Frishberg, N. and Gough, B. (1973) Morphology in American Sign Language, manuscript from the Salk Institute for Biological Studies.
Heim, I. (1982) The Semantics of Definite and Indefinite Noun Phrases, Ph.D. Dissertation. University of Mass., Amherst.
Liddell, S. (1978) Nonmanual Signals and Relative Clauses in American Sign Language. In P. Siple (ed.), *Understanding Language through Sign Language Research*, Academic Press, New York.
Liddell, S. (1980) *American Sign Language Syntax*, Mouton, The Hague.
Liddell, S. (1990) Four functions of a Locus: Reexamining the Structure of Space in ASL. In Lucas C. (ed.), *Theoretical Issues in Sign Languages II*. Gallaudet Press, Washington, D.C.
Link, G. (1983) The Logical Analysis of Plurals and Mass Terms: A Lattice-Theoretic Approach. In R. Bäuerle, C. Schwarze, and A. von Stechow (eds.), *Meaning, Use and Interpretation of Language*. de Gruyter, Berlin.
Klima, E. and Bellugi, U. (1979) *The Signs of Language*, Harvard University Press, Cambridge, Mass.
Lillo-Martin, D. (1986) Two Kinds of Null Arguments in American Sign Language, *Natural Language and Linguistic Theory* 4, 415–444.
Lillo-Martin, D. and Klima, E. (1990) Pointing out Differences: ASL Pronouns in Syntactic Theory. In S. Fischer and P. Siple, (eds.) *Theoretical Issues in Sign Language Research I: Linguistics*, University of Chicago Press, Chicago.
Padden, C. (1988) Interaction of Morphology and Syntax in American Sign Language. Garland Outstanding Dissertations in Linguistics, Series 4. Garland Press, New York.
Padden, C. (1990) The Relation between Space and Grammar in ASL Verbal Morphology. In C. Lucas (ed.), *Theoretical Issues in Sign Languages II*, Gallaudet Press, Washington, DC.
Partee, B., Bach, E., and Kratzer, A. (1987) Quantification: A Cross-Linguistic Perspective, NSF proposal, UMass, Amherst.
Poizner, H., Klima, E., and Bellugi, U. (1987) *What the Hands Reveal about the Brain*, MIT Press, Cambridge.
Supalla, T. (1982) Structure and Acquisition of Verbs of Motion and Location. Ph.D. Dissertation, University of California, San Diego.
Supalla, T. (1985) The Classifier System in ASL. In C. Craig (ed.), *Noun Classification and Categorization*, John Benjamin, Philadelphia.
Supalla, T. and Newport, E. (1978) How Many Seats in a Chair? The Derivation of Nouns and Verbs in American Sign Language. In P. Siple (ed.), *Understanding Language through Sign Language Research*, Academic Press, New York.
Wilbur, R., Bernstein, M., and Kantor, R. (1985) The Semantic Domain of Classifiers in American Sign Language, *Sign Language Studies* 46, 1–38.
Vendler, Z. (1967) *Linguistics in Philosophy*, Cornell University, New York.

18. QUANTIFICATION, EVENTS, AND GERUNDS

1. INTRODUCTION

In this paper I will argue that gerunds are amenable to a treatment that ascribes much of their semantic variability to various quantificational operators that may be present in a sentence. Such an analysis is in the spirit of the theories of indefinites of Kamp (1981) and Heim (1982). We will also be able to develop a new argument in favour of the Kamp/Heim framework, a result which has wider significance for understanding quantification in natural language. Furthermore, the treatment of gerunds requires a theory somewhat different from that needed for indefinites; in this way too we can gain in our study of quantification. Finally, these results are made precise when I put forward an explicit fragment that interprets many Logical Forms containing gerunds.

1.1. *Similarities and Differences between Bare Plurals and Gerunds*

As we first noted by Carlson (1977), gerunds show a range of meaning very similar to that displayed by bare plurals:

(1) a. Fleas are jumping on my dog.
b. Eating apples made me sick.

(2) a. Fleas jump on dogs.
b. Eating applies is fun.

(3) a. Fleas are a much-hated species.
b. Eating applies is extremely popular in the fall.

Both the bare plural in (1a) and the gerund in (1b) make a nongeneric statement about individuals – in (1a), about some fleas, in (1b), about a certain event of apple-eating. Both (2a) and (2b) make a generic statement about individuals. (2a) claims that a typical flea jumps on dogs, while (2b) asserts that a typical apple-eating event is fun. Finally, (3a) and (3b) make a different sort of statement: their predicates do not intuitively apply to an insect or an event. (3a) has to do with a natural

E. Bach, E. Jelinek, A. Kratzer and B. H. Partee (eds.), Quantification in Natural Languages, 619–659.

kind and not directly with individual fleas, while (3b) makes a statement about a practice, not directly about individual apple-eating events.

The parallelism drawn by Carlson between gerunds and bare plurals, while impressive, is not complete. Bare plurals of the sort in (1a) are interpreted as indefinites (that is, they are interpreted existentially), while gerunds like those in (1b) seem to be definites. Consider:

(4) It's unlikely that firemen are available.
It's unlikely that calling the fire station brought help.

(5) Iguanas didn't eat that hibiscus.
Lifting those clocks didn't tire me out.

(6) Sam didn't believe that bats scratched my face.
Sam didn't believe that planting cacti tired me out.

(7) If rats scratched Sam's face, he will surely die.
If planting cacti tired Sam out, he will surely die.

In each of these examples, the bare plural is clearly not presupposed material. In contrast, the events picked out by the gerunds are presupposed to have occurred.[1] In other words, they seem to be definite.

A main challenge for a theory of gerunds and bare plurals is to account for the similarities and differences between the two constructions. I will give my account of the difference in Section 1.3, and in more detail in Section 2.1. The essence of my proposal is this: gerunds are treated as elements which lack quantificational force of their own, but which are interpreted universally, existentially, or whatever, based on their context. This analysis has been given previously for bare plurals. Also for bare plurals, it has been claimed that the operation which gives existential force is confined to certain constituents of the sentence. Subject gerunds cannot be in the relevant positions, so they never get existential force. I also suggest that subject gerunds differ from subject bare plurals in that subject gerunds are topics, much like sentential subjects (Koster, 1978). Existential force can be argued to be incompatible with topichood.

1.2. *Previous Theories*

Several authors have discussed similarities in interpretation among bare plurals, mass terms, verbal nominalizations, and infinitives. Carlson (1977) gives a in-depth and uniform analysis of bare plurals, while also

making remarks about the other, similar constructions. Carlson seeks to explain the semantic variability that bare plurals show while postulating that they uniformly denote **kinds**.[2] Returning to (1a) and (2a), the bare plural in (1a) is interpreted existentially, while that in (2a) is interpreted generically. Carlson calls the sort of VP that allow an existential reading of its subject a **stage-level** predicate. Those that require a generic reading are the **individual-level** predicates. Carlson attributes this difference not to a distinction in how the bare plural is interpreted, but in terms of the predicate. The most transparent use of the bare plural is taken to be in sentences like (3a) where it seems clear that the bare plural must refer to a natural kind. Taking his cue from this, the predicate in (1a) is to be interpreted as claiming that there are members of the kind denoted by the subject (i.e. fleas) that are jumping on my dog: $\lambda x[\exists y[R(y, x) \& J(y)]]$. (R "Realizes" is a relation which holds between a temporally bounded stage of an object and the kind to which that object belongs.) The predicate in (2a) instead does not make direct reference to individual realizations of the kind denoted by its subject; it claims that the kind itself jumps on dogs, a statement which is to be related indirectly to the behavior of individual realizations of the kind.

Chierchia (1984) focuses his discussion on gerunds and infinitives. With respect to gerunds, he works out an account of their semantic variability that parallels Carlson's theory of bare plurals. Chierchia proposes that the gerunds uniformly denote an individual correlated with a property (its **individual correlate**), in (1)–(3) that of eating apples. This individual is an abstract object that plays the role of a kind in Carlson's theory. Let us call the kind-like object which is the denotation of the subject in (3b) a **practice**, to my mind its best colloquial rendition. On Chierchia's theory, a realization of a practice will be an event or situation.[3] The present theory will follow Chierchia in identifying practices with individual correlates of set-theoretic objects, and in having the realizations be events.

In the domain of bare plurals, Wilkinson (1986) and Gerstner and Krifka (1987) have challenged one major claim of the Carlsonian theory. They argue that not all bare plurals denote kinds. While, according to them, the bare plural in (3a) does denote a kind, those in (1a) and (2a) are ordinary indefinites. Their theory of what an ordinary indefinite denotes is that coming from the work of Lewis (1975), Kamp (1981) and Heim (1982). The crucial idea in this theory is that the surface

position of an indefinite is occupied by a variable in translation, and that the content of the indefinite (e.g. λx[**flea**(x)]) is also applied to that variable, placing a restriction on it. This process does not result in binding this variable, and, at least until other parts of the sentence are taken into account, the variable remains free. The difference in readings between (1a) and (2a) is then derived from a difference in what quantificational elements are subsequently associated with the open sentence. In particular, free variables can be bound: (1) by some adverb of quantification (e.g. *always, usually, never*) in the sentence, (ii) by an implicit generic quantifier which acts similarly to the adverbs (this would be the case in (2a)), or (iii) by an existential quantifier brought in in certain circumstances ((1a)). (Process (iii) is called **existential closure**).[4] In this way, one central idea of Carlson's analysis is adopted – that bare plurals' semantic variability is (largely) due to linguistic context.

The fragment in the appendix will give an explicit and compositional formulation of these ideas as they pertain specifically to gerunds. Gerunds containing stage-level VP's can denote sets[5] of events; they introduce and restrict a variable and may end up with interpretations parallel to (i)–(iii). This is exactly like ordinary indefinites on a rather straightforward way of looking at the Kamp/Heim theory.[6] The non-set-denoting gerunds containing stage-level VP's will denote practices, i.e. individual correlates of these sets of events. (We'll discuss gerunds containing individual-level predicates in Section 3.3.) I will call this type of theory a **Quantificational** theory of bare plurals or gerunds, because the readings that these items have are the result of what quantificational force they are given by the linguistic context, except when they denote a kind or practice. A Carlson/Chierchia-style theory will be referred to as a **predicational** theory, because the gerund or bare plural always refers to an individual of which something is directly predicated.

1.3. *The Difference Again*

So how do the previous theories fare with respect to the fact that gerund subjects are definite while bare plurals are indefinite? The predicational theory is not in a good position to explain this difference.[7] The existential force a bare plural subject gets is written into the meaning of the predicate, as we saw above. This is an existential over realizations of the kind. On the straight Carlsonian line, then, verbs that take gerunds would seemingly have to have an iota operator, binding an event variable,

written into their meaning. However, this will not work: predicates that take both bare plurals and gerunds (like *is nice*) need to be ambiguous between making a definite and an indefinite statement about realizations of their subject. Unless this predicate had a conjunction within its lexical meaning (λk[[K(k) ⊃ ∃x(R(x, k) & nice(x))] & [P(k) ⊃ nice(ιx(R(x, k))]] with K = kind and P = practice) we will need two separate lexical entries. Instead of this, one could avoid building the existential and definite entailments into the meaning of the verb structurally, but enforce them through some kind of redundancy rule or meaning postulate. This redundancy rule would have to apply to all predicates taking kind or practice subjects, but would need to be able to distinguish between the kinds and the practices so that the former could have an existential, and the latter a definite, entailment. I don't know of other lexical generalizations that need to partition the domain of individuals in this way. Another difficulty for the predicational theory is that there's no reason why it's the presence or absence of indefiniteness (as opposed to a universal reading, say) that's at issue.

According to the quantificational theory, existential force for a bare plural is the result of its being bound by existential closure. We will be able to distinguish gerunds from bare plurals by a single syntactic condition. In brief, one can say this: At Logical Form, a gerund subject will not be in a position in which the variable it introduces can be bound by existential closure.

The difficulties that have been mentioned above for the predicational theory aren't present on the quantificational theory. The quantificational theory reduces the question of whether an existential reading arises to whether a phrase is in the domain of an independently needed operation of existential closure. Subject gerunds differ from other subjects in that they are not in the domain of this operation. Only by looking more closely at the derivation of Logical Form will we be able to see exactly how this works.

2. SYNTAX AND THE DERIVATION OF LOGICAL FORM

This section goes over my assumptions concerning Logical Form and Syntax in general, with Section 2.1 containing the account of why gerund subjects are not existentially closed.

2.1. *The Status of Subjects*

2.1.1. *Subject Gerunds vs. Subject Bare Plurals*

Diesing (1988, 1992) proposes that bare plural subjects that can receive an existential reading originate from the specifier of VP position, though in English they always move to the specifier of IP at S-structure to receive case. The present proposal – with one crucial reservation to be discussed later in this section – adopts this theory. Diesing argues that VP's are canonically the domain of existential closure. Her most straightforward argument involves making a comparison to German, where subjects of stage-level predicates may be either inside the VP or outside it at S-structure; they get an existential interpretation just when they're inside the VP.

Returning to English, existential interpretation of bare plurals which are subjects of stage-level predicates can be seen as showing that they are interpreted as if they are inside the VP. Diesing postulates that the way they can be inside the VP is via a process of reconstruction in deriving Logical Form. Thus, the subject of a stage-level predicate can be outside the VP at S-structure but back inside at LF. Inside the VP, the existential closure operation will provide it with an existential interpretation. This is her, and my, account of why

(8) Cacti are on the shelf.

gives its subject existential force. Subjects of individual-level predicates, in contrast, do not originate inside the VP,[8] a hypothesis also supported by surface facts in German; because of this a bare plural subject of an individual-level predicate can never get an existential reading.

As we've seen before (Section 1.2), gerund subjects do not get an indefinite reading either. This means that the subject of (1b) cannot be inside the VP at Logical Form. There are two reasons it might be unable to be inside the VP at Logical Form, both of which are compatible with my proposals. First, perhaps it is never inside the VP, but is base generated in the surface subject position. Alternatively, it is inside the VP at D-structure, but is unable to undergo reconstruction. The former alternative is more attractive, because we have no theory of why reconstruction should fail with gerunds. The definiteness of subject gerunds can thus be reduced to a statement that they never originate inside the VP.

2.1.2. *Support for the Treatment of Subject Gerunds*

In this section I will discuss additional support for the above treatment of subject gerunds and suggest why they might behave in the way they do.

First, I will present another argument that the gerund subjects we've been discussing don't originate inside the VP, and thus don't avoid indefinite readings merely because they cannot undergo reconstruction. This is that, in cases where a gerund subject is derived by passive (from the complement position of a nonfactive verb), a non-definite reading is possible.

(9) John visiting Mary wasn't imagined by me.

(10) If visiting Mary was contemplated by Jon, Bill must have suggested it.

(11) It's possible that reading Austin was discussed by the group.

(12) Kim doesn't believe that flying to the moon was thought about by Leo.

These gerunds did originate inside the VP, according to transformational analyses of passive, and they do not have to get a definite reading. Any theory must explain why subject gerunds clearly related to a VP internal position may fail to be definite, while those which are underlying subjects are always definite. According to the framework adopted here, the facts above indicate that subject moved from within the VP can undergo reconstruction, in contrast to (4)–(7) and similar examples.

Allowing derived subject gerunds like (9)–(12) to undergo reconstruction may allow for indefinite reading in one of (at least) two ways. One way treats them as being interpreted back in an intensional complement position. Alternatively, in Section 4.2.3 it is suggested that specific intensional verbs like *imagine, contemplate, worship,* and *paint* might not be given this Montague-style analysis (Montague, 1973), but should rather involve (possibilist) existential closure. In this way these derived subjects could be treated almost exactly like Diesing's bare plural stage-level subjects. This possibility will be discussed further below.

One might wonder why ordinary subjects of stage-level predicates are generated in a different syntactic position from gerund subjects. I

think the answer ultimately has to do with a fact about propositional subjects – that they must be topics in focus-topic structure; the presuppositional nature of a topic would likely be incompatible with the narrow-scope existential reading associated with existential closure.[9] That sentential subjects seem to be topics has been noted by Koster (1978). Gerunds in most cases denote sets of possible events,[10] a meaning that has an obvious propositional correlate, the set of worlds in which an event in the set occurs. In an intuitive sense a set of events is very much like a proposition, where information even about what *part* of a world is involved in the truth of the proposition is available. (This connection is even more obvious on reconstructions of the notion of proposition in which propositions are analyzed as sets of situations (Zucchi, 1993; Krazter, 1989; Portner, 1992).

Now we can go to look at other relevant aspects of syntax and the derivation of Logical Form, with an eye towards creating an explicit and compositional semantic fragment to deal with gerunds.

2.2. *The Structure of Gerunds*

Many analyses of gerunds have proposed differing syntactic analyses for the three classes of gerunds: the POSS-ing, ACC-ing, and ing-of gerunds, exemplified below (Roeper and Wasow, 1972; Horn, 1975; Chierchia, 1984; Abney 1987).

(13) John's eating the apples disturbed me

(14) John eating the apples disturbed me

(15) John's eating of the apples disturbed me

I won't be dealing at all with the last type. Their heads seem to behave entirely like ordinary nouns. POSS-ing gerunds are often considered to contain nominalizations of VP's, while ACC-ing gerunds are treated as nominalizations of S's (Horn, 1975; Chierchia, 1984; Abney, 1987).

(16) I saw $[_{NP}\ [_{S}$ John leaving]]

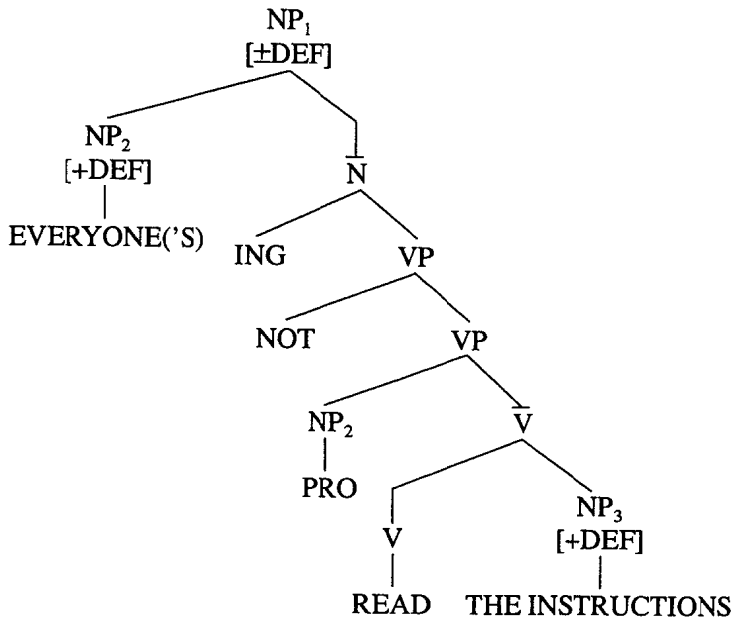
(17) I saw $[_{NP}\ [_{DET}$ John's] $[_{VP}$ leaving]]

I believe that the arguments that these two classes of gerunds have the distinct analyses shown in (16) and (17) are inconclusive, so here I will

propose a uniform syntax for them.[11] Nevertheless, the semantic values that I assign to gerunds could still be gotten on a number of syntactic analyses, including those above. After giving my syntactic proposal, I will briefly mention the arguments in its favor.

The S-structure I will assume is the following:

(18) Everyone('s) not reading the instructions[12]



The crucial parts of this proposal are that gerunds are nominalizations of VP's, not S's, and that the subject of a gerund binds a PRO within the VP.

There are two arguments which motivate this structure. The first concerns the proposal that gerunds are nominalizations of VP's. One might counter that if we assume that gerunds are instead nominalizations of S's, we could explain the parallelism below:

(19) John is not happy.

(20) John's being not happy.

The derivation of (19) involves raising of *be* into the I node. Despite this raising, the negation is still propositional. This causes no difficulties, since the VP in this theory is semantically propositional. If (20) contained a full S, we might expect the same type of raising to I to be able to occur.[13] However, negation in such a case is never sentential – instead it seems to take only *happy* as its argument; consider:

(21) John('s) not being outside at least once a day makes me sick.

(22) John('s) being not outside at least once a day makes me sick.

(23) John wasn't outside at the least once a day.

In (21), *not* can have scope over the PP, as it can in the full S (23). In (22) it cannot. This would follow if a verb could not get to the left of negation through raising because gerunds contain no I node.

Another argument concerns the treatment of *-ing* as inducing a control relation. A subject of a gerund always gets wider scope than a negation in the gerund.

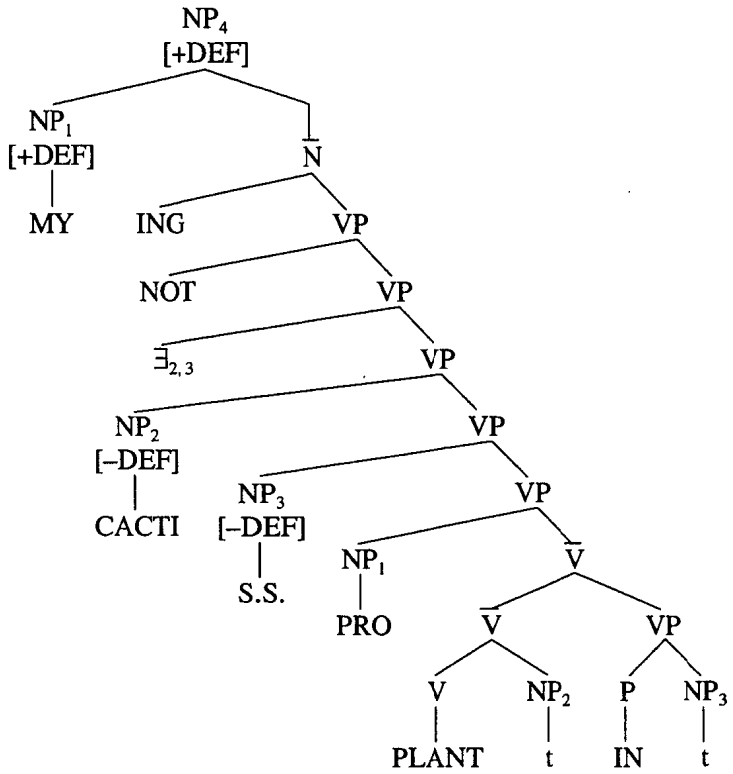
(24) Everyone('s) not liking someone caused problems.

As we saw above, it has been argued that subjects of S's are derived by raising from inside the VP, and that reconstruction is generally possible. If the subject of the gerund had raised, we'd expect for it to be able to undergo reconstruction, getting narrower scope than *not*. However if with gerunds there is control, and no raising, the narrow scope will be impossible.[14]

One puzzle concerning (18) is how the verb surfaces with an *-ing* on it. There are two possibilities. One is that the *-ing* lowers at PF, adjoining to V. The other is that what I've represented as *-ing* is just an abstract element with no phonetic content. It imposes an agreement requirement on its complement. Say it requires it to be [+ing]. By feature percolation, the V will have to be [+ing] too, and we can let this be realized by the *-ing* form of the verb. This latter possibility seems the more plausible and straightforward.

With a syntactic analysis like that in (18), we can derive a Logical Form for the gerund in (25) as below.

(25) My not planting cacti in sandy soil always leads to disaster.



How we derive this structure is discussed next. The points we will look at are the movements of the indefinites and the introduction of the existential quantifier.

2.3. *Quantifier Raising*

Most NP's which are of type ⟨⟨e, t⟩, t⟩ or ⟨e, t⟩ will undergo Quantifier Raising (QR) in the derivation from S-structure to LF. For reasons discussed in the next paragraph, nonspecific objects of intensional verbs and predicative NP's do not undergo QR. QR adjoins an NP to a dominating S or VP. I assume that every NP has an index at S-structure, and QR leaves behind a trace with the same index as the moved NP. The trace will be translated as a variable, and the moved NP will, if it is quantificational, bind that variable.

QR has a particular place in the view of the syntax-semantics interface reflected in the fragment. According to this view, the reason why NP's undergo QR is that they would not be able to be interpreted if they remained in their S-structure position (cf. Partee (1987)). The idea is that most NP positions in syntax are associated with type e ("entity") arguments of other words or phrases. If an NP not itself of type e remains in such a position at LF, the fragment below will be unable to interpret the combination. For instance, if *hit* is of type ⟨e, ⟨e, t⟩⟩ (ignoring any event argument), and *every man* ⟨⟨e, t⟩, t⟩, *hit every man* will be uninterpretable if QR doesn't occur. This conception of QR will receive independent support in Section 3.4.

2.4. *Adverb Preposing and Existential Closure*

As discussed by Heim, every adverb of quantification, including the phonetically null generic quantifier "G", is attached at LF to the left edge of S. With the adverb attached to an S, it will typically have two sisters. For instance, if an indefinite subject has undergone QR, the adverb will have as its sisters the indefinite and the original S:

$[_S$ always $[_{NPi}$ children$]$ $[_S$ t_i come$]]$

Following Heim, the first sister of the adverb is referred to as its **restrictive clause**, and the second its **nuclear scope.**

An existential quantifier is adjoined to every nuclear scope. Furthermore, every VP has an existential quantifier adjoined to it (as discussed in Section 2.1).

Each adverb of quantification is given a set of indices. These indices must be drawn from those which occur both in its restrictive clause and its nuclear scope.[15] The existential quantifier is given the indices of any free indefinites that it c-commands.

3. SEMANTICS

The appendix presents a formal fragment handling many logical Forms that contain gerunds. Before going on to look at some examples of what precise truth conditions the present system assigns to sentences containing gerunds in Section 3.2 – at which point the reader may wish to consult the appendix – we will examine some factors affecting the readings of gerund-containing sentences that haven't been discussed so far in this paper.

3.1. *What are we Quantifying Over?*

According to the quantificational theory, (25) (repeated)

(25) My not planting cacti in sandy soil always leads to disaster.

is a case of adverbial quantification over individuals. But what individuals are being quantified over here? They seem to be something like events or situations. Which events are being quantified over in (25)? It's not all events in which I didn't plant cacti in sandy soil, since this would include all sorts of irrelevant events like where Mary ate three apples, I killed an iguana, Cynthia decided to become a doctor, etc. Instead what (25) means seems clearly to depend on the focus structure of the gerund. The most natural focus here is on the PP, leading to a reading (26).

(26) All my cacti-plantings in which I didn't plant cacti in sandy soil lead to disaster.

With focus elsewhere, say on *cacti*, other readings arise (cf. Ryle, 1929; Jackendoff, 1972). Focus on *cacti* would give

(27) All my plantings-in-sandy-soil in which I didn't plant cacti lead to disaster.

These readings can be connected to the presuppositions that negated sentences have. As Ryle and Jackendoff, among others, discuss, a negated sentence presupposes its unfocused material. *I don't like THAT* presupposes that I like something, and denies that I like that. In (25) there therefore seems to be quantification over events which satisfy both the gerund's presupposition and its assertion. With the right theory of presupposition (perhaps that of Rooth (1985) or of Kratzer (1989a)) it should be possible to mechanically generate the presupposition of a negative sentence, but I won't pursue this here, as it is of minor relevance to my main points.

There are other cases in which the predicted reading does not easily arise, such as

(28) Mary's not talking to BILL usually makes me angry.

Here we seem to be quantifying over events in which Mary should have talked to Bill, but didn't, and not over events in which she talked to someone besides Bill. Sentences such as these show that what goes into the restrictive clause must be contextually adjustable, a point made Schubert and Pelletier (1987), among others.

The moral of this section is that it's not always straightforward to

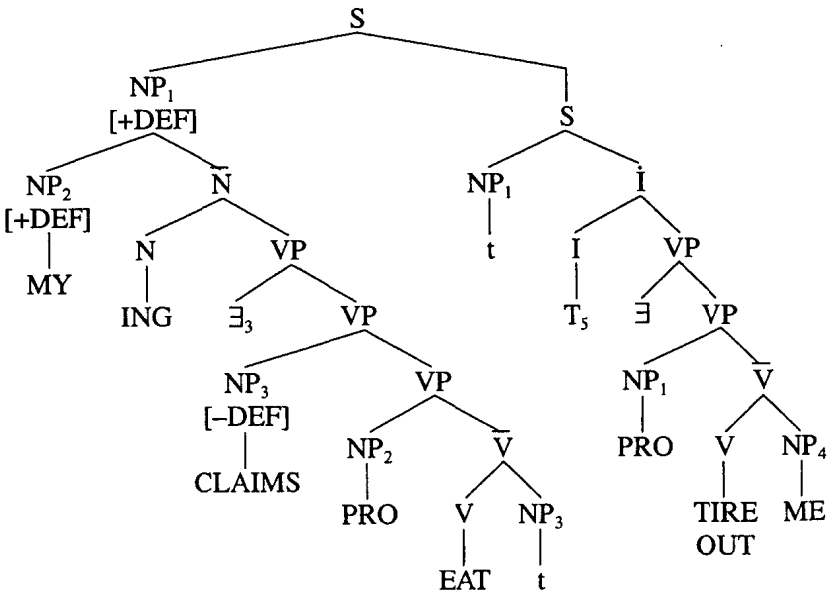
see which set of events is to be quantified over. Several factors contribute to the quantifier restriction; none of them are specific to the analysis of gerunds.

3.2. *Some Examples*

Now we're ready to see the hypotheses about the derivation of Logical Form do some real work. In conjunction with the fragment in the appendix, the Logical Forms given for the examples below will receive the translations shown. These translations are true to our understanding of the examples, I believe.

In the first example, (29) below, e_1 and e_5 are event variables whose reference is contextually fixed. This type of treatment of event arguments is very similar to analyses of contextual pronouns as free variables. *-ing* here denotes a function from sets of events to sets of events.[16] The interpretation is: e_1 is an event of my eating clams and e_5 is an event of e_1's tiring me out.

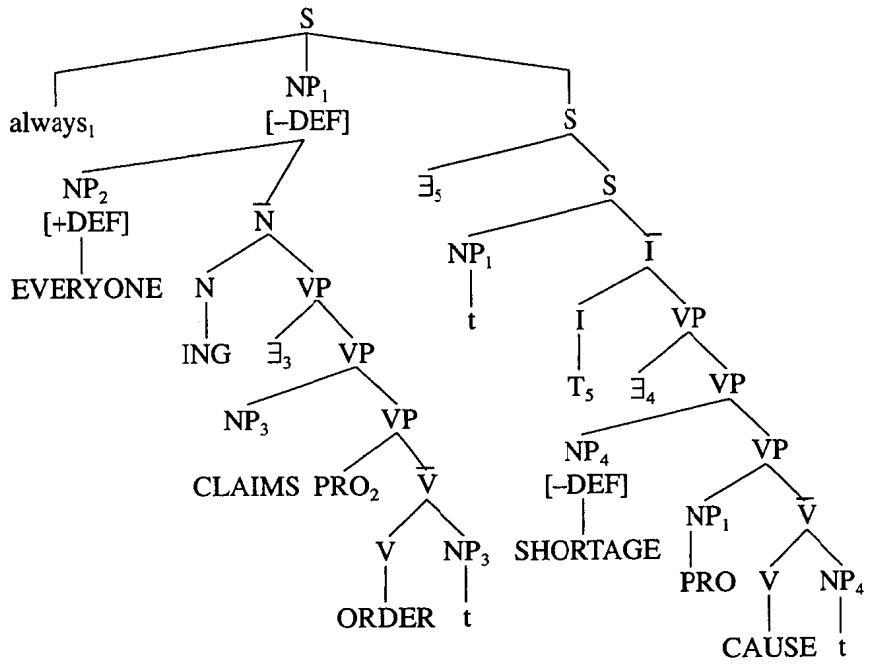
(29) An example of the type (1b): My eating clams tired me out.



$[\text{ing}([\exists x_3[\text{clams}(x_3) \,\&\, \text{eat}(x_3)(I)(e_1)]])] \,\&\, [T(e_5) \,\&\, [\text{tire-out}(I)(e_1)(e_5)]]$

In (30) x_2 represents the subject argument of *order*, and *everyone* quantifies into that position. The sentence means: for every event e_1 in which everyone orders clams, there is a shortage that e_1 causes. Why NP_1 is [-def] is discussed in Section 4.1.

(30) An example of the type (2b) Everyone ordering clams always causes a shortage.



$\text{always}_{e1}\,[\text{everyone}(\lambda x_2(\text{ing}(\exists x_3[\text{clams}(x_3) \,\&\, \text{order}(x_3)(x_2)(e_1)])))]$

$\exists x_4 \exists e_5[T(x_5) \,\&\, [(\text{shortage}(x_4) \,\&\, \text{cause}(x_4)(e_1)(e_5))]]$

3.3. *Some Loose Ends*

Kratzer (1988) argues that individual-level predicates don't have a Davidsonian event argument. Because of this, a question now arises as to how we're going to treat (31).

(31) Knowing French is exciting (for Ulric).

The lack of an event argument can be seen by the following:

(32) a. Speaking French is usually fun.
b. Eating apples is always pleasant.
c. Driving a car is seldom dangerous.

(33)a.??Knowing French is usually fun.
b.??Being a Capricorn is always pleasant.
c.??Having blond hair is seldom dangerous.

The (33a–c) examples don't have the quantification over events (or states or whatever) reading. Since these gerunds don't introduce an event variable, because they are individual-level, the predicates can't be predicates of events. Instead, they apparently must take a propositional subject. Comparing (33a) to (34).

(34) Knowing a foreign language is usually fun.

where there does seem to be a quantificational reading, makes two important points. One is that with individual-level predicates an explicit indefinite can introduce a variable to quantify over, though the verb itself cannot. (This type of point has been made in other cases by Kratzer.) In order to get an appropriate structure, the indefinite must undergo QR, giving:

(35) usually_x [foreign language(x)] [speaking x is fun]

The other point made by (34) is that the variable represented by the PRO subject of the gerunds in (33a–c) doesn't seem to be available for quantification, even though it's plausibly also in the nuclear scope, in an implicit dative phrase.[17]

In the absence of a quantificational reading with (31), the only alternative is to let the proposition that the gerund denotes, or its individual-correlate, being the argument of *is exciting*. If the individual correlate is the right choice, we might call it a **state**. It's not clear which is the better analysis of (31).

3.4. *A Related Construction*

In this section I will examine a construction related to the gerunds we've been discussing. It will be relevant for for two reasons. First it

gives evidence for my assumption that QR is the inevitable result of a non-type-e expression being in a type e argument position. And second, it supports the need for adverbial event quantification with clauses and gerunds. The argument relates to sentences like the following, which was problematical in the treatment of Partee (1984).

(36) Before John makes a phone call, he always lights up a cigarette.

This does not mean that for all events (times for Partee) before John makes a phone call, he lights up a cigarette. That is, the *before* clause itself does not form the restrictive clause for the adverb *always*. It means that whenever John makes a phone call, he lights up a cigarette beforehand. First note that we have a straightforward account of (37):

(37) Before making a phone call, John always lights up a cigarette.

If the gerund removes itself from its S-structure position by QR, as we've been assuming for the other cases, and forms a restrictive clause, we expect a Logical Form schematically like this:

(38) always_e [John makes a phone call(e)] [Before e, John lights up a cigarette]

We can treat *before e* just like any temporal modifier. Returning to (36), it could receive the same treatment as (37) if the clause can be forced out of its S-structure position leaving an e-type trace representing its event variable. Movement can be motivated by the assumption that *before* selects for an event argument (it's of type $\langle e, X \rangle$, for some X), so a clause is of the wrong type to be interpreted in place (cf. Parsons (1989)). The S itself then forms the restrictive clause, not *before S*. These cases are interesting because they're difficult to treat in a unselective binding framework unless the complement of *before* does move, but without a theory like the one here, the stipulation of movement is ad hoc.[18]

This concludes the discussion of the basic semantics for gerunds. Now we move on to the presuppositions of gerunds and the rules that put gerunds in a variety of syntactic positions, in particular complement gerunds, in the right logical forms. These are the next two major topics of the paper.

4. PRAGMATICS AND THE DERIVATION OF LOGICAL FORM

For the rest of the paper, we'll look at a number of consequences of the present analysis. With a quantificational theory of the semantic variability of gerunds, we will be able to understand a range of data concerning gerunds in complement position. Before doing this, however, we need to better understand the distinction between POSS-ing and ACC-ing gerunds. A POSS-ing gerund in complement position often has a generic reading when an ACC-ing gerund does not:

(39) Joyce always visualizes Bill's kissing Sue.

(40) Joyce always visualizes Bill kissing Sue.

(41) Greg usually discusses Bill's breaking the computer.

(42) Greg usually discusses Bill breaking the computer.

(39), in contrast to (40), can make a generic statement about events in which Bill visits Sue: Whenever there is an event of Bill kissing Sue, Joyce visualizes that event. (40) does not seem to quantify over the gerund. Instead, it means that in some relevant set of circumstances (say when she's home alone), Joyce visualizes (e.g. daydreams about) Bill kissing Sue. (41) and (42) show a similar contrast. These facts will be explained below.

4.1. *POSS-ing vs. ACC-ing Gerunds*

An important difference between POSS-ing and ACC-ing gerunds is that POSS-ing's are definite, while ACC-ing's are indefinite. This can be argued on the basis of facts which have previously been used to motivate different syntactic structures for ACC-ing and POSS-ing gerunds.

First, Horn (1975) discusses the fact that ACC-ing's cannot be topicalized, as shown by (43)(his (120)):

(43) a.*John kissing Mary we remembered.
b.*Fred singing the national anthem everyone imagined.
c.*Mary arguing with her parents all the neighbors heard.

cf.

(44) a. John's kissing Mary we remembered.
b. Fred's singing the national anthem everyone imagined.

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:

(45) a.*A man we remembered.
b.*A flying pig everyone imagined.
c.*A terrible fight all the neighbors heard.

A second difference between POSS-ing's and ACC-ing's is some extraction facts from Horn. It is possible to extract from an ACC-ing gerund but not from a POSS-ing.

(46) a. Which city do you remember him describing.
b.*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.

(47) a. Which man did he see a friend of.
b.??Which man did he see the friend of.

These two differences between ACC-ing's and POSS-ing's therefore seem to be connected to a difference of definiteness. Lending the final weight to the identification of POSS-ing's with definites and ACC-ing's with indefinites is the strong similarity that regular NP's show to the contrast between (48a) and (49a).

(48) a. John imagined Bill's leaving.
b. John imagined/predicted the earthquake.

(49) a. John imagined Bill leaving.
b. John imagined/predicted an earthquake.

(48b) presupposes that a particular earthquake is somehow salient in the conversation, just as (48a) presupposes that a leaving is under discussion.[19] Neither (49a) nor (49b) presuppose any event. The difference between (48b) and (49b) is simply definiteness, and it's seems likely that it's the same difference in (48a)–(49a).

4.2. *Definite vs. Indefinite Gerunds*

The difference in definiteness between ACC-ing and POSS-ing gerunds is relevant for when a quantificational reading is available. In simple subject cases both ACC-ing and POSS-ing gerunds allow quantification:

(50) Bill leaving town frightens Mary.

(51) Bill's leaving town frightens Mary.

In these examples, a generic operator quantifies over events in which Bill leaves town. Thus both subject ACC-ing's and subject POSS-ing's must be able to appear in the restrictive clause of their S, making the event variable available for quantification.

In looking at gerunds in complement position, it seems that in some cases a POSS-ing gerund can be present in the restrictive clause while an ACC-ing cannot (e.g. (39)–(40)). With the POSS-ing in the restrictive clause, quantification will be able to occur as normal, binding the event argument; quantification over this argument will be impossible in the ACC-ing case. What I will propose is that POSS-ing gerunds will always form part of the restrictive clause because they are definite – they will be present in the restrictive clause through a process of presupposition accommodation.

4.2.1. *Presupposition Accommodation*

Before going on, some more general comments should be made about the topic of accommodation. The central concept comes from the work of Lewis (1979). When a speaker makes a statement with presuppositions that are unmet in a discourse context, there are a number of different things his or her hearer may do. One course would be to explicitly point out that this presupposition is unmet, and to deny it, question it, or insist on further discussion. On the other hand, the hearer may simply assume that prior conversation did establish the presupposed proposition, changing his or her understanding of the prior conversation to reflect this. This process of accommodating the speaker's presupposition may take place quite consciously, or it may be done without the hearer becoming aware of it at all. Such would probably be the case, for instance, if I said *The problem with this book is that it's excessively long*, which presupposes that there is a problem with the book.

Intuitively there are several ways that presupposition accommodation could work. An example like (52a) uttered out of the blue would probably be interpreted synonymously with (52b).

(52) a. The man I talked to hit me.
b. I talked to a man and the man I talked to hit me.

Here we could say that the presupposition is accommodated via conjunction. The presupposed material is simply conjoined with the asserted statement. In contrast, in (53a) we can get an interpretation like (53b)

(53) a. I would realize that someone had betrayed me.
b. If someone had betrayed me, I would realize it.

Here we seem to have a presupposition accommodated by a conditional clause. *Realize*, as a factive, presupposes its complement. In this context the presupposition is accommodated in a way that is as if there were an *if* clause. In

(53) c. I realized that someone had betrayed me.

instead we have the first kind of accommodation – accommodation by conjunction.

Heim (1982, 1983) discusses these two methods of accommodation. The process in (52a) is called **global accommodation**. That in (53a) is **local accommodation**. Global accommodation is so-called because the accommodated material remains in the discourse context for good, while with local accommodation, the material is only assumed tentatively for the interpretation of the presupposing phrases. It is possible to have conjunctive accommodation that is local. This can happen in the context of an explicit conditional, as in

(54) a. If someone dies, Sam will realize that it was murder.

Here the presupposition of *realize* is not accommodated exactly as in either of the previous examples, but instead we get a meaning like

(54) b. If someone dies, it will be murder and Sam will realize it was murder.

This accommodation is not global in that the presupposition "it was murder" does not remain in the context for good,[20] but it doesn't play the role of an *if* clause either, since then the sentence would be equivalent to the following, which it isn't.

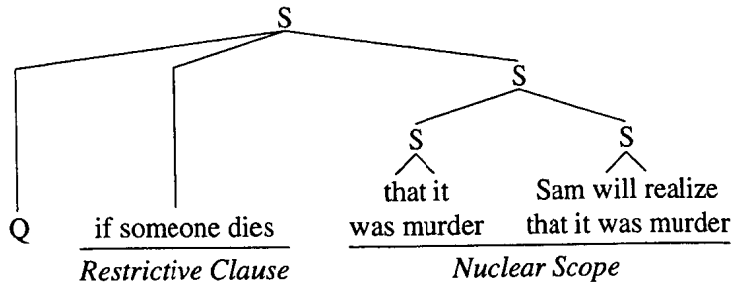
(54) c. If someone dies and if it's murder, Sam will realize that it was murder.

A completely worked-out theory of presupposition and presupposition projection will have to be able to account for all these types of accommodation. I do not have a completely worked out theory, but as I've

suggested above, I intend to treat presuppositions of definite gerunds as having been copied into a restrictive clause. An example is (41), where the descriptive content of a POSS-ing gerund is presupposed, and so is able to form a restrictive clause. First the gerund is adjoined to the VP by QR, and then presupposition accommodation copies the gerund (minus its definiteness) into the restrictive clause. This copying will assure that the presupposition of the definite gerund is met at the time it is interpreted, and in this way it has the effect of accommodation.

What I will defend now is that this idea, as it is made more explicit by the fragment given in the appendix, properly allows both conjunctive type and conditional type accommodation. Let us reexamine examples (29) and (30). In (30) we have a case where a sentence is broken down into a tripartite structure, the second element of which is the gerund subject. This is the restrictive clause. In (29) we have merely a bipartition, with the first element being the gerund, which has been moved by QR. This gerund gets where it is in the same way as that in (30), and we may if we wish continue to call it a "restrictive clause", even though there's no adverb that it restricts (following Kratzer (1988)). The gerund in (29) is ultimately translated by rule 9 of the fragment, by which it is interpreted as conjoined with the other half of the bipartition. Thus, given the right circumstances, a restrictive clause can be interpreted either conjunctively or conditionally.

What the proposal that a POSS-ing gerund is copied into the matrix restrictive clause amounts to then is that a copy of it is adjoined to the matrix S. Of course this syntactic conception is a very particular way of looking at presupposition accommodation, but one that is justified in a preliminary way by the fact that the correct variety of interpretations is then obtained by previously formulated rules. Now we should look again at (54a), which shows that our identifying "phrase adjoined to S" with "restrictive clause" is a bit problematical. Though accommodation has occurred, the clear restrictive clause – the *if* clause – is playing a role different from our derived "restrictive clause", the factive complement. Instead the latter is playing the role of one conjunct of the nuclear scope. However, this discrepancy need not be a problem if we accept a principle that explicit *if* clauses take priority over other potentially restricting material, and claim the sole right to restrict operators. The rest of the S will then be interpreted conjunctively, via rule 9, and given the existence of the adverb will turn out actually to be a nuclear scope.



Q is whatever implicit quantifier is present in (54a). The status of the copied phrase is thus better described by our theory – "adjoined to S" – than by the not quite appropriate concept "copied into the restrictive clause".

4.2.2. *Quantificational Readings for Complement Gerunds*

Now we can return to looking at gerunds in complement position. As we do so we will get more support for the idea that presupposition accommodation is (at least in the domain we're looking at) a process of adjunction to S.

In (55) and (56) we see a significant contrast.[21]

(55) John always celebrates winning a prize.

(56) John always imagines winning a prize.

(55) has a reading that involves quantification over events or states of affairs of winning a prize; that is, its meaning can be prarphrased by (55′):

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

(56), like (40), instead can not have the adverbially quantified meaning (56′):

(56′) For all e, if e is an event of (John) winning a prize, John imagines e.

This contrast seems to be between verbs that presuppose their complements – the factives – and those that do not – the nonfactives. (57) and (58) give more examples:

Factives:

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

Nonfactives:

(58) a. Fred always contemplates going to town.
b. Sarah usually thinks about visiting her mother.
c. Monique occasionally discusses playing soccer.

Whereas all the examples in (57) can involve quantification over events, those in (58) cannot. (57a) can mean: whenever he goes to town, Fred enjoys it. (58a) cannot mean: whenever he goes to town, Fred contemplates it. Besides this reading in which the adverb of quantification is restricted by the gerund, the examples with factives also have another sort of reading, parallel to that of (54a), the narrow conjunction reading. On this reading (57a) will mean: In some contextually specified set of circumstances (e.g. when he goes to visit his mother), Fred goes to town and enjoys it.

This distinction between factives and nonfactives fits nicely into what was said in connection with the ACC-ing vs. POSS-ing difference above. Complements of factive verbs may be in the restrictive clause through presupposition accommodation, just like POSS-ing's. As will be discussed next, this analysis is completely parallel to Berman's treatment of indirect questions. The fact that POSS-ing's are available for quantification even when they are the complement of a nonfactive ((39) and (41)) supports the idea that they are inherently definite.

The paraphrases of (57) given above indicate that the verbs are being treated as selecting for an event complement. Another hypothesis might be that they select for a proposition. That this is not right can be seen by a comparison to indirect questions. Berman (1989) analyzes a set of facts for factive and nonfactive indirect question-taking verbs that parallels (57)–(58).

(59) John always knows who won a prize.

(60) John always wonders who won a prize.

(59) can mean that for every person who won a prize, John knows that they won a prize. (60) cannot quantify over prize-winners. Berman explains the contrast by claiming that the complement of the factive can be accommodated into the restrictive clause, allowing quantification over the wh-phrase, while the complement of the nonfactive cannot. Now consider

(61) John always celebrates Jane's winning a prize.

This case can be paraphrased by "whenever something is an event of Jane winning a prize, John celebrates it." It cannot mean that whenever

something is an event of Jane winning a prize, John celebrates Jane's winning a prize. He can't keep celebrating the same prize-winning, each time she wins a new prize. Notice that the requirement that a *prize* not be interpreted *de dicto* does not hold with (59). There he must merely know of each person who won a prize that they won some prize or another, and if someone won several prizes, he needn't know it.

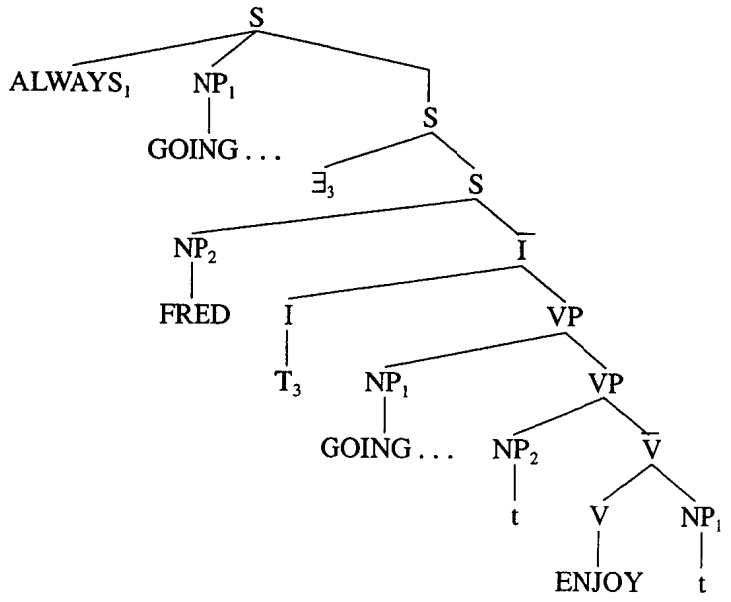
The fact with gerunds can be explained if the complement is really an event variable, since each event of winning a prize will involve a particular prize. Indirect questions, in contrast, have propositional complements, allowing an NP inside to be understood *de dicto*.

4.2.3. *ACC-ing Complement Gerunds*

So far we've only considered complement gerunds that can get quantificational readings. We must be sure that ACC-ing gerunds complements of nonfactive verbs cannot be quantified over. This means that these ACC-ing gerunds must not be adjoined to IP. The only place left for them to move would appear to be the VP.

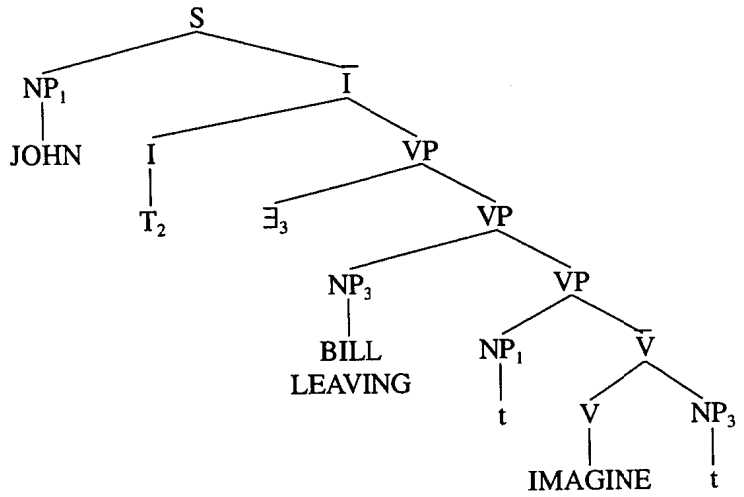
Once a gerund has adjoined to the VP, only if it is factive can it be copied in adjunction to S, giving (62) for (57a):

(62) $always_1[G(e_1)]\ \exists e_3[T(e_3)\ \&\ G(e_1)\ \&\ enjoy(Fred,\ e_1,\ e_3)]$
(G=going to town)



Though we know what happens to those factive gerunds, what of the nonfactive gerunds which are only adjoined to VP? According to our general theory, which follows those of Kamp and Heim in their treatment of indefinites, they should be existentially closed. So the gerunds in (58) should carry an existential implication (though *not* a presupposition). For (49a) we get (63):

(63) $T(e_2)$ & $\exists e_3$[Bill-Leaving(e_3) & imagine(Fred, e_3, e_2)]



This implication is apparently a problem, though one that affects Kamp/Heim theories of ordinary indefinites as well. There are two possible ways out. One is to claim that nonfactive gerund-taking verbs are of the right type to combine with a complement gerund that has remained in its S-structure position (cf. Zimmermann, 1993). Then there would be no QR. This move has the difficulty that it leaves unexplained why, as far as I know (checking Rosenbaum's (1967) list of gerund complement verbs), no nonfactive gerund-taking verbs do end up in the structure (63). We would expect some verbs that did not presuppose their complement but which forced it to undergo QR and existential closure – to be as I've just suggested the nonfactives themselves are treated. Such a verb would be an implicative, implying the occurrence of its complement, and there don't seem to be any which take gerunds as objects. Nevertheless, though this approach does have this one conceptual difficulty, it seems to be a workable solution.

Instead of admitting this unexplained gap, one can follow the analysis that some nonfactive ACC-ing complements do undergo QR, and simply deny that existential closure over a gerund entails a commitment to the real world occurrence of such an event. Bennett (1974), Cocchiarella (1969), and Parsons (1980) have proposed nonextensional quantifiers for natural language. With this analysis, existential closure would quantify over possible objects.

We must be very careful with an analysis involving possibilist quantifiers, however, to avoid the potential incoherence of *de re* attitudes towards unrealized possibles. Consider (63) to see whether the analysis makes sense for the present task. If this Logical Form is meant to mean that there is a particular possible event which Fred imagined, much more needs to be said. If possible events are complete and on a par with actual ones, Fred's mental contents could not possibly pick out a single event. There will be many compatible with his imaginings. One solution, the approach Parsons would presumably take, would be to admit incomplete possible individuals (sort of like property bundles), and say that Fred imagines the minimal (certainly incomplete) event consistent with his mental contents. Another approach would preserve possible individuals as complete as actual individuals. There we would take advantage of *imagine*'s synonymy with *have an image of*.[22] Let's say that an image's content is a set of possible individuals. Then, *for y to image/have an image of x* could be explained as *for y to have an image z such that* $x \in$ *the content of z*. This example

(64) John imagined a blue horse.

would then be true iff there is a (possible) blue horse x such that John's mental image has a content which includes x.[23]

Using a nonextensional existential quantifier is only plausible for verbs which do not take a nonspecific intensional object. A verb like *think about* seems to place its subject in a relation to a fairly constrained set of possibly nonexistent individuals, while one like *seek* allows an altogether nonspecific object. In the domain of events, parallel verbs are *imagine* and *deny*. One can propose that *imagine* does involve a Logical Form like (63), while Montague's (1973) treatment of *seek* should be extended to *deny*. One useful diagnostic for telling *seek*-type verbs from *think about*-type verbs is to use an impossible object or event as a complement:

(65) John is seeking a round square.
John is denying being both here and not-here.

(66) ??John is thinking about a round square.
??John is imagining being both here and not-here.

(65) is possible while (66) is, by my judgment, not possible.[24] (Some judge (66) not to be totally impossible, but still find a clear difference from (65).)

The fragment given in the appendix can be modified in a fairly straightforward way to deal with the above comments. It is necessary to be sure that possible objects are not quantified over in too many cases. Both Cocchiarella and Parsons develop theories in which a relation or property may entail the existence of any of its arguments. So for instance *imagine* entails the real-world existence of its subject argument, while it allows its complement not to exist in the real world.

5. CONCLUSION

The main point of this paper has been to investigate the similarities and differences between gerunds and bare plurals. I have argued that they are only naturally accounted for on a quantificational theory. I have also investigated the presuppositional nature of POSS-ing and ACC-ing gerunds, and found POSS-ing's to be definite and ACC-ing's to be indefinite. The definiteness distinction correlated with the availability of readings in a way that was naturally accounted for in the quantificational theory.

APPENDIX: THE FRAGMENT

As I discuss a semantic fragment for gerunds, I assume a framework wherein the interpretive component is provided with Logical Forms derived in accordance with Government and Binding syntactic theory. The LF's are to be interpreted in a compositional and precise way. The set of possible Logical Forms will be those structures which can both be generated by syntactic rules and be interpreted by the available semantic operations. These operations apply to structures by a strategy of type-driven combination.[25] The semantic component may actively place constraints on LF due to the fact that only a limited array of operations are available to it; the way QR is forced is an example of this.

I will now go into several of the more interesting and potentially confusing rules of the semantic system, discussing them one at a time, before summarizing the fragment as a whole. I am assuming that PRO is to be interpreted as an e-type variable ("entity type"), as in Chierchia (1987), and that stage-level predicates have a Davidsonian event argument along the lines of Kratzer (1988).

I am not making any special assumptions about the relationship between syntactic categories and semantic types. The rules in the fragment tell what type a category's translation is, given the types of its immediate constituents, but as far as my system goes there's nothing to rule out any old type being assigned to a given phrase, if it has constituents that combine that way. This fragment can therefore only deal with fairly well-behaved Logical Forms, and at this point I'm relying on the syntax to keep them well-behaved enough. However, as a further line of research, a theory of what types a given category can be translated into could place many interesting and strong restrictions on the range of possible Logical Forms.[25]

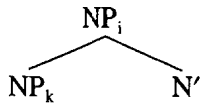
It may be helpful to see the category/type correspondences that play a role in interpreting the Logical Forms discussed in the text. For this reason I give the following table:

Category	Type	Remarks
N, N′	e; ⟨e, t⟩; ⟨⟨e, t⟩, t⟩	(the latter two for names only)
NP	e; ⟨e, t⟩; ⟨⟨e, t⟩, t⟩	
Det	⟨⟨e, t⟩, ⟨⟨e, t⟩, t⟩	(*the* and *a* not included)
Adj	⟨⟨e, t⟩, ⟨e, t⟩⟩	
$V_{trans,\ I\text{-}level}$	⟨e, ⟨e, t⟩⟩	
$T_{trans,\ S\text{-}level}$	⟨e, ⟨e, ⟨e, t⟩⟩⟩	
$V_{intrans,\ S\text{-}level}$	⟨e, ⟨e, t⟩⟩	
PP	⟨⟨e, ⟨e, t⟩, ⟨e, ⟨e, t⟩⟩	(for PP's that attach to stage-level VP)
P	⟨e, ⟨⟨e, ⟨e, t⟩⟩, ⟨e, ⟨e, t⟩⟩⟩⟩	
VP	t; ⟨e, t⟩	
IP	t	(= S)
$Adv_{quant.}$	⟨t, ⟨t, t⟩⟩	(= adverb of quantification)

The and *a* are treated as typeless; they only mark in a pragmatic difference.

The first rule is for quantifying into type ⟨e, t⟩ expressions. The official version (rule 8 in the fragment) is quite general, but as it applies to stage-level gerunds we have:

(67)



N′ is all of the gerund except its subject, and NP_k is the subject.

(67) a. NP_i translates as $\lambda xj[\mathbf{NP}_k(\lambda x_k[\mathbf{N}'(xj)])]$.

Let's use as an example the subject gerund in (30). NP_k is *everyone* and N′ is *ordering clams*. The latter denotes a set of events and the former denotes a generalized quantifier. Bold characters in (67a) indicate the translations of the corresponding part of the structure, so that whole translates is $\lambda x_j[\mathbf{everyone}(\lambda x_2[\mathbf{ordering.clams}(x_2)(x_j)])]$. 2 is the index on *everyone*, and the control relation *-ing* sets up assures us that an x_2 occurs in **N′**. x_j represents the event argument of *order*, and it is just carried along to the whole NP. The index i will not come into play until the whole NP is combined with other phrases, just as the index k (= 2) on the subject of the gerund played no role internal to NP_k, but was used in combining it with N′.

For individual-level gerunds in the configuration (67) the combination can be achieved through the ordinary rule for quantifying into S. The result will be:

(67) b. NP_i translates as $\mathbf{NP}_k(\lambda x_k[\mathbf{N}'])$

Here I'm treating an individual-level N′ like *being tall* as propositional. This follows from their lack of an event argument and the structure (18).

In now going over the semantics for adverbs of quantification, I'll be following the treatment of Kamp and Heim. The rule 3 that combines an adverb of quantification with its two arguments will, when the first argument is a gerund (or other ⟨e, t⟩ expression) apply the gerund's translation to a variabe of its own index. So, for the gerund of (25), indexed 4:

(68) $\mathbf{my}(\lambda x_1(\mathbf{ing})\mathbf{NOT}(\mathbf{UP}))(x_4)$

The index 1 on x_1 comes from my_1. The translation of the structure

(69) [$_S$ always α β]

is then as $\mathbf{always}_\omega(\alpha)(\beta)$, where the interpretation of **always** is given by

(70) $\|\mathbf{always}_\omega(\alpha)(\beta)\|^g$ = {w : for all $g'\langle\omega\rangle g$, if $w \in \|\alpha\|^{g'}$, then $w \in \|\beta\|^{g'}$}

$g'\langle\omega\rangle g$ means that g′ agrees with g on all variables not in ω. As discussed in Section 3.1, in many cases we're going to have to conjoin the translation of the gerund with its presupposition to obtain the correct restrictive clause α. In (71) I've given a representation of the reading of (25) describe in (26). The first argument of the adverb in (71) reflects both the assertion of the gerund and its presupposition.

(71) $always_4[\sim\exists y[cacti(y)$ & $in\text{-}sandy\text{-}soil(plant(y))(I)(e_4))$
& $\exists r\ \exists y(cacti(y)$ & $in\text{-}r(plant(y))(I)(e_4)]]$
$[leads\text{-}to\text{-}disaster(e_4)]$

ω can contain more than one variable, allowing for quantification over pairs, triples, or larger tuples of individuals. For instance, in a sentence like

(72) Writing her abstract in a new font always makes 10% of Mary's hair go grey as she tries to figure out the font.

one may quantify over writing-event/font pairs; on this reading, for each pair of a writing event and a new font used it in, 10% of Mary's hair goes grey. So if she used 3 new fonts on one abstract, she'd go 27.1% greyer.

Finally I would like to discuss briefly the meaning for *-ing* and its relation to the meaning of I. With stage-level gerunds, *-ing* leaves the NP a set-denoting expression, as suggested above, and this is what will force the gerund to undergo QR. With an individual-level gerund, the VP denotes a proposition, as does the NP. So *-ing* affects the meaning of a VP in a way that doesn't affect the type of the expression, though it does change the syntactic category. In contrast, I can change a VP's type. It implicitly satisfies the event argument of a stage-level gerund with a free variable. This variable will get a contextually specified reference, giving the specific interpretation Partee (1984) argues "tense" receives. With structure (73a), I′ is interpreted as (73b):

(73) a. [$_{I'}$ [$_I$ T] VP] (T is some tense morpheme).
b. I′ translates as $\mathbf{T}(x_i)$ & $\mathbf{UP}(x_i)$

This is a first approximation that doesn't work for individual-level predicates. On our assumptions, individual level VP's don't denote sets.

Perhaps the real translation is as (74)/(75), the cases being transparently related perhaps by a type-shift:

(74) stage-level $\lambda x[\mathbf{T}(\mathbf{\cup P}(x))]$

(75) individual-level $\mathbf{T}(\mathbf{\cup P})$

(74) could be made equivalent to (73) by meaning postulate. However, adopting (74) would remove the nice parallelism between tense in stage-level predicates and ⟨e, t⟩ (weak) NP's that (73) provides. In the fragment below, weak NP's in adjunction structures are interpreted by a conjunction like (73b). Perhaps the nicest compromise available at present is to have a lexical rule that takes the ⟨t, t⟩ tense morpheme and changes it into a ⟨e, t⟩ version that can figure in (73b).

Since we don't want to say too much about the details of the meaning of *-ing*, we'll just say its an ⟨⟨e, t⟩, ⟨e, t⟩⟩ expression for stage-level gerunds, and ⟨t, t⟩ for individual-level.

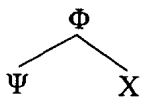
A. *Translation*

The idea behind the translation rules below is that, for each basic element of the syntax, the lexicon assigns a type and a meaning. Then, for each subtree of a node and its daughters, there will be one translation scheme in (2)–(10) that matches the types of the daughter nodes of the LF subtree. This scheme will assign a translation and a type to the mother node. Working ones way up the tree, eventually the matrix S is assigned a translation and a type.

$\mathbf{\Phi}$ indicates the translation of Φ. In the trees below, precedence relations are irrelevant.

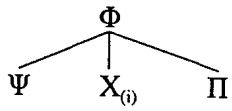
1. *John* translate as $\mathbf{John_1}$ or $\mathbf{John_2}$, he_n translates as x_n, *run* translates as **run**, etc.

2. FUNCTIONAL APPLICATION

with 

$\mathbf{\Psi}$ type $\langle \rho, \tau \rangle$ and $\mathbf{X}$ of type ρ, $\mathbf{\Phi} = \mathbf{\Psi}(\mathbf{X})$.

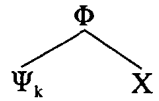
3. DYADIC FUNCTIONAL APPLICATION

with 

a. $\mathbf{\Psi}$ type $\langle \rho, \langle \pi, \tau \rangle \rangle$, $\mathbf{X}$ of type $\langle e, \rho \rangle$, and $\mathbf{\Pi}$ of type π, $\mathbf{\Phi} = \mathbf{\Psi}(\mathbf{X}(x_i))(\mathbf{\Pi})$.

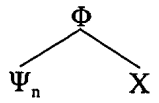
b. $\mathbf{\Psi}$ type $\langle \rho, \langle \pi, \tau \rangle \rangle$, $\mathbf{X}$ of type ρ, and $\mathbf{\Pi}$ of type π, $\mathbf{\Phi} = \mathbf{\Psi}(\mathbf{X})(\mathbf{\Pi})$.
(i is the index of X, if it has one.)

4. QUANTIFYING INTO TYPE t EXPRESSIONS

with 

$\mathbf{\Psi}$ type $\langle \langle e, t \rangle, t \rangle$ and $\mathbf{X}$ of type t, $\mathbf{\Phi} = \mathbf{\Psi}(\lambda x_k[\mathbf{X}])$.

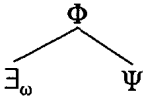
5. CONJUNCTION OF PREDICATES

with 

$\mathbf{\Psi}$ of type $\langle e, t \rangle$ and $\mathbf{X}$ is of type $\langle e, t \rangle$, $\mathbf{\Phi} = \lambda x_i[\mathbf{\Psi}(x_n)$ & $\mathbf{X}(x_i)]$.

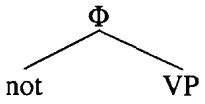
This rule is used to combine a VP-adjoined weak NP with a stage-level VP. The NP is applied to a variable with the NP's own index, and the event argument of the VP is simply carried along.

6. EXISTENTIAL CLOSURE

with 

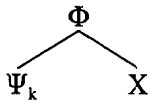
$\mathbf{\Psi}$ of type $\langle e, t \rangle$ $\mathbf{X} = \lambda x_i[\exists_\omega[\mathbf{\Psi}(x_i)]]$.

7. VP NEGATION

with 

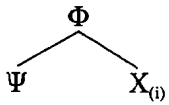
a. with **UP** of type ⟨e, t⟩, **Φ = NOT$_1$(UP)**.
b. with **UP** of type t, **Φ = NOT$_2$(UP)**.

8. QUANTIFYING INTO ⟨e, t⟩ EXPRESSIONS

with 

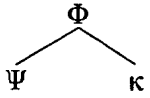
Ψ of type ⟨⟨e, t⟩, t⟩, and **X** of type ⟨e, t⟩, **Φ** = $\lambda x_j[\mathbf{\Psi}(\lambda x_k[\mathbf{X}(x_j)])]$.

9. SENTENCE CONJUNCTION

with 

a. **Ψ** and **X** of type t, **Φ = Ψ & X**.
b. **Ψ** of type t, **X** of type ⟨e, t⟩, **Φ = Ψ & X**(x_i)
(i is the index of X, if it has one.)

10. RAISING TO KIND-LEVEL

with 

Ψ of type ⟨e, t⟩, **Φ** = $^{\cap}\mathbf{\Psi}$

κ is an abstract element which converts an NP into a kind-denoting expression: this produces gerunds of the sort in example (3). '$^{\cap}$' is from Chierchia (1984).

B. *Logic*

This is the description of, and semantics for, the logical language into which Logical Forms have been translated.

Types: e and t are types, and if ρ, τ are types, ⟨ρ, τ⟩ is a type.

Basic expressions of various types:

e	John$_1$
⟨e, t⟩	girl$_1$, T$_{\text{past-2}}$ (stage-level)
⟨⟨e, t⟩, t⟩	John$_2$, my
⟨⟨e, t⟩, ⟨⟨e, t⟩, t⟩⟩	most, every
⟨⟨e, t⟩, ⟨e, t⟩⟩	ing$_1$, sandy
⟨e, ⟨e, t⟩⟩	contain, run
⟨e, ⟨e, ⟨e, t⟩⟩⟩	hit
⟨e, ⟨⟨e, ⟨e, t⟩⟩ ,⟨e, ⟨e, t⟩⟩⟩⟩	in
⟨t,⟨t, t⟩⟩	always
⟨t, t⟩	ing$_2$, T$_{\text{past-1}}$ (individual-level)
⟨⟨e, t⟩, e⟩	$^{\cap}$
⟨e, ⟨e, t⟩⟩	$^{\cup}$ (undoes '$^{\cap}$')

For each type τ and natural number n, there is a variable $v_{n,\tau}$ of type τ.

Syntax

If α is of type ⟨ρ, τ⟩ and β is of type ρ, α(β) is of type τ.
If α is of type t and ω is any tuple of indices, $\exists_\omega\alpha$ is of type t.
If α is of type t, **NOT$_2$**(α) is of type t.
If α is of type ⟨e, t⟩, **NOT$_1$**(α) is of type ⟨e, t⟩.
If α is of type τ and v is any variable of type ρ, λv[α] is of ⟨ρ, τ⟩.
If α and β are of type t, (α & β) is of type t.

Domains

We have a domain I of individuals and a set W of worlds.
D_τ, the set of possible denotations for expressions of type τ, is defined by

$$D_e = I$$
$$D_t = \mathcal{P}(W)$$

for all types ρ and τ, $D_{\langle\rho,\tau\rangle} = D_\tau^{D\rho}$

Semantics

The notation $\|\alpha\|^g$ indicates the semantic value of α with respect of assignment g.

$\|John_1\|^g$ = JOHN

$\|John_2\|^g$ = that $f \in D_{\langle\langle e,t\rangle,t\rangle}$ such that for any $\delta \in D_{\langle e,t\rangle}$, $w \in f(\delta)$ iff $w \in \delta(John)$

etc.

If $v_{n,\tau}$ is a variable of type τ, $\|v_{n,\tau}\|^g = g(v_{n,\tau})$.

If α is of type $\langle\rho, \tau\rangle$ and β is of type ρ, $\|\alpha(\beta)\|^g = \|\alpha\|^g(\|\beta\|^g)$.

If α is of type $\langle e, t\rangle$, $\|\mathbf{NOT_1}(\alpha)\|^g$ = that $f \in D_{\langle e,t\rangle}$ such that for any $x \in I$, $f(x)=\{w: w \notin \|\alpha\|^g(x)\}$

If α is of type t, $\|\mathbf{NOT_2}(\alpha)\|^g = \{w: w \notin \|\alpha\|^g\}$.

If α if of type τ and v is a variable of type ρ, $\|\lambda v[\alpha]\|^g$ = that $f \in D_{\langle\rho,\tau\rangle}$ such that for any $\delta \in D_\rho$, $F(\delta) = \|\alpha\|^{g(\delta/v)}$.

For any tuple of variables ω and α of type t, $\|\exists_\omega\alpha\|^g = \{w:$ there is a $g'\langle\omega\rangle g$ such that $w \in \|\alpha\|^{g'}\}$.

If α and β are of type t $\|(\alpha \,\&\, \beta)\|^g = \|\alpha\|^g \cap \|\beta\|^g$.

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ACKNOWLEDGEMENT

I would like to thank Emmon Bach, Angelika Kratzer, Barbara Partee, Ede Zimmermann, and Max Cresswell for helpful comments on this paper. Remaining errors are mine alone.

NOTES

[1] Kiparsky and Kiparsky (1971) discuss the relationship between gerunds and factivity.

[2] Actually, their meanings are generalized quantifiers, but within that theory they function as names of kinds.

[3] Chierchia treats kinds as individual correlates of property-denoting expressions, e.g. the individual correlate of the property of being a horse. Realizations of this kind are stages of instances of the property, e.g. stages of individual horses. Practices (**actions** for Chierchia) are also nominalizations of properties, e.g. the property of being a runner. However, realizations of practices aren't stages of instances of the property – this would be stages of individual runners. The realization relation is in this sense not uniform in Chierchia's theory.

The present theory treats practices as correlates of properties of events, and realizations as individual events. Likewise kinds can be thought of a correlates of properties of ordinary individuals, and their realizations are those ordinary individuals. It is therefore more uniform.

[4] Kamp and, in one of her theories, Heim don't introduce explicit existential quantifiers, but rather get the effect of such a quantifier from the definition of satisfaction. In my fragment I will assume that Logical Forms do have these existential quantifiers, but this could be dispensed with if it's advantageous to do so.

[5] Throughout this paper, 'set-denoting' really means 'of type $\langle e, t\rangle$', where t is the type of propositions, not of truth values (see the appendix).

[6] There are three equivalent ways of seeing the Kamp/Heim treatment of indefinites. One sees an indefinite as being translated as a variable (type e), with the CN content of the gerund placing a restricting on that variable (Partee (1987)). A second sees the indefinite as being of type t (common noun applied to variable), with its trace translated with another occurrence of that variable. In this way the CN meaning restricts the interpretation of the variable. The third continues to see the trace as being translated with a variable, and translates the indefinite as of type $\langle e, t\rangle$; this $\langle e, t\rangle$ meaning is applied to another occurrence of the variable in the translations of expressions containing the indefinite. Clearly this view has exactly the same effect as the previous two.

Partee (1987) argues for the first view of the Kamp/Heim theory on the grounds that it allows a uniform statement of which NP's allow discourse anaphora – type e NP's do. However, since all three ways of looking at the situation are essentially equivalent, they can be equally easily used in formal theories of discourse anaphora like Kamp's and Heim's. In File Change Semantics terms, type e and type $\langle e, t\rangle$ NP's allow discourse anaphora when they result in cards being added to the file for good.

[7] Weir (1986) makes the point that Carlson's theory should be abandoned, or at least much modified, once the definiteness of gerunds is taken into consideration. For him, gerunds are definite descriptions of events as well as names of kinds of events. His theory is incompatible with the fact, discussed later, that not all gerunds are definite (though all subject gerunds apparently are).

[8] Kratzer (1988) argues that there are unaccusative individual-level predicates. We would expect these to have different properties.

[9] Sentential subjects derived by passive seem to still be topics, in contrast to the gerunds in (9)–(12):

That John is tall was doubted by many.

This could be explained if sentential "subjects" were really topics at S-structure, while gerund subjects only had to move to topic position at LF. None of Koster's arguments that sentential subjects are syntactically topics apply to gerunds. Once a sentence had moved to topic position, we could assume it cannot undergo reconstruction, while a gerund could reconstruct, avoiding having to be an LF topic. More work needs to be done to see if this approach is viable.

[10] Functions from individuals to sets of possible worlds.

[11] The clearest difference is the fact that POSS-ing's of *there* insertion sentences are impossible, while ACC-ing's are possible.

There(*'s) being men outside surprised him.

Perhaps this can be explained in terms of the presuppositional difference between ACC-ing's and POSS-ing's discussed in Section 4.1. My main points do not depend on whether the really is a syntactic difference between ACC-ing's and POSS-ings.

[12] This analysis is similar to that of Schachter (1976).

[13] This is exactly what Pollock (1989) proposes.

[14] Subjects of infinitives also receive wider scope than everything else in the infinitive (Postal (1974)).

I believe everyone not to be happy.
I expect for everyone to not be happy.

I would propose to treat them similarly, with the apparent subject of the infinitive, really an object of the higher verb, controlling a PRO inside the infinitive.

Postal argues against a control analysis of these infinitives by suggesting that an interpretation couldn't be assigned to infinitival idioms and *there* insertion sentences. This worry will have to be investigated in the context of a detailed account of the semantics of infinitives.

[15] If an adverb can be given the index of an NP that is in its restrictive clause but not in its nuclear scope, we will get incorrect interpretations for

A farmer who owns a donkey is usually happy.

If one rich farmer owns ten donkeys, and is happy, and five poor farmers own one donkey each, and are sad, this sentence will incorrectly come out true. The situation is even worse if the adverb can be given the index of an NP in its nuclear scope but not in its restrictive clause. A sentence like

A farmer likes a donkey.

will mean that most pairs of a farmer and anything are such that the thing is a donkey and the farmer likes it. This is not to deny that this example has a reading quantifying over farmer/donkey pairs, but it can't arise if *a donkey* stays in the nuclear scope.

[16] In examples like *Building houses is fun*, *-ing* seems to give the gerund imperfective aspect, but such other elements of its meaning are beyond the scope of this paper.

[17] As pointed out to me by A. Kratzer, in

Being from Bavaria is seldom a guarantee of a happy life (*for John)

quantification over the subject of the gerund (a PRO) in the manner outlined does seem possible. The reasons for the difference are unknown to me.

[18] B. Partee has brought up the question of why *if* and *when* differ from *before* in that they move with their complement into the restrictive clause. They must be either of the right type to combine with their complements without QR or typeless (i.e. semantically neutral) like *a* or *the*.

[19] In most cases these presuppositions would entail that an earthquake or a leaving actually occurred, but they don't necessarily.

[20] Perhaps a more complex global accommodation could work.

[22] Bennett (1974) notes that all verbs in this class seem to have such paraphrases.

[23] Of course not all possible blue horses need be included in the content of his image; he may have imagined it a mare as well, for instance. In all likelihood, his imagining is very much more specific that any report of it. Furthermore, Wittgensteinian considerations assure us that the image itself will be extremely vague, and its content will only be determinable in the light of the imaginer's beliefs and intentions. One who follows this approach is not committed to the content of the image being completely specified even in light of all of the imaginer's mental state. There may be no certain answer to the question of whether the content of the image includes or doesn't include horses with a scar on their left from hoof. Whether we want to consider this vagueness epistemic or metaphysical is an open question.

[24] This type of consideration may argue against Parson's approach to nonexistent objects, since he places possible and impossible objects on a par.

[25] cf. Klein and Sag (1985). The idea of type-driven translation is somewhat different here, however (see below).

[26] Thanks to E. Bach for pointing these considerations out to me.

REFERENCES

Abney, S. (1987) *The English Noun Phrase in its Sentential Aspect*, MIT Ph.D. Dissertation.

Bennett, M. (1974) *Some Extensions of a Montague Fragment in English*, UCLA Ph.D. Dissertation.

Berman, S. (1989) An Analysis of Quantificational Variability in Indirect Questions, *The Proceedings of WCCFL 8*.

Carlson, G. (1977) *Reference to Kinds in English*, University of Massachusetts. Ph.D. Dissertation, GLSA, Amherst.

Chierchia, G. (1984) *Topics in the Syntax and Semantics of Infinitives and Gerunds*, University of Massachusetts. Ph.D. Dissertation, GLSA, Amherst.

Chierchia, G. (1987) Anaphora and Attitudes *de se*. ms., Cornell.

Cocchiarella, N. (1969) Existence Entailing Attributes, Modes of Copulation and Modes of Being in Second Order Logic, *Nous* 3, 33–48.

Diesing, M. (1988) Bare Plural Subjects and the Stage/Individual Contrast. In M. Krifka (ed.), *Genericity in Natural Language. Proceedings of the 1988 Tübingen Conference*, Seminar für Natürlich-sprachliche Systeme der Universtät Tübingen.

Diesing, M. (1992) *Indefinites*. MIT Press, Cambridge, MA.

Gerstner, C. and Krifka, M. (1987) An Outline of Genericity. Seminar für Natürlich-sprachliche Systeme der Universtät Tübingen.

Heim, I. (1982) *The Semantics of Definite and Indefinite Noun Phrases*, University of Massachusetts. Ph.D. dissertation, GLSA, Amherst.

Heim, I. (1983) On the Projection Problem for Presuppositions. In M. Barlow, D. P. Flickinger, and M. T. Wescoat (eds.), *Proceedings of the West Coast Conference on Formal Linguistics* 2, Stanford Linguistics Association, Stanford, CA.

Horn, G. (1975) On the Nonsentential Nature of the POSS-ing Construction, *Linguistic Analysis* 1(4), 333–387.

Jackendoff, R. (1972) *Semantic Interpretation in Generative Grammar*, MIT Press, Cambridge MA.

Kamp, H. (1981) A Theory of Truth and Semantic Representation. In J. Groenendijk *et al.* (eds.), *Formal Methods in the Study of Language*, Mathematical Centre, Amsterdam.

Kiparsky, P. and Kiparsky, C. (1971) Fact. In D. Steinberg and L. Jakobovits (eds.), *Semantics*, Cambridge University Press, Cambridge.
Klein, E. and Sag, I. (1985) Type-Driven Translation, *Linguistics and Philosophy* 8, 163–201.
Koster, J. (1978) Why Subject Sentences Don't Exist. In S. J. Keyser (ed.), *Recent Transformational Studies in European Languages*. Linguistic Inquiry Monograph 3, MIT Press, Cambridge MA.
Kratzer, A. (1988) Stage-Level and Individual-Level Predicates. Manuscript, University of Massachusetts. Reproduced in *Papers on Quantification*, NSF grant BNS 8719999 report.
Kratzer, A. (1989a) The Representation of Focus. In A. von Stechow and D. Wunderlick (eds), *Semantics: An International Handbook of Contemporary Research*, Walter de Gruyter, Berlin and New York.
Kratzer, A. (1989b) An Investigation of the Lumps of Thought, *Linguistics and Philosophy* 12, 607–653.
Lewis, D. (1975) Adverbs of Quantification. In E. Keenan (ed.), *Formal Semantics of Natural Language*, Cambridge University Press, Cambridge, England, pp. 3–15.
Lewis, D. (1979) Scorekeeping in a Language Game, *Journal of Philosophical Logic* 8, 339–359.
Montague, R. (1973) The Proper Treatment of Quantification in Ordinary English. In J. Hintikka, J. Moravscik, and P. Suppes (eds.), *Approaches to Natural Language: Proceedings of the 1970 Stanford Workshop on Grammar and Semantics*, D. Reidel, Publ. Co., Dordrecht.
Parsons, T. (1980) *Nonexistent Objects*, Yale University Press, New Haven and London.
Parsons, T. (1989) The Progressive in English: Events, States, and Processes, *Linguistics and Philosophy* 12, 213–241.
Partee B. (1984) Nominal and Temporal Anaphora, *Linguistics and Philosophy* 7, 243–286.
Partee, B. (1987) Noun Phrase Interpretation and Type-Shifting Principles. In J. Groenendijk, D. de Johgh, and M. Stokhof (eds), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, Foris, Dordrecht.
Pollock, J-Y. (1989) Verb Movement, Universal Grammar, and the Structure of IP, *Linguistic Inquiry* 20, 365–424.
Portner, P. (1992) *Situation Theory and the Semantics of Propositional Expressions*, University of Massachusetts Ph.D. Dissertation, GLSA, Amherst.
Postal, P. (1974) *On Raising*, MIT Press, Cambridge MA.
Roeper, T. and Wasow, T. (1972) On the Subject of Gerunds, *Foundations of Language* 8, 44–61.
Rooth, M. (1985) *Association with Focus*, University of Massachusetts Ph.D. Dissertation, GLSA, Amherst.
Rosenbaum, P. (1967) *The Grammar of English Predicate Complement Constructions*, MIT Press, Cambridge MA.
Ryle, G. (1929). Negation. *Proceedings of the Aristotelian Society*, Supplementary Vol. 9, 80–96.
Schachter, P. (1976) A Nontransformational Account of Gerundive Nominals in English, *Linguistic Inquiry* 7, 205–241.

Schubert, L. and Pelletier, F. (1987) Problems of Generics, Plurals, and Mass Nouns. In E. LePore (ed.), *New Directions in Semantics*, Academic Press, London.
Weir, C. (1986) English Gerundive Constructions. University of Texas, Ph.D. Dissertation.
Wilkinson, K. (1986) Genericity and Indefinite NPs. ms., University of Massachusetts.
Zimmermann, T. (1993) On the Proper Treatment of Opacity in Certain Verbs, *Natural Language Semantics* 1(2), 149–180.
Zucchi, S. (1993) *The Language of Propositions and Events: Issues in the Syntax and Semantics of Nominalization*, Kluwer Academic Publishers, Dordrecht.