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ADVERBIAL QUANTIFICATION AND EVENT STRUCTURES

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0. Introduction.

The central concerns of this paper are the expression of quantification and the semantic distinctions between eventive and non-eventive sentences. The issues will be addressed in the spirit of what Emmon Bach 1986a calls "natural language metaphysics", as an inquiry into what ontological presuppositions best support an explicit semantics for natural language which characterizes truth conditions and entailment relations.

Determining what a given language quantifies over, and how, is one important source of evidence about the basic domains that are recognized in the semantics of that language. Here I will particularly be exploring the domain of individuals or entities and the domain of eventualities in the sense of Bach 1986b, including events, states, and processes; and extending the latter domain into the harder-to-pin-down realm of "situations" and "cases".

1. Quantificational structures.

1.1 Barwise and Cooper's NP Universal. One appeal of Montague grammar is the uniform semantic analysis of NPs as generalized quantifiers. Barwise and Cooper 1981 follow Montague in this respect and propose the following NP-Quantifier Universal:

(1) Barwise and Cooper's NP-Quantifier Universal: "every natural language has syntactic constituents (called "noun-phrases") whose semantic function is to express generalized quantifiers over the domain of discourse." (Barwise and Cooper 1981: 177)

The generalized quantifier perspective has led to illuminating studies of the semantic properties of NP's and DET's, but the universal in (1) needs to be sharpened and questioned. In the strong form in (2) below, it has now been falsified by Jelinek's work on Salish (see Jelinek (1988; to appear) and discussion in Partee (to appear; in preparation)).

(2) Strong form: All languages have essentially quantificational NPs, i.e. NPs which can be analyzed as generalized quantifiers but not reasonably as referential (type *e*) or predicative (<*e*,*t*>).

1.2.2 A-Quantifiers vs. D-quantifiers: Lewis, Heim, Kamp. Among the quantificational devices of English are determiners like

every, adverbs like *always* and modals like *must*. Lewis 1975 uses (3a), interpreted as in (3b), to show that adverbs of quantification do not just quantify over times or events:

(3) (a) A quadratic equation usually has two different solutions.
(b) Usually, x is a quadratic equation, x has two different solutions.

(3b) has a tripartite structure consisting of a quantifier, a restrictive clause, and a matrix clause; it is true iff most things that satisfy the restrictive clause also satisfy the matrix clause. Quite generally, adverbs of quantification can unselectively bind any number of free variables in their scope, as in (4), true iff most pairs of things that satisfy the restrictive clause also satisfy the matrix clause.

(4) (a) Usually, if a man owns a donkey, he feeds it.
(b) Usually, x_1 is a man and x_2 is a donkey and x_1 owns x_2, x_1 feeds x_2

Adverbs of quantification may unselectively bind event variables as well as individual variables, as illustrated in (5) (Partee 1984a); we will have more to say about such cases below.

(5) (a) Usually, if a man sees a donkey, he feeds it.
(b) Usually, x_1 is a man and x_2 is a donkey and e_1: x_1 sees x_2, $e_2 > e_1$ and e_2: x_1 feeds x_2

Heim 1982 further tightens the parallels between determiner quantifiers and adverbs of quantification and brings modals into the picture. She argues that all three types of quantifiers may unselectively bind variables of various sorts, and that indefinite NP's *never* carry any quantificational force on their own. (Analogous proposals are made independently by Kamp 1981.) Indefinite NP's contribute a restrictive predicate and a variable to logical representations like (3b), (4b) and (5b): their quantificational force derives from the adverb. (For examples with no operator, Heim and Kamp propose an operation of existential closure, which will bind any variable introduced by an indefinite NP that has not already been bound.)

On the Kamp-Heim proposal to treat determiner quantifiers like *every* or *most* just like Lewis treats adverbs of quantification, a sentence like (6a) has a logical representation (6b) virtually identical with (3b), and with the same truth-conditions. And determiner quantifiers can also be unselective, as in the case of (7a), which on Kamp's and Heim's account has a logical representation analogous to (4b).

(6) (a) Most quadratic equations have two different solutions.

(b) Most, x is a quadratic equation, x has two different solutions.

(7) (a) Most men who own a donkey beat it.

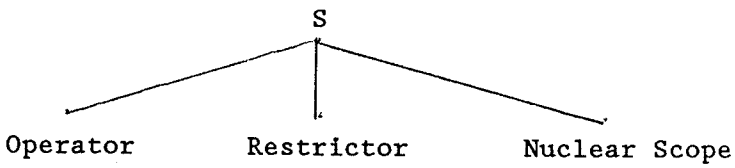
(b) Most, x_1 is a man and x_2 is a donkey and x_1 owns x_2, x_1 beats x_2

In proposing to investigate further the syntax and semantics of different sorts of expressions of quantification corss-linguistically, Partee, Bach and Kratzer 1987 introduce the terminology D-quantification and A-quantification: 'D' is mnemonic for Determiner, 'A' for the cluster of Adverbs, Auxiliaries, Affixes, and Argument-structure Adjusters, all of which can be thought of as alternative ways of introducing quantification in a more 'constructional' way (Carlson 1983).

From the work of Jelinek we can conclude that D-quantification is not universal, but A-quantification so far seems to be (Bach, Jelinek, Kratzer and Partee, eds., in preparation). The investigation of the structure and interpretation of D-quantification and A-quantification provides an indirect means of exploring the semantics of the N-V distinction and its relation to a possible ontology of individuals and events (Davidson 1967, Langacker 1987, Partee, Bach and Kratzer 1987).

1.2.3 Tripartite structures as a unifying generalization. The sort of structure we have seen in (3b) - (7b) is represented graphically in (8).

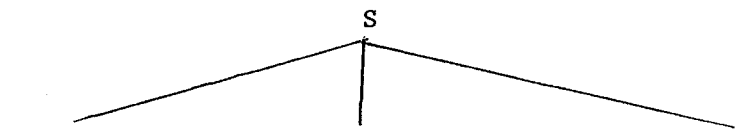
(8)



Such "tripartite structures" may be taken as a useful metatheoretical device for expressing the commonalities among several possible binary-branching structures, such as generalized quantifiers or structures in which an adverbial operator combines with the nuclear scope or matrix.

The following generalized tripartite structure shows a number of hypothesized syntactic, semantic, and pragmatic structures that can be argued (Partee, in preparation) to be correlated with each other and with the basic tripartite scheme.

(9)



Operator	Restrictor	Nuclear Scope
V	"cases"	main clause
must	*if*-clause	assertion
not	subordinate clauses	focus
almost every	common noun phrase	consequent
always	topic	main predication
mostly	presuppositions	
Generic	domain	
	antecedent	
	context	

2. Event structures and the proportion problem.

The proportion problem has been discussed by Partee 1984a, Bäuerle & Egli 1985, Root 1986, Rooth (1987,1989) Kadmon 1987, Heim 1990, Berman 1987, Groenendijk and Stokhof (1990a,1990b), Chierchia (1988,1990), Schubert and Pelletier (1987,1989) and Kratzer 1989, among others. It is both an empirical and a theoretical problem, touching central issues in the syntax and semantics of quantification and indefinites, the construction and interpretation of tripartite structures, and the role of event variables in the analysis of natural language.

The problem arises with non-universal proportional quantifiers like *most*, *almost every*, *mostly*, *almost always*. The empirical question is: what factors determine what is being quantified over. The theoretical challenge is to determine an appropriate mix of syntactic, semantic, and logical apparatus to be able to express and explain the empirical generalizations. As an example, consider (10) from Kadmon 1987.

(10) *Almost every* woman who *owns* a dog talks to it.

On the original Kamp-Heim analysis, (10) should quantify over woman-dog pairs, which is not equivalent to quantifying over dog-owning women, as the following scenario illustrates. Suppose one woman owns fifty dogs and talks to them all and nine other women own one dog each and don't talk to it. If we count woman-dog pairs then (10) should come out true, but if we count dog-owning women, it should come out false. The empirical question is which is right, in this case and others, and what properties of the sentences (and their contexts) determine the choice.

A number of parameters affect judgements and intuitions are undoubtedly affected by real-world knowledge as well. Here I focus on two relevant factors. One factor (Partee 1984a) is the

syntactic difference between D-quantification and A-quantification. In examples (10-14) I indicate that parameter by annotating the examples with **D** or **A**. A second relevant factor (Kadmon 1987) is whether the restrictive clause contains an individual-level (relatively permanent,or atemporal) predicate or stage-level (episodic) predicate, using the distinction developed by Carlson (1977, 1980). Note that non-stative predicates are all stage-level, while statives are split between stage-level (*available*, *on fire*) and individual-level (*expensive*, *from Chicago*). In examples (10-14) I use the annotations I for individual-level predicate and S for stage-level predicate.

(10) *Almost every* woman who *owns* a dog talks to it. D, I
(11) *Almost always*, if a woman *sees* a dog, she talks to it. A, S
(12) A woman who *sees* a dog *almost always* talks to it. A, S
(13) *Mostly*, if a woman *owns* a dog, she talks to it. A, I
(14) *Almost every* woman who *sees* a dog talks to it. D, S

In (10) we have both D-quantification and an individual-level predicate; in such cases we seem strongly inclined to count women, not woman-dog pairs. Example (11) is maximally different: it has A-quantification and a stage-level predicate. In this case we seem much more inclined to count woman-dog pairs, or episodes of a woman seeing a dog, even if the same woman has occurred in a number of different episodes. A possible paraphrase of this reading is: "On almost all occasions on which a woman sees a dog, she talks to it."

Example (12) is suggestive of the complications that have to be considered. Like (11), it involves A-quantification and a stage-level predicate, but the restrictor clause comes from a noun phrase with one noun as the head noun (as in (10)) and the other inside a relative clause. I think there is still a tendency to count episodes as in (11), but a weaker one; we seem to have tension between a syntactically asymmetric structure and a preferred semantically symmetric (in the sense of Kadmon 1987) interpretation.

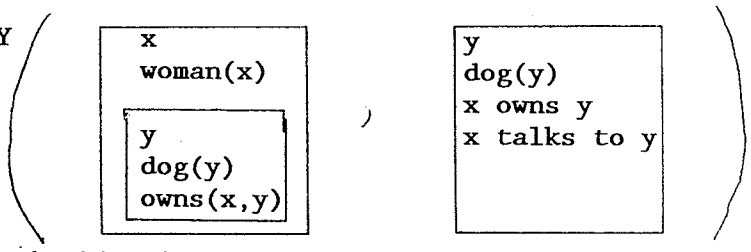
The comparison of (10)-(12) suggests that D-quantification and individual-level predication favor quantifying over individuals, while A-quantification and stage-level predication favor quantifying over epsiodes or cases.

When we consider the other combinations of the two parameters, as illustrated in examples (13) and (14), I think intuitions become less clear. In (13) we have A-quantification but an individual-level predicate, and judgements tend to be uncertain; similarly in (14), where the parameters are combined the other way: D-quantification but a stage-level predicate. My impression is that the pull of the stage-level predicate toward

quantifying over episodes is stronger than the push of the D-quantification toward quantifying over individuals.

Let us turn very briefly to some proposals for dealing with some of the proportion-problem data. On the most natural extension of the standard Kamp-Heim treatment, we would simply arrive at a representation similar to (7b). Such a reading is symmetric as regards women and dogs (appropriate for (11) and (12)), not the asymmetric reading quantifying over women that we want for (10). One of the first systematic treatments of the proportion problem, Kadmon 1987, argued that for cases like (10), there should be additional structure within the restrictive clause, as in (15).

(15) **ALMOST EVERY**



The embedded box inside the antecedent box induces existential closure over the variable *y* contained within it: "for almost every x, if x is a woman and there is a y such that y is a dog and x owns y, ...". But then the occurrence of *y* in the consequent box; that pronoun is no longer accessible to its intended antecedent. Kadmon argues for the reinstatement of a version of Evans' 1977 treatment of "E-type pronouns", with accommodation of a uniqueness presupposition in the consequent box. Kadmon's work has touched off a debate on E-type analyses vs. Kamp-Heim-style analyses of anaphora that is still continuing.

There is another approach which Berman 1987 and Partee 1989 independently proposed, invoking an event or situation variable as a discourse referent in some cases. In my work this suggestion was for treating implicit antecedents for certain kinds of anaphora, as in (17), due to Roger Schwarzschild.

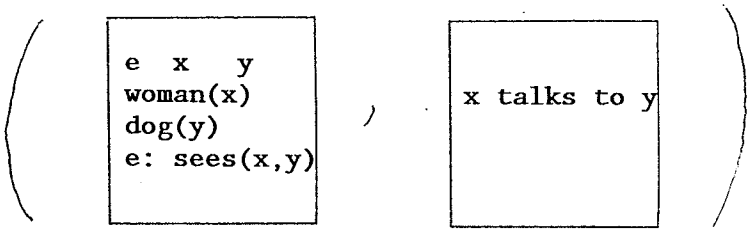
(16) Every man who owns a donkey beats *it*.
(17) Every man who stole a car abandoned it *within 50 miles.*
50 miles away.

Fifty miles away involves adverbial anaphora that requires an anchor: fifty miles from where? The most natural interpretation is fifty miles from the location of the (quantified) stealing event. The example is like the donkey-sentence (16) but with the antecedent implicit. I argued for the inclusion of an event referent (a proposal that had been made in the context of temporal anaphora by Kamp 1979, Hinrichs 1981, Bäuerle (1977,

1979), and Partee 1984a), and proposed that if a construction leads to the introduction of an event variable, then derivative elements like the time or the place of the event are available for anaphora. Note that the event-variable must be structurally licensed; predicates that merely entail the existence of an event do not license event anaphora, as can be seen by trying to substitute *car thief* or *murderer* in sentences like (17): the results are parallel to the anaphoric island cases studied by Postal 1969.

Berman's proposal was made in the context of adverbial quantification and is more explicit about the individuation of the relevant situations. Kratzer 1989 builds on Berman's proposal in developing an analysis of stage-level and individual-level predicates involving syntactic as well as semantic differences. On Berman's analysis, the representation of an example like (11) or (12) would be as in (18).

(18)



It is most natural to posit an event variable when the antecedent has a stage-level predicate. And the "cases" in the antecedent must be compatible with what is in the consequent. Consider (19)-(21)[1].

(19) Every woman who sees a dog telephones the police.
(20) Every woman who owns a dog telephones the police.
(21) Every woman who owns a dog buys it a license.

(19) is interpreted unproblematically as involving co-binding of an implicit time variable: when a woman sees a dog, then she telephones the police. But if we try to interpret (20) similarly, it is anomalous. Since owning isn't normally construed as episodic, the antecedent of (20) does not provide a temporal anchor for the telephoning. There is a non-anomalous way to interpret (20), though: if one interprets the verb *telephones* as a habitual or dispositional generic present, one can interpret (20) (with a Kadmon-type structure as in (15)) as saying that every woman who owns a dog has the property of habitually telephoning the police. In (21), on the other hand, we can indeed construe *owns* episodically: for each "event" of a woman owning a dog, there is a corresponding event of her buying it a license. All the non-anomalous construals show compatibility between the antecedent and consequent parts of the structure, agreeing in quantifying over events or over individuals. This correlation is

explored further and given an explanation in the work of Kratzer 1989.

The proposals described above may be seen as competing proposals for certain structures in English, but they may also represent distinct strategies, all at least partially correct, for dealing with quantification in different kinds of structures within or across languages. There are clearly several factors interacting in complex ways, and researchers are currently elaborating competing proposals for capturing the appropriate generalizations. At the level of ontology, the most linguistically interesting and relevant distinction in this domain seems to be the shiftable line between "individuals" and "events" or "situations"; some such distinction seems to play a central role in the semantics of many languages, and may play an important role in syntax-to-semantics mapping (see Kratzer 1989). The classification is not one that either nature or our experience imposes directly, but a matter of "cognitive choice."

3. Stump's generalization.

Stump (1981, 1985) succeeded in turning a seeming morrass into the interaction of two or three well-defined structural factors together with the behavior of a certain context-variable occurring in a certain subclass of the structures. The structures Stump dealt with are free absolutes and adjuncts; free adjuncts are illustrated below in (22a,b) and (23a,b).

(22) (a) Wearing that outfit, Bill would fool everyone.
(b) Being a master of disguise, Bill would fool everyone.

(23) (a) Standing on a chair, John can touch the ceiling.
(b) Having unusually long arms, John can touch the ceiling.

Stump established that there are two fundamentally different kinds of interpretations that these adjunct constructions receive, depending on whether the predicate in the adjunct is stage-level or individual-level.

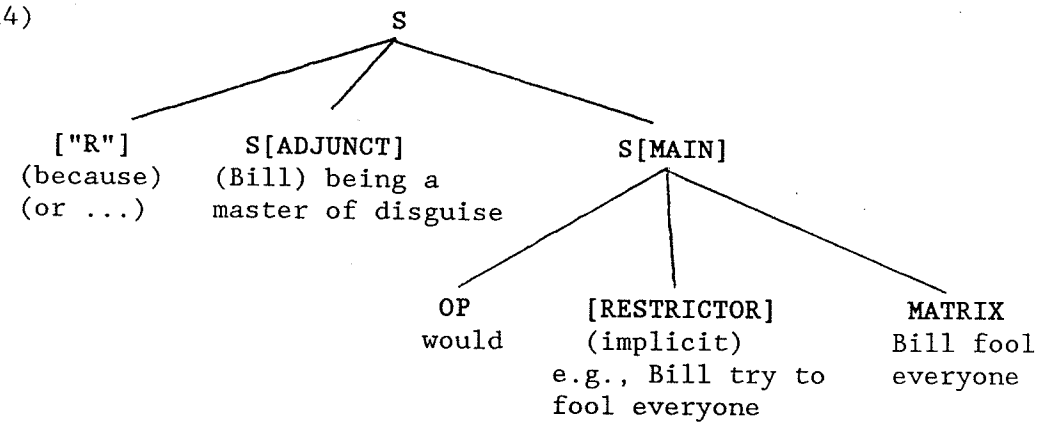
Sentence (22a) has a paraphrase as a conditional sentence with the adjunct corresponding to an *if*-clause: "If Bill were wearing that outfit, he would fool everyone." The modal *would* is an operator that demands a restrictor clause, and the adjunct is interpreted as supplying the restrictor clause, restricting the class of possible worlds to be quantified over.

But in the apparently similar (22b), one can't interpret "being a master of disguise" as an *if*-clause. Unlike (22a), the adjunct in (22b) is factive. The sentence asserts that Bill is a master of disguise and that he would fool everyone (with the

required *if*-clause left implicit, determined by the context), with a contextually determinate binary relation between these two propositions. The relation must be a factive one such as *because* or *in spite of*. Similarly for (23a) and (23b): one can interpret (23a) with the adjunct understood as playing the role of an *if*- or *when*-clause, providing a restrictor in construction with the operator *can*, but we can't interpret (23b) as asserting that if or when John has long arms he can touch the ceiling.

Stump showed that only an adjunct containing a stage-level predicate can be interpreted as the restrictor in a tripartite structure whose operator is in the main clause. An adjunct with an individual-level predicate has to be interpreted as a higher factive adjunct on the whole construction, with a contextually determined relation providing the "semantic glue" connecting the adjunct to the main-clause proposition, as in (24). (See Stump 1985 and discussion in Partee 1984b.) The (a) cases are in fact ambiguous and can be interpreted either way.

(24)



The question arises whether Stump's generalization is an idiosyncratic fact of English that just has to be stipulated. Assuming as a working hypothesis that the answer is no, the challenge is to determine what the generalization follows from. One clue is the wide variety of constructions for which the stage/individual-level distinction plays a crucial role, such as the interpretation of bare plurals, adjectival complements of perception verbs, the existential *there*-construction, and some focus phenomena; see Kratzer 1989 and Diesing 1989.

Now recall that in the case of the proportion problem, a central issue is to clarify the basis for distinguishing between quantification over individuals and quantification over cases, events, or situations. The tendency for clauses with stage-level predicates, whether adverbial clauses or relative clauses within NPs, to go into the restrictor clause of quantificational

structures seems to be a significant factor in these cases. In the case of Stump's generalization, the ability of a subordinate phrase to be interpreted as a restrictor clause also depends on whether it contains a stage-level predicate or not, so the role of stage-level predicates as restrictor clauses with certain kinds of operators seems worth exploring further.

I would like to suggest a tentative general hypothesis that could link both the proportion problem and Stump's generalization to more general issues of syntactic structure and conceptual organization. The hypothesis, which builds on and extends the distinction between D-quantification and A-quantification of Partee, Bach, and Kratzer 1987, is that there are at least two main kinds of quantificational ontology, quantification over individuals and quantification over cases, events, or situations, and that these are often interchangeable from a purely truth-functional point of view (as in many examples with *every* and *always*), but with a different conceptual organization and a clustering of different typical properties, as listed in (25).

(25)

	Individual	Case/event/situation
(a) Category	NP	S
(b) Operator	Det	Adv of Q., Modal, Aux, ...
(c) Sortal	Noun	Verb or verb frame
(d) Predicates in restrictors	Indiv.-level	Stage-level
(e) Typical restrictors	CNP Relative clauses	*if/when*-clauses focus-frames

Looking first at the properties that I suggest typically go together in the case of quantification over individuals: a natural locus of such quantification is the NP, with the determiner as operator and the head noun as the principal sortal predicate. The use of an NP structure, which normally has a unique head noun, tends to give us one principal individual variable to quantify over. In this case we tend to have individual-level predicates as restrictors, adding additional specification of the domain of individuals being quantified over, typically expressed by the common noun phrase and the relative clause. (Note that this clustering of properties is clearly not absolute; I mention various "atypical" cases below.)

The typical clustering of properties in the case of quantification over cases, events, and situations (a grouping that clearly needs further refinement) includes the fact that the quantification is often expressed at the level of the sentence or VP, and that the operator is likely to be expressed by an adverb of quantification or a modal. The principal sortal is often provided by the verb. The domain of quantification, specified by such a sortal and by further restrictors that generally involve

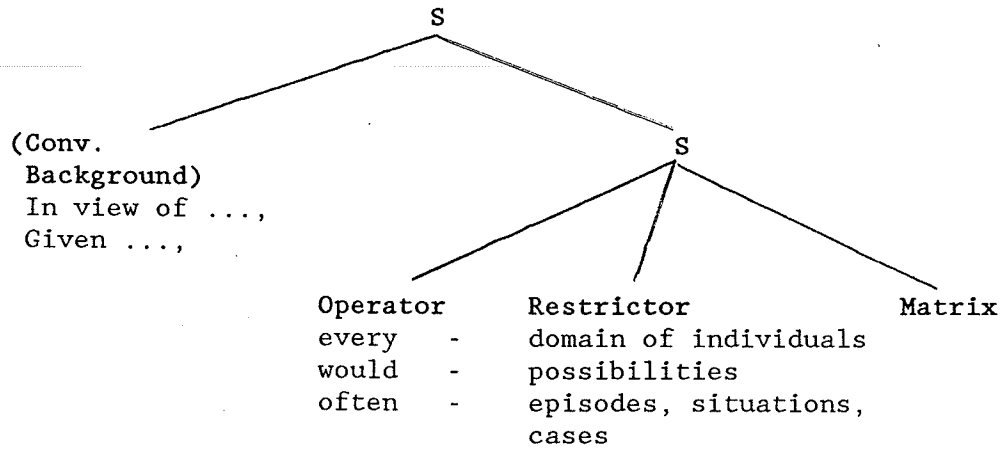
stage-level predicates and are typically expressed by *if-* or *when-*clauses, thus tends to be episodic, construable as consisting of events or situations or "cases" of some sort that we distinguish from individuals *simpliciter*. When there is no explicit restrictor, though not only then, a restrictor clause may be provided by the "focus-frame" of the sentence.

The less typical combinations include sentences with an adverb of quantification but an individual-level main predicate like (3a) in section 1 and (13) in section 2, or NPs with stage-level modifiers like (14) in section 2 or as exploited in the riddle song "I Gave My Love a Cherry", sample lines from which are in (26).

(26) How can there be a cherry that has no stone? ... A cherry when it's blooming, it has no stone.

In (27) I sketch a slightly elaborated version of a tripartite structure in which I indicate not only samples of the different sorts of operators and domains of quantification discussed above, but also a place in the structure that could be thought of as corresponding to "factive" background material, establishing certain characteristics of the context within which the quantificational structure is to be interpreted, and which are thus outside the scope of the quantificational operator. I suggest that this is an appropriate location for the individual-level adjuncts in the Stump examples. At some level at which explicit and implicit material are integrated, it might also be thought of as the place in the structure where the context or conversational background reside, or a place into which such contextual material may freely be accommodated.

(27)



While I suggest that such clusters of typical properties have some linguistic and conceptual reality, I don't want to put too much weight on them in specific analyses. Different parts of specific linguistic structures can force, constrain, or influence what parts of a syntactically given structure are to be interpreted as playing what role in such tripartite structures (see e.g. Diesing 1989, 1990) and what further properties the operator and the restrictor in such a structure must have in a given case (see e.g. Kratzer 1980).

One natural challenge that confronts these suggestions is the following: if my hypothesis is at all correct, why should these two very different kinds of quantification be so frequently interchangeable? English certainly allows us to express many things either way, and different languages seem able to prefer one kind over the other, or to do without D-quantification altogether. My answer to this challenge is to appeal to the fact that the notion of an individual and the notion of a case or situation or episode or event are both ontologically extremely broad notions, and not mutually exclusive. Insofar as we can think of cases, for instance, as tuples of entities, we can identify individuals with their singletons or one-tuples. Even for more temporal notions of episode or event or situation, there is no obstacle in principle to regarding an individual as a situation or an event; some individuals come with natural spatiotemporal boundaries, and for those that don't, there are various ways that spatiotemporal boundaries can be contextually supplied or imposed. So a system designed for quantifying over cases or situations or events could certainly be used for quantifying over individuals, since there are various ways of taking what we might have been thinking of as an individual and reconstruing it as a case or situation or even event. And on the other hand, there's nothing that can't be an individual. The phenomenon of nominalization, particularly as analyzed by Chierchia and Turner (Chierchia (1982, 1984), Chierchia and Turner 1987), clearly demonstrates the human tendency to treat every robust ontological type as also a potential subtype of the type of entities. The paradigmatic individual may be a person or a physical object, but an individual can be an encounter, a situation, a property, a state of affairs. Not only nominalizations but even the range of lexical nouns suggests that there's no limit on what can be an individual.

Now I want to try to apply that general perspective to the puzzle of what Stump's generalization follows from. I assume, perhaps controversially, that there is no independent syntactic distinction between the two kinds of adjuncts, so that their different behavior should be predictable on the basis of the semantic difference between the stage-level and individual-level

predicates that head them plus the contribution of the adjunct construction itself.

This leads me to suggest the following as the beginning of an explanation. As far as the basic rules of the grammar go, all adjuncts can be interpreted either as higher factive modifiers or as restrictors; I consider this to be a species of non-restrictive and restrictive modification on the level of the sentence. Then since adjuncts containing stage-level predicates can in fact be used with both kinds of interpretation, we just need to find a basis for arguing that adjuncts with individual-level predicates cannot be interpreted as restrictor clauses. A promising line of argumentation of this sort would be that when free adjuncts are interpreted as restrictors, they must restrict events or situations; and perhaps we can argue that individual-level predicates don't restrict events or situations.

In examples (22a-b), for example, one could say that "(Bill) wearing that outfit" can restrict a set of possible situations understood with a spatiotemporal dimension as well a dimension of possible worlds. But "(Bill) being a master of disguise", where the individual-level predicate can express a property of Bill but not a property of episodes, is perhaps incompatible with the requirement that the restrictor clause restrict cases or situations.

But here is a possible counterargument. If we use explicit *if*-clauses, as in (28a-b), the sentences are perfectly fine regardless of whether they contain an individual-level or stage-level predicate. So how can we suggest an argument based on semantic anomaly to rule out the possiblility of interpreting (22b) as (28b), when adjuncts play the role of *if*-clauses in restrictor clauses and (28b) is perfectly fine?

(28) (a) If he were wearing that outfit, Bill would fool everyone.
(b) If he were a master of disguise, Bill would fool everyone.

Here is a reply. Free adjuncts are not semantically identical to *if*-clauses, even though sometimes paraphrasable. The lack of tense/mood marking on adjuncts may well be a significant property. As a tentative suggestion, I would suggest (although this itself needs explanation) that stage-level adjuncts are neutral with respect to the distinction between *if* and *when* as well as to the distinction between indicative and subjunctive. They are thus like potentially counterfactual *when*-clauses.

Adjuncts containing individual-level predicates are in principle neutral among these distinctions as well, but lack *when*-paraphrases. The proposals of Kratzer 1989 provide part of the basis for this last fact. Kratzer 1989 has given many

arguments for the claim that stage-level predicates actually have an argument place for a spatiotemporal location or event or situation (a "Davidsonian" argument) which individual-level predicates lack. She also makes the independently plausible assumption that natural language quantification must be non-vacuous: in any tripartite quantificational structure, the operator must bind at least one variable which occurs in both the restrictor and the matrix.

If we accept those features of Kratzer's analysis, then I think we have the basis for the kind of argument I was looking for above. If any adjunct can be mapped into the restrictor part of the structure in (27) or (24) by a general syntax-to-semantics interpretation rule, but as a restrictor must restrict spatiotemporal locations (which fits the fact that the only *if*-clause paraphrases are of the *if=when* type), then the restrictor-clause interpretations of the adjuncts in (22a-b) would be as in (29a-b), where *l* is the variable for Kratzer's proposed spatiotemporal argument.

(29) (a) λl[wearing (Bill, that outfit, *l*)]
(b) λl[master-of-disguise (Bill)]

Since the individual-level predicate in (29b) does not have a spatiotemporal argument place, the result violates the prohibition against vacuous quantification, which explains its anomaly.

The fact that restrictive adjuncts must restrict spatiotemporal locations or situations also seems to solve a problem raised by Angelika Kratzer (personal communication): why is (30b) not a perfectly good paraphrase of (30a)?

(30) (a) When a linguist knows a foreign language, she usually knows it well.
(b) #Knowing a foreign language, a linguist usually knows it well.

A *when*-clause can provide a restrictor for any quantificational operator, whether the relevant "cases" are event-like or merely tuples of individuals; but an adjunct has to have an event or spatiotemporal argument to restrict. The analogy between restrictive adjuncts and relative clauses may be instructive here: the adjunct is forced to do its restricting at the sentence level, and cannot be construed as if it were simply a moved relative clause. A paraphrase of (30a) can be constructed, as in (31a), by putting the restrictor content in the form of a relative clause; these can even be counterfactual as in (31b), but the quantificational structure involves quantifying over individuals (possible individuals in (31b), not over episodes.

(31) (a) A linguist who knows a foreign language usually knows it well.
(b) A man who had unusually long arms would be able to touch the ceiling.

This point may be reinforced by noting the function of the "sort-shifters" identified by Stump which serve to turn individual-level predicates into stage-level ones or vice versa, illustrated in (32).

(32) a teacher, / as a teacher,
having long arms, / with long arms,
being drunk, / drunk,

Although it might seem at first as though the stage-level versions like *with long arms* would give us a way to use adjuncts to quantify over individuals, in fact they are used to quantify over stages of a single individual, much like the *cherry* example (26).

In conclusion, I do not claim to have offered a full account of either the proportion problem or Stump's generalization; both are complex phenomena involving several interacting phenomena, and the former in particular is the object of much current research and debate. But I hope to have shown that quantification, as it becomes better understood, is a valuable diagnostic domain to work with, because it is strongly if not exclusively tied up with sentence grammar. Just as early work in generative semantics emphasized the need to take account of quantifier scope and binding in theories of grammar, quantification can also help shed light on where implicit "event arguments" and the like enter the grammar proper, and open up interesting areas of research on the interaction of syntactic and semantic constraints on possible forms and their interpretations.

Notes

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