

## Gerunds and Types of Events\*

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### I. Introduction

It has often been suggested that gerunds can refer to events. Examples (1)-(3) seem to suggest this analysis.

(1) Reading *Bellefleur* was not very exciting.

(2) Jaye liked reading *Bellefleur*.

(3) Sarah stopped reading *Bellefleur*.

However, this cannot be quite right, since gerunds may be quantified over, as seen in (4).

(4) Reading *Bellefleur* is usually rewarding.

The fact that there are sentences, like (4), in which the events in a gerund's denotation are quantified over seems to indicate that gerunds may denote properties of events, and such a meaning is also workable for (1)-(3). (1) and (2), as well as (4), can be analyzed in a theory closely related to those proposed by Kamp (1981) and Heim (1982) for indefinites. And (3)--whose gerund is the complement of an aspectual verb--can also be analyzed if gerunds denote properties of events. It claims that there was a change from the presence of an event of Sarah reading *Bellefleur* to the lack of such events (Dowty (1979), von Wright (1963)).

In this paper I will argue that, if events are to be used in analyzing (1)-(4), we must contemplate generic events, events which are constituted by a repetition of simpler events. (This is something like Montague's (1960) distinction between generic and individual events.) Gerunds which involve internal event quantification show exactly the same range of meanings as those which do not. So consider the following:

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- (5) Always eating cabbage when I had dinner was never fun.  
 (6) Eating cabbage whenever I ate corned beef made me very unhappy.  
 (7) Always eating cabbage was usually rewarding for me.  
 (8) Always eating cabbage was not very exciting.  
 (9) Jaye liked always eating cabbage.  
 (10) Sarah stopped always eating cabbage.

In these examples, internal to the gerund there seems to be quantification over events. In (5), for example, the gerund denotes the set of possible events--i.e. the property of events--such that, for each of my eatings of dinner which is a mereological part of one of these events, I eat cabbage at that dinner. These "generic events" are subsequently quantified over by the adverb *never*; this example is therefore parallel to (4). The type of quantification in (7)-(10) is similar but highly dependent on focus. With focus on *cabbage* the gerund in (7) seems to denote the set of events *e* such that all my eating events *e'* which are part of *e* are cabbage-eating events. The sentence as a whole then means that most events *e* such that, whenever I eat in *e*, I eat cabbage in *e*, are rewarding. This can be represented as in (11).

- (11) [usually<sub>e</sub> [∀e'[(e' < e & ∃x(eat(I,x) in e')) ⊃  
 eat(I,cabbage) in e']] [rewarding-for-me(e)]]

*e' < e* represents the idea that the event *e'* is a part of *e*. In (11) the *e*'s are in a sense collections of cabbage-eating events. The easiest way of organizing these cabbage-eating events into groups seems to be by time. Thus (7) is easily preceded by

- (12) Every winter we always ate CABBAGE.

As we will see, the availability of this kind of reading poses problems for a Davidsonian approach to the semantics of gerunds. A Davidsonian approach says that events come into the semantics for gerunds by way of an implicit event argument of the verb--this event argument is on a par with the subject and other arguments. The reason for the difficulty is clear: if the Davidsonian event argument of the VP which forms the gerund is bound by a quantifier internal to the gerund (*always* in (7)), it will not be available for binding by another quantifier (i.e. *usually*) at the matrix level. Instead, a situation-based semantics will turn out to be more appropriate. A situation-based theory treats propositions as sets of possible situations. Some of these situations can play the role of events.

## II. A Categorization of Gerund Meanings

Now I will attempt to outline a categorization of gerunds while indicating how treating gerunds as denoting properties of events in a Kamp/Heim-style theory allows an account of their range of readings. For more details, see Portner (1991). The fact that, across a wide range of contexts, internally quantified gerunds and simple gerunds show the same types of readings argues strongly that they should be given a unified treatment. After the categorization we will look at how a Davidsonian and a situation-based semantics can each give a formal theory of the meanings of gerunds.

In analyzing the various gerunds I will make use of a Government and Binding theory syntax with a level of Logical Form. In deriving Logical Forms a process of quantifier raising may be used. QR is a consequence of semantic type-mismatch. It occurs when a function selects for an argument of one semantic type but finds itself with an element of a different type. So, for instance, if a verb selects for an individual as its object, but there is a quantifier there, the quantifier will have to move, leaving behind a trace of the right type. This idea is similar to one of Partee (1987).

In subject position, both internally quantified and simple gerunds can be interpreted as definite, quantified, or event-kind.

### definite

- (13a) Eating green beans was not very exciting.  
 (13a') [<sub>S</sub> [<sub>NP1</sub> PRO eating green beans] [<sub>S</sub> e<sub>1</sub> was not very exciting]]  
 (13b) Always eating GREEN beans was not very exciting.

(13a) will receive the Logical Form shown. The gerund introduces a free variable, e<sub>1</sub>, as on Kamp's and Heim's analyses, which will be interpreted like a discourse pronoun. The sentence will be interpreted as claiming that e<sub>1</sub> was an event of eating green beans and e<sub>1</sub> was not very exciting. Just how (13b) is interpreted is dependent on the focus structure of the gerund. With focus on *green*, the sentence claims that some particular past situation such that, whenever I ate beans in that situation I ate green beans, was not very exciting.

In (14) there is quantification over the events in the denotation of the gerund.

quantified

- (14a) Eating green beans was never exciting.  
 (14a') [S never<sub>1</sub> [NP<sub>1</sub> PRO eating green beans] [S e<sub>1</sub> was  
 very exciting]  
 (14b) Always eating GREEN beans was never exciting.

In the LF shown in (14a') the adverb of quantification compares the sizes of its two sisters, and it asserts that nothing which is an event of eating green beans was very exciting. By varying the adverb of quantification, different quantificational forces can be arrived at; Lewis (1975) uses this fact to argue for the type of semantic structure shown.

In some cases no particular events seem to be picked out by the gerund, but instead something like a practice or activity is at issue. This can be seen in (15).

event-kind

- (15a) Eating green beans is getting very popular.  
 (15b) Always eating GREEN beans is getting very popular.

Chierchia's (1984) treatment of activities--what I call event-kinds in view of their similarity to natural kinds--is to claim that they are abstract individuals correlated with the property which is the gerund's ordinary meaning. I will follow him in treating these gerunds as names for such abstract objects.

As the complement of a factive verb, definite and quantified structures are available for both internally quantified and simple gerunds.

definite

- (16a) Lisa didn't enjoy eating green beans.  
 (16a') [S [NP<sub>1</sub> PRO eating green beans] [S Lisa didn't enjoy  
 e<sub>1</sub>]]  
 (16b) Lisa didn't enjoy always eating GREEN beans.

quantified

- (17a) Julie never enjoyed eating green beans.  
 (17a') [S never<sub>1</sub> [NP<sub>1</sub> PRO eating green beans] [S Julie  
 enjoyed e<sub>1</sub>]]  
 (17b) Julie never enjoyed always eating GREEN beans.

These get the kind of LF's shown, which are in relevant respects the same as those for subject gerunds.

Certain nonfactive verbs seem to result in a reading on which there is an attitude towards a particular possible event. This can be seen in (18).

(18a) Nick dreamt about eating green beans.

(18a') [S Nick [VP  $\exists_1$  [VP [NP1 PRO eating some green beans] [VP dreamt about  $e_1$ ]]]]

(18b) Nick dreamt about always eating GREEN beans.

Such a reading can be arrived at if, after QR, the gerunds are bound by a process of existential closure.<sup>1</sup> (Such an analysis is similar to that of Bennett (1974).) In this way these gerunds differ from the complements of factives, which are not bound by existential closure. The difference is due to the combination of hypotheses due to Diesing (1990) and Berman (1989).

According to Diesing, existential closure--a process first proposed by Kamp and Heim--is limited to unbound indefinites inside the VP. Thus we should hypothesize that the gerunds in (18) are moved by QR only onto the VP. Berman argues that a process of presupposition accommodation can copy an indirect question which is the complement of a factive into a position outside the VP. Adopting this proposal for gerunds will, after QR onto the VP, copy the factive gerunds in (16) and (17) into a position in which they can be bound by an adverb of quantification and outside the domain of existential closure. The true LF of (16a) will therefore be:

(16a'') [S [NP1 PRO eating green beans] [S Lisa didn't [VP [NP1 PRO eating green beans] [VP enjoy  $e_1$ ]]]]

Some gerund complements of nonfactives are interpreted nonspecifically.

(19a) Carter avoided eating green beans.

(19b) Carter avoided always eating GREEN beans.

These are simply interpreted in their S-structure positions. There is no QR.

Finally, aspectual verbs can take both internally quantified and simple gerunds:

(20a) Pete stopped eating green beans.

(20b) Pete stopped always eating GREEN beans.

This class of verbs is clearly related to the progressive, which has been argued by, for example, Vlach (1981), Bach (1977), Parsons (1990), and Landman (1990) to involve reference to events. The imperfective character of the events in these

<sup>1</sup>As a syntactic process, it is possible to dispense with existential closure, but I show it explicitly for clarity.

gerunds' denotations needn't be of worry, since in many other cases gerunds may be interpreted imperfectly, as seen by (21).

- (21) I enjoyed building that house, even though I didn't finish.

I will assume that aspectual verbs are raising verbs, taking a single gerund argument. Here too the gerund is interpreted in place, with no QR.

From the examples in this section, we can conclude that an adequate semantic theory must be able to accommodate gerunds with internal quantification as well as simple gerunds, and that it should provide them with essentially the same semantics. If it does not postulate the same kind of semantic structure, the fact that the range of readings available for the two classes is identical would go unexplained.

### III. Two Theories of Events

Now we will consider a Davidsonian and a non-Davidsonian approach to the semantics of gerunds. A Davidsonian system claims that events get into the semantic values for gerunds by way of an extra argument of the verb inside the gerund. Parsons (1990) is a recent advocate of this view. An intransitive verb like *run* will really be of type  $\langle e, \langle e, t \rangle \rangle$ ; it is a relation between individuals (runners) and events (runnings). What I will call the situation-based account leaves *run* of type  $\langle e, t \rangle$ , but builds events into the denotation of the verb via the definition of the type  $t$ . According to the situation-based theory, instead of the possible denotations of expressions of type  $t$  being all sets of possible worlds, it will be all sets of possible situations. Some of these situations can play the role of "events" in the previous discussion. Though I use the term "situation" when discussing the second theory, and the term "event" when discussing the first, I don't mean to presuppose any difference between the objects referred to.

#### III.1. The Davidsonian Theory

A Davidsonian theory will treat gerunds as being of type  $\langle e, t \rangle$ . The "e" is the event argument of the verb, so far unsaturated.<sup>2</sup> We should look at a more concrete version of this

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<sup>2</sup> $t$  is the type of propositions--sets of possible worlds--not truth values.

idea. Consider the following translation rules that can apply to the Logical Forms of a few gerunds:

*run* translates as **run**, which is of type  $\langle e, \langle e, t \rangle \rangle$   
*eat* translates as **eat**, which is of type  $\langle e, \langle e, \langle e, t \rangle \rangle \rangle$   
*like* translates as **like**, which is of type  $\langle e, \langle e, \langle e, t \rangle \rangle \rangle$   
*-ing* translates as **-ing**, which is of type  $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$   
*some* translates as **some**, which is of type  $\langle \langle e, t \rangle \langle \langle e, t \rangle, t \rangle \rangle$   
*beans* translates as **beans**, which is of type  $\langle e, t \rangle$   
 $PRO_i$  translates as  $\lambda P[P(x_i)]$ , which is of type  $\langle \langle e, t \rangle, t \rangle$   
*Jack* translates as  $\lambda P[P(j)]$ , which is of type  $\langle \langle e, t \rangle, t \rangle$   
 $t_i$  translates as  $x_i$ , which is of type  $e$

### Functional Application

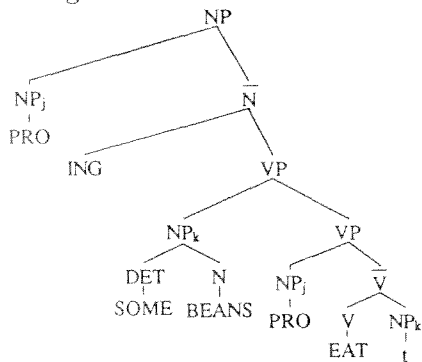
with  $[_C A B]$ ,  
 A of type  $\langle b, c \rangle$ ,  
 B of type  $b$ ,  
 C is of type  $c$ ,  
 $C = A(B)$ .

### Quantifying In

with  $[_C A_i B]$   
 A of type  $\langle \langle e, t \rangle, t \rangle$   
 B of type  $\langle e, t \rangle$   
 C is of type  $\langle e, t \rangle$   
 $C = \lambda x_j[A(\lambda x_i[B(x_j)])]$

For the LF (22), this fragment gives a translation equivalent to (23).

(22) eating some beans



(23)  $\lambda e[\text{ing}(\text{some}(\text{beans})(\lambda x_k[\text{eat}(x_k)(x_j)(e)]))]$

Now consider what happens when a gerund figures in a structure like that in (24), whose LF is (24').

(24) Jack always likes eating some beans.

(24') [<sub>S</sub> always<sub>I</sub> [<sub>NP<sub>I</sub></sub> PRO eating some beans] [<sub>S</sub> Jack likes e<sub>1</sub>]]

*always<sub>I</sub>* has two arguments--one of type <e,t> and one of type t. Its translation and semantics can be given by

**Adverbial Quantification** (this can be generalized)  
 with [<sub>C</sub> always<sub>I</sub> A<sub>I</sub> B],  
 A of type <e,t>,  
 B of type t  
 C is of type t,  
 C=**always<sub>I</sub>**(A(x<sub>I</sub>))(B)

The meaning of **always** is given by:

$\llbracket \text{always}_I (\alpha)(\beta) \rrbracket g =$   
 $\{w : \text{for all } g' \text{ differing from } g, \text{ if at all, only in what it}$   
 $\text{assigns to } x_i, \text{ if } w \in \llbracket \alpha \rrbracket g', \text{ then } w \in \llbracket \beta \rrbracket g'\}.$

(24) is now given the translation (25):

(25) **always<sub>I</sub>** [**ing**(**some**(**beans**)( $\lambda x_k[\text{eat}(x_k)(j)(e_1)]$ ))]  
**like**(e<sub>1</sub>)(j)(e<sub>2</sub>)

e<sub>2</sub> is the event argument of *like*, and is given a value contextually.<sup>3</sup> (25) denotes the set of worlds in which every entity which is an event of Jack eating some beans is liked by Jack (in e<sub>2</sub>).

The rules needed for definite and specific (existential) gerunds are quite simple. Along with an ordinary rule for existential quantification, what is needed are rules for gerunds adjoined to S and VP.

<sup>3</sup>I assume the event argument of *like* to be saturated by I, the head which projects S (=IP) and which takes VP as an argument.

**Adjunction to S**

with [<sub>C</sub> A<sub>i</sub> B],  
 A of type <e,t>,  
 B of type t  
 C is of type t,  
 C=(A(x<sub>i</sub>) & B)

**Adjunction to VP**

with [<sub>C</sub> A<sub>i</sub> B],  
 A of type <e,t>,  
 B of type <e,t>  
 C is of type <e,t>,  
 C= $\lambda y[A(x_i) \& B(y)]$

I am assuming that VP's denote properties of events, like gerunds, because the subject argument has been saturated inside the VP. This follows from the hypothesis that subjects are base-generated within the VP (Sportiche (1988), Kitagawa (1986) among others). As an example, the adjunction to S rule associates with (2) the translation (26):

- (2) Jaye liked reading *Bellefleur*.  
 (26) **ing(read(B))(Jaye)(e<sub>1</sub>) & liked(e<sub>1</sub>)(Jaye)(e<sub>2</sub>)**

Both free variables are given values from context. It denotes the set of worlds such that e<sub>1</sub> is an event of Jaye reading *Bellefleur* and e<sub>2</sub> is an event of Jaye liking e<sub>1</sub>.

Lastly, aspectual predicates and nonspecific complement-taking verbs combine with their gerunds via functional application, with no movement. The semantics for *stop* can be analyzed by (27). Ignoring tense, an example is (28).

- (27) stops G in e = {w :  $\exists e'[e'$  is in w & G(e') & e' immediately precedes e &  $\sim\exists e''[e''$  is in w & G(e'') & e'' immediately follows e]}
- (28) [S Herman [<sub>VP</sub> stop [<sub>NP1</sub> PRO building the house]]]  
 {w : there is a building of the house by Herman in w just before e and there is no building of the house by Herman in w just after e}

Now comes the hard part: What to do about the gerund in (29).

- (29) Jack liked always eating some BEANS.

For simplicity, let's only consider the reading with focus on *beans*, so that intuitively the gerund denotes the set of events which, whenever Jack eats, he eats some beans.

At first, with this Davidsonian system, one is tempted to derive a structure in which *always* can quantify over the verb's event argument, yielding a propositional entity. This would mean that the gerund in (29) gets a semantic structure like

(30) [always<sub>1</sub> [PRO eats something in e<sub>1</sub>] [PRO eats beans in e<sub>1</sub>]]

However, if we do so, that argument will be bound off and no longer available to provide the semantics for the gerund as a whole.<sup>4</sup> The gerund as a whole is consequently of type *t* and the event reference of the gerund in (29) will presumably have to come from the definition of the type *t*. That is, a situation-based approach to the semantics for gerunds will have to be used for this case.

If this approach is followed, it will also be impossible to provide a uniform semantics for any of the pairs in (13)-(20). In the case of a non-internally quantified gerund, in the ways described above the semantics provides for all the different types of readings for an expression denoting a property of events. With internally quantified gerunds instead, the semantics will have to derive very similar readings for propositional phrases. It will have to have duplicate systems for adverbial quantification, existential closure, definite reference for unbound gerunds, and aspectual predicates.

If one accepts having a situation based-theory of gerunds alongside a Davidsonian theory, gerunds without internal quantification will be treated like ordinary definite and indefinite NP's. Indefinite NP's, which are of type  $\langle e, t \rangle$ , have adverbially quantified and existential interpretations, as seen in (31)-(32), so the adverbial quantification and VP-adjunction rules for properties given above can be used for them too.

(31) Cats always eat mice.

(32) Those mice fled from cats.

Definite NP's will use the S-adjunction rule. In contrast, internally quantified gerunds will require their own unique set of rules. Dividing the treatment of gerunds into two distinct

<sup>4</sup>One might suggest that the *always* can introduce a new event variable, referring to events in which something always happens ("alwaysings"). This would effectively give a variant of the situation-based theory.

systems in this way is quite unsatisfying, and there are other problems as well. Verbs which combine with gerunds directly, by functional application--that is, the nonspecific gerund-complement verbs like *avoid* and the aspectual verbs like *stop*--will all have to have two separate meanings. They must combine with either an expression of type  $\langle e,t \rangle$  or one of type  $t$ . This problem becomes particularly acute when the verb's meaning is decomposed into more primitive semantic relations, as has been done with *stop* above. The application of the gerund to an event variable in the decomposed meaning of *stop*--"G(e)"--will not be transferrable to the internally quantified gerunds. The only way to fully capture the parallelism between the two groups of gerunds is to provide them with the same kind of semantics values.

Another possibility might appear to be to continue letting the Davidsonian event argument of the gerund's verb in (29) provide the event reference for the gerund as a whole, and treat *always* as quantifying over something else. However, this is clearly unworkable. Consider a hypothesis that treats this *always* as quantifying over time intervals. (29) will get a meaning something like (33).

- (33) For some particular event  $e$ ,  
       for every interval  $i$  such that  $e$  is an event of  
               Jack eating something during  $i$ ,  $e$  is an  
               event of Jack eating some beans during  $i$ ,  
       and Jack liked  $e$ .

This claims that Jack liked some particular event (which, whenever it's an eating event, it's an bean-eating event), and not--as it should--that he liked the bean-eating habit.

### III.2. The Situation-Based Theory

We have seen that a Davidsonian approach to the semantics for gerunds results in an irreducibly mixed theory. The internally quantified gerunds will have to receive a non-Davidsonian treatment anyway. In this section we will examine a non-Davidsonian alternative based on a situation-semantics like that proposed by Kratzer (1989) and applied to nominalizations by Zucchi (1989). (Some other recent advocates of situation theories are Barwise and Perry (1983) and Landman (1986).)

Within the situation-based theory, the set of possible denotations for expressions of type  $t$  will be the power set of the set of possible situations. The situations form a mereological summation structure; any situation which is not part of another situation can be called a world. No situation can be part of more

than one world. Lastly, it will be necessary to refer to situations by expressions of type  $e$  as well, so I will assume that the set of situations is a subset of the set of individuals.

The following revised lexicon will allow us to spell out this situation-based view in a bit more detail:

*run* translates as **run**, which is of type  $\langle e, t \rangle$   
*eat* translates as **eat**, which is of type  $\langle e, \langle e, t \rangle \rangle$   
*like* translates as **like**, which is of type  $\langle e, \langle e, t \rangle \rangle$   
*-ing* translates as **-ing**, which is of type  $\langle t, t \rangle$   
*some* translates as **some**, which is of type  $\langle \langle e, t \rangle \langle \langle e, t \rangle, t \rangle \rangle$   
*beans* translates as **beans**, which is of type  $\langle e, t \rangle$   
 $PRO_i$  translates as  $\lambda P[P(x_i)]$ , which is of type  $\langle \langle e, t \rangle, t \rangle$   
*Jack* translates as  $\lambda P[P(j)]$ , which is of type  $\langle \langle e, t \rangle, t \rangle$   
 $t_i$  translates as  $x_i$ , which is of type  $e$

The verbs have one less argument than on the Davidsonian theory, and **-ing** is correspondingly of a lower type.

Example of meaning:

**run** denotes that function  $f$  such that, for any individual  $\alpha$   
 $f(\alpha)$  = the set of all possible situations which are runnings  
 $\alpha$  or a counterpart of  $\alpha$ .

#### Functional Application

with  $[C A B]$ ,  
**A** of type  $\langle b, c \rangle$ ,  
**B** of type  $b$ ,  
**C** is of type  $c$ ,  
 $C = A(B)$ .

#### Quantifying In

with  $[C A_i B]$   
**A** of type  $\langle \langle e, t \rangle, t \rangle$   
**B** of type  $t$   
**C** is of type  $t$   
 $C = A(\lambda x_i[B])$

Given the meaning for *run* above, the untensed proposition denoted by *Janet run* will not be true of any situations larger than the minimal ones of Janet running. Situations which contain as a proper part a running by Janet are not themselves

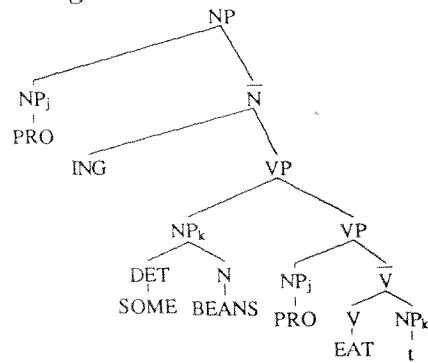
necessarily runnings by Janet. For example, the worlds in which Janet runs are not runnings by Janet. I will rely on tense to change the denotation of tenseless clauses so that they are true of situations which properly include the situations which satisfy the untensed clause (that is, it will make them persistent).

**PRES** is of type  $\langle t, t \rangle$ . It denotes that function  $f$  such that for any proposition  $p$ ,  $f(p) = \{s: \text{for some } s' \in p, s' < s \text{ and the time of } s = \text{the present time}\}$

As Zucchi discusses, there are elements which take *that* clauses as arguments but not gerunds, such as *be true/false*, *believe*, and *want*. Since gerunds and *that* clauses denote different propositions, this can be accounted for on a propositional theory of gerunds without introducing new elements for gerunds to denote, as Zucchi does.

We are now ready to look again at (22). The translation it is assigned is (34):

(22) eating some beans



(34)  $\text{ing}(\text{some}(\text{beans})(\lambda x_k[\text{eat}(x_k)(x_j)]))$

(34) denotes the set of situations which are eatings of some beans by the reference of  $x_j$ . Returning to (24), we get the LF (35).

(24) Jack always likes eating some beans.

(35)  $[\text{always}_1 [\text{NP}_1 \text{ PRO eating some beans}] [\text{s Jack likes } e_1]]$

Now **always** has two type  $t$  arguments, so the following rule will do:

**Adverbial Quantification** (this can be generalized)  
 with [C  $\text{always}_i$  A<sub>i</sub> B],  
 A of type t,  
 B of type t  
 C is of type t,  
 C= $\text{always}_i(A[x_i])(B)$

With A the gerund's translation and B the rest of the sentence's (35) is translated as (36).

(36)  $\text{always}_1 (\text{ing}(\text{some}(\text{beans})(\lambda x_k [\text{eat}(x_k)(j)])))(x_1)$   
 ( $\text{like}(j)(x_1)$ )

In the Adverbial Quantification rule we have a novel combination operation, shown by the square brackets, which uses a proposition to restrict an individual variable. Here we are taking advantage of the fact that situations are individuals as well as the stuff from which propositions are made. The semantics of  $A[x_i]$  is given by:

$\llbracket \Phi[x_i] \rrbracket g = \{s : g(x_i) \in \llbracket \Phi \rrbracket g\}$

If the individual assigned to  $x_i$  is a situation in the proposition denoted by  $\Phi$ ,  $\Phi[x_i]$  will denote the set of all situations; otherwise it will denote the empty set. As can be seen in (36),  $x_i$  appears in the translation of B in the Adverbial Quantification rule as well, because the gerund left a trace with index  $i$  when it underwent QR. Thus the gerund functions to bring reference to situations into an NP (here, semantically type e) position. It leaves a variable there, and restricts that variable to situations of Jack eating some beans.

The meaning of *always* is given by:

$\llbracket \text{always}_i (\alpha)(\beta) \rrbracket g =$   
 $\{s : \text{for all } g' \text{ differing from } g, \text{ if at all, only in what it}$   
 $\text{assigns to } x_i, \text{ if } s \in \llbracket \alpha \rrbracket g' \text{ and } g'(x_i) < w_s, \text{ then } s \in \llbracket \beta \rrbracket g'\}$   
 ( $w_s$  is the world of  $s$ .)

When  $\alpha$ , the first argument of *always*, is a gerund, this denotes the set of situations  $s$  such that, for every  $b$  which is in the proposition denoted by  $\alpha$  and a part of the world of  $s$ ,  $\beta$  is true in  $s$  when  $b$  is assigned to  $x_i$ . This meaning is reminiscent of Berman's (1987); however, it is quite different because the situations are treated as ordinary individuals and assigned as the

values of variables. (24) denotes the set of situations in which Jack likes every one of his bean-eatings in the world of that situation.

With a specific gerund, as in (37), we need to use a combination rule like that in given below.

(37) Jack liked eating some beans.

**Conjunction with Event Anaphora** (Adjunction to S or VP)

with [C A<sub>i</sub> B]

A of type t

B of type t

C is of type t

C=(A[x<sub>i</sub>] & B)

Some general rule along these lines will be independently needed for discourses like (38).

(38) Richard ate an apple. He enjoyed it.

(it=eating the apple)

(37) is now translated as (39).

(39) **(ing(some(beans)(λx<sub>k</sub>[eat(x<sub>k</sub>)(j)])))[x<sub>1</sub>] & like(j)(x<sub>1</sub>)**

If b is the individual denoted by x<sub>i</sub>, this denotes the set of situations in which b is an eating of some beans by Jack and Jack likes b.

Given the assumption that the subject argument is saturated within the VP, VP's as well as S's will be of type t. The above conjunction rule will therefore feed existential closure as well.

I believe that within this system the incorporation of internally quantified gerunds goes smoothly. Looking again at (29),

(29) Jack liked always eating some BEANS.

Rooth (1985) shows how to associate *eating some BEANS* with two interpretations, one expressing its presupposition and the other its ordinary meaning. Straightforward modifications of his ideas allow the ordinary interpretation to be the set of all situations which are bean-eatings by Jack and the secondary interpretation to be the set of all situations which are something-eatings by Jack. The secondary interpretation will be the first argument of *always*, and the ordinary interpretation will be its second argument. The semantics for this focus-sensitive *always* can be given as:

$[\text{always}_F(\alpha)(\beta)]_g =$   
 $\{s : P(s) \text{ and for all } s' \text{ such that } s' \in [\alpha]_g \text{ and } s' < s,$   
 $s' \in [\beta]_g\}.$

In our example,  $\alpha$  is the denotation of *Jack eats something* and  $\beta$  is the denotation of *Jack eats beans*. The gerund in (29) will denote the set of "P" situations such that whenever Jack eats something in that situation, he eats beans in it. P is meant to supply a contextual division of the eating situations into groups. With an example like (40)

(40) Every winter we ate nothing but beans. I always liked always eating beans.

P will be something like the set of situations s such that s is the sum of all my eating situations for a past winter.

The goal of this section has been to show how reference to generic events and ordinary events can be unified within a situation-based semantics. The basis of the analysis is to identify events with situations, the entities that make up propositions. Another beneficial consequence of this view should be noted: Vendler (1967) shows that in many cases gerunds seem paraphrasable by *that*-clauses. He concludes from this that they are fact- (or proposition-) denoting--for example (41).

(41a) Bill denied leaving.

(41b) Bill denied that he left.

At first it is difficult to see how to make this conclusion compatible with cases where sentences involving gerunds seem to involve quantification over events, such as (4). Having seen that the two ideas are compatible, however, it turns out that Vendler is exactly right about gerunds, like the complements of aspectual predicates, *deny* or *avoid*, that are interpreted in place. These elements select for a proposition and the gerund directly provides one.<sup>5</sup>

Another potentially fruitful area to investigate is the possibility that the situation-based theory allows an explanation for why in general gerunds do not have existential interpretations when in subject position. Given the categorization of gerund meanings of §II, gerunds have all of the

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<sup>5</sup>Since the gerund and the finite clause denote different, though related, propositions, the synonymy of these examples will also depend on the meaning of *deny*.

readings of ordinary definite and indefinite NP's combined, except for this one. First note that it seems that sentential subjects are presupposed, as in (42a).

(42a) That he came didn't bother me.

(42b) His/him coming didn't bother me.

(42c) Unicorns didn't bother me.

(42b) shows that subject gerunds are similar, and contrast with the indefinite NP in (42c). Koster (1978) has argued that sentential subjects are always topics. While his claim that no clauses appear in subject position at S-structure, but rather are in a Topic position, has been the subject of debate (Delahunty (1983)), this does not affect the idea that subject gerunds are presupposed. If, instead of saying that the syntactic class of subject clauses must be topics, we extend this claim to all propositional entities, the situation-based theory will entail that subject gerunds are topics as well. Topics, being presupposed material, are incompatible with an indefinite meaning. Instead, when a gerund introduces a situation variable it will have to be assigned a value that is familiar or under discussion. On a familiarity theory of definiteness (e.g. Heim (1982), Kamp (1981)), this is to say that the gerund is definite. If this idea works out, it provides a further advantage over the Davidsonian theory. It requires further work, however, because of the variety of differences between *that*- clauses and gerunds.

#### IV. Conclusion

In conclusion, it seems that gerunds are best considered to be propositional entities. This conclusion is not at odds with the fact that gerunds seem to denote properties of events. What is perhaps the simplest way of letting gerunds denote properties of events--by incorporating a special Davidsonian argument and otherwise treating a gerund like an ordinary noun--has difficulty giving a unified treatment of both internally quantified and simple gerunds. Instead, if the notion of proposition is reconstructed in situational terms, gerunds can be propositional expressions that have event-like entities in their denotations.

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