

# THE TELIC/ATELIC DISTINCTION AND THE INDIVIDUATION OF QUANTIFICATIONAL DOMAINS

Michael Johnston  
Center for Human-Computer Communication  
Oregon Graduate Institute

## Abstract

Aspect plays an important role in determining the restriction and nuclear scope of an adverb of quantification. This is illustrated by examination of the composition of adverbs of quantification with multiclausal constructions involving clausal temporal adjuncts such as *when*-clauses. The head clause can only serve as the restriction if it contributes a telic eventuality description. The inability of atelic eventuality descriptions to serve as restrictions is shown to follow from their mass-like nature. The account developed extends straightforwardly to examples with activities, progressives, and iteratives with bare plurals.

## 1 Introduction

In order to interpret an adverb of quantification, such as *always*, it is necessary to determine what is being quantified over, the restriction of the quantifier, and what it is being compared against, the nuclear scope. A number of factors constrain the determination of the restriction and nuclear scope of a quantificational operator, including focus and syntactic structure. This paper investigates the role of aspectual distinctions in constraining the determination of the restriction and nuclear scope of an adverb of quantification. In order to address this issue, I examine in detail the composition of adverbs of quantification in multiclausal sentences involving clausal adjuncts. An example of this type of construction is given in (1).

(1) Marcia always writes a letter when she is at the cafe.

In (1), the main clause *Marcia writes a letter*, which I will refer to as the *head clause*, is being modified by an adjunct *when*-clause, *when she is at the cafe*. I will refer to the clause in the adjunct as the *adjunct clause*. I follow Bach 1986 in using *eventuality* as a cover term for both states and events. An *eventuality description* is an expression which is true or false with respect to eventualities in the model.

When an adverb of quantification combines with a clause with a temporal adjunct, as in (1) above, two different interpretations are possible, depending on how the sentence is partitioned into the restriction and nuclear scope of the quantifier. Either the head clause or the adjunct provides the restriction while the other provides the nuclear scope. I will refer to the reading on which the adjunct provides the restriction as the *adjunct restriction reading* (ARR) and to the reading on which the head clause provides the restriction as the *head restriction reading* (HRR). The two available interpretations for (1) are represented informally in (2) and (3) respectively. The adjunct restriction reading of (1), represented in (2), is that on all occasions that Marcia is at the cafe, during that period of time she writes a letter. The head restriction reading for (1), represented in (3), is that on all occasions that Marcia writes a letter, she is at the cafe.

(2) **always'**{*when she is at the cafe*}**Restriction** [*Marcia writes a letter*]**Nuclear scope**

(3) **always'**{*Marcia writes a letter*}**Restriction** [*when she is at the cafe*]**Nuclear scope**

The adjunct restriction reading of (1) can be paraphrased using *if* or *whenever*, as in (4) and (5). The head restriction reading can be approximately paraphrased by replacing *always* with *only*, as in (6).

(4) Marcia always writes a letter if she is at the cafe.

(5) Marcia writes a letter whenever she is at the cafe.

(6) Marcia only writes a letter when she is at the cafe.

It is not just *when*-clause constructions that have both head and adjunct restriction readings. They are found with a wide variety of other temporal adjuncts such as those in (7-9), locative *where*-clauses as in (10), and purposive adjuncts as in (11) and (12). They are also found with a wide variety of other quantifiers, including *usually*, as in (13).

- (7) Mary always smokes a cigarette *before she teaches class*.
- (8) Francesca always picks flowers *on Sundays*.
- (9) Marie always lights the fire *at 3 O'clock*.
- (10) Mrs. Jones always takes a holiday where Mr. Smith has visited on business.
- (11) Jane always hires a qualified mechanic to fix the Dodge.
- (12) Jane always washes the dishes for Mary.
- (13) John usually shaves when he is in the shower.

In this paper, the data are limited to constructions with *when*-clauses and *always*, but the analysis developed readily extends to other combinations of adjuncts and adverbs of quantification. A wider range of data are addressed in Johnston 1994b. The availability of these different readings for constructions with *when*-clauses is discussed in Rooth 1985 and de Swart 1991. In Johnston 1994a and b, I argue against Rooth's treatment of these readings in terms of association with focus. I will not address the treatment in terms of association with focus in this paper.

In the next section, an analysis of the composition of adverbs of quantification with multiclausal adjunct constructions is developed. With that groundwork laid, Section 3 returns to the question of the role of aspectual class in determining the possibilities for composition and demonstrates the fact that the telicity of the eventuality description in the head clause affects its ability to serve as the restriction. In Section 4, I show how this follows from the mass-like nature of atelic eventualities. In Section 5, I show how the analysis accounts for what at first appear to be problematic cases involving activities, progressives, and iteratives in the head clause.

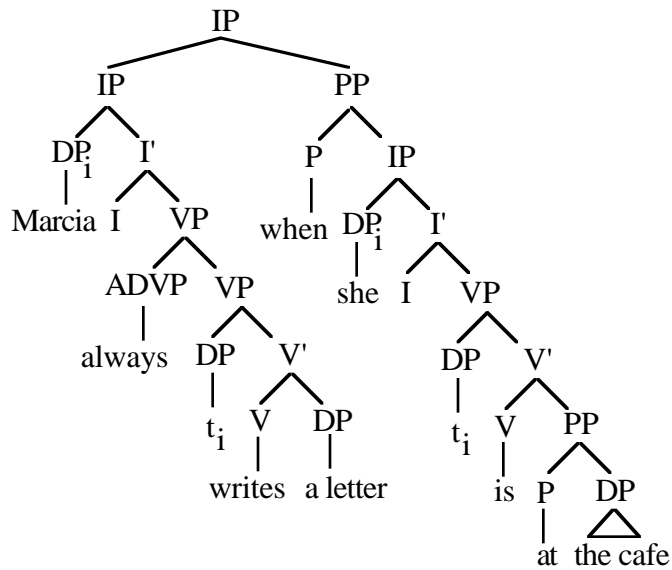
## **2 The composition of adverbs of quantification in adjunct constructions**

I assume that the interpretation of adverbs of quantification such as *always* involves the determination of a tripartite structure consisting of the quantifier, its restriction and its nuclear scope, as in (14). The restriction serves to enumerate the domain for quantification, and the nuclear scope provides a condition which Q-many members of the domain must meet. Q is determined by the quantifier. In the case of *always*, all members of the domain must meet the condition.

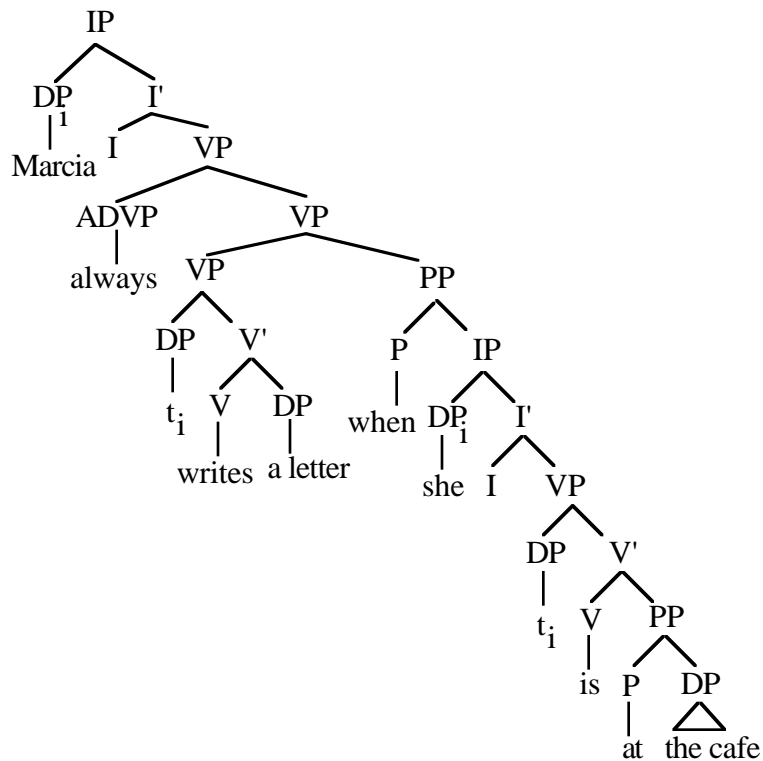
- (14) Quantifier Q {Restriction} [Nuclear Scope]  
(15) Marcia always writes a letter when she is at the cafe.  
(16) When she is at the cafe, Marcia always writes a letter.

As shown in Johnston (1994a, 1994b), the partition of the sentence into the restriction and nuclear scope is dependent on the position of the *when*-clause adjunct. While (15) has two readings, if the adjunct is initial, as in (16), then only the adjunct restriction reading is available. This is reminiscent of Diesing 1992's analysis of the interpretation of indefinites, where being in IP correlates with being in the restriction and being in VP correlates with being in the nuclear scope. There are a number of different ways to perform the partition of the sentence into the restriction and the nuclear scope. Several are addressed in Johnston 1994b. This is not the main concern of this paper though, so I will not address these possibilities here. For the purposes of this paper, I assume a simplified analysis compared to that in Johnston 1994b, in which either the adjunct or the head clause can provide the restriction, and the other provides the nuclear scope. I assume here a sentential phrase structure with a VP IP CP projection (Chomsky 1986). The analysis is not dependent on this though and can be readily recast in other syntactic representation schemes. I assume that *when*-clauses are adjuncts which may be base-generated adjoined to IP or VP, and that the adverb of quantification is adjoined to VP. I assume that subjects originate internal to VP (Kuroda 1988, Huang 1993). The two trees associated with (15) are as in (17) and (18).

(17) IP-attachment of Adjunct:



(18) VP-attachment of Adjunct:



The partitioning of the sentence into restriction and nuclear scope is dependent on the distinction between IP and VP attachment of the adjunct. If there is an adjunct

in IP, then it necessarily serves as the restriction on the quantifier. If there is no adjunct in IP, then either the adjunct or the head clause within VP serves as the restriction, and the remaining material in VP serves as the nuclear scope. The recipe for this partition is given in (19).

(19) Partition of Clause into Restriction and Nuclear Scope:

- (i) If there is an adjunct adjoined to IP, it serves as the restriction.
- (ii) Otherwise, either the head clause or the adjunct in the VP serves as the restriction, and the rest of the VP serves as the nuclear scope.

Example (15), will have two possible partitions. These are given in (20) and (21).

(20) always { *When she is at the cafe* } [ *Marcia writes a letter* ]

(21) always { *Marcia writes a letter* } [ *When she is at the cafe* ]

The first is the adjunct restriction reading, and the second is the head restriction reading. If the *when*-clause is clause initial, as in (16), it is necessarily adjoined to IP and therefore must serve as the restriction, and only the adjunct restriction reading, as in (20), is available. This proposal is also supported by VP-deletion facts which are discussed in Johnston (1994 a and b).

## 2.1 Semantic interpretation

Having presented the recipe for the determination of the partitioning of these constructions into a restriction and nuclear scope, I turn now to the interpretation of basic clauses and of the operator *when*. I assume that a clause such as *Marcia writes a letter* contributes an eventuality description as in (22) which is true of eventualities of Marcia writing a letter. Material which I do not give an explicit translation to, such as the determiner phrases (DP) here, is left in italics.

(22) Marcia writes a letter:  $\lambda e_1[\mathbf{writes}'(\textit{Marcia}, \textit{a letter}, e_1)]$

The interpretation of *when* utilizes a runtime function  $\mathbf{f}$ , given in (23), which maps from the domain of eventualities  $\mathbf{S}$  to the domain of intervals  $\mathbf{I}$ . Given an

eventuality  $e$ ,  $f$  returns the interval  $i$  it covers on the temporal axis. Similar functions are employed by Krifka 1989 and Lasersohn 1990.

(23) Runtime function  $f: S \rightarrow I$  (Krifka 1989, Lasersohn 1990)

The definition of the semantic contribution of *when* utilizes a function MAX which picks out maximal eventualities which meet a given eventuality description  $\phi$ .

(24) Definition of Maximal Eventuality Function :

$$\text{MAX}(\phi) = \lambda e [\phi(e) \ \& \ \sim \exists e' [\phi(e') \ \& \ (e \neq e') \ \& \ (f(e) \subseteq f(e'))]]$$

The semantic contribution of *when* is an operator which combines with an eventuality description  $\phi$ , to yield a description of intervals. It is given in (25). The semantic contribution of *when Marcia is at the cafe* is as in (26). It is a description which is true of intervals which are the runtimes of maximal eventualities of Marcia being at the cafe.

(25) The Semantic Contribution of *when* :

$$\lambda \phi \lambda i [\exists e [\text{MAX}(\phi)(e) \ \& \ [i = f(e)]]]$$

(26)  $\lambda i [\exists e [\text{MAX}(\text{at}'(\textit{Marcia}, \textit{the cafe}, e))(e) \ \& \ [i = f(e)]]]$

Given these definitions, the adjunct and head restriction readings of (15), presented informally in (20) and (21), can be captured formally as in (27) and (28) respectively.

(27)  $\text{always}' \{ \lambda i [\exists e [\text{MAX}(\text{at}'(\textit{Marcia}, \textit{the cafe}, e))(e) \ \& \ [i = f(e)]]] \}$

$$[\lambda e_1 [\text{write}'(\textit{Marcia}, \textit{a letter}, e_1)]]$$

(28)  $\text{always}' \{ \lambda e_1 [\text{write}'(\textit{Marcia}, \textit{a letter}, e_1)]] \}$

$$[\lambda i [\exists e [\text{MAX}(\text{at}'(\textit{Marcia}, \textit{the cafe}, e))(e) \ \& \ [i = f(e)]]]]$$

I do not assign *always* a set-theoretic interpretation which requires the set provided by the restriction to be a subset of the set provided by the nuclear scope<sup>1</sup>. Instead,

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<sup>1</sup>This analysis can be recast in set-theoretic terms through the introduction of type shifting operators between eventualities and intervals. Telic eventualities are shifted to the set of superintervals that contain them. Atelic eventualities are shifted to the set of subintervals contained within their

I provide a semantics for *always* which allows the content of the restriction and the nuclear scope to differ in semantic type<sup>2</sup>. They may be either interval descriptions or eventuality descriptions. If the material in the restriction is an interval description, then the quantification is over intervals. If the material in the restriction is an eventuality description then the quantification will be over eventualities. Rather than inclusion in a set provided by the nuclear scope, what the quantifier requires is that each member of the set provided by the restriction be true of the nuclear scope. In order for this to work, we need some principles regarding the truth of an eventuality description with respect to an interval and the truth of an interval description with respect to an eventuality<sup>3</sup>. These principles are sensitive to the aspectual distinctions between eventuality descriptions. I utilize Vendler's aspectual classes (Vendler 1967) as described in Dowty 1979<sup>4</sup>.

(29) Aspectual Classification:

Atelic: State:	Marty is in the shower.
Activity:	Marty sings.
Telic: Accomplishment:	Marty wrote a paper.
Achievement:	Marty noticed someone famous.

These classes are states, activities, accomplishments, and achievements. Furthermore, I divide these into two groups. Accomplishments and Achievements, which have a telos, an inherent finishing point, are grouped together as *telic* eventualities. States and Activities, which lack a telos, have no inherent finishing point, are grouped together as *atelic* eventualities.

The basic pattern is that when an eventuality *e* and an interval *i* are being evaluated against each other in a quantificational statement, then if *e* is atelic, *i* is contained in *e*, and if *e* is telic, *e* is contained in *i*. This cashes out into a set of four principles covering the different combinatorial possibilities.

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runtime. Given the introduction of these operators, all cases can be treated as set-theoretic quantification over intervals.

<sup>2</sup>See also Lewis 1975 for discussion of the interpretation of adverbs of quantification.

<sup>3</sup>The analysis presented in Johnston 1994b is more complex in terms of the syntax/semantics interface but only requires a set of principles for the truth of an eventuality description with respect to an interval.

<sup>4</sup>On the telic/atelic distinction see also Garey 1957.

In (27), the quantification is over intervals which are the runtimes of maximal eventualities of Marcia being at the cafe. The nuclear scope is an eventuality description of Marcia writing a letter. If the eventuality description is telic, as in (27), then it is true with respect to an interval if that interval contains the runtime of an eventuality which meets that eventuality description. In this case, the interval must contain the runtime of an eventuality of Marcia writing a letter. If the eventuality description is atelic, as in an example like (30), the adjunct restriction reading of which is as in (31), the requirement is that the runtime of an eventuality which meets the atelic eventuality description, contain the interval.

(30) Marcia is always at the cafe when she writes a letter.

(31) **always'**  $\{\lambda i [\exists e [\mathbf{MAX}(\mathbf{write}'(\textit{Marcia}, a \textit{ letter}, e)(e) \ \& \ [i = \mathbf{f}(e)])]]$   
 $[\lambda e_1 [\mathbf{at}'(\textit{Marcia}, the \textit{ cafe}, e_1))]]\}$

The two principles covering quantification over intervals are summarized in (32).

(32) The Truth of an Eventuality Description with Respect to an Interval :

- (i) If the eventuality description is telic, then the interval must contain the runtime of an eventuality which meets the eventuality description.
- (ii) If the eventuality description is atelic, then the interval must be contained in the runtime of an eventuality which meets the eventuality description.

The next two principles concern quantification over eventualities. This is for cases such as the head restriction reading of (15), represented in (28). In this case, the quantification is over eventualities of Marcia writing a letter. The nuclear scope is a description of intervals which are the runtimes of maximal eventualities of Marcia being at the cafe. For each letter writing, there must be some interval of Marcia being at the cafe which contains its runtime. The principle for this case is given in (33i), while (33ii) covers cases where the eventuality description is atelic.

(33) The Truth of an Interval Description with Respect to a Telic Eventuality :

- (i) For an interval description to be true of an telic eventuality, there must be an interval which meets the description and in which the runtime of the eventuality

is contained.

- (ii) For an interval description to be true of an atelic eventuality, there must be an interval which meets the description and which is contained in the runtime of the eventuality.

These principles apply not just to *when*, but to the interpretation of all manner of constructions involving temporal adjuncts. I turn now to examine the role of aspectual class in constraining their range of interpretation.

### 3 Aspectual class and the head restriction reading

In the previous part of the talk, I demonstrated the two different readings of the example in (15), repeated here as (34). Now consider reversing the clauses in (34), as in (35).

(34) Marcia always writes a letter when she is at the cafe. (ARR, HRR)

(35) Marcia is always at the cafe when she writes a letter. (ARR, ~HRR)

Unlike, (34), (35) does not have two readings. It can mean that on all occasions that Marcia writes a letter she is at the cafe, but it cannot mean that on all occasions that Marcia is at the cafe she writes a letter; that is, (35) can mean what (36) means but cannot mean what (37) means.

(36) When she writes a letter, Marcia is always at the cafe.

(37) When she is at the cafe, Marcia always writes a letter.

The question here is why it should be that examples like (34) can have a head restriction reading while examples like (35) cannot. The answer to this question lies in the aspectual classes of the eventuality descriptions. In (34), the head clause eventuality description *Marcia writes a letter* is an accomplishment and the adjunct clause eventuality description *she is at the cafe* describes a state. In (35), the head clause describes a state and the adjunct clause describes an accomplishment. The same pattern appears in examples with achievements and states, as in (38) and (39).

(38) Marcia always notices someone famous when she is at the cafe. (ARR, HRR)

(39) Marcia is always at the cafe when she notices someone famous. (ARR, ~HRR)

The basic generalization which emerges is that the head restriction reading is only available if the head clause eventuality description is telic and is not available if it is atelic. This fact is expected given differences in internal structure between telic and atelic eventualities.

#### 4 Mass-like and count-like eventualities

Given the analysis presented above, the semantic representations of potential head restriction readings for (34) and (35) would be as in (40) and (41). Why should it be that (40) is possible but (41) is not ?

(40) **always'**  $\{\lambda e_1 [\text{write}'(\text{Marcia}, a \text{ letter}, e_1)]\}$

$[\lambda i [\exists e [\text{MAX}(\text{at}'(\text{Marcia}, the \text{ cafe}, e))(e) \ \& \ [i = f(e)]]]]$

(41) **always'**  $\{\lambda e_1 [\text{at}'(\text{Marcia}, the \text{ cafe}, e_1)]\}$

$[\lambda i [\exists e [\text{MAX}(\text{write}'(\text{Marcia}, a \text{ letter}, e))(e) \ \& \ [i = f(e)]]]]$

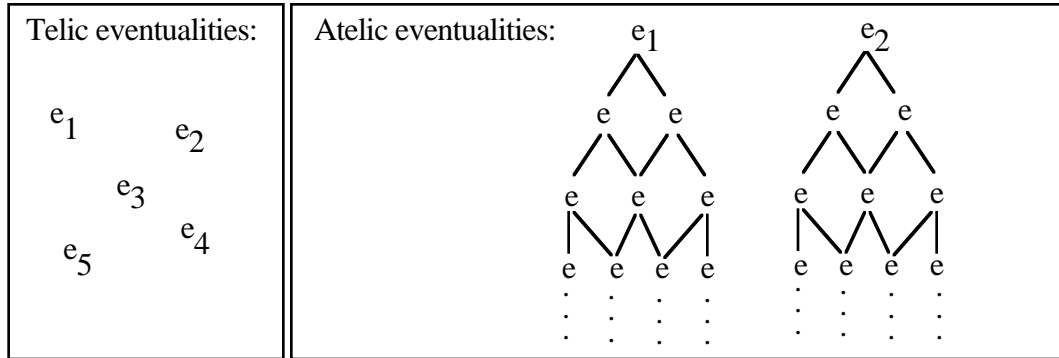
I propose that the difference comes down to the mass-like nature of atelic eventualities as opposed to the count-like nature of telic eventualities. Parallels that exist between the count-mass distinction in nominals and the event-process (telic-atelic) distinction in the aspectual classification of verbal expressions have frequently been brought up in the literature on aspect (Allen (1966), Taylor(1977), Mourelatos (1978), Carlson (1981), Bach (1986), Krifka (1989)).

(42) Nominal:	Count: book	Mass: water
Verbal:	Telic: write a letter, win the race	Atelic: be at the cafe run, knit

Following Bach 1986, I assign atelic eventualities a subsective lattice structure like that which Link 1983 utilizes in the description of mass terms. This captures the fact that just as water contains a multitude of subparts each of which can itself be described as water, an atelic eventuality of being at the cafe is comprised of a multitude of subeventualities each of which can itself be described as an eventuality

of being at the cafe<sup>5</sup>. Telic eventualities are treated as count-like entities in the model, and are not assigned a subjective lattice structure.

(43) Telic Eventualities: Atomic count-like Atelic Eventualities: Subjective mass-like



In the case of the head restriction reading of *Marcia always writes a letter when she is at the cafe*, represented in (40), the telic eventuality description *Marcia writes a letter* picks out count-like complete eventualities in which Marcia writes a letter. These provide an adequate domain for quantification. In the case of the potential head restriction reading of *Marcia is always at the cafe when she writes a letter*, represented in (41), the eventuality description *Marcia is at the cafe* would pick out not just maximal eventualities of Marcia being at the cafe, but also all of their subparts.

It may be that an adverb of quantification such as *always* requires its domain to be individuated, and comprised of disjoint, bounded eventualities, and therefore quantification over these atelic eventualities is not possible. If this cannot be maintained and such quantification is possible, the apparent absence of a head restriction reading for these cases may result from the awkwardness of the reading that would result. In this case, the truth conditions given would require that every single one of the subeventualities of Marcia being at the cafe contain the runtime of an eventuality of Marcia writing a letter. This reading is highly awkward and always false and might for these reasons appear inaccessible.

Given that atelic eventuality descriptions cannot serve as restrictions, why then should it be that the adjunct restriction reading of (34) can involve

<sup>5</sup>Bennett and Partee (1974) call this is the *subinterval* property. Carlson (1981:47) uses the term *partitivity* and Verkuyl (1993) calls this *homogeneity*.

quantification over occasions on which Marcia is at the cafe. The reason is that in those cases it is not the bare eventuality description which serves as the restriction, rather the whole *when*-clause. The semantic representation of the adjunct restriction reading is as in (44).

(44) **always'**  $\{\lambda i [\exists e [\text{MAX}(\text{at}'(\text{Marcia}, \text{the cafe}, e))(e) \ \& \ [i = f(e)]]]\}$   
 $[\lambda e_1 [\text{write}'(\text{Marcia}, \text{a letter}, e_1)]]]$

*When* contributes a maximality requirement which allows the atelic eventuality description to serve as the restriction. Only maximal, bounded eventualities of Marcia being at the cafe provide intervals for the quantifier to quantify over.

Cases in which the head clause contains an activity, progressive, or iterative at first appear to be problematic for this account. In the following section, I show how the account extends to these cases.

## 5 Extensions: Activities, progressives, and iteratives

### 5.1 Activities and aspect coercion

Given that activities are classified as atelic, and atelic eventualities are mass-like, we would expect examples with an activity in the head clause to lack a head restriction reading. This is not the case however. For example, consider (45) and (46). Example (45) can mean that on each occasion that Marcia runs it is the case that there is no-one else on the track. Similarly, (46) can mean that all occasions on which Peter knits are occasions on which he is bored.

(45) Marcia always runs when there is no-one else on the track. (ARR, HRR)

(46) Peter always knits when he is bored. (ARR, HRR)

These facts are consistent with the assumption that activities are inherently mass-like, given the availability of a coercion from an activity to an accomplishment. Moens and Steedman 1988 discuss the phenomenon of propositions changing in their aspectual type under the influence of modifiers such as tenses, temporal adverbials, and aspectual auxiliaries. They refer to such modifiers as functions which coerce their inputs to the appropriate type. This sense of coerce is the same

as that used in Pustejovsky's work on type shifting operations in lexical semantics. The phenomenon of shift in aspectual class is also addressed in Pustejovsky (1995).

In their account, Moens and Steedman use an aspectual classification different from the Vendler classification that I have utilized here. The significant elements of this for the discussion here are that what I have been calling activities are in their terminology *processes*, and what I have been calling accomplishments are termed *culminated processes*. Achievements are called *culminations*. They describe the available routes for aspectual type coercion in terms of a transition network (Moens and Steedman (1988, p18). Some of the paths in this network are constrained by particular requirements on the morphology and syntax, while others are freely available. The important part for us here is that the route from process to culminated process is freely available and does not require particular syntax or morphology; that is, activities are readily coerced into accomplishments.

I propose that when an activity is factored into the restriction of an adverb of quantification, it cannot itself serve to restrict the quantifier, but a coercion to an accomplishment is readily available and takes place so that quantification is possible. The availability of this coercion can also be seen from consideration of *in* and *for* adverbials. The inherent nature of *run* as a process is demonstrated by its appearance with durative *for*-adverbials, as in (47). However, *run* can also appear with adverbials like *in an hour* which generally require culminated processes, as in (48). In this case, the *run* eventuality described is bounded. Unlike processes, there is not the same coercion route for states. While, (48) is just somewhat awkward, (50) is much worse. Note that it is the duration sense of the *in*-adverbial that is relevant here.

(47) John ran for fifteen minutes.

(48) ? John ran in an hour.

(49) John was at the cafe for an hour.

(50) \* John was at the cafe in an hour.

I propose that this coercion process at minimum serves to add a maximality requirement to the eventuality description it applies to. This enables the description to pick out countable occasions of, for example, running. The coercion process is given in (51). It takes an activity eventuality description A and generates another eventuality description B which is true only of maximal eventualities which meet eventuality description A. The **MAX** function was defined earlier in (24). The head restriction reading of (52) will be as in (53).

(51) Where  $\lambda e [ R(x,y, \dots, e) ]$  is an activity eventuality description:

$$\lambda e [ R(x,y, \dots, e) ] \rightarrow \lambda e_1 [ \text{MAX} (\lambda e [ R(x,y, \dots, e) ] )(e_1) ]$$

(52) Marcia always runs when John is at the cafe.

(53) **always'**  $\{ \lambda e_1 [ \text{MAX}(\text{run}'(\text{Marcia}, e_1))(e_1) ] \}$

$$[ \lambda i [ \exists e [ \text{MAX}(\text{at}'(\text{John}, \text{the cafe}, e))(e) \ \& \ [ i = f(e) ] ] ] ]$$

This requires that on each occasion which Marcia runs, the runtime of her running is contained within the runtime of a maximal eventuality of John being at the cafe.

## 5.2 Progressives

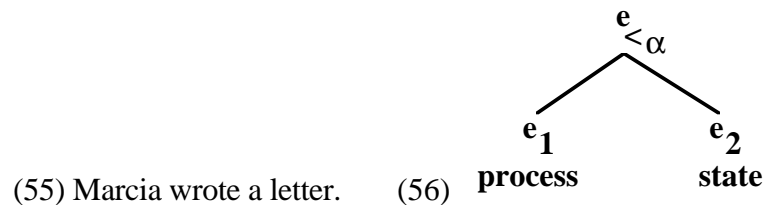
For examples where the head clause is in the progressive, the head restriction reading is never available. Even if the eventuality in question has an inherent telos, no head restriction reading is available. For example, (54) cannot mean that on all occasions that Marcia is writing a letter, she is at the cafe.

(54) Marcia is always writing a letter when she is at the cafe. (ARR, ~HRR)

In the account above, atelic eventuality descriptions are unable to pick out a domain for quantification because they are true not just of bounded maximal atelic eventualities but also of all of the sub eventualities of which they are composed. I propose that progressives cannot serve as restrictions for much the same reason. The important factor is that in the case of progressives of telic eventuality descriptions the progressive focuses in on the preparatory process, and it is that preparatory process which is atelic and mass-like and results in the impossibility of the eventuality description providing the restriction of the quantifier.

In the description above of the ontological differences between telic and atelic eventualities, telic eventualities were given a simplified treatment in which they were atomic objects. Telic eventualities do appear as atomic entities with respect to telic eventuality descriptions; that is, telic eventuality descriptions are true of them as wholes and do not apply to their subparts. However, in order to account for the progressive a representation which captures the subeventual structure of telic eventualities is required. Pustejovsky's *extended event structure* (Pustejovsky (1988, 1991, 1995)) provides such a representation. Pustejovsky's

approach owes a lot to the predicate decomposition approach of Dowty 1979. I refer the reader to those works for more detailed description of this model and will discuss only the bare essentials for our purposes here. In Pustejovsky's extended event structure, an accomplishment, such as that described by (55) is associated with an event structure consisting of two subeventualities, the process of writing a letter and the consequent state of the letter being written. This structure is represented as a binary branching event tree structure, as in (56). The notation  $e_{<\alpha}$  represents a complex eventuality  $e$  consisting of two subeventualities  $e_1$  and  $e_2$  such that  $e_1$  temporally precedes  $e_2$ , and there are no other eventualities which are part of the complex eventuality  $e$ .



The atomic level of telic eventualities, which is picked out by an expression like (55), is the top-level event in the event structure, that which includes both the process and the resulting state.

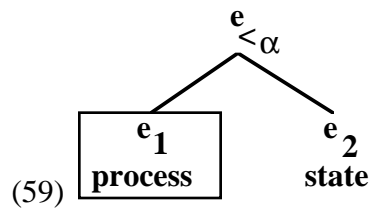
Moens and Steedman also address the need for a complex event structure, which they call a *nucleus*, a structure consisting of a culmination, associated preparatory process, and consequent state, but they do not elucidate its representation in detail. In their model, the progressive is a function on propositions which requires a process and yields a progressive state. For a culminated process such as *write a letter* the culmination can be removed through coercion to yield a process and the resulting process serves as input to the progressive function to yield a progressive state, the state of being in the process of writing a letter. The representation associated with (57) would be as in (58).

(57) Marcia was writing a letter.

(58) progressive( process ( *Marcia wrote a letter* ))

In the extended event structure model, this shift can be thought of as an operation which focuses attention on a particular part of the event structure. The

progressive applied to the event structure associated with *Marcia wrote a letter* focuses attention on the process subevent. In (59), I have indicated this by putting a box around the subevent in question.



When a description such as *Marcia was writing a letter* is in a position to serve as the restriction on an adverb of quantification, as in what would be the head restriction reading of (60), it is the part of the event structure on which attention is focused, the subevent **e<sub>1</sub>**, the preparatory process, that is available to pick out the domain for quantification.

(60) Marcia is always writing a letter when she is at the cafe.

Since that process description will be true of all the subeventualities within the preparatory process, as in the cases above with atelic eventuality descriptions, it is unable to individuate a domain for quantification.

### 5.3 Iteratives with bare plurals

The third problem concerns the iterative interpretation of expressions with bare plurals and their ability to serve as restrictions. The expression in (61) has both an adjunct restriction reading and a head restriction reading. On one level, the availability of a head restriction reading is unexpected because iterative expressions like *wrote letters* are generally considered to be atelic (Dahl(1981:79), Smith(1991:73-74)). As we would expect of an atelic eventuality description, they can be modified by durative *for*-adverbials, as in (62), but not by *in*-adverbials, as in (63).

(61) Marcia always wrote letters when she was at the cafe.

(62) Marcia wrote letters for 2 hours.

(63) \* Marcia wrote letters in 2 hours.

In fact, the head restriction reading is easier to get for (61) than it is for the corresponding example we have considered with *writes a letter*. This apparent problem is resolved when we consider how it is that the iterative interpretation arises for expressions like *Marcia wrote letters*.

I propose that the iterative interpretation arises as follows. When a bare plural appears in an eventuality description, the resulting eventuality description is just like one with an indefinite object, but it requires that the eventuality description be bound by an operator which quantifies over a plurality of eventualities. Such an eventuality description cannot be closed by an existential quantifier, because that would not quantify over a plurality of such eventualities. When a sentence like *Marcia wrote letters* as in (64) has an iterative interpretation, the iterativity does not come from the inherent semantic content of the expression *wrote letters*, rather it arises through composition. The presence of the bare plural *letters* results in the eventuality description *Marcia wrote letters* requiring an operator which quantifies over a plurality of eventualities. Existential closure over the eventuality description is not an option and instead the eventuality description is bound by an abstract iterative operator meaning something close to *several*. This reading is represented by the expression in (65). It is this expression which is iterative and therefore has atelic behaviour. The iterative operator meets the requirement that there be quantification over a plurality of the eventualities. Example (64) also has a generic interpretation meaning that Marcia habitually wrote letters. In this instance an abstract generic operator quantifies over letter writing eventualities. Once again, the plurality of eventualities requirement is met. If *wrote letters* was treated as inherently iterative, it would be difficult to derive the generic interpretation because the variables needed would already be bound or closed by the iterative operator.

(64) *Marcia wrote letters.*

(65) **several'** {**e<sub>1</sub>**}[**wrote'** (*Marcia,letters,e<sub>1</sub>*)]

Further support comes from more careful consideration of (63) above. This example is ill-formed on an iterative interpretation but does in fact have a generic interpretation, which is that generally, Marcia's letters writings take two hours.

In the head restriction reading of (61), the quantifier *always* binds the eventuality variable associated with *Marcia wrote letters*. As a result there is no possibility of an iterative operator binding the eventuality variable and there is no iterative interpretation. In this case, the quantifier *always* satisfies the requirement that there be quantification over a plurality of the eventualities in question. The presence of the quantifier *always* pre-empts the possibility of an atelic iterative interpretation for *Marcia wrote letters*.

In this treatment, there is nothing inherently iterative and therefore atelic about the semantic contribution of *Marcia wrote letters*. It is simply an eventuality description which is true of eventualities of Marcia writing a letter. It only ever has an iterative interpretation by virtue of its embedding under an iterative operator.

## 6 Conclusion

In constructions with adverbs of quantification and adjuncts, there is an ambiguity with respect to whether the head clause or the adjunct clause provides the restriction. This results in the availability of head and adjunct restriction readings. The central point of this paper is to show that the availability of these readings is dependent on the aspectual nature of the eventuality description in the head clause. If the eventuality description is telic, the head restriction reading is possible. If it is atelic, then the head restriction reading is not possible. This sensitivity to telicity was argued to result from the count-like nature of telic eventualities, as opposed to the mass-like nature of atelic eventualities. Telic eventualities are count-like and therefore a telic eventuality description can successfully individuate a domain for quantification. Atelic eventualities are mass-like and therefore cannot successfully individuate a domain for quantification. Atelic eventuality descriptions can serve as restrictions when they appear in the *when*-clause because *when* introduces maximality function which picks out maximal eventualities. These facts demonstrate the inherently asymmetric nature of *when* constructions.

Despite their inherently mass-like structure, descriptions of activities frequently can serve as restrictions on adverbs of quantification because of a readily available route (in English at least) for coercion from unbounded activities to bounded instances of an activity. This strategy of coercion from atelic to telic eventuality descriptions is not available for states but the maximality and resulting

individuation required by the quantifier can be provided for a state by an overt operator such as *when*.

The fact that progressives of accomplishments and achievements cannot serve as restrictions on adverbs of quantification was accounted for by adopting Pustejovsky's extended event structure. Progressives of accomplishments and achievements exhibit this atelic behaviour because they focus in on the initial event in the event structure; the preparatory process. The preparatory process is atelic and so cannot individuate a domain for quantification.

Statements with bare plurals can serve as restrictions because they are not inherently iterative and atelic. They only gain an iterative interpretation and atelic behaviour if the eventuality variable is free to be bound by an abstract iterative operator.

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