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The Semantic Variability of Gerunds

Paul Portner

I. Background

There are several types of gerunds in English, and even more sorts of meanings that they seem able to have. In this paper I will look at the kinds of gerunds usually referred to as POSS-ing and ACC-ing gerunds, and will try to understand the wide range of semantic variability these gerunds show. In constrast to the approach of Chierchia (1984), I will not try to make the range of meanings that appear to be available to gerunds compatible with the idea that the gerund itself is really unambiguous. Instead I will argue against such approaches as they are applied to the analysis of gerunds, and try to show reasons why a similar approach outside of the area of gerunds--Carlson's (1977) theory of bare plurals--should not be accepted either. A difference between whether a gerund is name-like or denotes a set of states of affairs, and a subdifference in whether a gerund is definite or indefinite, I believe to be the keys to understanding the range of interpretations gerunds can have. Beyond these differences in the meanings gerunds themselves can have, that a set-denoting gerund can be involved in a quantificational structure or not gives us an important semantic distinction for sentences containing gerunds.

After setting up this contrast between Chierchia's way of looking at gerunds and the other, I will present a first approximation of the latter theory. This first approximation will consider only gerunds in subject position, but the discussion will show serious problems with the opposing view. Then we will see how definiteness is deeply tied in with the analysis of gerunds, and I will suggest that the only difference between the POSS-ing and ACC-ing gerunds that have for a long time been considered syntactically quite distinct is really one of definiteness. Thus I will be trying to present a unified theory of these constructions, though the theory is not unifying in the same sense as Chierchia's, since I don't at all try to make gerunds unambiguous. Following these intial discussions of definiteness, I will go on to consider a wider range of data, by examining gerunds in complement position. The facts we uncover there will put us in a better position to understand the true nature of definiteness in gerunds.

There have traditionally been three categories into which gerunds have been placed. I will be referring to these types as the CN-gerunds,

the POSS-ing gerunds, and the ACC-ing gerunds. The first category I won't discuss at all; these are the gerunds that seem to be completely nominal in character, and to refer to sets of events. These nominals don't seem to have any semantic properties distinguishing them from commonplace nouns. CN-gerunds can have determiners, take an of-phrase to contain their object (if they have one), and are modified by adjectives and not adverbs.

1. The terrible singing of the song encouraged me to leave early.

Zucchi argues that the events in the denotations of CN-gerunds are not involved in the interpretation of other types of gerunds, even though the other sorts aren't strictly proposition-denoting categories. Instead he shows that the others must be seen as denoting sets of some other kind of entity, and he dubs these things states of affairs. I will generally agree to his terminology (though sometimes I'll make clear my equivocation), even though my arguments for these states of affairs are very different from his, and are neutral as to whether they are the same as events. So by definition states of affairs are things sets of which POSS-ing and ACC-ing gerunds denote, if they turn out to denote sets of anything, and their precise nature and relation to events must be settled on independent grounds, so long as the phenomena I discuss below can still be accounted for.

POSS-ing gerunds and ACC-ing gerunds should be understood as loose terms at this point, meant to indicate the groups of gerunds that have been labelled these ways in the history of generative grammar. Below I will have a theoretical discussion of the two categories, and will examine their similarities and differences, and until then won't make any appeal to differences between them. POSS-ing gerunds are the ones that have a possessive subject NP, or gerunds which are syntactically like those that have a possessive subject NP. Given the traditional way of looking at things, it's possible to have a POSS-ing with no POSS, since POSS-ing gerunds were given a certain kind of syntactic structure distinctive from ACC-ing's. ACC-ing's are the gerunds with an accusative subject NP, or the subjectless gerunds syntactically like them. The majority of syntactic accounts of the difference between POSS-ing and ACC-ing involve making the former nominalizations of VP's and the latter nominalizations of S's. Below we will see that the arguments that any syntactic difference must be posited between the categories are weak. At this point all that's important is that I'll be dealing with all the gerunds besides the CN ones.

Chierchia (1984) presents a theory of the semantics of gerunds that provides background and the contrast case to the ideas I'll be pursuing here. Chierchia's theory has much in common with Carlson's (1977) theory of bare plurals, and indeed, as will be discussed below, it seems

clear that gerunds and bare plurals should be given very similar semantic treatments. The ability to capture this parallel and maintain it through the uncovering of any minor differences between bare plurals and gerunds should be taken as an important criterion of adequacy for a theory of gerunds. For these reasons, I will first summarize Chierchia's view on gerunds, and then outline Carlson's on bare plurals, before moving on to any novel discussion of the topic. Chierchia's and Carlson's theories will be referred to as **predicational** theories of the domains in question, for reasons that will become clear below. The alternative views, which I will espouse, will be the **quantificational** theories, again for reasons to become clear shortly.

Chierchia argues that gerunds are unambiguously names of nominal images of properties. In the model theory of his semantics, corresponding to each property is an individual in the domain, its "nominal image", and both infinitives and gerunds are said to denote the image of the property denoted by the VP they are derived from. So, in (2)

2. To be smart is smart.

the property of being smart is predicated of the nominal image of itself. Chierchia uses a sortal theory to prevent the emergence of paradoxes. The symbols + and - are uses to shift between a property and its reified counterpart (my typography for his $\cap$ and $\cup$): (3) represents the meaning of the subject of (2):

3. +(be.smart')

- turns a nominalized property's meaning into a property:

4. -(+(be.smart')) = be.smart'

So the translation of (2) in Chierchia's system will be

5. be.smart'(+(be.smart'))

- comes into play whenever a nominalized property needs to be given a subject, as in (6)

6. For John to be good is good.

Since *to be good* denotes

7. +(be.good')

and (7) is not an entity which can take an argument, but is rather merely an object, - is needed to give the infinitival VP its subject:

8. +((-(+be.good'))(John')) = +(be.good'(John'))

In Chierchia's theory, a full infinitival S denotes the nominal image of a proposition, along the lines of (8). This object is what *is good* is is predicated of, in (9), the final translation of (6) (ignoring tense):

9. be.good'(+(be.good'(John')))

For **can be given the translation in (10) to make a compositional analysis of (6) work out.**

10. $\lambda x\ \lambda y\ [+(-y(x))]$

For then combines with an infinitival's subject, making a function which takes the nominalized property, denominalizes it and applies it to the subject, and nominalizes the resulting proposition.

Gerunds receive a treatment similar to that for infinitives. ACC-ing gerunds are said to denote nominalized propositions, and the subject of the gerund is directly an argument of the VP. This implies that the gerund VP must be a function, not a nominalized counterpart. However, the fact that ACC-ing's cannot be matrix clauses implies to Chierchia that the gerund VP's aren't propositional functions, but rather are functions from individuals into nominalized propositions (what Chierchia calls 'states of affairs'). This conclusion is implied by the fact that in Chierchia's tremendously flattened type theory, virtually all arguments denote individuals; the reduction of type complexity is one of the main attractions of Chierchia's system, not only in that it makes the semantics system overall much simpler, but also because it lets the self-application of functions (as in (2)) be quite straightforward. Thus the complement of a sentence like

11. I imagined [him helping Mary].

should have the logical representation

12. $+(help'(m)(him'))$

and -ing should be given a translation to make this possible. -ing must take properties and create functions from individuals into nominalized propositions:

13. $-ing' = \lambda P\ \lambda x\ [+(P(x))]$

So -ing' applied to the translation of *help Mary* applied to the translation of *him* will give (12).

POSS-ing gerunds also must denote individuals of some sort. Chierchia claims that even subjectless POSS-ing gerunds must denote individuals, in contrast to the case for ACC-ing's. This he encodes by a rule which nominalizes a (subjectless) ACC-ing gerund. So the meaning of the POSS-ing gerund *helping Mary* is the nominal image of that of the ACC-ing *helping Mary*.

14. $+(\lambda x\ [+(help'(m)(x))])$

Subjectless POSS-ing gerunds will then denote objects, and will not be able to take arguments. Just as we had to use a special translation for *for* with the infinitivals, in order to give the nominalized VP's a subject, we will have to do something special to give a POSS-ing gerund its POSS subject. The possessive morpheme will play a role similar to that of *for*, turning the nominalized function denoted by the gerund back into a function.

15. $POSS(z) = \lambda x\ [+(-x(z))]$

So *John's* wil denote

16. $\lambda x\ [+(-x(j))]$

where 'x' represents the subjectless POSS-ing gerund. (17) will denote (18):

17. John's helping Mary

18. +[-(+(help'(m))) (j)] = +(help'(m)(j))

Given this background, we can now go on to look at how Chierchia describes certain aspects of semantic variabilily for gerunds. Simplifying a bit from Chierchia's assumptions, let's assume that a gerund-taking predicate like *be fun* has only one argument position. A simple statement about a particular event's being fun (19) would be represented on Chierchia's theory as (20) (ignoring tense):

19. Dancing a tango was fun.

20. fun'(+(dance'(a.tango')))

Chierchia would like to suggest that *fun* perhaps should be given a more complex internal representation, along the lines of what Carlson uses in describing bare plurals in order to capture the fact that in (19) only one particular occurance of dancing is under consideration. Carlson's views will be discussed below. However, the important point to notice at this moment is that the representation of (19) involves only a simple case of predication.

Moving on to more complicated sentences like (21)

21. Dancing a tango is fun.

there needs to be a way to express the fact that (21) makes a generic statement about tango-dancing. This is done by bringing in a VP operator 'Gn':

22. (Gn(fun')) (+dance'(a.tango'))

(22) works by making a predication of the whole activity of tango-dancing, and not directly about events of dancing tangos. The same is technically true of (20), even though the more complicated internal representation might mean that it boils down to making some claim about an individual events of dancing a tango. Chierchia admits that in many cases a generic statement is apparantly about many individual events, and perhaps this character of some generic statements can be built into the meaning of Gn. That is, what ways the world can be for a generic statement to be true of a nominalized property might in many cases be required to involve some number of events of the right sort having some property; however, this would not be a matter of logical representation. Nor would it be universally required. In (23), Chierchia claims, no particular events of writing dissertations need be involved:

23a. Writing dissertations is difficult.

23b. We talked about writing dissertations.

While I agree with respect to (23b), the claim seems doubtful with respect to (23a). In any case, it is correct that sometimes a generic staement involving a gerund doesn't require reference to individual events, as

(23b) shows. Thus it would seem that the looseness of the semantics of Gn is a good thing.

Chierchia hopes to use a version of Carlson's (1977) theory to account for generic/nongeneric differences in meaning with gerunds and infinitives. Carlson's ideas were developed to deal with generic/existential ambiguities of bare plurals. I will give a very brief summary of how Carlson's account works, and then show how it could apply to gerunds. In a sentence like (24) *horses* seems to have an existential interpretation, while in (25) it has a generic interpretation:

24. Horses were in the yard.

25. Horses are intelligent.

In many examples there is ambiguity between the two:

26. Horses are used to pull carts.

(26) can mean either that it is a general property of horses that they are used to pull carts, or that some horses are used to pull carts. First of all let's try to deal with (25). In Carlson's theory, bare plurals unambiguously refer to kinds. *Horses* refers to the natural kind of horses. A sentence like (25) makes a simple predication of that kind, and it is given a representation like (27):

27. intelligent'(horses')

Because bare plurals are mere names, (24) cannot involve existential quantification over a variable modified by *horses*, and so it must be given a simple predicational structure as well:

28. be.in.the.yard'(horses')

However, the existential character of the subject's interpretation is not ignored, but captured by giving the predicate a complex internal composition. This composition involves existential quantification over realizations of the kind of horses, where realizations of the kind of horses are what Carlson calls "stages" of individual horses. A stage of a horse is a spatiotemporally bound segment of some particular horse. Consider the revised translation of (24):

29. Vx [R(x,horses') & in.the.yard(x)]

This translation says that there is a realization of the kind of horses in the yard. The predicate in (24) the predicate must get the translation:

30. λz [Vx [R(x,z) & in.the.yard(x)]]

Finally (26) is given a basic translation similar to that of (24):

31. Vx [R(x,horses') & be.used.to.pull.carts(x)]

This provides the existential reading of (24). To get the generic reading, the Gn operator is used. It converts a predicate with the existential quantification over realizations (a so-called **stage-level** predicate) into one without that quantification, like *intelligent* (an **individual-level** predicate). So the other representation for (26) is

32. Gn(λz [Vx [R(x,z) & be.used.to.pull.carts(x)]]) (horses')

By using these techniques Carlson is able to account for the ambiguities associated with bare plurals while maintaining that bare plurals are unambiguous and that all sentences containing them involve a simple predication of a property of a kind.

Carlson notes that gerunds and infinitives seem to display the same range of meanings as bare plurals. Particularly important is the fact that they can appear with predicates which intuitively relate to kinds. The possibility of (33) is the main evidence that what bare plurals unambiguously denote is natural kinds, and these predicates also go with gerunds and occasionally infinitives.

33a. Horses are very common.
33b. Bananas are rare.
33c. Fleas are widespread.
34. Getting into trouble is common/rare/widespread among the youth of today. [=Carlson's Ch. VII (120)]
35. For people to love their children is common. [=(123), ex. due to Bach]

For this reason Carlson suggests, but avoids discussing further, the possibility that infinitives and gerunds denote abstract individuals. These abstract entities would be kind-like; presumably they would denote kinds of eventualities. It is just this possibility that Chierchia picks up on, though he doesn't talk about it in detail either.

Now let's try to see how a version of Carlson's theory can apply to (36) and (37) (=(19) & (21)).

36. Dancing a tango was fun.
37. Dancing a tango is fun.

We must assume that realizations of nominalized properties exist, and that they are eventualities of the intuitively correct sort. The eventualitites perhaps needn't be added to the domain for just this purpose, since there are already some in the extensions of CN-gerunds. Zucchi (1989) however argues that CN-gerunds and other gerunds need to refer to sets of different sorts of things (the latter of states of affairs), and his consideration apply either to a theory where the reference is direct, such as his, or one where the reference is mediated by a realization operator. For now let's assume that realizations of nominalized properties are indeed eventualities. Then (36) can get the translation (38):

38. Ve [R(e,+(dance'(a.tango'))) & fun(e)]

Where *is fun* must translate as

39. λz [Ve [R(e,z) & fun(e)]]

In contrast, the generic reading of (37) is

40. Gn(λz [Ve [R(e,z) & fun(e)]]) (+(dance'(a.tango')))

(36) should therefore mean that there was an event of tango-dancing that was fun. In fact I don't believe that this captures the meaning of (36) quite correctly, but we'll go into the problem later.

So far we have looked at the analysis of gerunds that I have called 'predicational'. Next we will move on to the quantificational theory.

II. The Basic Version of the Quantificational Theory

We will now look more closely at the semantic variability of gerunds and its relation to that of bare plurals. In (41)-(43) is a pair of paradigms, recapitulating the similarities between gerunds and bare plurals. The categorization given is representative of a view of bare plurals that contrasts with Carlson's (that of Wilkinson (1986), Krifka (1987)), and that will be discussed further below.

41. Kind Use
    a. Eating an apple before breakfast is becoming increasingly popular.
    b. Cats are becoming increasingly popular.
42. Quantified Use
    a. Eating an apple before breakfast is (usually) dangerous.
    b. Cats are (usually) dangerous.
43. Existential or Specific Use
    a. Eating an apple before breakfast really made me sick.
    b. Cats scratched my face.

The subjects in (41) seem not to refer to individual events of apple-eating or to individual cats. Instead, (b) talks about the natural kind "the cat" and (a) about the whole practice of apple-eating. In (42) we still have a generic statement, but this time individual events or cats do seem crucially involved. With the adverb *usually* the sentences talk about most events of apple-eating or most cats; with an *always* they would concern all events of apple-eating of all cats; and with no adverbial quantifier at all, they would involve some kind of poorly understood generic quantification over the events or cats. Finally in (43) one or a small number of events of apple-eating or cats are what the sentence's subject refers to.

Wilkinson and Krifka argue that the pattern seen for bare plurals should really be captured by positing an ambiguity in their interpretation. Specifically, with the kind use the bare plural actually refers as a name to a kind. With the other two uses, the bare plural in an indefinite. The so-called quantified use involves an adverb of quantification quantifing over a variable introduced by the bare plural. Following the semantics proposed for singular indefinites by Kamp (1981), Heim (1982), and Lewis

(1975), (42b) receives a Logical Form in which an adverb of quantification has two arguments--the bare plural subject and the rest of the sentence:

42b'. usually_x (cat'(x)) (dangerous'(x))

The first argument of the adverb is referred to as the **restrictive clause** by Heim, and the second part is named the **nuclear scope**. In cases where there is no explicit adverb, a default generic quantifier is used. Finally, (43b) is said to arise from a structure in which the variable introduced by the (indefinite) bare plural is bound by an existential quantifier.

43b'. Vx[cat(x) & scratch.my.face(x)]

Follwing ideas argued for by Diesing (1987), we can say that all variables left free in the nuclear scope are bound by a default existential. Heim and Kamp had related rules of **existential closure**, but applying this process to the nuclear scope gets us the right result in this case, since we can take it that the bare plural is not mapped into the restrictive clause in (43), and this results in the existential reading. When the bare plural is in the restrictive clause, some adverb must bind it, giving a reading like in (42).

Wilkinson's and Krifka's arguments for their treatment of bare plurals come from basically two directions. The first is that the two sorts of meaning that the bare plural can have are needed independently. The indefinite reading associated with the adverbially quantified use and the existential use are also possible for indefinite singulars:

44. A cat is (usually) dangerous.

45. A cat scratched my face.

However, the kind use is not possible.

46. A cat is becoming increasingly popular.

(46) does not mean what (41) means. In order to unify (42b) and (43b) with (44)-(45), it will be necessary to allow bare plurals to have an indefinite use; a unified treatment seems desirable given the quantificational variability both bare plurals and indefinite singulars show as the adverb of quantification in their sentence is varied. The kind use of bare plurals is also possible for definite NP's, as in

47. The cat is becoming increasingly popular.

Both the bare plural and definite NP's in contexts that select for kinds become less acceptable as less plausible kinds are introduced:

48. ?The rotten avocado from Bill's farm is becoming increasingly popular.

49. ?Rotten avocados from Bill's farm are becoming increasingly popular.

Definite NP's can occur in contexts like (42) and (43) as well, as seen by

50. The cat is (usually) dangerous.

51. The cat scratched my face.

(50) means something very similar to (42); (51) refers to a particular cat, and not to cats in general, though clearly it does not receive the existential reading of the indefinite singular and bare plural. These possibilities reveal that if bare plurals are systematically ambiguous, definites must be so too. The fact that (43) and (51) differ in meaning show that both definites and bare plurals cannot both be unambiguously the names of kinds, but rather some difference must be postulated. The hypothesis at issue is that the kind readings are separated off, and are impossible for indefinite singulars. Beyond this, a theory of the other definites and indefinites needs to be elaborated. Heim's theory of definiteness that considers both definites and indefinites to be predicates of variables, with all their differences flowing from presuppositional differences, seems promising for understanding the similarities and differences among the (42)-like and (43)-like readings of definites, indefinites, and bare plurals.

Another problem for Carlson's theory involves the typhoon-sentences brought up by Milsark (1975). Simple present tense verbs seem to result in individual level predicates, and so give bare plural subjects a generic reading.

52. Cheetahs run fast.

However, in the typhoon-sentence situation such predicates can get an existential interpretation:

53. Typhoons arise in this part of the Pacific.

(53) is ambiguous between a generic statement about typhoons and a generic statement about this part of the Pacific, to the effect that there are typhoons that arise there. In the quantificational system, such ambiguity can be handled by allowing the bare plural to occur either in the restrictive or in the nuclear scope. Why the bare plural with other simple present verbs cannot end up in the nuclear scope is an open question, but seems to be related to the possibility that the unaccusative hypothesis could be correct for English verbs like *arise*. On Carlson's theory, sentences like (53) are problematical, since if simple present predicates are intrinsically individual level, they should only allow generic readings. Of course the move could be made of allowing a certain group of simple present predicates to be stage-level, but then one will have to explain why the simple present applies a Gn to most stage-level predicates, but not to this group. It's possible that this difference could be related to the argument structure of verbs like *arise*, if the subject argument of them is under the Gn, and so unaffected by it, while that of *run* is outside. So both the predicational and quantificational theories will have to do some work to deal with the typhoon sentences.

It will also be necessary to understand how it's possible to have a generic statement about *in this part of the Pacific* in (53). Presumably Carlson would want to assimilate this case to his analysis of habituals,

which are basically statements about individuals that involve Gn. For instance (54) could receive a translation like (55):

54. John smokes.

55. (Gn(smoke'))(j)

However, because this operator must apply to VP's, it cannot be directly used for (53). Names in object position cannot generally get a habitual reading, so we don't want to be able to abstract on a nonsubject and apply Gn to that property, so the situation with (53) is not easily accounted for in the predicational framework. As we discuss the semantics of gerunds in detail, we'll look more closely at the typhoon sentence in a quantificational theory.

What, then, would be the quantificational theory for gerunds? Following the ideas of Wilkinson and Krifka, one one conclude that gerunds are ambiguous between a name-of-kind use and an indefinite use. The indefinite use could either result in an existential or an adverbially quantified sentence. I don't think the parallel is quite this complete. The sentence in (41a) does contain a gerund that refers to a "kind", I think, in complete parallel to (42b). Henceforth, then, I will assume that gerunds can refer to kinds of states of affairs; intuitively a kind of this sort is something like a practice, as in *The practice of jogging before breakfast is becoming quite popular*. Below I will argue that the kind denoting gerunds do need to be distinguished for independent reasons, and these considerations will further suggest that kind-denoting gerunds are of type e, whereas the other gerunds are not. This difference will also back up the quantificational analysis, since the kind-denoting gerunds seem name-like, while other gerunds should be expected to be set-denoting. Such a situation is exactly like that that the quantificational theory asserts for bare plurals.

Other gerunds all denote sets of states of affairs. This much is in accordance with the quantificational theory of bare plurals. Sentences like (42a) are given a tripartite Logical Form, and a quantificational generic results.

42a' Usually$_e$ (eating.an.apple.before.breakfast'(e)) (dangerous'(e))

(43a) would be expected to have Logical Form (43a')

43a' V$_e$(eating.an.apple.breakfast'(e) & really.made.me.sick'(e))

Here the parallelism breaks down--as we will now see, gerunds that don't receive a generic interpretation do not get an existential one.

Consider the sentences below.

56. The doctor didn't believe that eating apples made me sick.

57. The doctor didn't believe that cats scratched my face.

While in (57) the doctor doubts the existence of any cats that may have interacted with me, in (56) the doctor does not doubt that I ate apples. He only doubts that that event, the occurance of which he admits, made me

sick. This difference can be captured as one of definiteness. The contrast is similar to

58. The doctor didn't believe that the bullet wounds killed Shelley.

59. The doctor didn't believe that bullet wounds killed Shelley.

In (58) it's presupposed that there were bullet wounds, while in (59) that's what's under dispute. Let's assume that definites move to the matrix restrictive clause at Logical Form, as the formal reflex of their presupposition. This idea is similar to that of Berman (1988), and will be discussed more thoroughly later; Heim (1982) discusses how a elements in a restrictive clause often serve to satisfy the presuppositions of elements in the nuclear scope. In contrast, indefinites do not move to the restrictive clause, but in cases like (59) remain under the scope of *believe*. If these ideas are right, the difference between (58) and (59) is explicable. Now if we assume that gerunds are always definite, in (56) we'll end up with a Logical Form in which the gerund is outside the scope of *believe*, giving the appropriate reading. The bare plural in (57) will instead act like (59), and the negated existential reading will result.

So at this point we could conclude that gerunds are always definite, and that the quantified gerunds are like the cases of adverbially quantified definites:

60. The dog that barks usually doesn't bite.

However, the situation is more complicated. Consider the difference between an ACC-ing and a POSS-ing gerund in this context:

61. The doctor didn't believe that Bill leaving town sometimes disturbs someone.

62. The doctor didn't believe that Bill's leaving town sometimes disturbs someone.

63. The doctor didn't believe that leaving town sometimes disturbs someone.

In (61) (and (63)) the gerund does not receive a presupposed reading, apparantly an effect of the adverb, since (64)'s gerund seems to be presupposed:

64. The doctor didn't believe that Bill leaving town (had) disturbed anyone.

(62)'s gerund remain presupposed, however, showing a difference between POSS-ing's and ACC-ing's that will be discussed extensively in § III. In the absence of a adverb (or a modal), however, all the gerunds seem to receive a presupposed reading. So it seems that the analysis given above of the definiteness of must be modified. The possibility of (61) shows that a gerund can be placed in an embedded restrictive clause; there it is the restrictive clause for *sometimes*. Thus the question is why any gerund cannot move to this position, rather than the matrix restrictive clause, and stay under the scope of believe.

What I'd like to propose is that a POSS-ing gerund must move to the highest restrictive clause, along the lines suggested for all gerunds above, and to allow ACC-ing gerunds to move to the lower restrictive clause. When there is no adverbial quantifier, the variable introduced by the gerund can be free. The apparant wide scope of all gerunds in the nonquantified, nonmodal sentences results from the way that these free variables are interpreted. I would like to propose that they are name-like, and that they receive a contextually specified reference. This will result in the lack of a negated narrow-scope existential interpretation for (56). This treatment of ACC-ing gerunds is very similar to one that some indefinites could plausibly get, name the "referential indefinites" (Fodor and Sag (1982), Kripke (1977), Heim (1982)). Some indefinites appear to be given a specific, contextual reference, as in (65), where there is no crossover violation, in contrast to (66) and like (67):

65. The woman who liked him invited a man I met in Texas last week for dinner.

66 ??The woman who liked him invited a man for dinner.

67. The woman who liked him invited John for dinner.

Other evidence supports the possibility that some indefinites can be free in the restrictive clause; Rullmann (1989) shows that indefinite subjects not in there-insertion sentences in Dutch must either be quantified over by an adverb or receive a reading as a referential indefinite. There-insertion plausibly forces the subject into the nuclear scope, while a subject in the VP-external subject position would go into the restrictive clause. Below in § V I bring up the proposal of Diesing (1988) which identifies nuclear scopes with VP's.

The possibility just outlined for gerunds will explain the facts described above, but the question still remains of why all gerunds differ from regular indefinites in not permitting an existential interpretation. This boils down to the question of why gerunds cannot reside outside of some restrictive clause, and we will will take up this problem in more detail in § V.

One loose end to be tied up concerns the interpretation of (62). If the gerund must go to the matrix restrictive clause at Logical form in order to continue to be presupposed, and the adverb needs to have the gerund as its restrictive clause (but does not have scope over believe) don't we have a contradiction as to the Logical Form position of the gerund? It must be both in the embedded and in the matrix restrictive clause. What actually happens is that the gerund moves intially to the embedded restrictive clause, just like other gerunds, and then is copied into the matrix restrictive clause. Considerations in § V will predict that (non-kind denoting) gerunds must move from their S-structure positions (into a restrictive clause, it would seem, though there will be other

possibilities when we consider complement gerunds), and this behavior will contrast with other categories which need only be copied into a restrictive clause. Once in the embedded restrictive clause, the conditions that intially forced the gerund to move rather than be copied no longer hold, and so copying is the expected response to the condition that POSS-ing's must be in the matrix restrictive clause. See § V for details. Simply put, as a first step, all gerunds are moved into the closest restrictive clause, and may be subsequently copied into the matrix restrictive clause if need be.

In summary of the recent discussion, it seems that all subject gerunds must be placed in a restrictive clause at logical form, in marked contrast to indefinite singulars and bare plurals. POSS-ing gerunds must be placed in the matrix restrictive clause, while ACC-ing gerunds at least can be in an embedded one. If a gerund's variable is not bound by some operator, it receives a contextually supplied reference, and so appears to have maximally wide scope.

Now let's return to the typhoon sentences. Typhoon sentences with gerunds receive an interpretation similar, but not identical, to that we get with bare plurals. The differences are due to the fact that the gerunds must go into a restrictive clause. Consider (68):

68. Sailing outriggers into typhoons kills lots of people in this part of the Pacific.

This sentence has the subject generic reading, wherein it's a characteristic of sailing outriggers into typhoons (anywhere) that it will kill lots of people in this part of the Pacific. However, it does not have the second reading (69) has, namely the existential subject/generic PP reading.

69. Typhoons kill lots of people in this part of the Pacific.

Instead the other reading (68) has is a double generic, meaning that this part of the Pacific has the generic property that sailing outriggers into typhoons has the generic property of killing lots of people there. (69) has such a double generic reading as well. Given our ideas, the lack of the subject existential reading in (68) is expected, since it would arise by having the subject appear in the nuclear scope. Though the bare plural in (69) can go into the nuclear scope, the gerund in (68) cannot. Thus we have a minimal difference that is predicted by the quantificational theory.

The facts that support the idea that gerunds must appear in a restrictive clause are not easy to account for with the predicational theory. What is apparantly required is that, while predicates that take bare plurals have an existential quantification over stages, predicates that take gerunds need something like an definite operator. Though (43b) gets the Logical Form (70b), (43a) would need (70a):

70a. really.made.me.sick'(thex[R(x,eating.apples.before.breakfast'))

70b. Vx[R(x,the.cat) & scratched.my.face'(x)]

Such an analysis is forced to postulate a lexical difference between the predicate in (43a) and that in

71. Viruses really made me sick.

Furthermore the difference is rather arbitrary. There's no reason to expect such a distinction between predicates that take bare plurals and those that take gerunds. The quantificational theory, in contrast, because it distinguishes the two in terms of structural requirements at Logical Form, captures the difference much more naturally. Furthermore, to the extent that the proposed behavior of gerunds can be theoretically motivated in § V, the quantificational theory will receive even more support.

III. Definiteness and POSS-ing vs. ACC-ing

In the last section I briefly argued that gerunds are always definite, but soon retracted that to the claim that gerunds are always referential. We had a couple of examples that suggested that POSS-ing gerunds are definite while ACC-ing gerunds are not. ACC-ing's instead behave like referential indefinites. In this section I will further examine the differences between POSS-ing and ACC-ing gerunds, and it will seem that all of the factors that have been used to argue that they were syntactically different can be attributed to a difference of definiteness. If this is indeed the case then we are left with a view that differentiates ACC-ing's and POSS-ing's syntactically only in the presence of absence of the POSS morpheme. Such a minor variation was originally argued for by Rosenbaum (1967); he attributed the presence or absence of POSS to a (usually) optional version of the complementizer deletion transformation. Here the argument for minimizing the syntactic difference will simply be that everything can be explained by reference to a single semantic/pragmatic feature of definiteness, and so there's no reason to posit more of a difference than between regular definite and indefinite NP's. The well-known fact that English possessives are always definite should be kept in mind: *Karen's book* means 'the book of Karen', not 'a book of Karen'. The presence of a possessive morpheme might therefore be expected to have all those effects on a gerund attributable to definiteness, on the assumption that there's only one POSS morpheme. If this indeed turns out to be the case, further complicating the syntax is unwarranted.

I will discuss nine claimed differences between ACC-ing's and POSS-ing's. The tests are drawn from Horn (1975), Abney (1987) and Chierchia (1984). Several of the tests will turn out not to be valid at all, and those that do will be relatable to definteness.

First, Horn claims that ACC-ing gerunds take singular agreement when they conjoin, while POSS-ing's take plural:

72. John coming and Mary leaving bothers me.

73. John's coming and Mary's leaving bother me.

Even in these two cases I don"t find that reversing the singular and plural agreement causes ungrammaticality, and it seems to me that what's really at issue here is whether the two events are construed as parts of some larger event or not.

74. John eating apples and Mary sailing around the world bother me.

75. John's coming and Mary's consequently leving bothers me.

In (74) we have two intuitively unrelated events, and even an ACC-ing takes plural agreement. In (75) is the reverse--two POSS-ing's that refer to parts of a single event. There we have singular agreement.

Second, Abney claims that a subject reciprocal of an ACC-ing gerund, when the whole gerund is an embedded subject, is impossible, while of a POSS-ing gerund it is ok:

76. *They thought that each other giving up the ship was forgivable.

77. They thought that each other's giving up the ship was forgivable.

This comparison is flawed, however, since (76) is ungrammatical even without a reciprocal:

78. *They thought that John giving up the ship was forgivable.

If we look at an object ACC-ing, a reciprocal is clearly ok:

79. They took exception to each other flirting with their wives.

and even a subject ACC-ing gerund in a similar context is fine:

80a. They had believed each other leaving town to be a likely outcome.

80b. They wouldn't have found each other riding the horse to have been as bad.

Thus it seems the reciprocal binding test doesn't work either.

The third supposed difference is brought up by Horn, who says that subjectless ACC-ing gerunds allow only a controlled interpretation, while subjectless POSS-ing's allow only a non-controlled reading. *Defend* takes only POSS-ing:

81. John defended Israel's attacking Egypt.

82. *John defended Israel attacking Egypt.

83. John defended attacking Egypt.

(83) is said to have only a non-controlled interpretation; however, I think the example is too leading. Consider (84) (example due to John McCarthy):

84. Egypt defended attacking Egypt.

Horn also claims that, because it allows only a controlled interpretation, *annoy* must only take ACC-ing.

85. Eating apples annoys John.

However, *annoy* can take an explicit POSS-ing as in (86).

86. Mary's eating all the apples annoyed John.[1]

So Horn would have to claim that *annoy* must take an ACC-ing when the gerund is subjectless, an unmotivated idea that I don't know how to implement.

Forth, Chierchia asserts that ACC-ing gerunds are subject to the double -ing filter, while POSS-ing's are not.

87. John was practicing singing the national anthem.

88. *John was keeping singing the national anthem.

Chierchia has another test for the difference between ACC-ing's and POSS-ing's (to be discussed next) that this difference is meant to back up. However, an explicit ACC-ing with a progressive is ok:

89. John was imagining Mary catching trout.

Of course we can't get a clear case of an ACC-ing in a double-ing, since we don't have any verbs which only take ACC-ing. The fifth difference, also used by Chierchia, is the idea that only POSS-ing's can passivize. This is meant to support his idea that verbs like *keep* take subjectless ACC-ing complements, while those like *practice* take subjectless POSS-ing complements.

90. Singing the national anthem was practiced by everyone.

91. *Singing the national anthem was kept by everyone.

However, explicit ACC-ing's can passivize.

92. John kissing Mary was imagined by everybody.

The sixth ACC/POSS-ing difference is the final one that I will claim simply doesn't work. Horn says that ACC-ing's can cleft or be involved in subject-AUX investion (Horn's (118); his judgments):

93. *It was John kissing Mary that upset everyone.

94. *Did John kissing Mary annoy her parents?

I don't find these two so bad, but I think such examples are perfect when the ACC-ing's are in a less definite environment:

95. It's John kissing Mary that would upset me.

96. Would John kissing Mary annoy you?

Thus to the extent that (93)-(94) may show something, it seems to be that ACC-ing's prefer not to be presupposed.

The final three facts that differentiale ACC-ing's and POSS-ing's are valid, but they don't seem to show more than that POSS-ing's are definite and ACC-ing's indefinite. Horn discusses the fact that ACC-ing's cannot be topicalized, as shown by (97) (his (120)):

97a. *John kissing Mary we remembered.

97b. *Fred singing the national anthem everyone imagined.

---

[1]Notice that I had to make the context of the gerund more definite to allow the POSS-ing.

97c. *Mary arguing with her parents all the neighbors heard.

Compare:

98a. John's kissing Mary we remembered.

98b. Fred's singing the national anthem everyone imagined.

(These are best with stress on the possessive NP.) This difference can be related to the fact that indefinites don't like to be topicalized, presumably because topics should be background information, i.e. presupposed:

99a. *A man we remembered.

99b. *A flying pig everyone imagined.

99c. *A terrible fight all the neighbors heard.

The eighth difference between ACC-ing's and POSS-ing's is also brought up by Horn. WH possessives in POSS-ing's can pied-pipe their gerunds, while WH accusatives in ACC-ing's cannot:

100. The man whose flirting with your wife you took such exception to.

101. *The man who flirting with your wife you took such exception to.

In order to examine this fact, we first have to notice that a verb like *imagine* has a presupposed gerund complement if that complement is POSS-ing, but not if it's ACC-ing.

102. Jill imagined Bill's leaving.

103. Jill imagined Bill leaving.

With (102), Bill must really have left, and Jill visualized it. In contrast, with (103) there need have been no actual leaving. This fact in itself strongly supports that idea that POSS-ing's are definite and ACC-ing's not. The pied-piping paradigm for imagine is the expected one:

104. A man whose flirting with your wife you imagined.

105. *A man who flirting with your wife you imagined.

Given that the fact that pied-piping goes along with the definite reading of the gerund, we might wonder whether it's not the definiteness that allows the pied-piping, and not a syntactic difference. I believe this is the case; the theoretical justification for this is the idea that movement to COMP might be expected to result in definiteness in these cases. A direct WH-question seems to presuppose that there's some answer, and, if relative clause formation is the same process, moving a gerund to COMP would cause its content to be presupposed as well. Such a situation would only be compatible with a POSS-ing.

The final difference between POSS-ing's and ACC-ing's I will discuss is the extraction facts from Horn. It is possible to extract from an ACC-ing gerund but not from a POSS-ing.

106. Which city do you remember him describing.

107. *Which city do you remember his describing.

This contrast can readily be assimilated to the well-known fact that it's more difficult to extract from definite NP's than from indefinites.

108. Which man did he see a picture of.

109. ??Which man did he see the picture of.

What contrasts there are between ACC-ing's and POSS-ing's therefore seem to be connected to a difference of definiteness, and I have tried to show how they can be reduced to such a difference. It's worth pointing out the strong similarity that regular NP's show to the contrast of (102)-(103).

102. John imagined Bill's leaving.

103. John imagined Bill leaving.

110. John imagined/predicted the earthquake.

111. John imagined/predicted an earthquake.

((110)-(111) were suggested to me by A. Kratzer.) (110) presupposes that an earthquake occured, just as (102) presupposes that a leaving occured. Neither (103) nor (111) presuppose any event. The difference between (110) and (111) is simply definiteness, and it's seems likely that the same is all that going on with (102)-(103).

IV. Complement Gerunds

So far we've only been talking about gerunds in subject position. Before going on to try to give an overall characterization of semantic variability in gerunds, it will be necessary to examine gerunds in complement position. In looking at these contexts, we will mostly be concerned with the possibility of getting an adverbially quantified reading, in contrast to a specific reading. There are kind-type complement gerunds, as in

112. John wanted to take up driving motorcycles.

In (112) there is no reference to particular events or states of affairs of driving motorcycles, either definite or quantified. Instead again it's the practice that's at issue.

In (113) and (114) we see an important contrast.[2]

113. John always celebrates winning a prize.

114. John always denies winning a prize.

(113) has a reading that involves quantification over events or states of affairs of winning a prize; that is, its meaning can be paraphrased by (113'):

113'. For all e, if e is an event of (John) winning a prize, John celebrates e.

[2]Thanks to A. Kratzer for pointing out this contrast.

We will look more closely at what the representation of (113)'s meaning should be below. (114) instead can not have the adverbially quantified meaning (114'):

114'. For all e, if e is an event of (John) winning a prize, John denies e.

This contrast seems to be between verbs that presuppose that the state of affairs picked out by the gerund actually occured--the factives--and those that do not--the nonfactives. (115) and (116) give more examples:

115. factives
   a. Fred always enjoys going to town.
   b. Sarah usually regrets visiting her mother.
   c. Monique occasionally loves playing soccer.

116. nonfactives
   a. Fred always avoids going to town.
   b. Sarah usually thinks about visiting her mother.
   c. Monique occasionally imagines playing soccer.

Whereas all the examples in (115) can involve quantification over states of affairs/events, those in (116) cannot. (115a) can mean: whenever he goes to town, Fred enjoys it. (116a) cannot mean: whenever he goes to town, Fred avoids it.

Berman (1988) shows that indirect questions show a similar contrast. The indirect question complement of factive verbs allow quantification over the WH argument of the indirect question, while nonfactive verbs do not:

117. John mostly knows who wins the prize.

118. John mostly imagines who wins the prize.

With the factive *know*, there can be quantification over the subject argument of *wins*. Thus the sentence can be paraphrased by (117'):

117'. For most x who win the prize, John knows that x won the prize.

(118) does not have the corresponding reading (118'):

118'. For most x who win the prize, John imagines that x won the prize.

So at first glance it appears that indirect questions and gerunds should be given completely parallel treatments.

There is a crucial difference between complement gerunds and indirect questions, however. In the case of a quantificational complement gerund ((113)), the semantic complement of the matrix verb *celebrate* appears not to be a proposition, but rather a state of affairs. *Whenever John wins a prize, he celebrates it* is a reasonable paraphrase of (113). In contrast, the indirect question complement (117), though the quantification seems to be over individuals, retains a proposition as its

semantic complement. So it means something more like (119a) than (119b):

119a. For most people who win the prize, John knows that s/he wins the prize.

119b. For most people who win the prize, John knows him/her.

Berman's analysis of the relation of factivity to indirect questions is a particular implementation of the concept that verbs like *know* presuppose their complements. A general process of presupposition accomodation is argued to apply, copying the indirect question into the restrictive clause. Once it is there, a logical form like (120) is in place, giving the proper reading:

120. mostly_x [x wins the prize] [John knows that x wins the prize]

I hope to give a similar but different analysis to gerunds.

The gerunds are also similar, but in a different way, to another construction that Berman briefly discusses: free relatives. Berman notes that a sentence like (121) has the meaning (122), not (123):

121. John likes what Bill has.

122. For all x that Bill has, John likes x.

123. For all x that Bill has, John likes that Bill has x.

In other words, *likes* here has only an individual variable as its complement, and not a whole proposition. In this way it's like the gerunds. However, free relatives differ from gerunds in that they are not sensitive to factivity:

124. Bill generally wants what Mary has.

(124) does have the quantificational reading (124'), even though *want* is not factive.

124'. For most x that Mary has, Bill wants x.

Berman analyzes free relatives in such a way that their always allowing a quantificational reading is expected; they are claimed to be inherently definite, so they must move into the restrictive clause at Logical Form. They thus inevitably provide a variable for an adverb of quantification to bind. This situation contrasts with the indirect questions, which are not inherently definite, but which only go into the restrictive clause under the influence of a factive verb. In Berman's system, then, the way of dealing with presupposition accomodation that is due to a factive verb must be different from that for dealing with an inherently definite category. The indirect questions, our example of the former, are only copied into the restrictive clause, while the free relatives, i.e. the latter, are moved there.

The problem that arises with complement gerunds is that they seem to split the characteristics of indirect questions and free relatives in an unwelcome way. Though they are sensitive to verb class, like indirect questions, they should be analyzed as being moved, and not copied, to the restrictive clause, like free relatives. For this reason we must look again

at the analysis of complement gerunds. One thing to notice is that the definiteness difference of POSS-ing's versus ACC-ing's is relevant in our current problem. Though (125) cannot have a quantificational reading, (126) can.

125. Sally usually forsees Bill leaving town.
126. Sally usually forsees Bill's leaving town.

As expected, the definite POSS-ing gets into a position for quantification that the indefinite ACC-ing does not. Notice that the situation contrasts with that of subjects, where both ACC-ing's and POSS-ing's can be quantified over:

127. Bill leaving town frightens Mary.
128. Bill's leaving town frightens Mary.

If we recall the discussion of (61) and (62) from § II, a relevant fact was noted.

61. The doctor didn't believe that Bill leaving town sometimes disturbs someone.
62. The doctor didn't believe that Bill's leaving town sometimes disturbs someone.

Both gerunds were argued to go into some restrictive clause or another. The ACC-ing had to be moved into the embedded S's restrictive clause so it could get a specific reading in (64):

64. The doctor didn't believe that Bill leaving town (had) disturbed anyone.

The specific reading of the gerund in (61) vanishes under the influence of the adverb (as it does with a modal as well, as seen by (129)

129. The doctor didn't believe that Bill leaving town could disturb someone).

The POSS-ing in (62) however must have moved into the matrix restrictive clause so that it can be presupposed even with a modal or adverb. As we might expect from this view of matters, a matrix adverb can only quantify an embedded POSS-ing, and not an ACC-ing:

130. The doctor usually believes that Bill leaving town disturbed someone.
131. The doctor usually believes that Bill's leaving town disturbed someone.

(131) can be paraphrased by (131'), but (130) cannot.

131'. For most e, e is an event of Bill leaving town, the doctor believes that e disturbed someone.

The situation is expected because the matrix restrictive clause has the gerund in (131)'s Logical Form, but not in (130)'s, so in the former case there is a variable available to quantify over.

In summary, then, factive gerund-taking verbs always allow adverbial quantification, and verbs with POSS-ing complements always do

too. The situation differs from the subject case, where any gerund allows quantification within the embedded S, though only POSS-ing are available for matrix level adverbial quantification. It looks as if the data for when nonfactive complements allow adverbial quantification at all shows the same pattern as the data concerning when subject gerunds can be quantified over at the level of a higher S--both are ok if the gerund is POSS-ing. In the next section I try to tie all these facts together into a single theory.

V. Movement and Copying--The Availability of Quantificational Gerunds

The fact that complement gerunds of factives move to a restrictive clause and don't just get copied there shows that more than mere presupposition accomodation is involved in their behavior. Berman's data on indirect questions shows that all accomodation forces is copying, so some other factor must require movement. I'd like to argue that gerunds must move out of their S-structure position because of a semantic category mismatch. Though the gerunds are set-denoting, they occupy an e type position ('e' in the sense of individual-denoting, though it's presumably something like event-denoting as well). For this reason they must move, leaving behind an e-type trace. Rooth (1985) considered this idea, but neither accepted nor rejected it. Before going on to work out its effects, I'll present an argument that the gerunds under consideration really aren't allowed in certain constructions.

Though the gerunds involved in quantificational and specific readings are set-denoting, the kind gerunds refer to individuals. There is an construction, Tough Movement (TM) that selects only for kind gerunds. Some of the predicates we've been using up until now with gerunds are TM adjectives; thus the pattern:

132a. Kissing cats is fun.
132b. It's fun kissing cats.
132c. It's fun to kiss cats.
132d. Cats are fun to kiss.

(132d) is the actual case of TM. First I will argue that the form in (132a) is not a case of TM, and then I will attempt to show that TM sentences whose subjects are gerunds only have the kind, and not the quantificational or referential/specific, reading. The first arguments are also interesting because they conflict with Pesetsky's (198) claim that all sentences with TM adjectives involve actual TM, and that in some cases this involves an abstract complement of the adjective. In an example like (132a), there would presumably be an abstract *to do*, as in *Kissing cats is fun to do*.

Consider the sentences

133. Running was dangerous (for Mary).
134. Running was dangerous (for Mary) to do.

I will argue that (134) involves TM, while (133) does not. The first argument is that, when TM occurs, the individual for whom the cost[3] that the adjective refers to applies is the same individual that is the understood subject of the adjective's complement. In the case of (134), it is Mary who both experiences the danger and runs (or, does the running). If in (133), *running* were the D-structure complement of *dangerous*, or the complement of some invisible complement of *dangerous*, and moved to subject position via TM, we'd expect Mary to have to be both the runner and the one in danger. However, this is not the case. To show that it is a characteristic of TM that the complement subject be the one for whom the cost applies, consider the following:

135a. *Running is dangerous for John for Mary to like.
135b. *Cats are dangerous for John for Mary to kiss.
136a. It is dangerous for John for Mary to like running.
136b. It is dangerous for John for Mary to kiss cats.

The examples in (136) show that in the non-TM alternants of (135) it is possible for there to be two *for* phrases, one specifying the complement subject and one specifying the individual for whom there is the cost. (135b) however shows that the pair of *for* phrases is impossible when there is TM, and (135a)'s similarity argues that it involves the same structure. The origin of this constraint is unknown to me, but in any case it can be used to distinguish (133) and (134).

The other argument that (133) has a non-TM source comes from the pattern in (44)-(47):

137. To eat beans is easy.
138. Eating beans is easy.
139. *To eat beans is easy to do/like/try.
140. Eating beans is easy to do/like/try.

These examples show that *is easy* has at least one analysis on which it has a subject that is not related to an empty complement position of a VP like *to do* via TM.

Besides indicating that a TM adjective can occur also as the main predicate in a non-TM structure, (137)-(140) is revealing in another way. It shows that the non-TM version is more permissive than the TM version. If we assume Chomsky's (1977) analysis of TM, on which the matrix subject is related to the empty complement position through WH-movement in the adjective's complement, we can explain the ungrammaticality of (139) as being due to the impossibility of WH-

[3]See Nanni (1977) for discussion of the notion of "cost" as unifying the meanings of TM adjectives.

moving an infinitive. In general we can only WH-move NP's, PP's, AdvP's, and AP's, and not VP's or S's. The infinitive will be either a VP or an S, depending on your analysis. Therefore we can figure that the subject of a TM sentence will not be a VP or an S. Now we've got the test we've been looking for--a construction which accepts gerunds but which can be expected to filter out any semantically non-NP gerunds, on the crucial assumption that a semantically non-NP-like gerund doesn't allow TM any more than does an explicit VP or S. Set denoting gerunds will be sets of states of affairs, a meaning that has also been argued to be appropriate for S's (Kratzer (1988)). The restriction on TM could be either because the constraint is semantic or because these gerunds aren't syntactically NP's. The fact that the TM construction does distinguish the groups of gerunds in the predicted way justifies making the assumption. What I show next is that only the kind gerunds occur as TM subjects.

(141) and (142), a non-TM gerund subject and a TM gerund subject, respectively, differ in whether they allow the subject gerund to be quantified over:

141. Sitting on these tables was usually fun.
142. Sitting on these tables was usually fun to (try to) celebrate/like/deny.[4]

While (141) can mean that most events of sitting on these tables were fun, (142) cannot mean that most event of (Y) sitting on these tables were fun (for Y) to celebrate. What it seems to mean is that, whenever we celebrated our having sat on these tables, it was a fun celebration. Quantification is over celebrations if anything, and not over sittings. Thus it seems that in order for there to be quantification, a restrictive clause--"whenever we celebrated our having sat on these tables"--must be accomodated. The situation is like the case of

143. Cats usually land on their feet.

to which we implicitly accomodate a restrictive clause, "whenever you drop them". Next consider (144) and (145), which aim to show that definite/specific gerunds cannot occur in real TM sentences.

144. Eating that apple at lunchtime was really very pleasant.
145. ??Eating that apple at lunchtime was really very pleasant to (try to) celebrate/watch/like.

(146) gives the closest constructions to (145) that are acceptible.

146. The eating of that apple at lunchtime was very pleasant to celebrate.

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[4] I have inserted the optional "try to" in order to control for the possibility that a TM adjective plus a single infinitive can undergo a process of Complex Adjective Formation, as argued by Nanni. If the predicate were reanalyzed as a single complex adjective, we'd expect the non-TM facts to return.

In order to fix (145), we must make use of a clearly NP-like gerund. The problem with (145) is intuitively a conflict in figuring out what event was pleasant. The definite gerund's event of eating seems to be competing with the event of celebrating/watching/etc. for the status of "what's pleasant". The above discussion shows that neither a specific/definite gerund nor an adverbially quantified gerund can occur in a TM sentence, though they both can occur with TM adjectives in non-TM sentences.

Now we will consider the meaning of TM sentences with subject gerunds, and will come to the conclusion that such gerunds are kind gerunds. An important background fact has been observed by Partee (1977), namely, that subjects in TM sentences inevitably take wide scope. This fact is shown by (147)-(148).

147. Every chicken is easy to kill.

148. It's easy to kill every chicken.

While (148) can have *every chicken* interpreted with either wide or narrow scope, in (147) it must have wide scope. Moving on now to (149),

149. Killing young chickens is hard (to want) to justify.

at first glance *killing young chickens* may seem to be construed as a narrow existential. However, if we respect the fact represented by (147) and (148), and the conclusion that (149) can't be analyzed with quantification over chicken-killing events, I think that the only alternative is to treat the gerund as being namelike and referring to the practice "killing young chickens". Thus we have reached the conclusion we were aiming for--that TM gerunds only have the kind use, a fact that would be expected if only kind gerunds were semantically nominal. This situation is related to the question of when gerunds can be construed in their S-structure position in that the only way that a gerund could occur there would be if it were semantically nominal, since the S-structure position the gerund is related to is an NP position.

The preceding discussion was meant to back up the idea that kind and non-kind gerunds are categorially different. All the other arguments for the quantificational analysis support treating non-kind gerunds as set-denoting, and perhaps the conclusion isn't very controversial at all. The Tough Movement facts are also significant because, given the basics of the quantificational analysis, we have evidence that the difference in category that is implied by that analysis can have effects on where a gerund can be located. In TM sentences, only an entity denoting gerund (a kind gerund) is allowed. As we move on to look at the Logical Forms of sentences involving non-kind gerunds, I'll argue that those gerunds must sometimes move because they're in a position that non-kind gerunds aren't allowed in. The TM facts therefore reveal the same sort of kind/non-kind contrast that will be used in explaining the other facts that have been brought up in the paper.

Unlike indirect questions, then, (and like free relatives perhaps) gerunds occupy an S-structure position which they're not of the right semantic category for. In order for interpretation to work, they must move. But where do they move? In choosing a landing site we must (i) be sure that ACC-ing complement gerunds don't go into a position where they'll be mapped into the restrictive clause; (ii) make sure that subject ACC-ing gerunds do end up in their own S's restrictive clause, but never get into the matrix restrictive clause; and (iii) get all POSS-ing gerunds into the matrix restrictive clause. Because all gerunds presumably share the category mismatch with their S-structure position, the movement due to the mismatch cannot be any farther than is possible for the ACC-ing's. Subject gerunds can simply adjoin to their S. Given principle discussed by Diesing (1989), an element in such a position will be mapped into the restrictive clause. According to Diesing, any element outside the VP goes into the restrictive clause, while material inside the VP constitutes the nuclear scope. She makes special provisions for subjects of stage-level predicates, so that a sentence like (24) (repeated) can have its subject in the nuclear scope.

24. Horses were in the yard.

Once there, the variable introduced by the subject will be bound by existential closure, and the sentence will receive the correct interpretation. This subject can be put in the nuclear scope because, Diesing proposes, the subjects of stage-level predicates originate inside the VP, and at S-structure continue to bind a trace there. Given our current assumptions we wouldn't want to say that the subject in (24) is replaced to its D-structure position at Logical Form, since this would give the same kind of category mismatch that we're using to force movement with the gerunds. The bare plural is set-denoting, while on the simplest assumptions the argument position is of type e. There are several possibilities for working out her insight, though. One would be that the subject is replaced to the VP-internal subject position, and then subsequently behaves like complement ACC-ing gerunds, which shortly I will argue leave their S-structure position but stay inside the VP. The difficulty here is that I can see no reason why subject gerunds couldn't do the same thing, if they too bind a trace inside the VP, yet we don't want any gerund in a position where existential closure can apply to it. Apparantly the only possibility is the assume that subject gerunds don't bind a trace inside the VP, so they will always be mapped into the restrictive clause. The only adjunction site for them will be the S.

I don't think that the assumption that a predicate like *is fun* has its subject originate inside the VP when that subject is a bare plural or other non-gerund, but not when it is a gerund, is problematical. Kratzer (1989) discusses a possible way of deriving the fact that stage-level predicates'

subjects originate VP-internally; her proposal is that stage-level predicates have an argument position that individual-level predicates lack--namely an event or situation argument. This argument is assumed to be highest in the argument structure, and using a principle that all but the highest argument of a predicate must be generated inside the VP (from Williams (1981)), those stage-level subjects will have to come from within the VP. In the present case, however, notice that the gerunds seem to introduce something like a state of affairs/situation/event variable. Thus the natural argument position for them is that associated with the stage-level predicate's event-like argument. Since that argument is the highest of the predicate, it will be generated outside the VP. Support for this view comes from the fact that only stge-level gerunds can have the quantificational reading:

150. stage-level
    a. Eating apples is usually fun.
    b. Driving a car is seldom dangerous.
151. individual-level
    a. #Being a Capricorn is usually Fun.
    b. #Having blond hair is seldom dangerous.

Both of the sentences in (151) are grammatical, but don't have readings where individual states of being a Capricorn and having blond hair are under discussion. This can be accounted for by saying that the gerunds in (151) introduce no variable which can be quantified over. This fact suggests identifying the "event" variable responsible in Kratzer's theory for creating a stage-level predicate with the one that is introduced by a gerund. The argument is that gerunds that wouldn't be predicted to have Kratzer's variable don't seem to introduce the quantifiable variable that other gerunds can. The gerunds in (151), since they cannot denotes sets of states of affairs, events, or whatever, must be unambiguous and only have a kind interpretation.

All subject gerund must therefore move into a position where they will be mapped into their clause's restrictive clause. POSS-ing gerunds, we have seen, do not stop there, but must be present in the matrix restrictive clause of a multi-clausal S. Because the simple movement to adjoin to S has solved the category mismatch problem, the POSS-ing gerund is now in exactly the situation of Berman's indirect questions. The POSS-ing is definite, i.e. presupposed, so according to the mechanism of presupposition accomodation it must be copied into the matrix restrictive clause (since this is a presupposition that exists at the matrix level). This is just exactly the result we want.

Complement gerunds too must move out of their S-structure positions. Because nonfactive, ACC-ing complement gerunds do not reach

the restrictive clause, we must conclude that they are moved to some position within the VP. For concreteness let's say they adjoin to the VP. Like subject POSS-ing gerunds, complement POSS-ing's must be subsequently copied to the matrix restrictive clause. In this way the combination of category mismatich-induced movement and presupposition accomodation (copying) results in placing our gerunds in the right positions for interpretation.

The final problem is how to deal with the intensionality of ACC-ing complements. So far we have derived the Logical Form for (152) as (152'):

152. John imagined marrying an elephant.

152'. Ve [$_{VP}$ marry.an.elephant'(e) [$_{VP}$ imagine'(j)(e)]]

Thus it would appear that the existential must be interpreted extensionally. The same problem exists with the predicational theory, as Carlson (1977) discusses. The existential present inside the verb's translation on that theory should also result in an extensionally interpreted object. Carlson argues that not only arguments show this property, but existentials in IV-modifiers can be intensional as well (his V: 38a):

153. Bill eats peas with a knife.

Though *a knife* is interpreted existentially, no particular knife need be involved. Carlson says that the only reasonable course open is to posit a VP operator that introduces the intensionality (a variant of Gn). I don't think he's right about this. Previously he had suggested using a lexical ambiguity to account for the intensionality of (his IV: 102)

154. Bill looked for dogs.

Via meaning postulate, this would be effectively decomposed into *try to find*. The existential in the meaning of *find* would be under the intensional operator *try*. Notice that the case of (154) is significantly different from (153) in that its intensionality survives even in a nongeneric sentence. (153)'s does not:

155. Bill ate peas with a knife.

I think we should attribute the intensionality apparent in (153) to the implicit generic quantifier present on the quantificational account. Since the existential closure of (153), but not that of (155), has scope under another quantifier, the nonspecificity of the knife is predicted. The true intensionality of (154) may be explicable along the lines of Carlson's first proposal.

The status of (152) is interesting because it ties in to other facts about the interpretation of gerunds. It seems that the events/states of affairs relevant for gerunds are intensional objects anyway, so existential quantification doesn't necessarily imply real-world occurance. There are

circumstances in which the events a gerunds refers to need not be completed, such as

156. Squaring circles is usually difficult.

Here, the gerunds seems to refer to uncompleted (uncompletable) circle-squaring events (i.e. attempts). Thus, it seems that the elements in a gerunds denotation have an intensional character. Clearly in (156) the events being quantified over have some connection to the sort of event in which a circle would get squared, but they aren't actual events of that type. The distribution and analysis of the possibility of an imperfective interpretation of a gerunds is a project that I'm pursuing in other work, and turns out to be quite complicated in its own right. It seems likely, though, that this problem is related to that for (152).[5]

V. Conclusion

I have argued that the account I've labeled the 'quantificational treatment of gerunds' has several advantages over the 'predicational treatment'. It allows for an easy explanation of not only the similarities but also the differences between bare plurals and gerunds. While Cherchia's adaption of Carlson's theory of bare plurals is useful for explaining the ways gerunds are like bare plurals, it has difficulties naturally capturing the fact that gerunds in subject position are never interpreted existentially. Furthermore we have made progress towards a simple and unified treatment of POSS-ing's and ACC-ing's, and have seen how the definiteness difference that exists between them meshes with the present theory's way of explaining the availability of certain quantificational readings. The similarities and differences between gerunds and indirect questions also support the quantificational theory, since it is within a quantificational theory of both that the facts begin to make sense. Finally the idea that all non-kind gerunds must be moved from their S-structure positions has been supported by the range of available readings in Tough Movement sentences. The movement accounted for the major difference between indirect questions and gerunds.

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[5]Thanks to A. Kratzer for pointing out this approach to the problem of (152).

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