *that* subsituation are rejected. Relativization of the domain of the quantifier to the situation under consideration in the assessment of homogeneity allows proportions like *one third* to be construed as 'dispersing evenly' throughout a situation, but not quantities like *six*. So it is only in case quantifiers in ϕ are interpreted relative to s' that the definition in (15) is predicted to be compatible with the quantifier *one third* and not *six*.

Gawron and Peters (1990), von Fintel (1994), and Cooper (1996) propose that arguments of a determiner relation are relativized to the situation argument of the sentence containing the determiner. A sentence of the form $\partial(X, Y)$ is true of a situation *s* if the ∂ relation holds between the *X*'s in *s* and the *Y*'s in *s*. More explicitly, per von Fintel (p. 16):[1]

(16) For any determiner ∂, $[\![\partial]\!]$=the function $f \in D_{<<e,t>,<<e,t>,t>>}$ such that $\forall h,k \in D_{<e,t>}$:

$$(f(h))(k) = \{ s: \partial^{*}\langle \{a : h(a, s)\}, \{a : k(a, s)\} \rangle \}$$

Kratzer (2008) suggests that the denotation of basic verb stems is restricted to sets of 'minimal situations'—those that contain nothing other than what is necessary to verify the verb stem description (Taylor 1977; Cresswell 1977 develop an analogous constraint in interval semantic terms). For example, if *Ewan swam for 10 hours* were to describe a non-minimal situation in which Ewan swam for 10 hours, then the actual swimming part of it might have only lasted five minutes, contrary to our intuitions. Berman (1987) defines minimality as in (17) (as a restriction on the domain of quantificational adverbs, as discussed below), where *S* is the set of situations.

(17) A situation $s \in S$ is minimal with respect to the conditions expressed by α if, for some *g*, $[\![\alpha]\!]^{s,g}$ is true and for all $s' \in S$ such that $s' \leq s$, if $[\![\alpha]\!]^{s',g}$ is true then $s'=s$

As Zucchi (1993), von Fintel (2004), and Kratzer (2008) remark, this definition fails to identify a minimal situation for activity predicates, since these are subpart homogeneous. It is not true of a snowing situation, for example, that it has no proper subpart which is a snowing situation, meaning no snowing situation can ever be a minimal snowing situation. Yet atelic predicates are licensed in contexts that impose minimality. Berman (1987), Heim (1990), von Fintel (1994), and Elbourne (2005) claim that quantificational adverbs are restricted by minimal situations, which set up a domain in which definites and pronouns in the nuclear scope have unique reference. For example, the sentence *If a man is from Athens, he always likes Ouzo* (Heim's example (13)) contains a pronoun *he* that refers back to *a man (who) is from Athens*, even though that description by itself hardly presents a unique referent. But a minimal situation supporting *a man is from Athens* contains only one man, which the pronoun may name without problem. Now, as Kratzer points out, homogeneous situations like *snow falls* support donkey anaphora (Kratzer's example (28a)):

(18) When snow falls around here, it takes ten volunteers to remove it.

Addressing this puzzle, Kratzer proposes that the relationship between a description and a situation that verifies it asserts that there is nothing in the situation that does not contribute to the judgment that the situation supports the description, which is the case either when the situation is minimal or when it is completely homogeneous.

[1] I write *h*(*a, s*) where von Fintel writes $s \in h(a)$. Note that in von Fintel's type theory, the domain of expressions of type *t* is the power set of the set of situations.

Kratzer 2008 (revising Kratzer 1989, 1998, 2002) defines this relation as ‘exemplification’ (her (29)):

(19) A situation *s* exemplifies a proposition *p* iff whenever there is a part of *s* in which *p* is not true, then *s* is a minimal situation in which *p* is true.

A situation consisting only of swimming exemplifies *swim* by virtue of falsifying the antecedent of the conditional in (19); it does not contain any subpart which is not also in the denotation of *swim*. A situation consisting only of swimming across the English Channel exemplifies *swim across the English Channel* since there is a subpart of it that is not itself a swimming across the English Channel, and it is indeed a minimal situation of swimming across the English Channel.

Trading off ‘ϕ is true of *s*’ for ‘*s* exemplifies ϕ’ as the interpretation of $\phi(s)$ reconciles the internal homogeneity of activity predicates with the need for minimality in basic verb stem denotations and in the restriction of quantificational adverbs. But it necessitates a small revision to von Fintel’s schema for determiner relations. If basic verb stems denote sets of exemplifying situations, then the logical form of, for example, *Every child laughed* cannot be (20a), but must be (20b), because a situation *s* cannot exemplify *a* laughing if *s* includes all the other children as well (as (20a) wants to say), since they do not contribute to the judgment that *a* laughed. An exemplifying situation of *a* laughing can only be a subpart of a situation containing all the children, which the expression in (20b) allows. Von Fintel’s schema is revised accordingly in (21).

(20) a. $\{\ s : \text{every}^{*} \langle \{a\text{: child}(a, s)\}\ , \{a\text{: laughed}(a, s)\} \rangle \}$
b. $\{\ s : \text{every}^{*} \langle \{a\text{: child}(a, s)\}\ , \{a\text{: } \exists s'{\leq}s \text{ laughed}(a, s')\} \rangle \}$

(21) For any determiner ∂, $[\![\partial]\!]$=the function $f \in D_{<<e,t>,<<e,t>,t>>}$ such that $\forall h,k \in D_{<e,t>}$:
$(f(h))(k) = \{\ s\text{: } \partial^{*}\langle \{a\text{: } h(a, s)\}\ , \{a\text{: } \exists s'{\leq}s\ k(a, s')\} \rangle \}$

The PRET+Q sentences in (4a,b) express the propositions in (22a,b) respectively, with the determiners *exactly one third of* and *every* defined in (23) (where *U* is the discourse universe, a set of individuals, and *m* a constant naming the machine). Both transistor sorting situations schematized in (2) and (3) fall into the set defined in (22a). That is, as mentioned previously, both situations validate PRET+*1/3* but neither validates PRET+EVERY.

(22) a. $\{s : \text{exactly one third of}^{*}\langle\{x : \text{transistor}(x, s)\}, \{x : \exists s'{\leq}s \text{ reject}(m, x, s')\}\rangle\}$
b. $\{s : \text{every}^{*}\langle\{x : \text{transistor}(x, s)\}, \{x : \exists s'{\leq}s \text{ reject}(m, x, s')\}\rangle\}$

(23) a. $\forall X,Y{\subseteq}U$, exactly one third of$^{*}\langle X, Y\rangle = 1$ iff $|X{\cap}Y| = \frac{1}{3}|X|$
b. $\forall X,Y{\subseteq}U$, every$^{*}\langle X, Y\rangle = 1$ iff $X{\subseteq}Y$

The PROG+Q sentences in (5) require that their argument, a situation description, obeys the divisibility requirement stated in (15). The progressive operator applied to the situation descriptions in (22a,b) yields the denotations in (24a,b) for *PROG+1/3* and *PROG+EVERY* respectively.[2]

(24) a. $\lambda s{\leq}w\ \forall s'{\leq}s$ R(s', s) $\rightarrow$ exactly one third of*$\langle\{x : \text{transistor}(x, s')\}$, $\{x : \exists s''{\leq}s'\ \text{reject}(\text{m}, x, s'')\}\rangle$
b. $\lambda s{\leq}w\ \forall s'{\leq}s$ R(s', s) $\rightarrow$ every*$\langle\{x : \text{transistor}(x, s')\}$, $\{x : \exists s''{\leq}s'$ reject(m, x, s'')$\}\rangle$

(24a) asserts of a situation in the valuation world that in each relevant subpart of it, exactly one third of the things that are transistors in that subpart are things that the machine rejects in (a subpart of) that subpart. Such situations present themselves in the evenly dispersed situation (2) but not in the unevenly dispersed situation (3). (24b) asserts of a situation that in each relevant subpart of it, everything that is a transistor in that subpart is something that the machine rejects in that subpart. Such situations present themselves in the unevenly dispersed situation (3) (up until the reference time), but not at any time in the evenly dispersed situation (2). The *PROG*+6 sentence in (11b) denotes (25a) (with *exactly six* defined in (25b)), which asserts of a situation that in each relevant subpart of it, six things that are transistors in that subpart are things that the machine rejects in that subpart. No such subpart presents itself in either (2) or (3).

(25) a. $\lambda s{\leq}w\ \forall s'{\leq}s$ R(s', s) $\rightarrow$ exactly six*($\{x : \text{transistor}(x, s')\}$, $\{x : \exists s''{\leq}s'$ reject(m, x, s'')$\}$)
b. $\forall X,Y{\subseteq}U$, exactly six*$\langle X, Y\rangle = 1$ iff $|X{\cap}Y|{=}6$

In fact, cardinal quantifiers like *exactly six transistors* or *three cups of tea* are predicted to be systematically contradictory in the scope of the progressive because they cannot meet the divisibility requirement of the progressive in (15), for the reasons discussed above. This fact is part of the explanation for a perceived difference in felicity between, e.g. *PROG+EVERY*, repeated below as (26a), and *PROG+6*, repeated below as (26b). While (26a) is false in the evenly dispersed situation in (2), there seems to be more wrong with (26b) than a simple failure to hold.

(26) a. The machine was rejecting every transistor.
b. #The machine was rejecting exactly six transistors.

However, the fact that (26a) is false and (26b) is contradictory in the evenly dispersed situation in (2) is not the entire explanation for the difference in felicity between them. As a contradictory sentence, the negation of (26b) should be tautological. However, while the negation of (26a) is true in the evenly dispersed situation in (2) (as remarked earlier), the negation of (26b) is no better a description of what is happening there than (26b) is.

[2] These situation predicates are ultimately closed either by a relation to an existential quantifier ('existential closure' per Heim 1982) or by a relationship to a topic situation provided by the discourse context (Austin 1950), as pursued in Barwise and Perry (1983), Cooper (1996), Recanati (1996), and others. In either case, the relationship is also mediated by tense.

(27) a. The machine was not rejecting every transistor.
b. #The machine was not rejecting exactly six transistors.

The infelicity of both the affirmative *PROG+6* and its negation suggests that the underlying situation description *The machine rejects exactly six transistors* fails to meet a presupposition of the progressive. The evenly dispersed situation is not internally homogeneous with respect to either the description *The machine was rejecting every transistor* or *The machine was rejecting exactly six transistors*. That is, the internal homogeneity requirement stated in (15) does not suffice to differentiate the status of the two descriptions—that one is false and the other a presupposition failure. The presupposition involved is distinct from the internal homogeneity requirement.

Krifka (1998) proposes that the defining semantic property of activity predicates is 'cumulativity', defined in (28) (where U_P is the universe of elements in a part structure P.

(28) $\forall X \subseteq U_P$ [$\text{CUM}_P(X) \leftrightarrow \exists x, y\ [X(x) \wedge X(y) \wedge \neg x = y] \wedge \forall x, y\ [X(x) \wedge X(y) \rightarrow X(x \oplus_P y)]]$

A predicate is cumulative if it holds of at least two distinct things and for each such pair of things, it holds of their sum in the part structure represented by P as well. For example, any two situations that meet the description *eat apples* sum to a situation that meets the description *eat apples*. But any two situations that meet the description *eat exactly three apples* do not sum to a situation that meets the description *eat exactly three apples*, but rather one in which six apples are eaten. The cumulative predicate *eat apples* patterns like an activity and non-cumulative *eat exactly three apples* like an accomplishment according to Vendler's classificational diagnostic, i.e. compatibility with the adverbials *for X* vs. *in X*, where X is an interval denoting expression.

(29) a. Max ate apples (for an hour/#in an hour) [activity]
b. Max ate exactly three apples (#for an hour/in an hour) [accomplishment]

A cumulative predicate says 'the whole of the thing looks like its parts'. As such, the requirement it places on such a predicate is similar to the divisibility requirement stated in (15), which is intended to capture Mittwoch's observation that a predicate in the scope of the progressive is interpreted as an activity. And like divisibility, cumulativity bars relations like *exactly six* from building activity predicates, as described above. However, cumulativity and divisibility are not one and the same property. Cumulativity is a property of predicates, while divisibility is a property of situations with respect to a predicate, and the cumulativity of a situation description ϕ does not guarantee that any situation of which ϕ is true is also divisible with respect to ϕ. The unevenly dispersed situation in (3) is an example of a situation that is not divisible with respect to the description *The machine rejects exactly one third of the transistors* (which is true of the totality but not of its subparts). Yet that description is a cumulative predicate, since any two possible situations in which the machine rejects exactly one third of the transistors in that situation sum to a situation in which the machine rejects exactly one third of the transistors in that summed situation. Cumulativity distinguishes *The machine rejects exactly 6 transistors* from *The machine rejects every transistor*. Two situations in which the machine rejects exactly six transistors in that situation do not sum to a situation in which the machine rejects exactly six transistors in that summed situation, but rather 12. But two situations in which the machine rejects every transistor in that situation sum to a situation in which the machine rejects every transistor in that summed situation. Thus, when a predicate is cumulative, like *The machine rejects every transistor* or *The machine rejects exactly one third of the transistors*, the truth of its progressive form is determined by the divisibility of the situation at hand with respect to it, as described above. When a predicate is not cumulative, as in *The machine rejects exactly six transistors*, the question of the truth of its progressive form does not arise. It appears that *PROG(ϕ)* presupposes that ϕ is cumulative, and asserts that the situation in question is divisible with respect to ϕ, as expressed in (30), where the presupposition follows the slash.

(30) $\forall \phi \subseteq S\ [\![\text{PROG}(\phi)]\!]^{\text{w}} = \lambda s \leq \text{w}\ \forall s' \leq s\ \text{R}(s', \text{s}) \rightarrow \phi(s')\ /\ \text{CUM}(\phi)$

The hypothesis in (30) predicts that proportionality quantifiers are systematically felicitous in the progressive, because proportions distribute over summation, as (31) expresses. Proportionality quantifiers are those built from proportional determiners, defined in (32), due to Edward Keenan (p.c.; he offers this definition as an improvement over that which appears in Keenan and Westerståhl 1997). It states that a determiner *D* with relata *A* and *B* is proportional if it is sensitive only to the proportion of *A*'s that are *B*'s to the *A*'s, and is insensitive to how many *A*'s are actually *B*'s. *One third* is like this; *three* is not.

(31) $\forall x,y,z \in \mathbb{N}\quad \frac{1}{x}(y) + \frac{1}{x}(z) = \frac{1}{x}(y+z)$

(32) *D* is *proportional* iff for all $A,\ B,\ X,\ Y \subseteq U$

$$\left[\frac{|A \cap B|}{|A|} = \frac{|X \cap Y|}{|X|}\right] \rightarrow [D(A,\ B) \leftrightarrow D(X,\ Y)]$$

In addition to the relations *exactly one third of* and *every*, the proportional determiners include *most, no, 1 out of 10, 10% of, half, less than half*, etc., but exclude relations like *exactly six*, *between five and ten*, *less than ten*, etc. The proportionality quantifiers in the scope of the progressive systematically satisfy its cumulativity presupposition, as the sentences in (33) illustrate, in addition to the *PROG+EVERY* and *PROG+1/3* sentences discussed above, while non-proportionality quantifiers do not, as the sentences in (34) illustrate.

(33) a. The machine was rejecting most transistors.
b. The machine was rejecting one out ten transistors.
c. The machine was rejecting less than half of the transistors.

(34) a. #The machine was rejecting exactly six transistors.
b. #The machine was rejecting between five and ten transistors.
c. #The machine was rejecting less than ten transistors.

As Krifka remarks, there are some predicates that appear to meet the definition of cumulativity but that nonetheless do not pattern like activities, and are not felicitous in the progressive. For example, any two situations in which the machine rejects more than six transistors in that situation necessarily sum to a situation in which the machine rejects more than six transistors in that summed situation. We expect the description *The machine rejects more than six transistors* to pattern like an activity, but it neither conforms to Vendler's diagnostic for activities, as shown in (35a), nor is felicitous in the progressive, as shown in (35b).

(35) a. #The machine rejected more than six transistors for an hour
b. #The machine was rejecting more than six transistors.

Zucchi and White (2001) claim that the judgments in (35) pose a problem for a number of approaches to the issue of what defines activityhood. Here I extend a version of Zucchi and White's solution to the case at hand.

Zucchi and White point out that the infelicity of (36) is unexpected, since *John writes a sequence* is cumulative ('not quantized' in their terms—see Krifka 1998, p. 200): every two situations in which John writes a sequence sum to a situation in which John writes a (longer) sequence.

(36) #John wrote a sequence for ten minutes.

They claim along the lines proposed by Heim (1982) and Kamp (1984) that *a sequence* is a property of a variable that is free in the scope of *for ten minutes*—the activity portion of the sentence—but bound by existential closure outside the VP, represented by the LF in (37). Cumulativity applies within the innermost brackets in (37), and it is not the case that any two situations in which John writes x, where x is a sequence, sum to a situation in which John writes x.

(37) $\exists x\ \exists e\ [[\text{write(john}, x, e) \wedge \text{sequence}(x)] \wedge \text{10 minutes}(\tau(e))]$

I propose that the quantity *more than six* is defined as in (38), as a quantity n that is greater than six. The entity n is bound by existential closure outside the scope of cumulativity. The sentence *The machine was rejecting more than six transistors* has the LF in (39a), which is assigned the denotation in (39b) by the definition of the progressive morpheme in (30).

(38) $\forall X, Y \subseteq U$, more than six$^*\langle X, Y\rangle = 1$ iff $|X \cap Y| = n \wedge n > 6$

(39) a. $\exists n \in \mathbb{N}$ [PROG(the machine rejects n transistors and $n>6$)]
b. $\exists n \in \mathbb{N}\ \exists s \leq w\ \forall s' \leq s\ \text{R}(s', \text{s}) \rightarrow |\{x : \text{transistor}(x, s')\} \cap \{x : \exists s'' \leq s'\ \text{reject(m}, x, s'')\}| = n \wedge n > 6\}\ /\ \text{CUM}(\lambda s\ |\{x : \text{transistor}(x, s)\} \cap \{x : \exists s' \leq s\ \text{reject(m}, x, s')\}| = n \wedge n > 6\})$

The progressive presupposes the cumulativity of its argument, here *The machine rejects* n *transistors and* n > *6*. This situation description is not cumulative, since it is not the case that any two situations in which the machine rejects *n* transistors in that situation sum to a situation in which the machine rejects *n* transistors in that summed situation. This analysis of the semantics of *more than six* predicts that it behaves like *exactly six* vis à vis diagnostics for activityhood, as it does.

Thus, the hypothesis in (30), in concert with the situation-relative interpretation of quantifiers spelled out in (21), predicts the behavior of *PROG+Q* sentences to be as it is, and answers the puzzle of why certain quantifiers undermine the entailment from *PRET+Q* to *PROG+Q*. Proportional quantifiers are felicitous in the scope of the progressive, because the arguments of a quantifier are situation dependent and have variable reference in the valuation of cumulativity and divisibility. The truth of the progressive form of a predicate is decided by the internal homogeneity of the situation under consideration with respect to the predicate. Hence, *PROG+1/3* is true in the evenly dispersed situation in (2) and false in the unevenly dispersed situation in (3), even though a total of one third of the transistors are rejected in both cases. *PROG+EVERY* is true before the reference time in the unevenly dispersed situation in (3), because that portion of the situation is internally homogeneous with respect to *reject every transistor*, but false in the evenly dispersed situation in (2), even though neither situation is one in which every transistor is rejected. VPs like *reject exactly six transistors* and *reject more than six transistors* are not felicitous in the progressive at all, since they are not activity predicates.

3 Divisibility and telicity

The analysis described above answers a criticism that Zucchi (1999) levels against Mittwoch (1988), namely the fact that Mittwoch does not explain why it is that expressions like *rise ten feet* or *drink three cups of tea* are not capable of an activity interpretation. Cardinal quantifiers do not meet the cumulativity precondition on the progressive. However, the analysis above is still subject to a second criticism of Zucchi's, namely that "by Mittwoch's reasoning, base sentences like 'John go to Chicago' and 'John cross the street' must have these [activity] readings since, as [(40)] below shows, they can occur in the progressive. But why should the base sentences in [(40)] have readings that describe incomplete events and the base sentences in [(12)] lack such readings?" (p. 203f).

(40) a. John was going to Chicago when I met him.
b. John was crossing the street when I met him.

Along these lines, the proposal in (30) appears to have disastrous consequences for the analysis of progressive constructions that show the 'normal' entailment pattern from (1a) to (1b), repeated below as (41a,b).

(41) a. Osbert crossed the street.
b. Osbert was crossing the street.

The description *cross the street* only applies to the totality of the event so described; no two *cross the street* situations sum to a *cross the street* situation, nor is any subpart of a *cross the street* situation itself a *cross the street* situation. Since *cross the street* is neither cumulative nor divisible, it should not occur as an argument of the progressive operator if, per (30), the progressive presupposes that its argument is cumulative and asserts that the situation at hand is divisible with respect to it. I propose, however, that the analysis of the progressive in (30) is correct and that it is the lack of quantification in sentences like (41b) that allows them to pattern like activities. The 'culmination' of such activities is only found in the presence of a completiveness operator, as in a number of languages other than English described in more detail below.

Cross the street has an incremental argument; the completion of the event involves exhausting the path described by *the street* (which is a path that traverses the street). Kratzer (2004), building on work by Ramchand (1997), claims that telic verbs are derived from atelic verb stems by an exhaustivity operator that asserts that the incremental argument of the verb stem is exhausted by the event argument. This proposal presents an explanation for the felicitous occurrence of verb phrases like *cross the street* in the progressive: they do so in the absence of the telicizing operator. I discuss an implementation of Kratzer's proposal below that takes the basic interpretation of telic verb stems to be partitive, and the telicizing operator to be in complementary distribution with the progressive, with the result that the telic interpretation surfaces systematically in the absence of the progressive, but in the progressive only the atelic, activity interpretation is available.

An incremental predicate ϕ is defined as in (42), where the incrementality of the thematic relation that the incremental argument bears to the situation (event) argument is a precondition on the valuation of the expression (see Krifka 1998 on semantic criteria of incrementality).

(42) For all $n \in \mathbb{N}$, all lexical predicates $\phi(x_1,\ldots, x_n) \subseteq S$ with incremental argument x_n:
$$[\![\phi(x_1,\ldots, x_n)]\!]^w = \lambda s \leq w\ \exists y\ y \leq x_n \wedge \phi'(x_1,\ldots, x_{n-1}, y, s)$$

The denotation of *Osbert crosses the street*, then, is as specified in (43), which says that Osbert crosses the street in *s* if *s* is a situation of Osbert crossing a portion of the street.

(43) $[\![\text{cross(osbert, the-street)}]\!]^w = \lambda s \leq w\ \exists x\ x \leq \text{the-street} \wedge \text{cross'(osbert, } x, s)$

That is, the bare verb phrase *cross the street* means 'cross a portion of the street'.[3] This predicate is cumulative, since any two distinct situations in which Osbert crosses a portion of the street sum to a situation in which Osbert crosses a portion of the street. *Osbert crosses the street* is therefore a description that meets the cumulativity presupposition of the progressive. The progressive asserts that every relevant subpart of such a situation is also one that exemplifies *Osbert crosses the*

[3] What is crossed is not literally a portion of the street but a portion of a path across the street. In general, what actually measures out increments of an event is a semantic object *determined* by the incremental argument of the verb, not the referent of that argument itself (Jackendoff 1983, 1987, 1990; Dowty 1991; Tenny 1994; Kratzer 2004).

street, which is the case, since, again, the sentence *Osbert crosses the street* only requires that a portion of the street is crossed.

(44) $[\![\text{PROG(cross(osbert, the-street))}]\!]^{w} = \lambda s{\le}w\ \forall s'{\le}s\ \text{R}(s', \text{s}) \rightarrow \exists x{\le}\text{the-street} \wedge \text{cross'(osbert}, x, s') \ / \ \text{CUM}(\lambda s\ \forall s'{\le}s\ \text{R}(s', \text{s}) \rightarrow \exists x{\le}\text{the-street} \wedge \text{cross'(osbert}, x, s'))$

The progressive sentence *Osbert is crossing the street* asserts of a situation that all relevant subparts of it are situations in which Osbert crosses a portion of the street, assuming that this description is cumulative.

The expression in (44) does not assert that Osbert crossed the whole street, but rather only that he crossed a portion of it. This is not an unwelcome attribute for the interpretation of a progressive construction, since, as mentioned previously, lexical telicity in the base does not project to the progressive derivative. However, as an attribute of incremental predicates in general, as my account goes, this 'activity' interpretation of telic predicates is expected in non-progressive contexts as well. The interpretation of (41a) (*Osbert crossed the street*) is expected to be just that in (43), said of a contextually supplied past topic situation. But (43) asserts only that Osbert crossed a portion of the street in the topic situation, and not that that portion constitutes the totality of the street. So (43) is inadequate as a representation of the meaning of (41a), which asserts that Osbert crossed the entire street.

Kratzer (2004) proposes that telic verb stems are derived syntactically from atelic ones by the operator *[telic]*, defined in (45) (her example (7)). *[telic]* says of a predicate R with theme x and event argument e that R holds of x and e and also of every subpart of x and the corresponding subpart of e.[4]

(45) $[\![\text{[telic]}]\!] = \lambda R\ \lambda x\ \lambda e\ [R(x)(e) \wedge \forall x'\ [x'{\le}x \rightarrow \exists e'\ [e'{\le}e \wedge R(x')(e')]]]$

[telic] applied to *cross the street* is shown in (46a), which expands as (46b) by virtue of the definition for telic predicates in (42). (46) guarantees that all of the street is crossed, since if there is a subpart of the street that is not crossed, then there is a subpart of the street of which no subpart is crossed, which contradicts (46).[5]

(46) a. $\lambda \text{e}\ [\text{cross(the-street)}(e) \wedge \forall x\ [x{\le}\text{the-street} \rightarrow \exists e'\ e'{\le}e \wedge \text{cross}(x)(e')]]$
b. $\lambda e\ [\exists x\ x{\le}\text{the-street} \wedge \text{cross'}(x)(e) \wedge \forall x\ [x{\le}\text{the street} \rightarrow \exists e'\ e'{\le}e \wedge \exists x'{\le}x \wedge \text{cross'}(x')(e')]]$

The progressive aspect is morphologically marked in English, and the preterit arguably unmarked, since the past tense morphology that appears in the preterit appears in the progressive also. The fact that completiveness is asserted in the unmarked case, just when the progressive is lacking, gives the impression that

[4] I speak of 'events' where they are spoken of in the literature I cite, but do not thereby mean to distinguish them from situations. On the relationship of Davidsonian event semantics to situation theory, see Lasersohn (1990), Portner (1992), Zucchi (1993), Cooper (1997), and Kratzer (1998, 2008).

[5] Kratzer's analysis requires that telic verbs have an incremental argument, even if hidden. For instance, *leave* denotes an expression $\lambda x\ \lambda e\ leave(x)(e)$, where x is a path extending away from a deictic point of reference, sometimes explicit (as in *leave the party*), sometimes not (on which see Gillon 2008).

completiveness is a lexical property of the predicate that is ‘undone’ by the progressive. This impression hinges on the premise that the preterit is indeed unmarked, but the same state of affairs corroborates an analysis that casts Kratzer’s *[telic]* operator as a null counterpart to the progressive. The proposal that *[telic]* is in complementary distribution with the progressive morpheme ensures that non-progressive contexts are completive in English. Some crosslinguistic evidence supports the view that telic predicates are interpreted non-completively unless completiveness is imposed upon them by their morphosyntactic environment. Namely, completiveness is not a linguistically universal feature of the preterit form (*qua* otherwise-unmarked past tense) of telic predicates. Some languages do not show a completiveness entailment in the preterit. In those languages, completiveness may be introduced morphologically.

For example, Travis (2000) and Rasolofo (2006) show that simple past tense constructions in Malagasy do not display a completiveness entailment, illustrated in (47a,b). Completiveness is contributed by a class of telicizing morphemes, including *maha* in (48a) and *vua* in (48b), the latter of which is also passivizing.[6]

(47) a.

N-a-mory	ny	ankizy	ny	mpampianatra
PAST-*AN*-meet	the	children	the	teachers
nefa	tsy	n-anana	fotoana	izy
but	NEG	PAST-have	time	they

‘The teachers gathered the children, but they didn’t have time.’

b.

N-aN-vu’a	ni	varavarana	ni	ankizhi
PAST-*AN*-open	the	door	the	child
fa	tsi	vua-vu’a		
but	NEG	RES-open		

‘The child opened the door but it did not open.’

(48) a.

*n-aha-vory	ny	ankizy	ny	mpampianatra
PAST.*MAHA*.meet	the	children	the	teachers
nefa	tsy	n-anana	fotoana	izy
but	NEG	PAST-have	time	they

‘The teachers gathered the children, but they didn’t have time.’

b.

*Vua-vu’a	ni	ankazhi	ni	varavarana	fa	tsi	n-aN-vu’a
RES-open	the	child	the	door	but	NEG	PAST-*AN*-open

‘The child opened the door but he didn’t open it.’

Similarly, Singh (1998) reports that simple past tense constructions (which she calls ‘perfective’) in Hindi and Japanese do not assert the completion of the event they describe; cf. her examples in (49). Only the complex predicates in (50) have a completion entailment.

6 Travis and Rasolofo use rather different orthographic conventions, which I have not modified. Rasolofo glosses *vua* as *RES* for ‘resultative’. The morpheme glossed *AN* is a transitivizing morpheme.

(49) a. mãẽ ne aaj apnaa kek khaayaa aur baakii
I ERG today mine cake eat-PERF and remaining
kal khaaũũgaa
tomorrow eat-FUT
'I ate my cake today and I will eat the remaining part tomorrow.'

b. watashi-wa keeki-o tabeta dakedo keeki-wa mada nokotteiru
I-NOM cake-ACC ate-PERF but cake-NOM still remains
'I ate the cake but some of it still remains.'

(50) a. *mãẽ ne kek khaa liyaa, jo bacaa hae
I ERG cake eat take-PERF what remain is
wo raam khaayegaa
that Ram eat-FUT
'I ate the cake and Ram will eat the rest.'

b. *watashi-wa keeki-o tabeteshimatta dakedo keeki-wa mada
I-NOM cake-ACC ate-finish-PERF but cake-NOM still
nokotteiru
remains
'I ate the cake but some of it still remains.'

The examples in (47) and (49) have precisely the type of interpretation that the LF in (43) incorrectly attributes to the English sentence *Osbert crossed the street* ((41a) above). For example, the denotation of (49a) on analogy to (43), shown in (51), does not assert that the portion of the cake that is eaten in the situation s necessarily comprises the entire cake; this correctly characterizes what (49a) expresses.

(51) $[\![\text{eat(the-speaker, the-speaker's-cake)}]\!]^{w} = \lambda s{\leq}w\ \exists x{\leq}\text{the-speaker's-cake} \wedge \text{eat'(the-speaker}, x, s)$

As an incremental theme, the individual-denoting trace of a raised quantifier is interpreted partitively. Quantifier raising of a quantificational DP out of the scope of the partitivity imposed by the verb stem found in examples like (49) is expected to give rise to a surprising effect. A sentence like *I ate five apples* makes the assertion in (52), which says that for each of five apples, I ate at least part of it.

(52) $[\![\text{five apples}_x\ [\text{eat(the-speaker}, x)]]\!]^{w} = \lambda s{\leq}w\ \text{five}^{*}\langle\{x : \text{apple}(x, s)\}, \{x : \exists s'{\leq}s\ \exists x'{\leq}x\ \text{eat'(the-speaker}, x', s')\}\rangle$

Singh reports just this interpretation for (53a) (her (37), p. 187). Again, completiveness is marked by the complex predicate in (53b).

(53) a. amu ne pããc seb khaaye
Amu ERG five apples eat-PERF
'Amu ate five apples.' (not necessarily entirely, but each of the five apples was affected)

b. amu ne pããc seb khaa liye
Amu ERG five apples eat take-PERF
'Amu ate five apples.' (entirely)

Completiveness in Hindi is contingent on lexical aspectual properties of the predicate and quantificational properties of that predicate's arguments. For some predicate-quantifier pairs, the semantic effect of the complex predicate construction 'migrates' into the domain of definiteness. The object is interpreted as indefinite in the simplex construction, and definite in the complex predicate construction. (Thus the simplex/complex predicate distinction in Hindi is similar to the function of the partitive/accusative Case distinction in Finnish; see Kiparsky 1998 for an overview.) A complete analysis of these interactions is beyond the scope of this paper. The role that the facts in (47)–(53) play in the present discussion is that they corroborate the claim that completiveness is not inevitably associated with telicity in the absence of non-completive morphology like the progressive. It is morphologically marked in some languages, and such languages behave in a way that lends credence to the claim that incremental arguments are interpreted partitively.

Kratzer's proposal that completiveness in English is the semantic contribution of a morpheme lexically independent of the predicate it applies to exonerates the analysis of the progressive in (30), which is a unified analysis of the semantic contribution of the progressive in activities, accomplishments (telic predicates), and those 'activities' that emerge from the relativization of the interpretation of arguments of quantifiers to the situation argument of the quantifier, an analysis that captures the otherwise mysterious behavior of the *PROG*+Q construction contingent on the choice of *Q*. The analysis derives Mittwoch's claim that eventive predicates are interpreted as activities in the scope of the progressive, while ensuring completive interpretations elsewhere (in English) and formalizing a point of semantic crosslinguistic variation. In languages like Malagasy, Hindi, and Japanese, *[telic]* is not obligatory, and is associated with a particular morphological environment when it occurs, while in English it is obligatory (in lieu of the progressive) and covert. Below, I return to some matters relevant to the interpretation of the progressive forms of quantificational expressions of the type discussed in the first part of this paper, then make some concluding remarks on telicity and intensionality.

4 Aspectual interactions with quantifier scope

Proportional quantifiers license a reading of the progressive not entailed by the corresponding preterit only when the proportional quantifier falls in the scope of the progressive, since there the proportion is required to iterate in subsituations, which is not obligatory in the preterit. Quantifiers may fall outside the scope of the progressive. Adjunct clauses highlight the scopal ambiguity; an object must scope over the adjunct clause to bind a pronoun in it. This section explores the scopal configurations available to quantifiers with respect to *PROG*, showing that scope affects interpretation in the expected way.

Leech (1971) points out that progressive and preterit predicates interact differently with point adverbials such as *when*-clauses. Citing the examples in (54), he remarks that "the first example tells us that the coffee making *followed* the arrival; the second, that the arrival took place *during* the coffee-making" (p. 17, emphasis his). Vlach (1981) shows that what Leech says of the interaction of progressive predicates with *when*-clauses is true of stative predicates in general, pointing to the parallel in temporal interpretation between, for example, *Max was running when I arrived* and *Max was here when I arrived*. Vlach concludes that the progressive morphology is stativizing.

(54) a. When we arrived she made some fresh coffee.
b. When we arrived she was making some fresh coffee.

When-clauses are event predicates (Rooth 1985; von Fintel 1994). As Leech's and Vlach's remarks demonstrate, the concatenation of a *when*-clause with a stative verb phrase is interpreted as asserting temporal coincidence of the two eventualities. The concatenation of a *when*-clause with an eventive predicate is interpreted as asserting temporal succession of the two eventualities, spelled out in (55). Ideally this difference in behavior should fall out from a semantic analysis of the event/state distinction, but I do not undertake this task here. Here the symbol '<' is used to mean 'immediately precedes'.

(55) a. $[\![VP_{STATE}\ CP_{WHEN}]\!] = \lambda s\ \lambda s'\ [\![VP]\!]\ (s) \wedge [\![CP]\!](s') \wedge \tau(s') \subseteq \tau(s)$
b. $[\![VP_{EVENT}\ CP_{WHEN}]\!] = \lambda s\ \lambda s'\ [\![VP]\!](s) \wedge [\![CP]\!](s') \wedge \tau(s') < \tau(s)$

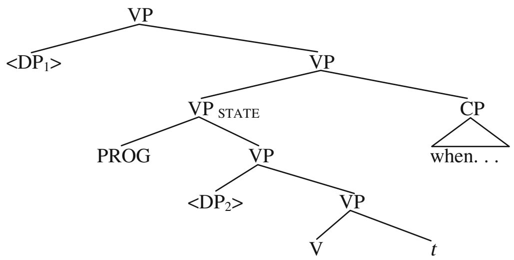
Now consider the sentences in (56).

(56) a. Osbert was cleaning every vase when it broke.
b. Osbert was cleaning every vase when his cell phone rang.

(56a) asserts that for each vase, Osbert was cleaning it at the time it broke. The natural interpretation of (56b), on the other hand, is that Osbert was going through all the vases, cleaning them one by one, when suddenly his cell phone rang (once, not once for each vase). A reading analogous to (56a) is available for (56b), in which his cell phone rings each time he cleans a vase, but is pragmatically militated against. No reading analogous to (56b) is available for (56a) as long as *it* is bound by *every vase*, since *every vase* must scope over the *when*-clause to bind the pronoun.

The *when*-clauses in (56a) and (56b) scope over the progressive. We know this because the interpretation of the *when*-clauses in (56) is the interpretation that is found when a *when*-clause modifies a progressive (thus stative) VP. In (56a) and (56b), the time of the *when*-clause event is situated within the time of the event described by the progressive predicate—during the cleaning of the vase (for each vase) in (56a), and during the larger scenario in which Osbert cleans the vases (until his cell phone rings) in (56b). This effect is expected under the generalization in (55a), indicating that the *when*-clause combines with the progressive (stative) VP there. In (56a), the object quantifier, thematically related to the VP, binds a pronoun in the *when*-clause, and therefore scopes above it. In (56b), the proportion denoted by the object quantifier is part of the description of the situation that is ongoing when Osbert's cell phone rings. It is therefore within the scope of the progressive. We can infer that an object quantifier may have wide or narrow scope with respect to the progressive, as illustrated in (57), where DP_1 labels the wide scope object position and DP_2 the narrow scope position. A quantifier in either position binds a trace *t* in a theta position. The interpretation of (56a), with the object scoping outside the progressive (in the DP_1 position), is given in (58a), composed from the definitions in (23b) (for *every*), (30) (for the progressive), (42) (for *clean*), and (55a) (for the *when*-clause), in the order shown in (57), with default existential closure of the situation argument of the *when*-clause. The interpretation of (56b), with the object scoping inside the progressive (in the DP_2 position), is given in (58b).[7]

(57)



(58) a. $\lambda s{\le}w$ every*$\langle\{x : \text{vase}(x, s)\}, \{x : \exists s'{\le}s\ \exists s''' [\forall s''{\le}s'\ \text{R}(s'', s') \rightarrow \exists x'{\le}x\ \text{clean'}(\text{osbert}, x', s'')] \wedge \text{break}(x, s''') \wedge \tau(s''')\subseteq\tau(s')\}\rangle$ / CUM$(\lambda s\ \exists x'{\le}x\ \text{clean'}(\text{osbert}, x', s))$

b. $\lambda s{\le}w\ \exists s'''\ \forall s'{\le}s\ \text{R}(s', s) \rightarrow$ every*$\langle\{x : \text{vase}(x, s')\}, \{x : \exists s''{\le}s'\ \exists x'{\le}x\ \text{clean'}(\text{osbert}, x', s'')\}\rangle \wedge \text{ring}(\text{his-cell-phone}, s''') \wedge \tau(s''') \subseteq \tau(s)$ / CUM $(\lambda s$ every*$\langle\{x : \text{vase}(x, s)\}, \{x : \exists s'{\le}s\ \exists x'{\le}x\ \text{clean'}(\text{osbert}, x', s')\}\rangle$

Not all quantifiers are equally comfortable taking inverse scope with respect to clausemate operators (Ioup 1975; Beghelli 1993; Beghelli and Stowell 1997). The wide scope reading of the object quantifier (the reading on which it binds the pronoun in the *when*-clause) decreases in felicity going down the list in (59a–f). The relevant reading is one in which the vases break at different times. For e.g. (59d), the relevant reading is paraphrased 'Each of most of the vases is such that Osbert was cleaning it when it broke' (the rest of the vases may have broken under different circumstances or not at all).

[7] Because *[telic]* does not appear anywhere in the structure in (57), the formula in (58b) does not assert that the vases that were cleaned were cleaned completely, but only that for each vase, a subpart of it was (necessarily) cleaned. Upon close inspection this turns out to be the right prediction, as discussed later.

(59) a. Osbert was cleaning each vase when it broke.
b. Osbert was cleaning every vase when it broke.
c. Osbert was cleaning all the vases when they broke.
d. Osbert was cleaning most vases when they broke.
e. Osbert was cleaning several vases when they broke.
f. Osbert was cleaning three vases when they broke.

Both of the last two configurations improve in felicity with the definite partitive *several of the* and *three of the,* respectively. The definite partitive quantifiers in (60) are specific in the sense of Enç (1991). The contrast between (59e,f) and (60a, b) is expected if specific DPs have wider scope than nonspecific DPs (Pesetsky 1987; Szabolcsi and Zwarts 1992; Diesing 1992; Mahajan 1992; Kiss 1993; Chung 1994).

(60) a. Osbert was cleaning several of the vases when they broke.
b. Osbert was cleaning three of the vases when they broke.

The hierarchy in (59) is identical to that proposed by Ioup of "quantifiers that tend to have highest scope regardless of the environment." Her hierarchy is shown in (61) (Ioup does not mention cardinal quantifiers like *three vases*, but Beghelli and Stowell (1997) group them together with *some* (NP_{PL})).

(61) each > every > all > most > many > several > some (NP_{PL}) > a few

The correspondence between the judgments in (59) and Ioup's hierarchy in (61) indicates that the ability of a proportional quantifier to license the 'normal' entailment from the preterit form of a predicate to its past progressive form is contingent on its ability to fall outside the scope of the progressive. Quantifiers such as *three vases* in (59f) and *three cups of tea* in (12b), which neither license cumulativity in the scope of the progressive nor readily scope out of the progressive, are highly marked in progressive environments, as Mittwoch reports.

An object quantifier may also scope out of an eventive VP, as in (62a), which asserts that each vase is such that, when it got dirty, Osbert subsequently cleaned it, or (62b), which asserts that each ashtray is such that, when it filled up, Osbert emptied it.

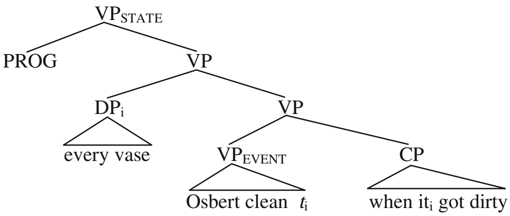
(62) a. Osbert cleaned every vase when it got dirty.
b. Osbert emptied every ashtray when it filled up.

The progressive forms of the examples in (62), shown in (63), also have an object wide scope reading, which is very pragmatically marked, as it asserts, analogous to (56a), that each vase got dirty while Osbert was cleaning it, and that each ash tray filled up while Osbert was emptying it. But they also have a pragmatically natural reading that describes a homogeneous situation throughout which, each time a vase got dirty, Osbert subsequently cleaned it, or each time an ashtray filled up, Osbert subsequently emptied it.

(63) a. Osbert was cleaning every vase when it got dirty.
b. Osbert was emptying every ashtray when it filled up.

The latter, pragmatically felicitous reading is one in which the quantifier falls in the scope of the progressive (since the proportion *every* is part of the description the VP denotes), yet it scopes over the *when*-clause (since it binds a pronoun in it), and the *when*-clause is interpreted according to the reading it gets when modifying an eventive VP, as asserting, in the case of (63a), that the getting dirty precedes the cleaning. On this reading, (63) has the structure in (64), with the denotation in (65).

(64)



(65) $\lambda s{\leq}w\ \forall s'{\leq}s\ \mathrm{R}(s', \mathrm{s}) \rightarrow$ every$^{*}\langle\{x : \text{vase}(x, s')\}, \{x : \exists s''{\leq}s'\ \exists s'''\ \exists x'{\leq}x$ clean'(osbert, $x', s'') \wedge$ get-dirty$(x, s''') \wedge \tau(s''') < \tau(s'')\}\rangle$ / CUM(λs every$^{*}\langle\{x : \text{vase}(x, s)\}, \{x : \exists s'{\leq}s\ \exists s''\ \exists x'{\leq}x$ clean'(osbert, $x', s') \wedge$ get-dirty$(x, s'') \wedge \tau(s'') < \tau(s')\}\rangle$)

As expected, the progressive VP in (64), being stative, may compose with another *when*-clause with the temporal coincidence interpretation, as shown in (66a). The two *when*-clauses may not be reversed, as shown in (66b), indicating that they indeed attach at different levels of structure.

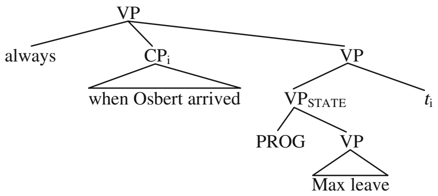
(66) a. Osbert was cleaning every vase when it got dirty, when he ran out of Windex.
b. #Osbert was cleaning every vase when he ran out of Windex, when it got dirty.

Quantificational adverbs show the same ambiguity in their relation to the progressive as object quantifiers. The second *when*-clause in (67a) highlights the reading of *Max was always leaving when Osbert arrived* that is analogous to (56a) above, *Max was cleaning every vase when it broke*. The second *when*-clause in (67b) highlights the reading that is analogous to (56b), *Max was cleaning every vase when his cell phone rang*.

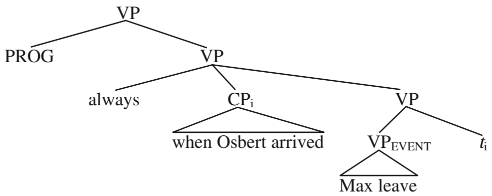
(67) a. Max was always leaving when Osbert arrived, when they decided to schedule an appointment.
b. Max was always leaving when Osbert arrived, when they finally made up and became friends again.

(67a) describes a state of affairs in which, every time Osbert arrives, Max is (already) in the process of leaving, until this state of affairs is interrupted by their decision to schedule an appointment to make sure they stop missing each other. (67b) describes a state of affairs that suggests that Max can't stand to be in the same room with Osbert, so whenever Osbert arrives, Max subsequently leaves, until the state of affairs is interrupted by Max and Osbert becoming friends again. In the reading highlighted in (67a), the adverb *always* is outside the scope of the progressive, as illustrated in (68a). In the reading in (67b), the adverb is inside the scope of the progressive, as illustrated in (68b). The *when*-clause (*when Osbert arrived*) itself restricts the quantificational adverb in both cases (Rooth 1985; von Fintel 1994). The semantic relationship of the *when*-clause to the VP it modifies (temporal coincidence or precedence) is established under sisterhood according to the definitions in (55), meaning the *when*-clause must be displaced in order to restrict the quantificational adverb.

(68) **a**



b



Von Fintel (2004), refining Berman (1987), proposes that quantificational adverbs with explicit restrictors are interpreted as in (69), where *min(X)* is the set of minimal situations in X and *f(s)* is a contextual restriction on the domain of the quantifier, namely the set of accessible situations related to *s* by the contextually determined function *f*.[8] Since the domain of the quantifier consists only of minimal *p* situations, these may not be large enough to qualify as *q* situations, but are asserted in (69) to extend to a larger *q* situation. (69) asserts that ∂-many minimal accessible *p* situations extend to a *q* situation.

(69) $[\![\partial(\text{when } p)(q)]\!] = \{s : [\![\partial]\!]\langle \min(f(s) \cap [\![p]\!]), \{s' : \exists s'' \, [s' \leq s'' \wedge s'' \in [\![q]\!]]\}\rangle\}$

In the examples in (67), the *p* situation is not extended by the *q* situation; the proposition *q* merely temporally juxtaposes the matrix VP situation and the *when*-clause situation. For perspicuity's sake I omit the 'extends to' notation in the cases at hand and abbreviate the denotation in (69) to $\{s : [\![\partial]\!]\langle \min(f(s) \cap [\![p]\!]), [\![q]\!]\rangle\}$. The structures in (68) have the denotations in (71), where the trace of the displaced *when*-clause is interpreted as a copy of the displaced *when*-clause and the nuclear

8 In terms of the contextual relevance relation *R* mentioned earlier, $f(s) = \lambda s' \, R(s', s)$.

scope of the quantifier is interpreted as an abstract over the situation argument of the moved *when*-clause, with default existential quantification of the situation argument of the matrix VP. That is, the nuclear scope of the quantifier in (68a) and (68b) is interpreted as in (70a) and (70b), respectively. (71a) asserts that every minimal contextually accessible situation of Osbert arriving is (or 'trivially extends to') a situation of Osbert arriving that happens during a state of Max leaving. The quantificational substructure in (71b) asserts that every minimal contextually accessible situation of Osbert arriving is a situation of Osbert arriving that happens just prior to an event of Max leaving. Like *every*, *always* satisfies the cumulativity presupposition of the progressive.[9] Other quantificational adverbs pattern similarly; *usually, often, occasionally, sometimes,* and others substitute for *always* in the examples in (71) with the same pattern of interpretation.

(70) a. $\{s : \exists s' \, [\![\text{VP}]\!](s') \wedge [\![\text{CP}]\!](s) \wedge \tau(s) \subseteq \tau(s')\}$
b. $\{s : \exists s' \, [\![\text{VP}]\!](s') \wedge [\![\text{CP}]\!](s) \wedge \tau(s) < \tau(s')\}$

(71) a. $\{s : \text{always*}\langle \min(f(s) \cap \{s' \leq s : \text{arrive(osbert}, s')\}), \{s' : \exists s'' \, [\forall s''' \leq s'' \, \text{R}(s''', s'') \rightarrow \exists x' \leq x \text{ leave'(max}, x', s''')] \wedge \text{arrive(osbert}, s') \wedge \tau(s') \subseteq \tau(s'')\rangle\} \, / \, \text{CUM}(\lambda s \, \exists x' \leq x \text{ leave} \leq (\text{max}, x', s))$
b. $\{s : \forall s' \leq s \, \text{R}(s', s) \rightarrow \text{always*}\langle \min(f(s') \cap \{s'' \leq s' : \text{arrive(osbert}, s'')\}), \{s'' : \exists s''' \, \exists x' \leq x \text{ leave'(max}, x', s''') \wedge \text{arrive(osbert}, s'') \wedge \tau(s'') < \tau(s''')\}\rangle\} \, / \, \text{CUM}(\lambda s \text{ every*}\langle \min(f(s) \cap \{s' \leq s : \text{arrive(osbert}, s')\}), \{s' : \exists s'' \, \exists x' \leq x \text{ leave'(max}, x', s'') \wedge \text{arrive(osbert}, s') \wedge \tau(s') < \tau(s'')\}\rangle)$

These remarks indicate that the predicted interpretations for the progressive in two possible scopal configurations (wide and narrow) with clausemate quantifiers of various types are attested. The possibility of the wide scope reading of an object quantifier with respect to the progressive correlates with an independently established scopal hierarchy for quantifiers, supporting a structural analysis of the ambiguities discussed here.

I conclude this section by discussing a point that bears on the claim that *PROG* and *[telic]* are mutually exclusive, i.e., that they are alternating semantic values for the same syntactic head, so only one may occur in a given predicate. At first glance, cases like (63) suggest otherwise. (63a) appears to describe a situation in which, every time a vase got dirty, Osbert cleaned it completely. That is, each vase that got cleaned was exhausted by the cleaning, suggesting that *clean* occurs with *[telic]* even though the complex including the quantifier falls in the scope of the progressive. However, the case in which Osbert cleans every vase that got dirty completely is merely compatible with the interpretation of (63a), not required by it, as the examples in (72) illustrate.[10] The *when*-clauses in (72) clarify that the object

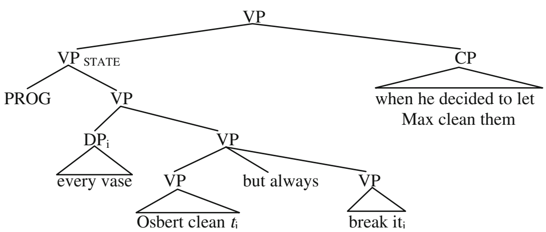
[9] The contextual restriction of the domain of quantificational adverbs is in danger of undermining the cumulativity presupposition, since there is no in-principle guarantee that f always maps a situation s to a set that includes the situations that f maps the subparts of s to. It seems to be necessary to stipulate either that cumulativity is blind to contextual restrictions or that f is cumulative, i.e. that the situations contextually accessible to any s and s' are also contextually accessible to their sum.

[10] I am grateful to an anonymous reviewer for pointing out this fact.

quantifier scopes below the progressive in each case; the examples share the structure in (73) (illustrated for (72a)). (72a) describes a situation in which Osbert is going through the vases, beginning to clean each one but breaking it while doing so (and therefore not finishing it), and this state of affairs is ultimately interrupted by his decision to let Max clean the vases. Consequently, not every vase is cleaned, but more importantly for present purposes, even the vases that Osbert begins to clean are not cleaned completely, since they break during the cleaning. Similarly, (72b) describes a situation in which Osbert begins to read each book in an ordered set (for example books sent to him weekly by a publisher for reviewing) and this state of affairs is interrupted at a point at which he doesn't even begin to read them any more. (72c) and (72d) are interpreted similarly.

(72) a. Osbert was cleaning every vase, but always breaking it, when he decided to let Max clean them.
b. Osbert was reading every book, but never finishing it, when he stopped reading them altogether.
c. Osbert was climbing every mountain, but never reaching the top, when he decided to get better shoes.
d. Osbert was solving every equation, but never finding the answer, when he gave up.

(73)



These facts indicate that incremental predicates like *clean, read, climb* and *solve* do not have completion entailments in the scope of the progressive, even when the progressive does not apply to the predicate directly, but to a quantificational expression containing the predicate. These observations support the conclusion that *PROG* and *[telic]* are alternating semantic values for the same syntactic node, and thus are mutually exclusive.

5 The progressive as a modal operator

The contrast in the interpretation of proportional quantifiers in the progressive (*PROG+Q*) and preterit (*PRET+Q*) supports the claim that the progressive asserts event divisibility, and therefore that there is an aspectual component to the interpretation of the English progressive construction. The analysis described in this paper is designed to capture this characteristic of the progressive. The fact that there is an aspectual component to the interpretation of the progressive does not preclude the possibility that there is also a modal component, as Dowty (1979), Landman (1992), Asher (1992), Portner (1998), and others claim. The remarks below are intended to demonstrate that the analysis above is compatible with analyses designed to capture certain modal characteristics of the progressive construction, and is not antagonistic to them.

The analysis presented in this paper is a version of what is sometimes called the ‘partitive’ analysis of the progressive, advocated in various forms by Hinrichs (1983), ter Meulen (1985, 1987), Bach (1986), Link (1987), Parsons (1990), and Krifka (1992). In terms of the present analysis, *cross the street* (and therefore its progressive derivative *be crossing the street*) asserts that there is an event in which a portion of the street is crossed, and does not assert that the rest of the street is ever crossed. The expression does, however, assert that the rest of the street exists, by virtue of asserting that a portion of it is crossed. This is an innocuous fact about the interpretation of *cross the street* but not necessarily all activity predicates. The expression *Osbert is building a house* would assert that a house exists, which Osbert built a portion of. This paraphrase does not accord with our intuitions in this case. If Osbert’s house building is interrupted, it remains true that Osbert was building a house though no house exists.

Further, Landman (1992) presents a modal explanation for the oddity of the sentences in (74). Both sentences in (74), he claims, are false even at a point in time when Mary is still swimming, with the intention of crossing the Atlantic, or still holding off the Roman army, with the intention of wiping it out.

(74) a. Mary was crossing the Atlantic (by swimming).
b. Mary was wiping out the Roman army.

According to Landman, the reason the sentences in (74) are odd is that they do not stand a chance of culminating. Both assertions can be denied along the lines: ‘Mary isn’t crossing the Atlantic—she’ll never make it!’. Landman presents an analysis in which the improbability of the possible world in which the events described in (74a,b) culminate causes the progressive form to be false.

I present here a revision of the definition of the progressive operator in (30) that invokes a *possible* situation in which the underlying event description culminates, and asserts that a subpart of that situation transpires in the valuation world. The revised definition is compatible with Landman’s procedure for evaluating the likelihood of a culmination, and therefore compatible with an explanation for the effect illustrated by the sentences in (74). At the same time, it does not commit to the existence of the totality of the incremental argument, and is therefore compatible with a modal explanation for the fact that *Osbert was building a house* does not entail the existence of a house.

The definition below states that the progressive form of a cumulative predicate ϕ describes a situation s by saying there is a possible situation s' (in any possible world) in which ϕ culminates (that is, s' exemplifies *[telic]*(ϕ)), and that s is a subpart of both the possible culmination situation s' and the valuation world w (that is, the world of s' overlaps with the valuation world at least in s), and s' is divisible as per the previous definition in (30) (and therefore so is its subpart s).

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

This definition makes explicit that the situation described by *PROG(ϕ)* culimates in some possible world. The preposterousness of that world may be calculated by Landman's procedure of exploring 'continuation branches' of the real world until either the culmination is reached or no continuation branch can be found that satisfies a measure of normalcy (that is what goes wrong in (74)). I do not treat the details here of harmonizing the present analysis with Landman's, but turn instead to an aspect of situation theory that does not entirely agree with this modalization of the aspectual analysis developed in the present study.

The definition in (75) commits only to the existence in the valuation world of things necessary to make ϕ true of s, which include the relata of s, including that portion of the incremental argument that is exhausted in s, which does not necessarily constitute the entire incremental argument. Thus, the valuation world shares a portion of the incremental argument with another world, in which the entire referent exists. The valuation world overlaps with another world in s.

Kratzer (1989) lists among the basic ingredients of situation theory a partial ordering on the set of situations that has the property in (76) (among others), where S is the set of situations.

(76) For all $s\in$S, there is a unique $s'\in$S such that $s\leq s'$ and for all $s''\in$S: if $s'\leq s''$, then $s''=s'$

This condition requires that each situation s has its own 'maximal' situation—one containing s and which is not itself contained by any other situation. Kratzer identifies this maximal situation with the 'world' of s.

The semantics for the progressive presented here violates the axiom of situation theory that each situation is a subpart of only one world. The definition in (75) asserts that there is a situation s contained in the valuation world but also contained in a possible culmination situation s' that is not necessarily itself part of the valuation world. Hence, s is a subpart of two situations neither of which contains the other, in violation of (76). Similarly, incremental arguments may be 'split' between worlds in this analysis, with a portion of a house existing in the valuation world (the portion that is actually built if Osbert was building a house) and a portion (the rest) existing only in a possible world not necessarily contained in the valuation world.

Kratzer's condition in (76) is designed to cast situation theory as an extension of classical possible-worlds semantics, so that classical notions of validity, logical consequence, and equivalence, for example, carry over to situation theory without modification. As Kratzer implies, however, there is no theoretical hindrance to recasting the classical notions in non-classical terms and abandoning the notion of 'possible world' altogether in favor of 'possible situation' (see Kratzer 1989:615f). Alternatively (as Kratzer also notes), Lewis (1968, 1971, 1973, 1986) argues that objects and events may have 'counterparts' in other worlds. From such a perspective, *PROG(ϕ)* would assert that there is a world w' that contains the culmination of the *counterpart* of s in w'. The fact that counterpart theory presents an alternative compatible with classical modal semantics relinquishes us from the obligation to abandon the premises of classical modal semantics, so I do not pursue the details of a world-free semantics here.

6 Conclusion

The analysis proposed here explains the unexpected interpretation of PROG+Q constructions with proportional quantifiers like those in (5) (the interpretation that the PRET+Q counterpart fails to entail). It explains the contrast between proportional quantifiers and cardinal quantifiers illustrated by the sentences in (11b) and (12) (which are presupposition failures) and folds the behavior of proportional quantifiers in the progressive into a general analysis of the progressive that also generates the 'normal' entailment pattern seen in (1). That general analysis states, in effect, that the progressive combines only with activity verb phrases. Expressions headed by a proportional quantifier are interpreted as activity predicates, since the relata of the quantifier are interpreted relative to the situation argument of the quantifier. Proportionality quantifiers license this activity reading because they denote a relation that is preserved under summation ('cumulative'). Further, lexically telic predicates are interpreted as activities because a telic predicate does not itself assert that its incremental argument is exhausted by its eventuality argument. Such 'partitive' properties are also preserved under summation. The partitivity of the incremental argument is not apparent in English because English makes use of a covert operator that imposes completiveness at the VP level, and which is in complementary distribution with the progressive operator. Languages without a completiveness assertion in the preterit display a behavior that is consistent with the analysis proposed here.

This analysis is compatible with modal analyses of the progressive, but it provides something more. Activity verb phrases have the property that when they are true of an event, they are true of subparts of the event, that is, every 'slice' of the event looks the same. This property is a powerful condition on the normalcy criterion in modal analyses of the progressive, because it tells us something about what continuation branches of an event have to look like to qualify as continuations. The activity interpretation of *cross the street* ensures that in every possible continuation of such an event (a subpart in a possible world), a portion of the street is crossed.

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