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On Shell Structure

Richard K. Larson



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This volume collects core papers by Richard K. Larson developing what has since come to be known as the “VP Shell” or “Split VP” analysis of sentential structure. The volume includes five previously published papers together with two major unpublished works from the same period: “Light Predicate Raising” (1989), which explores the interesting consequences of a leftward raising analysis of “NP Shift” phenomena, and “The Projection of DP (and DegP)” (1991), which extends the shell approach to the projection of nominal and adjectival structure, showing how projection can be handled in a uniform way. In addition to published, unpublished and limited-distribution work, the volume includes extensive new introductory material. The general introduction traces the conceptual roots of the VP Shell analysis and its problems in the face of subsequent developments in theory, and offers an updated form compatible with modern Minimalist syntactic analysis. The section introductions to the material on datives, complex predicates and nominals show how the updated form of shell theory applies in the empirical domains where it was originally developed.

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Acknowledgments

When series editor Carlos Otero approached me years ago about collecting my papers on the VP Shell structure, I had not thought about the issues discussed in them for many years. My initial plan was to write a brief general introduction drawing out the main themes of the works and their contribution to subsequent theory, leaving matters at that. What resulted instead was a complete rethinking of the whole VP Shell project, including the basic nature of syntactic projection. Carlos Otero encouraged me in embarking on the larger project even though it dramatically slowed completion of this collection as I worked through not only the ideas now found in the introductions but many others not presented here, which form part of a larger manuscript in preparation. I acknowledge Professor Otero's encouragement and patience with enormous gratitude. I thank a succession of editors at Routledge for their support and patience as well.

Special thanks Noam Chomsky for inviting me to teach 24.958 *Linguistic Structure* in 1988 at the Massachusetts Institute of Technology, where many of these ideas got their first public airing, as well as the students and visitors who attended the class. I thank Hiroko Yamakido for editorial work on several of the papers in this volume. I thank Norbert Hornstein and Beth Levin for comments on the dative materials, as well as audiences at the University of Maryland, CRISP (Brussels, Belgium), ICFL 5 (Ghangzhou, PRC), and Fuji Womens University (Sapporo, Japan), where various parts of this work were presented.

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7 The Projection of DP (and DegP)

Recent versions of the Extended Standard Theory (e.g., Chomsky 1981, 1986) have proposed that syntactic structures are largely projectable from the properties of their constituent lexical items—in particular, from their thematic properties. In this paper I argue for an extension of this approach to nominal structure. My focus will not be on nominals related in an obvious way to verbal projections (1a), but rather on ones involving simple determiners, possessives, and restrictive modifiers (1b–d):

- (1) a. The enemy's destruction of the city
- b. Every flower
- c. John's book
- d. The man that I met

The proposed analysis draws crucially on three lines of semantic and syntactic research: (a) the relational view of determiners, under which elements like *some*, *every*, *the*, and so on, correspond to binary relations between properties or concepts; (b) the “DP Hypothesis,” under which noun phrases (so-called) are actually projections of their constituent determiners; and (c) the view of constituent structure proposed in Larson (1988a), according to which X-bar projections assume a uniform, recursive transitive form. As I show, this account illuminates a variety of familiar questions about the form of noun phrases and suggests a return to certain “classical” transformational proposals about the relation between nominals and modifiers.

In section 1, I sketch the relational view of determiners, and in section 2, I show its basic implications for noun phrase structure under the “head-raising” syntax in Larson (1988a, 1989). In section 3, I examine nominals containing restrictive relatives and PPs and argue, in effect, for a restoration of the “Article-S” analysis of Smith (1964). According to the latter, restrictive modifiers in NP are complements of the determiner and not adjuncts of the nominal. Section 4 next considers the structure of possessive nominals, including possessives that are intuitively linked to relative constructions (*John's book/the book that John has*) and possessives that involve argumental relations (*the city's destruction/the destruction of the city*). I suggest a derivational analysis of such pairs analogous to the derivational relation holding between oblique and double object forms in examples like *John gave Mary a book/John gave a book to Mary*. Finally, in section 5, I briefly explore an extension of these views to the structure of degree phrases and comparatives.¹

1. THE SEMANTICS OF DETERMINERS

In logic texts, sentences like those in (2a,b) are standardly represented in the format of “unrestricted quantification” shown in (3a,b) (respectively):

- (2) a. All whales are mammals.
 b. Some man arrived.
- (3) a. $\forall x[\text{whale}(x) \rightarrow \text{mammal}(x)]$
 b. $\exists x[\text{man}(x) \ \& \ \text{arrived}(x)]$

On this view, quantificational determiners correspond roughly to operators combining with a single (possibly complex) unary predicate. Thus in (3a) \forall combines with the complex unary predicate “if-a-whale-then-mammal,” and so on.

As is well known, however, the format of unrestricted quantification appears unsatisfactory, on a number of counts, for representing natural language quantification. One problem is that the syntax departs sharply from that of natural language: (3a,b) involve truth-functional connectives that do not appear to be present in (2a,b); moreover, (3a,b) have fundamentally the structure of conjunctions, something not obviously true of (2a,b). A second, more serious difficulty is that sentences involving certain quantifiers can be shown to have no unrestricted representation. Thus, it can be proven formally that first-order representations analogous to (3a,b) simply cannot be given for sentences containing *most*, *many*, and *few*, such as (4a,b):²

- (4) a. Most people think that dinosaurs were cold-blooded.
 b. Few cats reject tuna fish.

Thus there is an expressive limitation on unrestricted quantification that is apparently exceeded by natural language.

1.1. The Relational View of Determiners

Given these results, there has been considerable interest in recent years in the analysis of natural language quantification as involving generalized or restricted quantifiers (Rescher 1962; Barwise and Cooper Davies 1981 Higginbotham and May 1981 Keenan and Stavi 1983; Wiggins 1980). The approach is based on a single, very simple idea that may be stated as follows:

Relational View of D

Determiners express relations among predicate meanings.

This idea descends from the Aristotelian tradition in logic but is also advanced by Frege (1953), who suggests that in quantified examples like (2), the element *all* expresses a relation between between concepts. In particular, Frege proposes that *all* expresses subordination of the concept ‘whalehood’ to that of ‘mammalhood’. On this view, the “logical form” of (2a) is something like (5a), where ALL corresponds to the

subordination relation. That is, (2a) is true just in case being-a-whale is subordinate to being-a-mammal so that all individuals possessing the first property possess the second. In a similar way, (2b) may be taken to have the logical form in (5b), where SOME is the “nonexclusion” relation. That is, (2b) is true just in case being-a-man and arriving are nonexclusive properties.

- (5) a. ALL(‘whalehood’, ‘mammalhood’)
 b. SOME(‘man’, ‘arrive’)

According to the relational analysis, then, determiners are semantically similar to transitive predicates such as *touch*; but whereas the latter express relations between two individuals, such as *Mary* and *John*, the former express relations between two concepts.

1.2. Determiners as Set Relations

Frege’s basic idea can be spelled out precisely by construing “property,” “subordination,” “nonexclusion,” and so on in set-theoretic terms. Suppose common nouns and verb phrases are viewed as corresponding semantically to sets of individuals:

- (6) a. *whale* $\Rightarrow \{x: x \text{ is a whale}\}$ b. *mammal* $\Rightarrow \{x: x \text{ is a mammal}\}$
 c. *man* $\Rightarrow \{x: x \text{ is a man}\}$ d. *arrive* $\Rightarrow \{x: x \text{ arrives}\}$

Then determiners can be interpreted as expressing relations of quantity between such sets. The “subordination” relation ALL can be spelled out in terms of the number of individuals in the common noun set (Y) that are not in the verb phrase (X) (7a). Likewise, the “nonexclusion” relation SOME can be spelled out in terms of the number of individuals that are in both (7b):

- (7) a. ALL(X,Y) iff $|Y - X| = 0$
 b. SOME(X,Y) iff $|Y \cap X| \neq 0$

Given (7a), *All whales are mammals* will be true if and only if the set of whales contains no members not in the set of mammals. Given (7b), *Some man arrived* will be true just in case the set of men and the set of arrivers have a nonempty intersection. These are the correct results.

This general picture extends naturally to a variety of other determiners, including *most*, which was problematic for unrestricted quantification:

- (8) a. NO(X,Y) iff $|Y \cap X| = 0$
 b. MOST(X,Y) iff $|Y \cap X| > |Y - X|$
 c. TWO(X,Y) iff $|Y \cap X| = 2$ (and similarly for other numeral determiners)
 d. THE-TWO(X,Y) iff $|Y - X| = 0$, where $|Y| = 2$
 (similarly for other numeral determiners of the form “*the-n*,” for some n)
 e. BOTH(X,Y) iff THE-TWO(X,Y)

- f. NEITHER(X,Y) iff $|Y \cap X| = 0$, where $|Y| = 2$
- g. THE(X,Y) iff THE-ONE(X,Y)

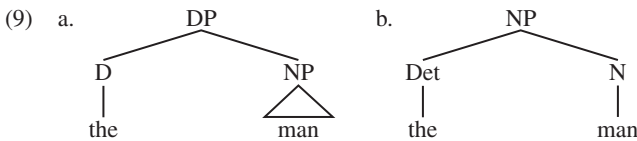
In all such cases, the determiner expresses a relation of quantity between the extension of a common noun (Y), traditionally referred to as the *restriction*, and the extension of a verb (or other predicate) phrase (X), traditionally referred to as the *scope*. D specifies, in effect, how many things satisfying the restriction Y are true of the scope X.³

2. IMPLICATIONS FOR NOMINAL SYNTAX

Under the relational analysis, determiners possess argument structure and lexical properties much like other predicate expressions. This view has interesting consequences for the syntax of nominals under the Extended Standard Theory of Chomsky (1981, 1986), which hypothesizes an intimate connection between argument structure and form.

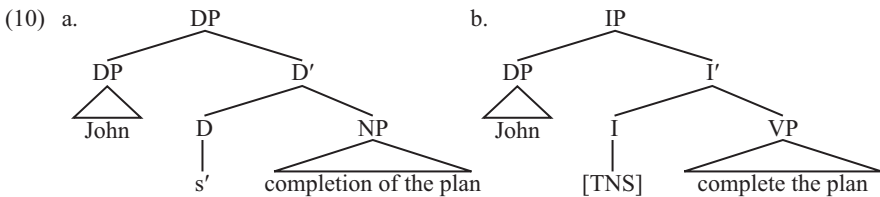
2.1. The Relational View and DP

As we have noted, the relational view of determiners treats D as a predicate, which selects its sister noun much like a transitive verb selects an object. This semantic analysis appears to fit naturally with the theory of nominal syntax proposed by Abney (1987) and Fukui and Speas (1986), wherein Ds are heads that take their nouns as complements (9a). In fact, the relational view appears to fit much better with the DP analysis than with the traditional NP picture (9b), which expresses no selection relation between D and N:



Nonetheless, despite the obvious attractions of connecting the relational semantics and DP, the assimilation is not completely straightforward.

Abney (1987) classifies D as a “functional category,” a group of forms bearing little or no semantic content on his view. He analogizes D in DP to I in IP, along the lines shown in (10a,b), analyzing *John* as the subject of DP in (10a) just as *John* is the subject of IP in (10b).



These proposals are simply not tenable under the relational analysis, however. First, as we have seen, the relational analysis does not take Ds to be semantically empty; rather,

they express relations of quantity between sets. Furthermore, D is not analogous to I under the relational analysis, but rather to a predicate category such as a V. Indeed, as we will discuss in detail below, the general semantics for Ds offers a natural classification of these elements into monadic, dyadic, and triadic forms, much as one finds with verbs. Basic determiners (*every, some, the*, etc.) correspond to dyadic predicates (11a), pronouns (*she, him, they*, etc.) correspond to monadic predicates (11b), and complex Ds like *more-than* and *every-except* correspond to triadic predicates (11c,d):

- (11) a. EVERY(X,Y) iff $|Y - X| = 0$ “dyadic D”
 b. HE_n(X) iff $g(x_n) \in X$ “monadic D”
 c. MORE-THAN(X,Y,Z) iff $|Y \cap X| > |Z \cap X|$ “triadic D”

Finally, under the relational view, an expression like *John* could not possibly constitute the subject of D in a semantic sense. Recall that the external “subject” argument of D (X) is semantically a predicate, one given by the syntactic constituent comprising the scope of the DP (usually the main predicate of the sentence). This is not compatible with a structure like (10a), which makes a name the subject of DP and which makes no provision for the scope argument of D.

In general, then, although a joining of the relational analysis and DP is attractive, this move doesn’t appear to be possible under the original intuition of Abney (1987) and Fukui and Speas (1986) that D is a functional category comparable to I. Instead, the natural correspondence offered by the relational semantics is between D and V.

2.2. A Theory of Structural Projection

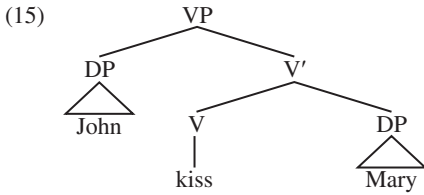
I wish to offer an alternative account of DP projection, one that is (I believe) more clearly compatible with the relational analysis of determiners. This account is based on the theory of argument projection in Larson (1988a), which includes the following principles:

- (12) a. $XP \rightarrow YP \quad X'$
 b. $X' \rightarrow X \quad ZP$
- (13) If β is an argument of α , then β must be realized within a projection of α .
- (14) Roles determined by a predicate are projected according to the thematic hierarchy
 $\Theta_{\text{AGENT}} > \Theta_{\text{THEME}} > \Theta_{\text{GOAL}} > \Theta_{\text{OBLIQUE}}$, such that if $\Theta_1 > \Theta_2$, then the argument to which Θ_1 is assigned c-commands the argument to which Θ_2 is assigned.

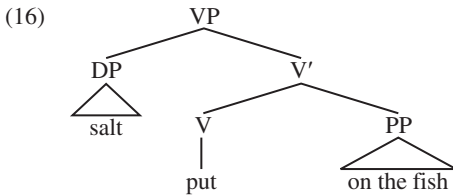
(12) is a restricted version of X-bar theory embodying a “Single Complement Hypothesis.” Under the latter, maximal projections are limited to one specifier and one complement per phrase. (13) and (14) give principles for the realization of arguments vis-à-vis their selecting head, specifying the location of these arguments and their relative hierarchical organization, respectively.

To illustrate these principles briefly, consider first the transitive verb *kiss*, which assigns an agent and a theme role. (12)–(14) determine a VP headed by *kiss* as in (15). This structure conforms to the restricted X-bar theory; furthermore, all arguments of

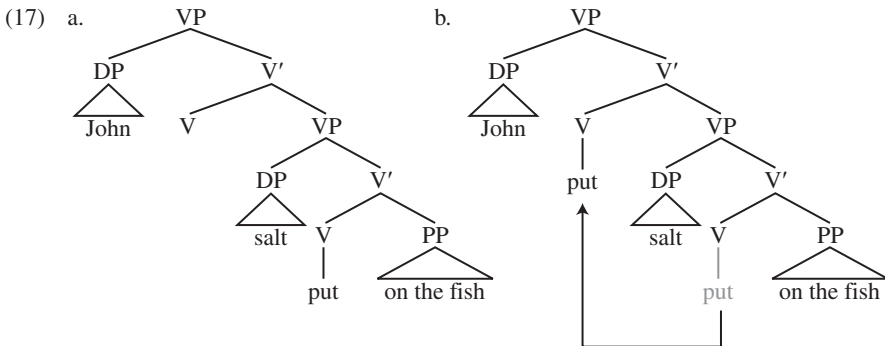
V are contained within a projection of V; finally, the argument bearing the agent role is projected into a position c-commanding the argument bearing the theme role, in compliance with (14) and the fact that $\Theta_{AGENT} > \Theta_{THEME}$.



Ditransitive *put*, which assigns agent, theme, and location, represents a more complicated case. Assuming $\Theta_{AGENT} > \Theta_{THEME} > \Theta_{LOC}$, we project a minimal VP as in (16), containing arguments corresponding to Θ_{THEME} and Θ_{LOC} , with the former higher than the latter:



This structure leaves Θ_{AGENT} unassigned, and no position for its bearer. In Larson (1988a) it is proposed that this circumstance licenses the “VP shell” in (17a), which contains a higher specifier for the agent and an empty verbal head position. The surface word order derives by raising the verb form to $[_V e]$ (17b):



2.3. Projecting DP

The theory sketched above can be extended to DPs under the assumption that they are projections of their constituent determiners. To do so, however, we must first settle some important preliminary questions about the thematic hierarchy and the status of the scope argument for DP. We then turn to the projection of DPs of various types.

2.3.1. The Thematic Hierarchy in D

A crucial element in the theory of projection given above is the assumption of a thematic hierarchy. The principle in (14) orchestrates the projection of verbal arguments by mapping relative prominence on the thematic hierarchy into relative structural prominence as defined by c-command. Larson (1988, 1989) assumes the specific thematic hierarchy argued for by Carrier-Duncan (1985) and M. Baker (1988), among others, that is:⁴

$$\Theta_{\text{AGENT}} > \Theta_{\text{THEME}} > \Theta_{\text{GOAL}} > \Theta_{\text{OBLIQUE}}$$

Under the latter, agent phrases are always projected into structure higher than other arguments, themes are projected higher than everything except agents, and so on.⁵

Whatever the correctness of this hierarchy for projection of verbal arguments in VP, it should be clear that it cannot help us with the projection of DP. There simply is no sense in which the set arguments (X,Y) of D under the relational analysis can be thought of as playing roles like agent or theme in DP. These concepts seem to be irrelevant. What then are the appropriate notions?

Proposals in this area must be regarded as highly tentative since the terrain is almost entirely unexplored. To my knowledge, application of thematic theory to nominals has so far been confined entirely to nominal gerunds and derived nominals like *John's destroying of the evidence* and *John's destruction of the evidence*, which show an obvious connection to verbal forms (*John's destroying the evidence*, *John destroyed the evidence*). Nonetheless, it is possible to reason by analogy to some extent. Canonically, verbs describe events, and notions like agent, theme, goal, and so on represent recurring semantic/functional roles that verbal arguments play in those events. Thinking analogically, we observe that determiners express quantification, and notions like restriction and scope represent two main recurring semantic/functional roles that set arguments play in quantification. Semantically, the restriction sets the domain of quantification, whereas the scope determines what is true of those individuals. Syntactically, restriction and scope are also plainly relevant in mapping the parts of DP. The former role is mapped to the NP complement of D. The latter role is associated with a main clause predication.

Given these points, I suggest an approach employing the two basic roles Θ_{SCOPE} and Θ_{RESTRICT} , which are ordered as such and play a part roughly similar to Θ_{AGENT} and Θ_{THEME} for V in a canonical VP. Thus, the scope argument is projected into Spec DP, and the restriction argument is projected lower down, inside D'. Below we will introduce various additional "oblique" arguments of D, including comparison phrases, exception phrases, and various forms of adjuncts. Summarizing, then, I propose the following thematic hierarchy in DP, where "NOBLIQUE" stands for nominal obliques:

$$\Theta_{\text{SCOPE}} > \Theta_{\text{RESTRICT}} > \Theta_{\text{NOBLIQUE}}$$

It follows from this hierarchy that the scope argument will always be projected highest, that the nominal restrictor will be projected higher than everything except the scope argument, and so on.

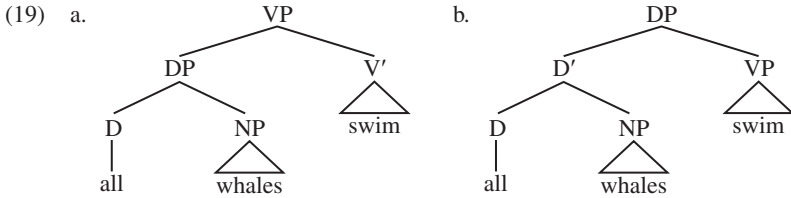
2.3.2. The Scope Argument X

Having established a rudimentary thematic hierarchy for determiner argument projection, we must return more carefully to the nature of the scope argument. In our semantic discussion of examples like *All whales swim*, we have analyzed D as relating sets X, Y. The Y argument was given by the noun and corresponded to the restriction on the determiner.

The X argument was given by the predicate and corresponded to its scope. On this view, the main predicate appears to function directly as one of the arguments of D.

- (18) a. *whales* => {x: x is a whale} b. *swim* => {x: x swims}
- c. ALL(X,Y) iff |Y - X| = 0
- d. *All whales swim* is true iff |{x: x is a whale} - {x: x swims}| = 0

Consider now the two candidate structures in (19a,b) in light of our principle (13) requiring all arguments of a predicate *a* to be realized within a projection of *a*:



Structure (19a) correctly expresses the projection requirements of V: *all whales*, the agent of *swim*, is realized within a projection of *swim* (VP). However, (19a) fails to express the projection requirements of D. Although *swim* is an apparent argument of D under the relational view, it fails to be realized within a projection of D. By contrast, structure (19b) has the opposite problem. Here the projection requirements of D are correctly expressed: *swim* is an argument of *all* and occurs within a projection of *all* (DP). But (19b) fails to express the projection requirements of V since *all whales* occurs outside VP. The problem is clear-cut. If DP is an argument of V and VP is simultaneously an argument of D, how can we find a structure that meets their joint requirements under the locality constraint on θ -role assignment (13)?

A related question arises with sentences containing a quantified object (20a). Here the scope argument is a set of individuals ({x: John respects x}) that is not given by any surface constituent (20b). A familiar view is that the quantified DP undergoes covert raising and adjoins to a containing category; the structural residue of movement (*John respects t_i*) then determines the scope argument of D (20c).

- (20) a. John respects [_{DP} all whales].
- b. *John respects all whales* is true iff |{x: x is a whale} - {x: **John respects x**}| = 0
- c. [_{DP_i} all whales] [**John respects t_i**]

Here again we may ask how the locality requirements of D are met given that its apparent scope argument (*John respects t_i*) does not occur within DP. But notice a further question as well. Since *all whales* is a complement of *respect* in (20a), it should constitute a phrase under X-bar theory, and hence should contain all its arguments within it. But how can this be if the scope argument of *all* is not present until *after all whales* has undergone raising, as in (20c)?

The answer to these questions I wish to suggest is that the syntactic scope argument of D is *never* in fact an overt predicate in the clause—neither the surface one given by VP (*swim*), nor a derived one created by movement (*John respects t_i*). Rather, the scope

argument of D is an independent, inaudible, pro-predicate element *Pro*, licensed by D and projected in Spec of DP, under the hierarchy $\Theta_{SCOPE} > \Theta_{RESTRICT}$ (21a). I suggest that the semantic value of this *Pro* argument is determined configurationally at the level of Logical Form (LF). Specifically, *Pro* gets its value from the derived predicate that is the structural sister of DP at Logical Form (LF) (21b).

- (21) a. $[_{DP} \textit{Pro} [_{D'} \textit{D} \textit{NP}]]$
 $\theta_{SCOPE} \qquad \qquad \theta_{RESTRICT}$
- b. $[_{DP_i} \textit{Pro} [_{D'} \textit{D} \textit{NP}]] [\textit{XP} \dots t_i \dots]$
GETS ITS VALUE FROM

To illustrate these ideas with a concrete case, consider again our example *all whales swim*. Under the proposals just stated, this sentence is projected initially with the structure in (22a) (irrelevant details suppressed). VP contains *all whales* in specifier position, satisfying the local projection requirements of *swim*. By contrast, DP contains the pro-predicate *Pro* in Spec position, satisfying the requirements of *all* and completing its argument projection. DP subsequently undergoes raising at the level of LF as in (22b). At LF, *Pro*'s value is identified by the the TP *t_i swim*, the structural sister of the raised DP (22c). Thus *Pro* comes to denote the set $\{x: \textit{swims}(x)\}$, the desired semantic result.⁶

- (22) a.
- b.
- c.

The same analysis applies straightforwardly to examples with a quantified DP object, such as (20a).

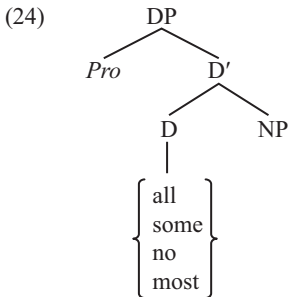
This account answers our two questions directly. With example (18a), we see (contrary to initial impressions) that *swim* is *not* in fact an argument of *all*, and hence not required to occur within a projection of DP. Rather, *Pro* is the true scope argument of D; *swims* simply identifies *Pro*'s value. Similarly, in example (20a), *John respects t_i* is not an argument of *all*, and hence need not be formed at the point where the DP *all whales* is projected. Rather, the scope argument is *Pro*, which *is* present when $[_{DP} \textit{all whales}]$ is formed but whose value is only determined at LF, after the quantified object has raised and the derived predicate *John respects t_i* has been formed. In essence, then, *Pro*, answers our two questions by separating the thematic domains of D and V, relating them only in an indirect way, through the assignment of its value.

The account also explains another, otherwise puzzling fact, what we might call the “categorial neutrality” of D's scope argument. Quantifiers have been argued to be able to adjoin to any category of phrase XP, taking XP as their scope (Stowell 1981). On a theory in which XP constitutes the direct argument of D, this implies that any category of phrase can be the scope argument of D—in other words that, D exercises no syntactic selection. This situation is at least anomalous. Other predicates typically do exert categorial selection on their arguments, and D itself limits its restriction argument to NP. The analysis in (21)/(22) resolves this puzzle: D does indeed exercise selection on its subject, constraining it to be *Pro*. The *appearance* of categorial neutrality arises from the fact that various different types of phrase can function as *antecedents* to *Pro*, fixing its value.

2.3.3. Dyadic Ds

Earlier we suggested that determiners, like verbs, can be divided semantically into monadic (intransitive), dyadic (transitive), and triadic (ditransitive) forms, according to whether they take one, two, or three predicate arguments. By far the most common case seems to be the dyadic-transitive one, illustrated by determiner relations like (23a–d). These take a restriction argument Y and a scope argument X and map to the general structure in (24), where the NP complement denotes the former and *Pro* in Spec denotes the latter:

- (23) a. ALL(X,Y) iff $|X - Y| = 0$
 b. SOME(X,Y) iff $|X \cap Y| \neq 0$
 c. NO(X,Y) iff $|X \cap Y| = 0$
 d. MOST(X,Y) iff $|X \cap Y| > |X - Y|$



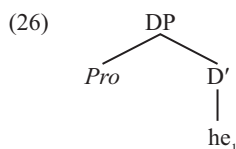
In this structure, all positions made available by the X-bar theory in (12)—Spec, head, and complement—are realized in a single projection.

2.3.4. Monadic Ds

The case of monadic, intransitive Ds is plausibly represented by the class of pronouns, which Montague (1974) analyzes (in effect) as restriction-less quantifiers. Montague assigns pronoun meanings according to a scheme equivalent to (25), which involves the single scope argument X . Under this scheme, the pronoun he_1 , for example, is true of those sets containing the individual $g(x_1)$ under some assignment g :

- (25) For any assignment g , $HE_n(X)$ iff $g(x_n) \in X$

Montague's semantics can be mapped to the syntax in (26), where the pronoun is analyzed as a determiner (following Postal (1969)) and where *Pro* constitutes D's sole argument:



Note that this structure treats pronouns specifically as “unergative determiners” insofar as their one argument is an underlying subject.⁷ This point might lead us to expect parallelisms between unergative Ds and Vs. (27a–c) show that unergative verbs have the property of licensing “cognate objects,” dummy complements that (in bare form) add no truth-conditional content to VP but at most serve to convey emphasis. Interestingly, pronouns have the property of licensing “emphatic reflexives,” dummy anaphors that also make no truth-conditional contribution but serve to emphasize or intensify:

- (27) a. [_{VP} laughed [**a laugh**]] Cognate objects
 b. [_{VP} coughed [**a coughed**]]
 c. [_{VP} smiled [**a smile**]]
- (28) a. [_{DP} he [_{NP} **himself**]] Emphatic reflexives
 b. [_{DP} she [_{NP} **herself**]]
 c. [_{DP} they [_{NP} **themselves**]]

Larson (1988a) notes the special status of transitive structures under the X-bar theory in (12) and proposes that cognate object formation represents a way of “filling out” the basic transitive frame with complement material. If this line of reasoning is correct, we might expect parallel processes in other categories, with other unergative heads. Emphatic reflexives are a potential candidate in the domain of DP; they might be analyzed, in effect, as cognate complements of D.

2.3.5. Triadic Ds

Finally, consider triadic, or three-argument, Ds. We suggested complex determiner constructions like (29) and (30) as representatives of this case:

- (29) a. **more** women **than men**
 b. ***no/three** women **than men**
- (30) a. **every** boy **but/except Bill**
 b. **no** boy **but/except Bill**
 c. ***each/some/three/most/many** boy(s) **but/except Bill**

As noted by Keenan and Stavi (1983), examples like these exhibit a dependency between the boldfaced elements. (29) shows that the determiner *more* licenses a comparison phrase following N, whereas other determiners do not. (30) shows that the universal determiners *every*, *all*, and *no* license an exception phrase following N, whereas other determiners (including universals like *each*) do not.

The dependencies in (29) and (30) can be analyzed as arising out of the basic semantics of the determiners in question. Following Keenan and Stavi (1983), a straightforward analysis of (29) is that *more-than* expresses the three-place relation in (31a), with the set argument Z provided by the *than*-phrase. (31b–d) illustrate how truth conditions with *more-than* might be computed in a simple case, where the Z argument is supplied first (31b), followed by the restriction Y (31c) and the scope X (31d):

- (31) a. MORE-THAN(X,Y,Z) iff $|Y \cap X| > |Z \cap X|$
 b. *More than women* iff $|Y \cap X| > |\{z: \text{woman}(z)\} \cap X|$
 c. *More men than women* iff $|\{x: \text{man}(x)\} \cap X| > |\{z: \text{woman}(z)\} \cap X|$
 d. *More men than women smoke* iff
 $|\{y: \text{man}(y)\} \cap \{x: \text{smokes}(x)\}| > |\{z: \text{woman}(z)\} \cap \{x: \text{smokes}(x)\}|$

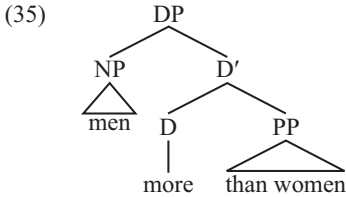
Although I will not try to defend the proposal in detail here, I suggest a similar approach to the exceptive constructions in (30). Specifically, I propose that the universal determiners licensing exception phrases are subject to a lexical alternation, which raises their valence from two to three, and that the exception phrase supplies the third argument to the augmented determiner.⁸ The basic idea is sketched in (32). Thus, for certain universal determiners D, including *every*, *all*, and *no* (but not *each*, *both*, *all three*, etc.), the grammar makes available an augmented three-place relation D-except'(X,Y,Z), where X is the scope set, Y is the restriction set, and Z is a set given by the exception phrase. The semantics of D-except'(X,Y,Z) is stated in (32b), where ${}^{\#}\text{Cond}(X,Z)$ is a relation whose content depends on whether D is positive (*every*, *all*) or negative (*no*). For D positive, $\text{Cond}(X,Z)$ is $|Z \cap X| = 0$. For D negative, $\text{Cond}(X,Z)$ is $|Z \cap X| \neq 0$. (33) and (34) show how truth conditions with exception phrases are computed in simple examples:

- (32) a. $D \in \{\text{every}, \text{all}, \text{no}\}$
 b. D-except'(X,Y,Z) iff $D'(X, (Y - Z))$ and ${}^{\#}\text{Cond}(X,Z)$
- (33) a. EVERY(X,Y) iff $|Y - X| = 0$
 b. EVERY-except(X,Y,Z) iff $|(Y - Z) - X| = 0$ and $|Z \cap X| = 0$

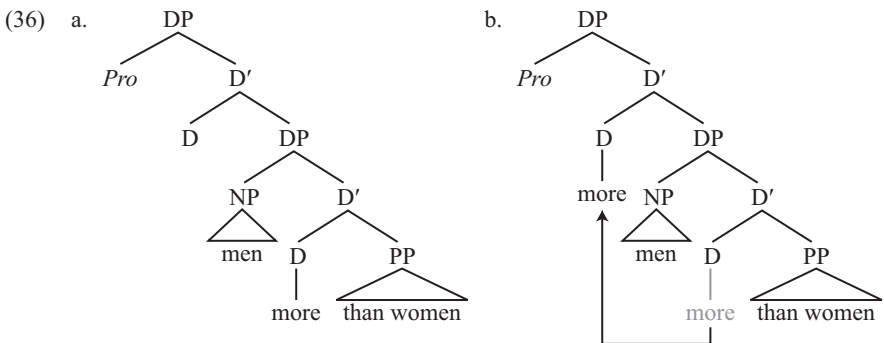
- c. *every except Bill* iff $|Y - \{\text{bill}\} - X| = 0$ and $|\{\text{bill}\} \cap X| = 0$
- d. *every boy except Bill* iff $(\{y: \text{boy}(y)\} - \{\text{bill}\}) - X = 0$ and $|\{\text{bill}\} \cap X| = 0$
- e. *every boy except Bill smokes iff*
 $|(\{y: \text{boy}(y)\} - \{\text{bill}\}) - \{x: \text{smokes}(x)\}| = 0$ and $|\{\text{bill}\} \cap \{x: \text{smokes}(x)\}| = 0$

- (34) a. *NO(X,Y)* iff $|Y \ll X| = 0$
 b. *NO-except(X,Y,Z)* iff $(Y - Z) \cap X = 0$ and $|Z \cap X| \neq 0$
 c. *no except Bill* iff $(Y - \{\text{bill}\}) \cap X = 0$ and $|\{\text{bill}\} \cap X| \neq 0$
 d. *no boy except Bill* iff $(\{\text{boys}\} - \{\text{bill}\}) \cap X = 0$ and $|\{\text{bill}\} \cap X| \neq 0$
 e. *no boy except Bill smokes* iff
 $|(\{y: \text{boy}(y)\} - \{\text{bill}\}) \cap \{x: \text{smokes}(x)\}| = 0$ and $|\{\text{bill}\} \cap \{x: \text{smokes}(x)\}| \neq 0$

The semantic analyses in (31) and (32) make *than*-phrases and exception phrases arguments of their associated determiner; thus the relevant Ds become three-place. This in turn makes their syntactic projection similar to that of verbs like *put*, discussed earlier. Assuming $\Theta_{\text{SCOPE}} > \Theta_{\text{RESTRICT}} > \Theta_{\text{NOBL}}$, we project the minimal DP in (35), containing arguments corresponding to Θ_{RESTRICT} and Θ_{NOBL} , with the former higher than the latter:



As in the case of *put*, this structure leaves a thematic role unassigned (Θ_{SCOPE}), and no position for its bearer. We therefore license a “DP shell” in (36a), containing a higher specifier for the scope argument and an empty D head position. The surface word order derives by raising *more* to $[_D e]$, stranding the *than*-phrase (36b):



Notice that this derivation directly accounts for the discontinuous dependency holding between *more* and *than*. The former underlyingly governs the phrase headed by the latter, a relationship that is broken up by the subsequent raising of D.

A parallel derivation can be given for exceptive constructions under the semantics proposed above. Under the assumption that the exception phrase represents the first argument of D, we create an initial DP as in (37a). The need to integrate the scope argument then licenses a higher DP shell as in (37b). Finally, D raises to the empty head position, stranding the exception phrase (37c):

- (37) a. $[_{DP} \text{ boy } [_{D'} \text{ every } [_{PP} \text{ except Bill}]]]$
- b. $[_{DP} \text{ Pro } [_{D'} \text{ e } [_{DP} \text{ boy } [_{D'} \text{ every } [_{PP} \text{ except Bill}]]]]]$
- c. $[_{DP} \text{ Pro } [_{D'} \text{ every } [_{DP} \text{ boy } [_{D'} \text{ t } [_{PP} \text{ except Bill}]]]]]$

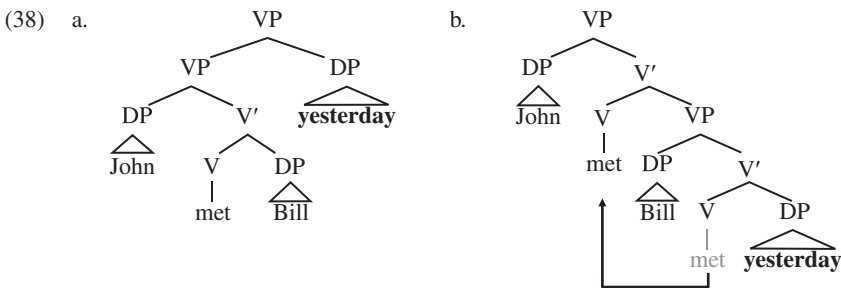
As above, the discontinuous dependency holding between D and PP is directly accounted for under this derivation.⁹

3. MODIFIERS IN DP

The analogy between DP and VP claimed in this analysis has interesting implications for the syntax of modifiers.

3.1. Adverbs and Adverbials as V-Complements

Larson (1988a, 1990a) proposes a theory of verbal modifiers, including adverbs and adverbials, that departs significantly from conventional views. A common proposal is that VP-modifiers adjoin on the right in VP, so that rightmost modifiers are highest (38a). Larson (1988a, 1990a) proposes that adverbs descend to the right, so that rightmost modifiers are lowest (38b).



The structure in (38b) follows from the thematic hierarchy assumed, which ranks oblique phrases, such as manner, locative, and temporal modifiers, lower than agents, themes, or goals:

$$\Theta_{AGENT} > \Theta_{THEME} > \Theta_{GOAL} > \Theta_{OBLIQUE}$$

The low insertion for adverbs typically triggers VP-shell projection and subsequent verb raising, as in (38b). An interesting result of this theory is that verbal modifiers are actually complements of the V head, and in fact closer complements of V than subjects, objects, or indirect objects.

Larson (1990a) offers several arguments for the low position for modifiers, including the fact that adverbs on the right typically behave as if they are in the domain of other VP elements, including objects. For example, consider the facts that adverbials containing negative polarity items can be licensed by an affective object (39). Assuming a restrictive theory of negative polarity item licensing based on c-command, this result follows under a structure like (38b), where the object c-commands the adverbial. It does not follow not under (38a), however.

- (39) a. John met few friends [**any** day this week].
 b. Alice speaks few languages [with **any** fluency].
 c. Gwen does few things [because **anyone** asks her to]

Another argument concerns the existence of verb-adverbial idioms like (40a–c), which suggest a form of discontinuous dependency between the boldfaced elements:

- (40) a. [_{VP} **treat** John **with kid gloves**] (“treat carefully”) MANNER
 b. [_{VP} **rub** John **the wrong way**] (“bother”) MANNER
 c. [_{VP} **put** John **on the spot**] (“confront”) LOCATION
 d. [_{VP} **kill** John **with kindness**] (“be very solicitous toward”) INSTRUMENT

Such items receive a very natural analysis in terms of V-Raising, where the semantic unit constituted by the idiomatic elements corresponds to an underlying syntactic unit that is broken up by subsequent movement (41):

- (41) [_{VP} . . . e [_{VP} John [_{V'} **treat** [**with kid gloves**]]]]
-

3.2. Relative Clauses as D-Complements

The general head-raising analysis, and the treatment of discontinuous dependencies, suggests a way of reviving some old but intuitively appealing views about the grammar of relative clauses. In the history of transformational grammar, there have been three main approaches to relative clause syntax. One is the NP-S analysis of Ross (1967), according to which relative clauses are adjoined to the maximal nominal phrase (42a). The second is the NOM-S analysis of Stockwell, Schacter, and Partee (1970), according to which relative clauses are adjoined to a smaller nominal phrase inside NP (42b). The third, and oldest, proposal is the Article-S analysis of Smith (1964), according to which relative clauses are not modifiers of the noun at all, strictly speaking, but are instead constituents of the determiner (42c).

Jackendoff (1977) makes virtually the same point with proper nouns, observing that although the latter reject a bare definite article, a relative clause or other restrictive modifier (AP, PP) renders the construction acceptable (45):

- (45) a. *the Paris
- b. the old Paris
- c. the Paris that I love
- d. the Paris of the twenties

What such examples appear to show is a form of discontinuous dependency holding between the determiner and the restrictive modifier, whether relative clause, attributive adjective, or PP.

The basic constituency of the Article-S analysis provides a natural account of these kinds of dependencies in terms of selection between D and its sister modifier. By contrast, under the nominal modifier theories (42a,b), the explanation must presumably be more complicated.¹⁰

3.2.1. A D-Raising Analysis

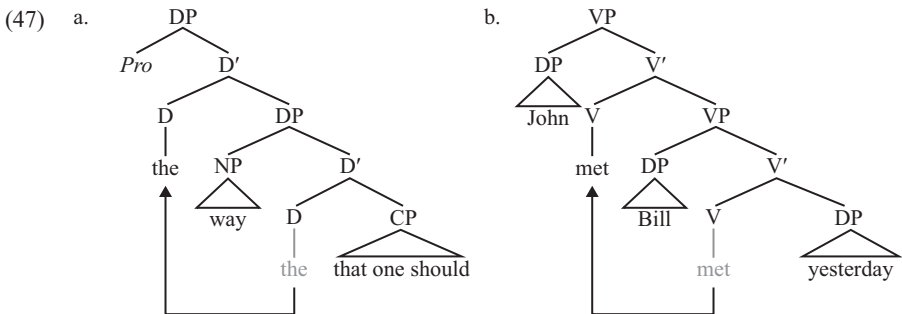
The pattern of dependency seen above with D and a relative clause modifier resembles that noted earlier with V and an adverbial modifier in our idiom cases (46):

- (46) a. **D NP RC**
- b. **V NP AdvP**

This suggests a similar approach. Suppose we treat relative clauses (and other restrictive modifiers in DP) as a form of determiner complement, governed by our thematic hierarchy for D and instantiating a lower thematic role than Θ_{RESTRICT} . For concreteness, I will label this role “ Θ_{RMOD} ,” for restrictive modifier:

$$\Theta_{\text{SCOPE}} > \Theta_{\text{RESTRICT}} > \Theta_{\text{RMOD}}$$

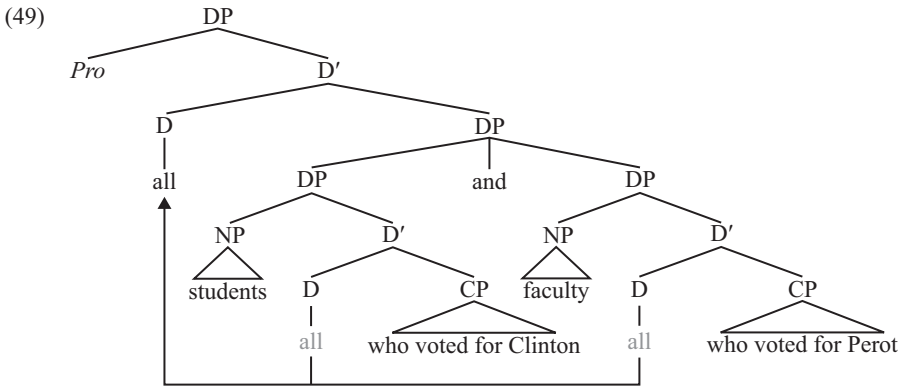
Then the inclusion of a relative clause modifier in a DP headed by a dyadic D will result in the minimal DP projection being filled by the arguments expressing Θ_{RESTRICT} and Θ_{RMOD} . This will trigger DP shell projection to accommodate the scope argument (*Pro*), and subsequent D-Raising. The resulting structure (47a) is parallel to the adverbial case discussed earlier (38b), repeated here as (47b).



The head-raising analysis can accommodate facts originally taken to argue for the NP-S and NOM-S analyses. Consider the example in (48a), for instance. It displays apparent conjunction of a constituent that includes the noun and relative clause but excludes the determiner (48b). The acceptability of such examples can be taken to argue for the NOM-S analysis, as discussed by C. Baker (1978).

- (48) a. All students who voted for Clinton and faculty who voted for Perot showed up.
- b. All [[students who voted for Clinton] and [faculty who voted for Perot]]

Under the head-raising analysis proposed here, this example can be analyzed as a case of inner DP conjunction, with across-the-board D movement along the lines indicated in (49).



On this view, examples like (48a) become analogous to cases of apparent nonconstituent coordination of objects and modifiers in VP, such as (50a). In Larson (1988a) these are analyzed as inner VP conjunctions, with across-the-board V movement (50b):

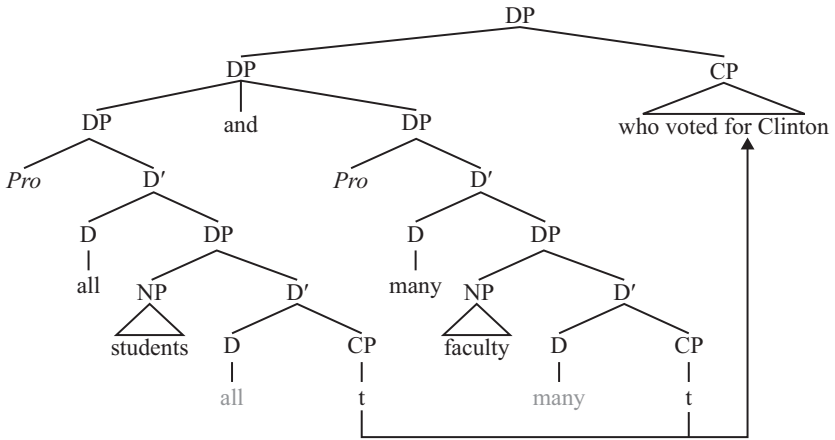
- (50) a. Max met Bill yesterday and Sue Tuesday.
- b. [_v met [_{vp} [_{vp} Bill [_v t [_{dp} yesterday]]]] and [_{vp} Sue [_v t [_{dp} Tuesday]]]]]

Consider also the example in (51a), which displays apparent conjunction of a constituent that includes the determiner and noun but excludes the relative clause. Its acceptability can be taken to argue for the NP-S analysis.

- (51) a. All students and many faculty who voted for Clinton showed up.
- b. [[All students] and [many faculty]] who voted for Clinton

Under the head-raising analysis, this example can be analyzed as a case of outer DP conjunction, with Right Node Raising of the relative clause to the right edge of DP.¹¹ The analysis of Right Node Raising is controversial;¹² however, if this operation is viewed as across-the-board movement of D, then the representation of (51a) is approximately as in (52), where D-raising has occurred separately in each of the conjoined DPs:

(52)



In short, then, standard conjunction facts taken to argue for nominal modifier accounts are also compatible with the D-Raising view.

3.2.2. Some Semantics

The analysis of relative clauses as D-complements invites natural questions about the computation of meaning for a structure like (47a). In giving a semantics, I will adopt the general proposal of Keenan and Stavi (1983) that determiner + relative clause combinations comprise a form of complex D. Specifically, I will treat relative clauses as combining with dyadic determiners to form new, complex dyadic determiners. This view is made concrete in the rule (53); a sample application is given in (54a–e) for the sentence *every boy that swims jogs*:

- (53) Let Δ be a determiner projection denoting a determiner relation $D(X, Y)$, where Y has the role θ_{RESTRICT} . Let CP be a relative clause denoting the set R . If Δ is D , then $[D' D CP]$ denotes the relation $D'(X, Y)$, where Y has the role θ_{RESTRICT} and $D'(X, Y)$ iff $D(X, (Y \cap R))$. If Δ is D' , then $[_{DP} CP D']$ denotes the relation $D'(X, Y)$, where Y has the role θ_{RESTRICT} and $D'(X, Y)$ iff $D(X, (Y \cap R))$.

- (54) a. $\text{EVERY}(X, Y)$ iff $|Y - X| = 0$
 b. $\text{EVERY}'(X, Y)$ iff $|(Y \cap R) - X| = 0$
 c. *every that swims* $\Rightarrow |(Y \cap \{\mathbf{r}: \text{swims}(\mathbf{r})\}) - X| = 0$
 d. *every boy that swims* $\Rightarrow |(\{y: \text{boy}(y)\} \cap \{\mathbf{r}: \text{swims}(\mathbf{r})\}) - X| = 0$
 e. *every boy that swims jogs* $\Rightarrow |(\{y: \text{boy}(y)\} \cap \{\mathbf{r}: \text{swims}(\mathbf{r})\}) - \{x: \text{jogs}(x)\}| = 0$

Basic *every* expresses a dyadic relation *EVERY* between two sets X and Y , where Y is the restriction (54a). (53) entails, in effect, that combining *every* with a relative CP creates the new dyadic determiner *EVERY'*, defined as in (54b), where the restriction argument of *EVERY'* is specified as the intersection of the relative clause denotation R with the

original restriction of EVERY. The relative clause supplies the value of R (54c); afterwards, the nominal restriction and scope arguments combine, respectively (54d,e).¹³

Although nonstandard, this analysis of relative clauses has precedent. Bach and Cooper (1978) propose a Montague Grammar semantics for relatives based on determiner translations like (55b); *this* may be compared to the more standard Montague Grammar translation in (55a) (which ignores intensions):¹⁴

- (55) a. *every* $\implies \lambda Q \lambda P \forall x [Q(x) \rightarrow P(x)]$
 b. *every* $\implies \lambda Q \lambda P \forall x [[Q(x) \ \& \ \mathbf{R}(x)] \rightarrow P(x)]$

The crucial feature of (55b) is the inclusion of a distinguished variable R, whose value is supplied by a relative clause and whose denotation is intersected with that of the restriction set Q. In effect, Bach and Cooper (1978) offer an Article-S semantic analysis, composing relative clause denotations with determiner denotations, analogously to what is proposed here.

RELATIVE CLAUSES AS ARGUMENTS?

It is interesting to compare a representation like (55b) with one like (56), in which the restriction variable R not only is present in the interpretation of D but is also abstracted over:

- (56) *every* $\implies \lambda \mathbf{R} \lambda Q \lambda P \forall x [[Q(x) \ \& \ \mathbf{R}(x)] \rightarrow P(x)]$

(55b) represents *every* as a binary determiner that always contains a restriction R on its quantificational domain. The value of R is presumably determined by context or by an overtly occurring restriction phrase, such as a relative. By contrast, (56) analyzes *every* as a true ternary determiner, which requires an additional syntactic restrictor argument to yield a binary D. The correct analysis of a given D as in (55b) or (56) is presumably a matter of whether the determiner in question genuinely requires a syntactic restrictor element.

Some interesting observations by Vendler (1967) suggest that interpretations like (56) may be justified for definite determiners. Consider (57) and (58), based on Vendler's examples.

- (57) a. I see a man. **The man** wears a hat.
 b. I see a man. **The man I see** wears a hat.
 c. I see a man. **The man you know** wears a hat.
- (58) a. I see a rose. **The rose** is lovely.
 b. I see a rose. **The rose I see** is lovely.
 c. I see a rose. **The red rose** is lovely.¹⁵

(57a) contains a bare definite description that is naturally understood along the lines of (57b). Both examples present discourse that is "continuous" in Vendler's terms: the individual introduced by the indefinite DP is understood as the same one picked up by the definite. Interestingly, as Vendler points out, (57c) is *not* continuous in the same sense. The individuals picked out with the definite and indefinite are not naturally understood as the same. The difference appears to be induced by the relative clause *you know* in the second clause. Analogous points apply to (58).

Vendler interprets these results as supporting the view that “the definite article in front of a noun is always and infallibly the sign of a restrictive adjunct, present or recoverable” (p. 46).¹⁶ In modern terms, a definite D selects a restrictive modifier. (57a) is analyzed as containing an elliptical or “deleted” relative clause equivalent to (57b), allowing continuity. By contrast, in (57c) the overt relative in effect “saturates” the relative clause required by *the*; hence (57c) cannot be understood equivalently to (57b), and hence there is no continuity.¹⁷

The continuity phenomenon distinguishes *the* from other quantifiers. Observe that although (59a) is naturally read as continuous, with *the linguists* referring to the linguists I met, this is not true in (59b). *Most linguists* is not naturally read as referring to most linguists that I met. To obtain this interpretation, an explicit definite is required (59c):¹⁸

- (59) a. I met some linguists. **The linguists** were educated in California.
- b. I met some linguists. **Most linguists** were educated in California.
- c. I met some linguists. **Most of the linguists** were educated in California.

These observations are very naturally interpreted in our terms by saying that whereas other determiners combine with restrictive modifiers via the rule in (53), the definite determiner actually selects a restrictive modifier as an argument, as part of its basic lexical semantics. That is, *the* should be interpreted via the relation in (60a), which replaces our earlier (8g); (60b) is the equivalent in a conventional Montague Grammar-style notation:

- (60) a. THE(X,Y,R) iff $| (Y \cap R) - X | = 0$, where $| (Y \cap R) | = 1$
- b. *the* $\implies \lambda R \lambda Q \lambda P \exists y \forall x [[[Q(y) \ \& \ R(y)] \equiv y = x] \ \& \ P(x)]$

Thus Vendler’s view that *the* always occurs with a restrictive modifier, overt or covert, fits in well with the notion of relative clauses as D-complements.¹⁹

ORDERING OF RELATIVE CLAUSES AND EXCEPTION PHRASES

The analysis of relatives offered here yields an account of the ordering of relative clauses in relation to other oblique elements. Consider the facts in (61a,b), which show that the exception phrase must occur rightmost (under a normal intonation for the DP). The reverse order is awkward to unacceptable. Since rightmost phrases are lower and combine earlier with D in this framework, the strongly preferred order in (61a) suggests that the exception phrase should project lower and combine with *every* before the two combine with the relative (61c).

- (61) a. Every boy that you saw except John
- b. ??Every boy except John that you saw
- c. $[_{DP} \textit{Pro} [_{D'} \textit{every} [_{DP} \textit{boy} [_{D'} t [_{DP} \textit{that you saw} [_{D'} t [pp \textit{except Bill}]]]]]]]]$

This result follows under the view that *every-except* is a triadic determiner, as proposed in (32)–(33). This entails that *every-except* must first combine with its third argument before it can be subject to the rule in (53), which combines relatives only with Ds denoting *dyadic* determiner relations. *Every-except* does not become *dyadic* until after

its third argument is saturated. So the exception phrase must combine first, that is, at lowest point in the tree.

There is one interesting qualification of the facts in (61) concerning heaviness effects. Consider the dialogue in (62), where the relative clause is given heavy stress to convey contrastive emphasis; or consider the example in (63), where the relative is quite long:²⁰

(62) A: What was every boy except John wearing?

B: Well, every boy except John **THAT I SAW** was wearing a kilt.

(63) Every boy except John [that was roaming the highlands of Scotland] was wearing a kilt

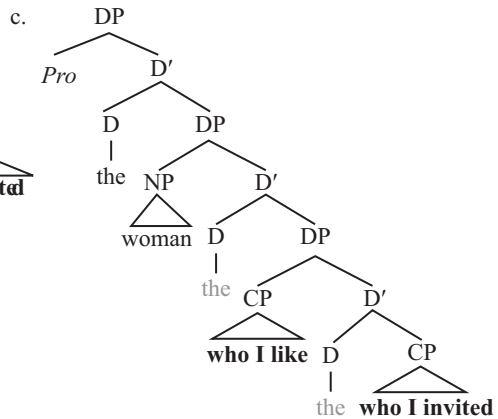
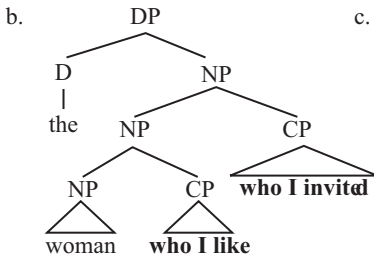
In both cases, the otherwise disfavored order—exception phrase followed by relative clause—seems to improve.

The view that I wish to support, ultimately, is that (61a,b) represent the true relationship between the relative and the exception phrase, and that (62)–(63) represent forms derived by movement from the equivalent of (61a). To motivate this proposal, we examine a broader, parallel phenomenon that arises in the context of multiple relative clauses.

3.3. Multiple Relatives

Multiple relatives receive very different representations in the nominal modifier analyses versus the D-Raising account proposed here. On the former, examples like (64a) stack upward to the right (64b), whereas on the latter they branch downward (64c).

(64) a. The woman who I like who I invited (came to the party).



Note an apparent difference of scope with respect to the two relatives. In the former tree, *who I like* is the first restrictor of the nominal, with *who I invited* restricting the result. In the latter, *who I invited* restricts the nominal first (according to our semantics), with *who I like* following.

Under a standard semantics using set intersection like the one adopted here, differences of relative scope with relative clauses are not truth-conditionally significant. This is because set intersection is a commutative and associative operation. If we have a noun set N , and two relative clause sets $R1$ and $R2$, then the result of intersecting N with $R1$, and the result of that intersection with $R2$, will always be the same as the result of intersecting N with $R2$ the result of this intersection with $R1$:

$$(65) \quad (N \cap R1) \cap R2 = (N \cap R2) \cap R1$$

In many cases multiple relatives do not appear to show relative scope, so that inverting the order of multiple relatives carries no difference in meaning. For example, when definite descriptions like (66a,b) are used referentially²¹ and read with neutral intonation, permutation of relatives has no apparent effect; both pick out the same individual:

- (66) a. the man [that you met] [that I talked to]
 b. the man [that I talked to] [that you met]

In other cases, however, particularly when emphasis is added, there does appear to be a scopal difference, even if not one that is truth-conditionally significant. Consider (67a,b), where capitalization indicates stress or emphasis:

- (67) a. Every woman who enjoys books WHO READS SHAKESPEARE (will like this).
 b. Every woman who reads Shakespeare WHO ENJOYS BOOKS (will like this).

(67a) is naturally understood as saying something like this: “among women who enjoy books, every one who reads Shakespeare will like this.” By contrast, (67b) conveys: “among women who read Shakespeare, every one who enjoys books will like this.” The force of this difference is clear in question-answering contexts like (68), where the questioner sets up the domain as women-who-enjoy-books, and hence the answerer must quantify over this same domain:

- (68) A: Which women who enjoy books will like this?
 B: Every woman who enjoys books WHO READS SHAKESPEARE will like this!
 #Every woman who reads Shakespeare WHO ENJOYS BOOKS will like this!

Summarizing informally, *woman who enjoys books* is perceived as a semantic constituent in (67a), and *woman who reads Shakespeare* is perceived as a constituent in (67b).

When these results are matched up against the structures in (64), the stacking theories of relative clauses appear to be favored. (64b) seems to project the correct constituency relations whereas (64c) does not. In fact, however, I think that an appropriate structure can be assigned under the D-Raising theory once another parallelism between VP and DP is acknowledged.

3.3.1. *Light Predicate Raising in VP*

Pairs like (69a,b), involving permutation of an object and other VP material, have been widely analyzed in the literature as the product of a movement operation that shifts the object rightward (69c), adjoining it at the edge of VP. This operation typically involves

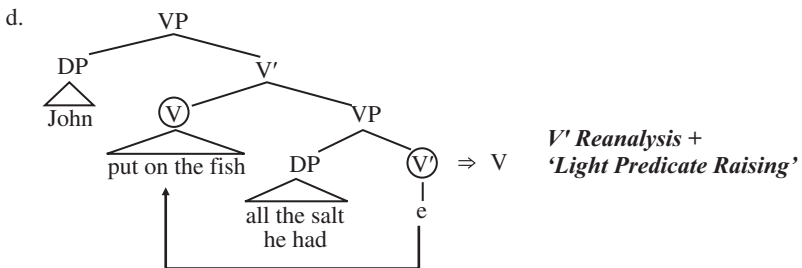
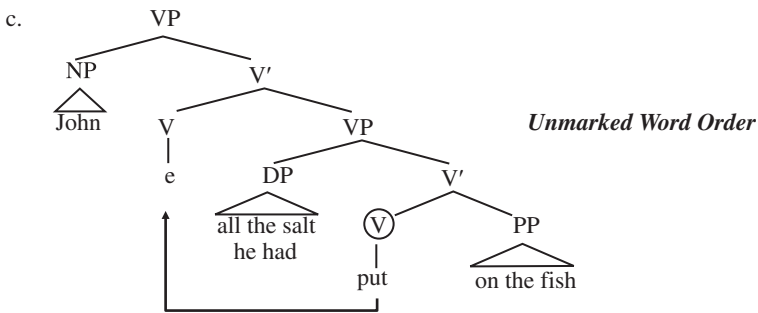
phrases that are phonologically “heavy” in relation to the material shifted over; hence it is referred to as “Heavy NP Shift”:

- (69) a. John gave a picture of Mary to Bill.
- b. John gave to Bill a picture of Mary.
- c. John [_{VP} gave t [_{PP} to Bill]] [_{DP} a picture of Mary]

Larson (1988a, 1989) proposes an alternative analysis of this phenomenon using VP shell structures. The basic idea is that examples like (69b) are not instances of rightward movement of a heavy nominal, but rather leftward movement of a light predicate. Accordingly, the phenomenon is rechristened “Light Predicate Raising.” The key ingredient of this account is a reanalysis rule that permits thematically transitive phrases—XPs with two unassigned thematic roles—to be categorially reanalyzed as X⁰s. Reanalysis allows the entire transitive phrase to undergo head raising.

To illustrate, consider (70a), which is similar to our earlier (17a) but contains a heavy object *all the salt he had*. The sentence receives the underlying VP shell structure in (70b). Since the verb *put* is ditransitive, when it combines with a location phrase the resulting V' (*put on the fish*) is thematically transitive, with the two thematic roles θ_{AGENT} and θ_{THEME} unassigned. This entails that V' can undergo V' Reanalysis, as shown in (70d). Once *put on the fish* is reanalyzed as a head, this element can raise around the object, resulting in a right-peripheral position for the object (70d):²²

- (70) a. John put all the salt he had on the fish.
- b. [_{VP} John [_{V'} e [_{VP} the salt he had [_{V'} put on the fish]]]]

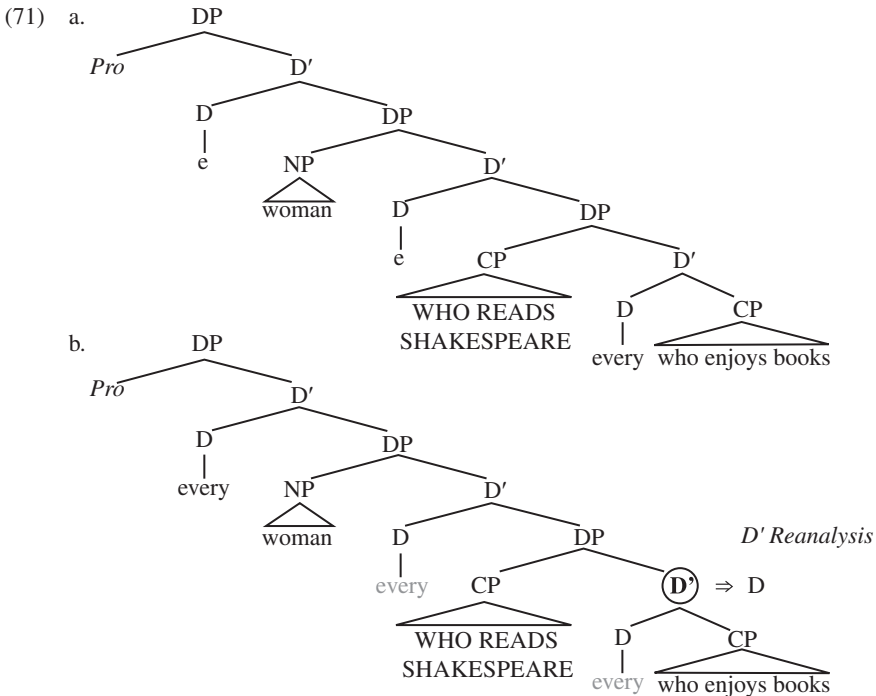


Although the exact nature of V' Reanalysis is somewhat unclear in Larson (1988a), one property it clearly must have is that it does not yield X⁰s that are opaque to further syntactic rules, including further head raising. This is clear from the need for V to raise out of V'/V⁰ for inflection in examples like *John was putting on the fish all the salt he had*. The progressive verb form (*putting*) must assume a local relation with progressive *be* for agreement.²³ V' Reanalysis must therefore be viewed as producing X⁰s only in the limited sense of items that can be treated as unprojected. Reanalysis clearly does not produce a morphological "word."

3.3.2. Light Predicate Raising in DP?

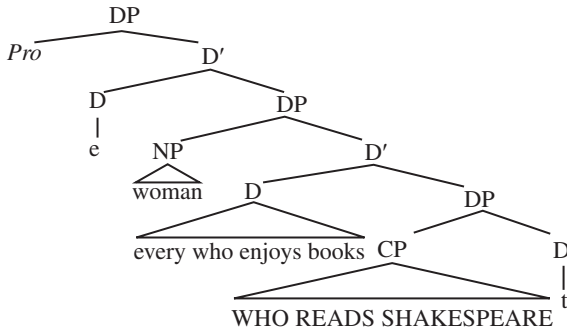
Although reanalysis and Light Predicate Raising were originally introduced in the context of VP, we have seen that notions like monadic/intransitive and dyadic/transitive can be carried over from VP to DP. A transitive V-predicate is one with Θ -roles like Θ_{AGENT} and Θ_{THEME} to assign. A transitive D-predicate is one bearing Θ -roles like Θ_{SCOPE} and $\Theta_{RESTRICT}$. Accordingly, there seems to be no barrier to a more general notion of X' Reanalysis, allowing any transitive X' to reanalyze as X⁰.

To illustrate this extension, consider again our multiple relative example *every woman who enjoys books WHO READS SHAKESPEARE*. Suppose this example has the underlying form in (71a), in which the outer relative is projected higher than the inner one. *Every* denotes a binary determiner relation and, under our semantics (53), so does the result of combining *every* with a relative clause. Thus *every who enjoys books* also denotes a binary determiner relation. Since [_D every who enjoys books] is thematically transitive, it is subject to reanalysis as a head (71b).



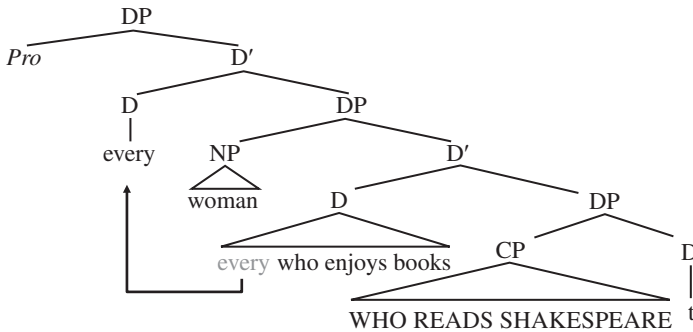
This allows it to raise as a unit around the CP to its left (72):

(72)



Finally, the D head raises out of the reanalyzed portion to the higher empty D position (73), yielding the desired surface order *every woman who enjoys books WHO READS SHAKESPEARE*:

(73)



The same general derivation will account for our earlier examples (62) and (63) (repeated below) in which the order of the relative clause and exception phrase is opposite to what we expect:

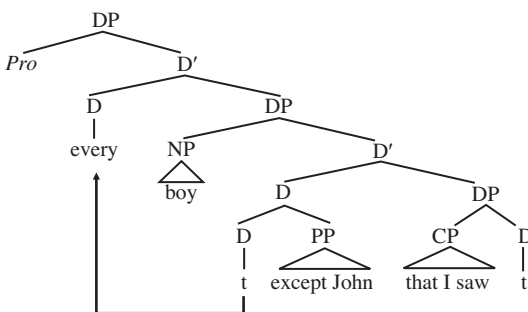
(62) A: What was every boy except John wearing?

B: Well, every boy except John THAT I SAW was wearing a kilt.

(63) Every boy except John [that was roaming the highlands of Scotland] was wearing a kilt.

These examples can be analyzed as deriving by D' Reanalysis of the lower D' containing the determiner + the exception phrase. This complex D is then raised, with the determiner later raising on its own (74):

(74)



Prenominal Relatives


It is natural to ask what blocks the raising of the entire reanalyzed D' into prenominal position, producing the ungrammatical (75). In fact, the same question arises with the simplest examples of relatives (76a). D' Reanalysis might lead us to expect the ungrammatical (76b), where a reanalyzed D' raises around NP (76c):

(75) *every who enjoys books woman WHO READS SHAKESPEARE

(76) a. every woman who enjoys books

b. *every who enjoys books woman

c. [_{DP} Pro [_D **every who enjoys books**] [_{DP} [NP woman] t]]



Examples like (75) and (76b) are plausibly ruled out by the same general constraint on prenominal items observed in cases like (77) and (78). It has been widely observed that prenominal modifiers must typically occur head-adjacent to the nouns they modify. Complements of prenominal adjectives are thus excluded since they prevent adjacency (77ai–ci). Either the complement must be “extraposed” rightward (77aai–cii), or else the entire adjective + complement must occur postnominally (77aiii–ciii). Similar remarks apply to the PPs in (78):²⁴

(77) a. i. *a **similar to Bill** man

ii. a **similar** man to **Bill**

iii. a man **similar to Bill**

b. i. *a **fun for children** game

ii. a **fun** game **for children**

iii. a game **fun for children**

c. i. *an **unfortunate for Max** complication

ii. an **unfortunate** complication for **Max**

iii. a complication **unfortunate for Max**

(78) a. i. *an **at two o'clock** meeting

ii. a meeting **at two o'clock**

b. i. *a **nearby the park** restaurant

ii. a **nearby** restaurant (***the park**)

iii. a restaurant **nearby (the park)**

Relative clauses are widely analyzed as CPs, with heads initial in their phrase in a language like English (79a). Consider then a raised, reanalyzed D' structure like (79b). If the whole complex D is considered as the prenominal element, then it will

clearly fail the requirement of head-adjacency: D is headed by **every**, and the latter is not adjacent to **woman**. Similarly, if the relative CP is considered as the prenominal element, it will also violate the requirement since C is not head-adjacent to *woman*:

- (79) a. [_{CP} who C [_{IP} t enjoys books]]
 b. [_{DP} . . . [_D **every** [_{CP} who C t enjoys books]] **woman** t]

It follows, then, that raising of a complex D' into prenominal position will always be excluded, and hence stranding derivations of the kind in (73) and (74) will be required.

3.4. Other D-Modifiers

The account of relative clauses proposed above can be extended to other categories of postnominal nominal modifiers, including postnominal PPs and APs like those illustrated in (80):²⁵

- (80) a. the man [_{PP} **at the podium**] [_{PP} **in a grey suit**]
 b. three women [_{AP} **present**] [_{AP} **capable of lifting a sofa**]
 c. every book [_{PP} **on the shelf**] [_{AP} **published since WWII**]

These can be analyzed as projected into low positions as complements of D, with subsequent raising of the determiner (81):

- (81) [_{DP} *Pro* [_{D'} every [_{DP} book [_{D'} t [_{DP} [_{PP} **on the shelf**] [_{D'} t [_{AP} **published since WWII**]]]]]]]]
-

The intersective semantics for relative clauses can likewise be directly extended to these categories. We simply generalize our rule to cover all predicative XPs of this kind:

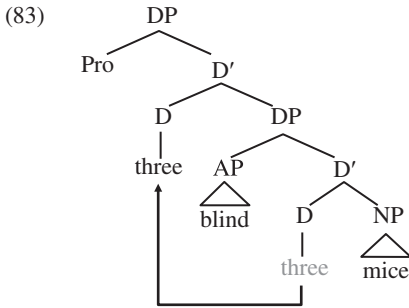
- (53') Let Δ be a determiner projection denoting a determiner relation $D(X,Y)$, where Y has the role θ_{RESTRICT} . Let XP be an AP, PP, or relative CP denoting the set R. If Δ is Δ , then [_{D'} D XP] denotes the relation $D'(X,Y)$, where Y has the role θ_{RESTRICT} and $D'(X,Y)$ iff $D(X,(Y \cap R))$.
 If Δ is Δ' , then [_{DP} CP D] denotes the relation $D'(X,Y)$, where Θ has the role θ_{RESTRICT} and $D'(X,Y)$ iff $D(X,(Y \cap R))$.

3.4.1. Prenominal APs

These results raise an interesting question as to how prenominal adjective modifiers should be analyzed. The adjectives in (82a–c) combine with their nominal in a way equivalent to that of a relative clause. All involve an intersective semantics:

- (82) a. the **tall** woman
 (cf. *the woman who is tall*)
- b. every **beautiful** house
 (cf. *every house that is beautiful*)
- c. three **blind** mice
 (cf. *three mice that are blind*)

Under the general analysis pursued here, there appear to be few options. If we attempt to treat pronominal adjectives as base-generated in the D-projection, along the lines of (83), then we must analyze them as items that can be combined with D *between* the scope and restriction arguments:



Achieving this is not straightforward, however. A crucial element in our approach to interactive D-modifiers is that they interact semantically with *transitive* determiner relations—in essence, they take transitive Ds and form larger, complex transitive Ds (recall (53) and (53') above). This in turn requires that the restriction phrase (NP) *not* be combined with D at the point where the modifier is added in. Evidently, this requirement is not met in (83); here D has already combined with NP at the point where AP is encountered.

If we cannot utilize the equivalent of (53) or (53'), the only obvious alternative for generating (83) is to treat pronominal APs as arguments of D in their own right, assigning them a thematic role lying between Θ_{SCOPE} and Θ_{RESTRICT} :

$$\Theta_{\text{SCOPE}} > \Theta_X > \Theta_{\text{RESTRICT}}$$

But this move is also problematic. Pronominal adjectives are optional DP elements, and although there is no problem making them arguments of D like relative clauses, it does seem quite strange to locate an *optionally* assigned thematic role (Θ_X) between two *obligatorily* assigned thematic roles (Θ_{SCOPE} , Θ_{RESTRICT}). Furthermore, it is well known that pronominal adjectives are iterable, so that we can get a number of such elements together (84):

- (84) a. three **German** mice
 b. three **blind German** mice

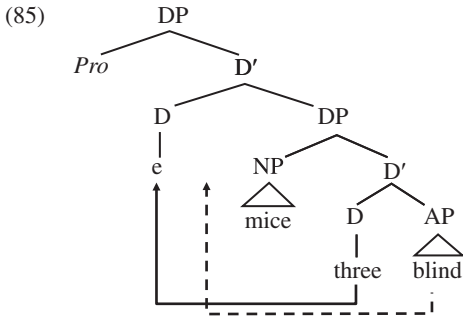
- c. three **grey blind German** mice
- d. three **furry grey blind German** mice
- e. three **small furry grey blind German** mice
- f. three **excellent small furry grey blind German** mice

On the approach being considered, this would seem to entail expanding the thematic hierarchy to include a number of roles between Θ_{SCOPE} and $\Theta_{RESTRICTS}$, *all* of which must be optional:

$$\Theta_{SCOPE} > \Theta_{X1} > \Theta_{X2} > \Theta_{X3} > \Theta_{X4} > \Theta_{X5} > \Theta_{X6} > \Theta_{RESTRICT}$$

Note that none of these issues arises in our approach to relative clauses and other post-nominal restrictive modifiers, such as PP and AP. The latter were not analyzed as arguments of D, and not as part of the nominal thematic hierarchy, but rather as elements that were (recursively) added in by a process forming complex Ds.

If a base-generated approach to prenominal adjectives is problematic, an attractive alternative is to adopt some version of the proposal by Smith (1964) and Jacobs and Rosenbaum (1968) that prenominal adjectives originate as postnominal modifiers and obtain their surface position by movement (85):



Under this approach, the specific problems raised above for (83) disappear. However, at least two new issues arise. First, we require an account of the precise mechanism by which adjectives generated postnominally are advanced to prenominal position. This account must accommodate the familiar fact that adjectives in prenominal position appear to obey certain (universal) restrictions on order of occurrence, which, for example, rule out combinations like those in (86) (uttered with neutral intonation) (Dixon 1977; Hetzron 1978; Sproat and Shih 1991):

- (86)
- a. ?*three **blind small** mice
 - b. ?*three **grey small blind** mice
 - c. ??three **small blind furry grey** mice
 - d. *three **German small furry grey blind** mice
 - e. ?*three **furry excellent small** mice

Second, such an analysis must deal with the fact that not all prenominal adjectives have the intersective semantics found with relative clauses and, postnominal PPs and APs. Cases like (87)–(89) are familiar examples:

- (87) a. Olga is an **alleged** dancer.
 (cf. **Olga is a dancer who is **alleged**.*)
 b. Alice is an **imagined** werewolf.
 (cf. ≠ *Alice is a werewolf who is **imagined**.*)
 c. Boris is a **supposed** perpetrator of a crime.
 (cf. **Boris is a perpetrator of a crime who is **supposed**.*)
- (88) a. Olga was a **reluctant** dancer.
 (cf. ≠ *Olga is a dancer who is **reluctant**.*)
 b. Boris was a **willing** perpetrator of a crime.
 (cf. ≠ *Boris was a perpetrator of a crime who was **willing**.*)
- (89) a. Olga is a **beautiful** dancer.
 (cf. ≠ *Olga is a dancer who is **beautiful**.*)
 b. Kathrin is a **skillful** manager.
 (cf. ≠ *Kathrin is a manager who is **skillful**.*)
 c. Peter is an **old** friend.
 (cf. ≠ *Peter is a friend who is **old**.*)

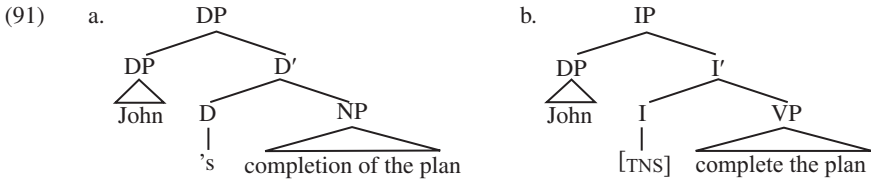
I believe that both of these issues can be dealt with satisfactorily, and the picture in (85) maintained; however, justifying this claim would require extensive additional discussion, which I put aside for development elsewhere.

4. GENITIVES

The postulation of a *Pro* subject in all DPs has strong consequences for the analysis of prenominal genitive constructions like (90a–d):

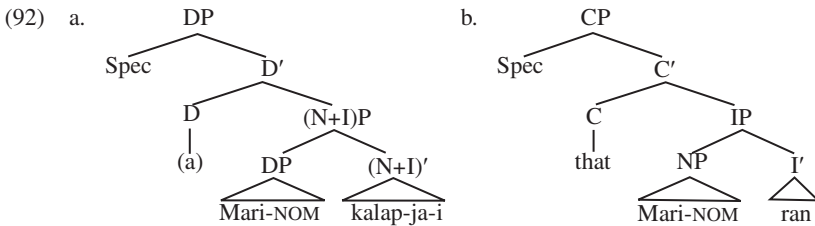
- (90) a. John's briefcase
 b. John's picture
 c. John's grandmother
 d. John's completion of the plan

As noted earlier, Abney (1987) assimilates the structure of genitive DPs to clauses (IPs), with the possessive element occupying a subject-like position; recall (10a,b) (repeated below):



Szabolsci (1983) further develops the clausal analogy with Hungarian examples like (91), in which the possessive item co-occurs with a definite article. Szabolsci analyzes the latter as counterpart to a complementizer; compare (92a,b):

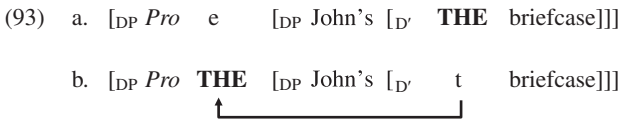
(91) (a) Mari kalap-ja-i
 (the) Mari hat-POSS-PL-2SG
 'Mari's hats'



The analysis of DP structure developed here does not comport with the basic sentential analogy. As we have seen, on the current account the highest argument position in a quantified DP—its thematic “subject”—is always the scope argument *Pro*. The possessive item therefore cannot be structurally parallel to a subject, and, by extension, the Hungarian definite determiner cannot be parallel to a complementizer. In place of the sentential picture, a rather different analogy suggests itself.


4.1. Possessive Ds as Triadic Predicates

Genitive DPs are familiar as definite nominals (McCawley 1988; Neale 1990). Suppose we view Hungarian as displaying the “true shape” of the genitive DP, where the head is a definite determiner and where the genitive-marked possessor occurs below the definite D. As a first approximation, we might propose the analysis in (93) for *John's briefcase*, where the possessor (*John*) and possessed (*briefcase*) are both arguments of a definite determiner (*THE*), which raises:



In Hungarian this definite determiner would be phonetically realizable, whereas in English (as in many other languages) it would be necessarily covert.

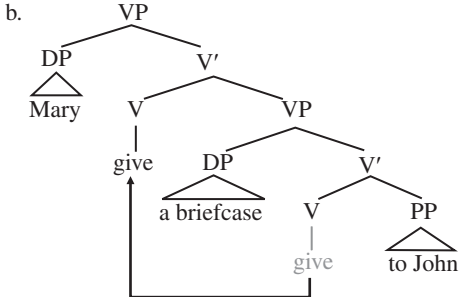
Notice that on this proposal, genitive nominals become a form of triadic DP construction, in which the two lower arguments of D (*John* and *briefcase*) stand in a possessive relation. This situation is interesting given the general parallelism between DP and VP that arises in our theory. Larson (1988a, 1990a, 1991) proposes an analysis very similar to (93) for a class of triadic VP constructions in which the two lower arguments of V stand in a possessive relation: namely, double object structures. An example like *Mary gave John a briefcase*, for instance, gets an analysis approximately as in (94a,b):

- (94) a. [_{VP} Mary e [_{VP} John [_{V'} gave a briefcase]]]
 b. [_{VP} Mary gave [_{VP} John [_{V'} t a briefcase]]]


What these points suggest, then, is that rather than viewing genitive nominals as clause-like, with the possessor analogous to a subject and the definite determiner parallel to C, we might instead see them as VP-like, with the possessor analogous to an object and the definite D parallel to V. Specifically, we might analyze genitive nominals as the DP equivalents of double object constructions in the verbal domain.

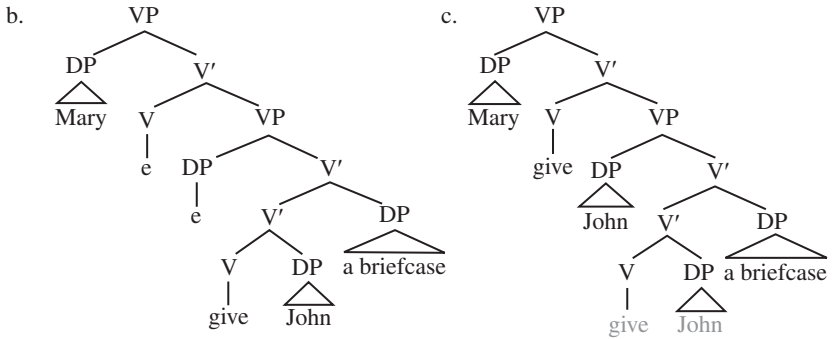
4.1.1. *Prepositional Datives and “Dative Shift” in VP*

The analogy between prenominal genitives and double object constructions can be developed further, through a more refined view of the latter. Larson (1988a, 1990a, 1991) proposes that prepositional datives like (95a) involve a relatively transparent source, in which the goal argument is projected lower than the agent and theme (in accordance with the thematic hierarchy in (14)), and where the dative verb raises in (95b):

- (95) a. *Mary gave a briefcase to John.*
 b. 

By contrast, double object constructions have a more complex derivation, which involves a modern version of “Dative shift”. An example like (96a) is assigned the underlying VP in (96b), where the goal (*John*) is initially projected into a low position, without the preposition *to* that would normally accompany it, and where the theme is a V-bar adjunct.²⁶ Absence of the Case marking provided by *to* triggers NP Movement. The result is (96c) (where the verb has also raised to the higher V position).

(96) a. Mary gave John a briefcase.

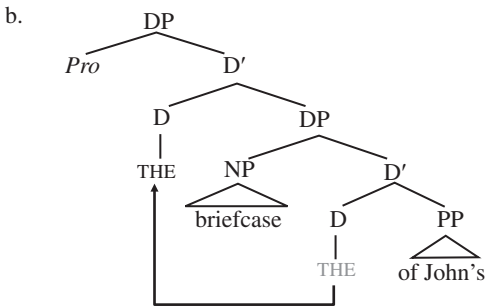


As discussed in Larson (1988a, 1990a, 1991), this account respects a strong theory of projection, in which the thematic hierarchy is directly reflected in the relative heights of arguments. Hence the goal argument (*John*) starts out lower than the theme argument (*a briefcase*) in initial structure. But it also allows for the important observation (due to Barss and Lasnik (1986)), that in a double object construction the goal argument appears to c-command the theme argument at surface form. This result is achieved by raising the goal to the higher position.

4.1.2. *Postnominal Genitives and “Genitive Shift” in DP*

This analysis of prepositional datives, double object structures, and their relationships can be extended directly to postnominal and prenominal genitives, following the basic analogy suggested above. Postnominal genitive constructions like (97a) can be assigned a relatively transparent initial structure as in (97b), where the genitive PP is treated as an oblique modifier and projected lower than the scope and restriction arguments of D, in accordance with the hierarchy discussed earlier. The definite determiner subsequently raises, yielding the correct surface order.²⁷

(97) a. the briefcase of John’s (that Alice lost/on the desk/taken)

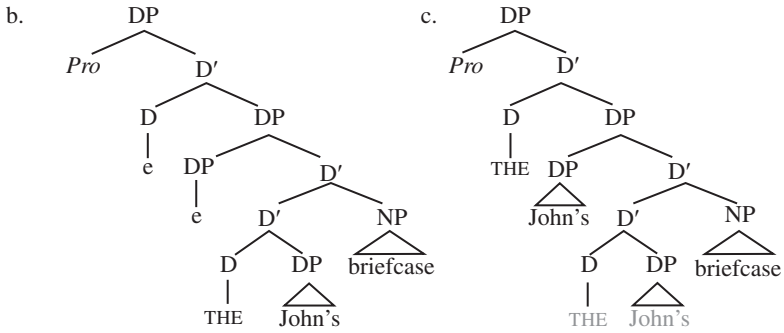


Postnominal genitives thus become the DP equivalents of the prepositional dative constructions.

By contrast, prenominal genitives receive a more complex movement derivation, involving what we might call “genitive shift.” Example (98a) is assigned the underlying DP in (98b), involving the covert definite determiner *THE*. Here again, the possessor

(*John's*) is projected into a low position, but now without the preposition *of*. The restriction argument (*briefcase*) is projected as a higher D' adjunct. Absence of the Case marking provided by *of* once again triggers movement. Finally, THE raises to the higher D position, yielding (98c):

(98) a. John's briefcase



As in the double object derivation, this account maintains a strict mapping between the thematic hierarchy and the relative structural height of arguments. Thus the possessor argument (*John's*) is projected lower than the restriction argument (*briefcase*) in both the prenominal and postnominal constructions. But this account also allows for the fact that in the prenominal genitive construction, the possessor c-commands the restriction argument at surface form, as shown by examples like (99a,b) involving negative polarity items and anaphors. This result is achieved by raising the possessor to the higher DP-Spec position.

(99) a. **no one's** picture of **anything**

(cf. **anyone's pictures of no one*)

b. **their** pictures of **each other**

(cf. **each other's pictures of them*)

4.2. Consequences and Comparisons

The analysis sketched above entails that prenominal genitives always achieve their surface position by movement and that the genitive DP always originates as an (oblique) argument of DP. Let us examine these points more carefully, considering two basic classes of prenominal genitives identified in the literature: so-called lexical, or **nonthematic genitives**, in which DP plainly does *not* bear a θ -role assigned by N, and **thematic genitives**, in which DP at least *appears* to bear a role assigned by N.

4.2.1. Nonthematic Genitives

Nonthematic genitives include examples like (100a–d), where, in each case, the only thematic role assigned by N (*briefcase*, *arm*, *accessories*, *afternoon*) is the usual one going to its external argument. As many have noted, the exact relation between possessor and possessed is typically vague in these cases, and not confined to ownership. Thus *John's*

briefcase can refer to one he owns, but it can also refer to one near him, one he was talking about, and so on. Similarly *Mary's arm* can refer to her own limb, but also one she is holding on to, or one lying before her on a dissection table. And so on.

- (100) a. John's briefcase (is on the veranda).
- b. Mary's arm (is tanned).
- c. Men's accessories (are in the next aisle).
- d. Jill's afternoon (was hectic).

On the present account, examples like (100a–d) derive by movement from the position of a postnominal genitive *of*-PP (101):

- (101) a. [DP the briefcase **of John's**]
 - b. [DP THE **John's** briefcase ____]
-

A movement account of nonthematic prenominal genitives is not new. Ross (1967, 1981), Chomsky (1970), Stockwell, Schacter, and Partee (1970), and McCawley (1988) all offer analyses that include the equivalent of (101a,b) at some derivational stage. For example, McCawley (1988) proposes the steps in (102a–c), where the genitive originates as the predicate of a copular relative clause (102a) that is subsequently reduced (102b), and where the genitive either combines with *of* (102ci) or fronts to prenominal position (102cii). Stockwell, Schacter, and Partee (1970) observe that the predicate genitives like (102a) show essentially the same range of readings found in (nonthematic) prenominal genitives and, hence a derivational relation between them seems semantically sound:

- (102) a. the briefcase [**which is John's**]
- b. the briefcase [**John's**] (from (102a) by Relative Clause Reduction)
- c. i. the briefcase [**of John's**] (from (102b) by *of*-insertion)
- ii. **John's** briefcase ____ (from (102b) by fronting DP's)

McCawley's analysis anticipates the one proposed here on several important points. In McCawley's account, as in ours, the prenominal genitive derives by fronting from the postnominal position of a genitive *of*-PP. Furthermore, for McCawley postnominal genitives occupy the same position as possessive relatives, a parallelism that also holds in our account, where relative clauses (including possessive relatives) and possessive PPs like *of John's* are analyzed as oblique D-arguments. The main divergence between the proposals is the assumption that nonthematic prenominal genitives literally derive from possessive relatives. That apart, the analyses are very similar.

It is interesting to note in this context that many languages show a formal similarity in the marking of relative clause and genitive constructions. The Australian languages Dyirbal and Gumbaingar, discussed by Dixon (1966), illustrate this phenomenon. As (103a,b) illustrate, the *nu* suffix appearing on the verb in Dyirbal relatives (103a) also occurs in Dyirbal genitives (103b):

- (103) a. yibi yara-ngu njalnga-ngu djilwa -**nu** -ru bura-n.
 woman-NOM man-ERG child-ERG kick -REL -ERG see-TNS
 ‘The man who had been kicked by the child saw the woman.’
- b. njalnga guda-ngu yara -**nu** ndjin-du badja-n.
 child-NOM dog-ERG man -REL ERG bite-TNS
 ‘The man’s dog bit the child.’

Dixon (1966) argues that this fact is not coincidental: that Dyrirbal and Gumbaingar possessive nominals actually derive from possessive relatives and that their shared morphology reflects this shared derivational history. Dixon’s results (and the general convergence between relative clauses and genitives) also appear compatible with the weaker proposal made here, that genitive DPs are generated in the same position as relatives (without being literally derived from the latter).²⁸

4.2.2. Thematic Genitives

The “genitive shift” analysis appears more problematic for thematic genitives like those in (104) and (105), where the possessive-marked DP appears to bear a thematic role assigned by N. Thus, in (104), *John* seems to receive an agent role from N, and in (105) *John* appears to receive a theme role from N (at least on one reading).

- (104) a. John’s examination of the plan
 (cf. *John examined the plan.*)
- b. John’s selection of the winner
 (cf. *John selected the winner.*)
- (105) a. John’s election
 (cf. *They elected John.*)
- b. John’s grandmother
 (cf. *the grandmother of John*)
- c. John’s picture
 (cf. *a picture of John*)

Such facts naturally suggest analyses in which *John* is an underlying argument of N. For example, Chomsky (1970, 1981), Anderson (1983/1984), Kayne (1984), and Giorgi and Longobardi (1990) (among others) take the possessive DPs in (104) to be base-generated in the subject position of the nominal, parallel to the subject position of a clause (106). (105a–c) are taken to derive by movement of the theme argument of N to subject position, much like what occurs in a clausal passive (107).²⁹

- (106) a. [John’s selection of the winner]
 b. [John selected the winner]

- (107) a. [the election of **John**]
 b. [**John's** election ____]
 c. John was elected ____
-

On the analysis entertained here, these proposals are not available, however. Assuming genitive DPs to be derived uniformly, none of the prenominal genitives in (104) or (105) is base-generated; all undergo movement. Furthermore, none originates as an argument of N; instead, all are generated initially as oblique D-arguments. Under our own assumptions about locality of θ -role assignment, this view appears to entail that with relational nouns and in nominalizations, prenominal genitives do *not* in fact receive a θ -role directly from N, but rather via some other, more indirect mechanism.

4.2.3. *The Semantics of Thematic Genitives*³⁰

Interestingly, Grimshaw (1990) has drawn essentially the same conclusion. In a thoroughgoing study of nominalizations, Grimshaw argues that, despite appearances, relational nouns and nominalizations *never* assign thematic roles directly to prenominal genitives, and hence possessives are never parallel to verbal arguments in this respect. Grimshaw terms such phrases “argument adjuncts,” a label expressing their paradoxical status as appearing to bear a thematic role assigned by N, but fully optional like unselected adjuncts, and unlike true subjects.

More recently, Burton (1995) has advanced an attractive semantic proposal that implements Grimshaw’s conclusions. Following a number of authors, including Higginbotham (1983), Partee (1983/1997), and Williams (1985, 1987), Burton assumes that possessives are headed by a definite determiner containing a free variable R over relations.³¹ In genitives containing a nonrelational noun, like (108a), R is determined deictically (108b).

- (108) a. John’s briefcase
 b. [the x: briefcase(x) & R(x,John)]

Letting the value of R vary with context, *John’s briefcase* may thus denote the briefcase that John owns, the briefcase he is holding, the briefcase sitting on the desk in front of him, and so on.

By contrast, in genitives containing a relational noun, like (109a), the value of R is determined in one of two different ways. One way is through contextual determination, as before. *John’s wife* thus denotes the individual who is a wife of someone and who John stands in some contextually given relation to (109b). Although not the normal understanding with relational nouns, this reading can be made pragmatically accessible. Imagine a diplomatic visit by a male dignitary from a foreign country allowing polygamy. During the visit, each of the diplomat’s wives is assigned her own individual security agent. John is one of these agents. In such a situation, *John’s wife* might naturally denote the wife that John has been assigned to protect; R is contextually fixed as the assignment relation, and so on.³²

- (109) a. John’s wife
 b. [the x: $\exists y$ [**wife**(x,y) & R(x,John)]]

Along with the deictic reading, there is also a (much more favored) “thematic” reading where *John’s wife* is understood to denote the individual that John is married to. Burton derives this reading in an interesting way, proposing that it arises, in effect, by a form of “inner anaphora,” in which the relational noun serves as the antecedent of R (110a) and determines its value (110b).³³

- (110) a. [the x: $\exists y[\mathbf{wife}(x,y)]$ & $\mathbf{R}(x,John)$]
└──────────────────┘
antecedes
- b. [the x: $\exists y[\mathbf{wife}(x,y)]$ & $\mathbf{wife}(x,John)$]
- c. [the x: $\mathbf{wife}(x,John)$]

As Burton observes, the complex expression (110a/b) can be shown to be semantically equivalent to the simpler (110c), but note an important difference between the two. Under (110a), *John* is not a direct argument of the relational noun *wife*. Rather, it is an argument of the relation R provided by the definite determiner. *John* comes to be understood as a semantic argument of *wife* through an indirect chain: *John* is an argument of R whose value is given by the relational N *wife*.

Burton’s semantics appears to be fully compatible with the syntactic results derived above, according to which prenominal possessors are never direct arguments of N, even when N is relational. Rather, the possessor is an argument of the R variable in D, which gets its value through N. This proposal appears to be generalizable to all relational nouns, and to nominalizations as well, along the lines of (111c), using the event semantics of Davidson (1967).³⁴

- (111) a. Nero’s destruction of Rome
- b. [the e: $\exists x[\mathbf{destruction}(e,x,Rome)]$ & $\mathbf{R}(e,Nero)$]
└──────────────────┘
antecedes
- c. [the e: $\exists x[\mathbf{destruction}(e,x,Rome)]$ & $\mathbf{destruction}(e,Nero,Rome)$]
- d. [the e: $\mathbf{destruction}(e,Nero,Rome)$]

Again (111c) is equivalent to the simpler (111d), but once again under (111b), *Nero* is not a direct argument of the nominalized form *destruction*. Rather, it is an argument of the *determiner*—specifically, its relation R, whose content is determined by the noun.

Under these proposals, then, the second major assumption of the genitive shift account appears to be sustainable. Indeed, the analysis seems to accord naturally with Grimshaw’s (1990) conclusions regarding the “argument adjunct” status of prenominal genitives in the context of relational nouns and nominalizations.

5. DEGREE PHRASES AND DEGP

The general approach to DP structure pursued here can be directly extended to other functional categories whose semantics is relational and quantificational. Degree modifiers of adjectival expressions are a potential case in point.

5.1. Comparatives as Quantificational

Predicative adjectives are often analyzed in logic books as simple unary predicates of individuals (112); however, examples like (113) and (114) show this view to be simplistic. (113a) appears to attribute, not simply intelligence, but a certain *degree* of intelligence; that is, the adjective appears to relate individuals and degrees (113b). Likewise, (114a,b) appear to compare degrees of intelligence.

- (112) a. Lester is smart.
 b. Smart(l)
- (113) a. Lester is that smart.
 b. Smart(l,d)
- (114) a. Lester is smarter than Kenton.
 b. Kenton is as smart as Lester.

There is evidence that certain degree-modified adjectival expressions are quantificational in nature. For example, equative comparatives like (115a) can be directly paraphrased with expressions independently argued to be quantificational (Larson 1987), such as the free relative construction in (115b).

- (115) a. Lester will grow as big as Kenton grew.
 b. Lester will grow however big Kenton grew.

Furthermore, as first noted by Russell (1905), comparatives appear to participate in familiar *de dicto/de re* ambiguities, widely taken to be a matter of scope. For example, (116a) is ambiguous between two readings, one of which is sensible (116b) and one of which is not (116c). This ambiguity can be analyzed in terms of two positions for the degree-modified adjectival expression *taller than he is*, along the lines in (117a,b). In the first, the adjectival phrase is scoped outside the propositional attitude verb, yielding the sensible reading. In the second, it takes scope inside *thinks*, yielding the nonsensical reading.³⁵

- (116) a. Maryann thinks Kenton is taller than he is.
 b. Kenton's height is such that Maryann thinks Kenton is taller than that.
 c. #Maryann thinks Kenton is taller than himself.
- (117) a. [taller than he is]_i Maryann thinks [Kenton is t_i]
 b. Maryann thinks [[taller than he is]_i , Kenton is t_i]

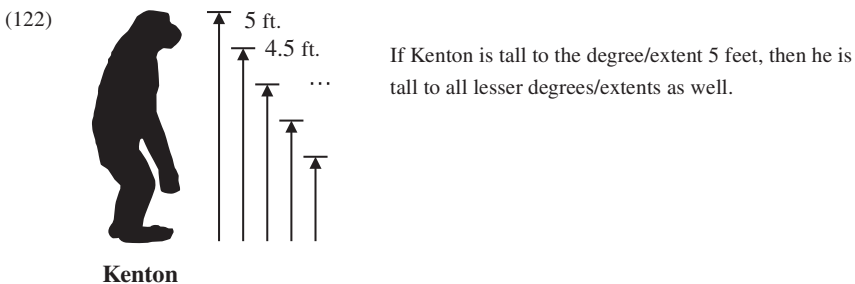
Finally, comparatives exhibit the Antecedent-Contained Deletion phenomenon, widely associated with quantificational structures. Larson (1988b) notes that the boldfaced phrase in (118a), containing an elliptical VP, is a complement of the verb *last*. As discussed by Sag (1976), Williams (1977), and May (1985), proper recovery of the elided material in such circumstances requires the null VP to escape the matrix VP at LF. This result is achieved if the comparative AP is quantificational and undergoes raising (118b) with subsequent reconstruction of the missing VP (118c):

- (118) a. John's party will [_{VP} last **as long as Bill's party will** [_{VP} \emptyset]].
- b. [_{AP} **as long as Bill's party will** [_{VP} \emptyset]] John's party will [_{VP} last t]
- c. [_{AP} **as long as Bill's party will** [_{VP} last t]] John's party will [_{VP} last t]
- ↑
RECONSTRUCTION

Ross (1973), Seuren (1973), and Klein (1980) offer an attractive quantificational semantics for comparatives and equatives, in which adjectives are understood as applying to pairs of individuals and degrees. Comparatives are analyzed as involving existential quantification over the degree element (119)–(120), whereas equatives are analyzed as involving universal quantification (121):

- (119) a. Kenton is taller than Lester.
b. $\exists d[\neg\text{tall}(l,d) \ \& \ \text{tall}(k,d)]$
- (120) a. Lester is less tall than Kenton.
b. $\exists d[\text{tall}(k,d) \ \& \ \neg\text{tall}(l,d)]$
- (121) a. Lester is as tall as Kenton.
b. $\forall d[\text{tall}(k,d) \rightarrow \text{tall}(l,d)]$

Note crucially that the notion of “degree” invoked in these formulae is not that of point-on-a-scale, but rather that of vector: a “directed interval” or “extent.” So understood, when an adjectival predicate is true of an individual to a degree/extent *d*, it is true of that individual to all lesser extents/degrees *d'* as well. For example, if Kenton, a chimpanzee, is tall to degree/extent 5 feet, then he is also tall to degrees/extents 4.5 feet, 4.0 feet, 3.5 feet, and so on.³⁶



With degrees conceived in this way, (119b)–(121b) seem to correctly express the truth conditions of (119a)–(121a), respectively. If there is a degree of height that Lester lacks and Kenton has, there can be no degree of height that Lester has and that Kenton lacks. Thus, Kenton must be taller than Lester (119a). Likewise, if every degree of height that Kenton possesses, Lester possesses as well, then Lester must be (at least) as tall as Kenton (121b). As noted by Klein (1980), this analysis captures certain intuitively correct inferences as a simple matter of first-order logic. For example, (123a), the negation

of (121a), does not merely imply that Lester and Kenton are of different heights but specifically that Lester is shorter (123b). This follows directly under the Ross/Seuren analysis, since the negation of the logical form of the first (124a) entails the logical form of the second (124b):

- (123) a. Lester is not as tall as Kenton. \vdash
 b. Lester is less tall than Kenton.
- (124) a. $\neg \forall d[\text{tall}(k,d) \rightarrow \text{tall}(l,d)] \quad \vdash$
 b. $\exists d[\neg \text{tall}(l,d) \ \& \ \text{tall}(k,d)]$

5.2. Degree Morphemes as Relational

Larson (1988b) offers a precise compositional semantic analysis of degree morphemes that adopts the basic Ross/Seuren proposal. Adjectives like *red* are analyzed as of type $\langle d, \langle e, t \rangle \rangle$ — functions from degrees to functions from entities to truth-values. Comparative degree morphemes *-er/more* and *less* are analyzed as triadic relations that combine with an adjective and two term phrase denotations. The basic analyses of the comparative morphemes *-er/more* and *less* are given in (125a) and (126a), respectively, where Q and P are variables of the type of DP denotations $\langle \langle e, t \rangle, t \rangle$ and where \mathcal{A} is a variable over adjective denotations $\langle d, \langle e, t \rangle \rangle$. Examples are given schematically in (125b–d) and (126b–d). In brief, the degree morpheme first combines with the comparative complement (the *than*-phrase element), then combines with the adjective, and finally combines with the subject.

- (125) a. *-er/more* $\Rightarrow \lambda Q \lambda \mathcal{A} \lambda P \exists d[\neg A(d)(Q) \ \& \ A(d)(P)]$
 b. Lester is taller than Kenton.
 c. $\lambda Q \lambda \mathcal{A} \lambda P \exists d[\neg A(d)(Q) \ \& \ A(d)(P)](\mathbf{Kenton}')(\mathbf{tall}')(\mathbf{Lester}')$
 d. $\exists d[\neg \mathbf{tall}'(k,d) \ \& \ \mathbf{tall}'(l,d)]$
- (126) a. *less* $\Rightarrow \lambda Q \lambda \mathcal{A} \lambda P \exists d[A(d)(Q) \ \& \ \neg A(d)(P)]$
 b. Lester is less tall than Kenton.
 c. $\lambda Q \lambda \mathcal{A} \lambda P \exists d[A(d)(Q) \ \& \ \neg A(d)(P)](\mathbf{Kenton}')(\mathbf{tall}')(\mathbf{Lester}')$
 d. $\exists d[\mathbf{tall}'(k,d) \ \& \ \neg \mathbf{tall}'(l,d)]$

The equative degree morpheme receives a similar analysis. As is assigned the interpretation in (127a), expressing a three-place relation between one DP meaning, an adjective meaning, and a second DP meaning. An example is given schematically in (127b–d):

- (127) a. *as* $\Rightarrow \lambda Q \lambda \mathcal{A} \lambda P \forall d[A(d)(Q) \rightarrow A(d)(P)]$
 b. Lester is as tall as Kenton.
 c. $\lambda Q \lambda \mathcal{A} \lambda P \forall d[A(d)(Q) \rightarrow A(d)(P)](\mathbf{Kenton}')(\mathbf{tall}')(\mathbf{Lester}')$
 d. $\forall d[\mathbf{tall}'(k,d) \rightarrow \mathbf{tall}'(l,d)]$

Larson (1998b) shows how these proposals can be extended to clausal comparative and clausal equative complements (like *taller than Kenton is* and *as tall as Kenton is*), and how they can be mapped into a quantificational syntax, in which comparative and equative phrases like *taller than Kenton* or *as tall as Lester* raise and take scope, leaving a trace in their base position.³⁷

It is revealing to compare this analysis of quantificational degree morphemes with that of quantification determiners. (128) shows existential *some*, analyzed as a binary relation between sets of individuals (128a), and applied in an example (128b–d). (129) gives the parallel points for the universal determiner *every*.

(128) a. *some* $\Rightarrow \lambda Q\lambda P\exists x[Q(x) \ \& \ P(x)]$

b. Some man smiles.

c. $\lambda Q\lambda P\exists x[Q(x) \ \& \ P(x)](\mathbf{man}')(\mathbf{smiles}')$

d. $\exists x[\mathbf{man}'(x) \ \& \ \mathbf{smiles}'(x)]$

(129) a. *every* $\Rightarrow \lambda Q\lambda P\forall x[Q(x) \rightarrow P(x)]$

b. Every man smiles.

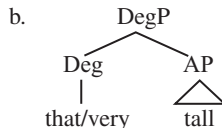
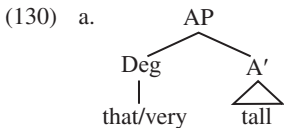
c. $\lambda Q\lambda P\forall x[Q(x) \rightarrow P(x)](\mathbf{man}')(\mathbf{smiles}')$

d. $\forall x[\mathbf{man}'(x) \rightarrow \mathbf{smiles}'(x)]$

Evidently, the parallels between degree elements and determiners are quite close on this account, with both receiving a relational analysis. Notice also that the nominal element in DP and the adjectival element in DegP play very similar semantic roles. In the former, NP functions to restrict a quantification over individuals, and hence receives the role Θ_{RESTRICT} . In the latter, AP functions to restrict a quantification over degrees—specifically, degrees of A as the latter applies to the nominal arguments. Hence AP is also a natural candidate for the role Θ_{RESTRICT} in our analysis. Likewise, both categories involve a scope element. In Larson (1988b), the element represented by the variable *P* in (125)–(127) functions very much like the element represented by the variable *P* in (128)–(129). Both receive their values from the phrase to which DP or DegP adjoins at LF. Hence these elements are both candidates for the role Θ_{SCOPE} .

5.3. DegP Syntax

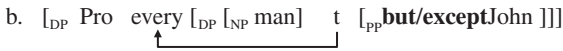
The semantic parallels between Deg and D match recent parallel syntactic accounts of these elements. Like determiners, degree elements were earlier analyzed as specifiers of a lexical phrase: just as Dets were viewed as specifiers of NP, Degs were analyzed as specifiers of AP (130a) (Bowers 1975; Jackendoff 1977). More recently, however, Abney (1987) and Corver (1990) have argued that Deg, like D, heads its own phrasal category, DegP (130b):



Note that the latter fits smoothly with our relational analysis, in which a degree element takes an adjectival phrase as its semantic complement. Indeed, our triadic comparative and equative Degs can be directly analogized to the triadic determiner relations discussed earlier.

Recall that the universal determiners *every*, *all*, and *no* license an exception phrase following N, whereas other determiners (including universals like *each*) do not (131a). We analyzed the relevant instances of *every* and *no* as ternary determiners that select the exception phrase as an initial complement. The latter is stranded by subsequent D-Raising, which produces a discontinuous dependency (131b):

(131) a. **Every/No/*Each/*Some** boy **but/except**John was present.



Something quite similar is motivated for DegP. Comparative and equative degree morphemes exercise a well-known selection relation on the element introducing the comparative/equative complement (Bowers 1975); *-er/more* and *less* require a complement introduced by *than* (132a), whereas *as* requires a complement introduced by *as* (132b).

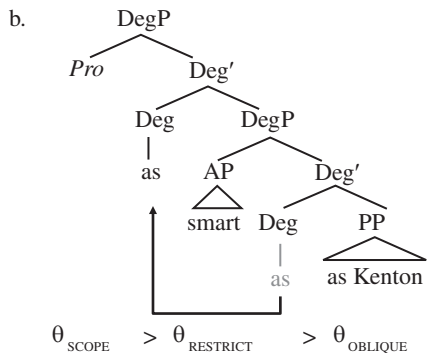
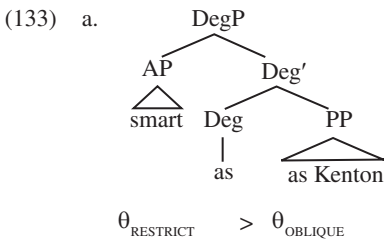
(132) a. That car is **more/less** expensive **than/*as** the one I bought (is).

b. Bill is **as** tall **as/*than** Harry (is).

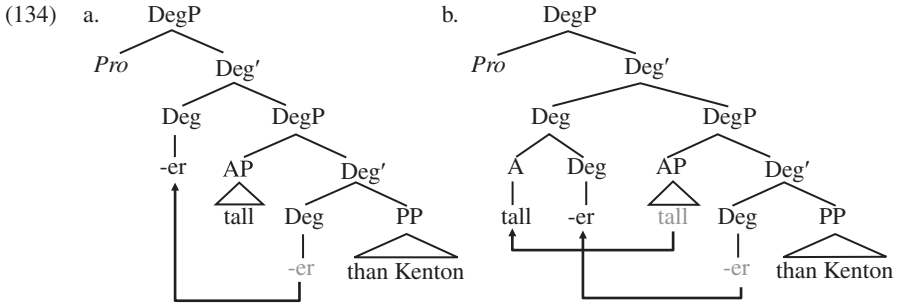
On the basis of this, we might suggest a similar syntactic analysis, which I will sketch briefly.

Suppose that comparatives and equative degree elements combine with their arguments in the order specified by the semantic analyses in (125)–(127), which, as we have noted, express essentially the same thematic hierarchy introduced for DP (viz., $\Theta_{SCOPE} > \Theta_{RESTRICT} > \Theta_{OBLIQUE}$). Thus, Deg first combines with the comparative/equative complement, then with the adjective phrase (AP) that functions as the restriction, and then with a subject of the semantic type of DP that constitutes the scope.

Under our assumptions about syntactic projection, Deg and its first two arguments project within a minimal phrasal projection DegP containing no position for the subject argument (133a). This situation prompts the projection of an additional DegP “shell” to accommodate the subject (133b), which is analyzed as a null element (*Pro*) whose value is fixed at LF after DegP is assigned scope, in parallel to the DP case. Deg raises to the empty Deg position, achieving the correct surface ordering of elements.



Comparatives receive the same analysis, except that the complement involves *than*, and, in cases like *taller than Kenton*, there is presumably an extra step in which the head of AP raises to Deg to support the bound morpheme *-er* (134a,b).



5.3.1. Too and Enough Constructions

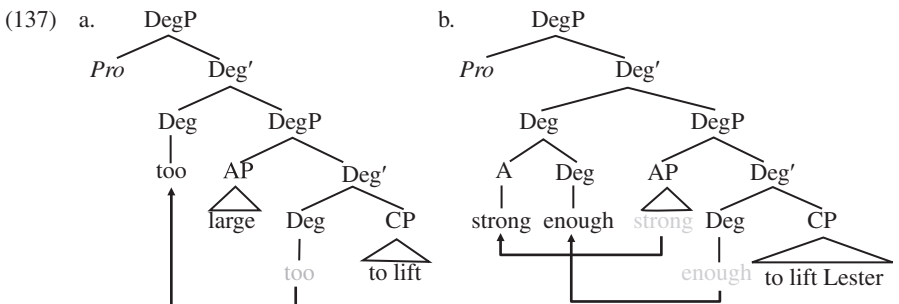
The syntactic analysis offered here for comparatives may be extended to *too* and *enough* constructions, which are known to exhibit similar properties (135a,b).

- (135) a. Kenton is **too large** [to lift].
 b. Kenton is **strong enough** [to lift Lester].

As discussed by Jackendoff (1977), Guéron and May (1984), Baltin (1987), and Nikiforidou (1987), the infinitive following AP is licensed only by the *too* or *enough* morpheme, and unavailable without it. Furthermore, even when the *too* and *enough* morphemes occur without an overt infinitive, the latter is understood through context (136):

- (136) A: Kenton is too large.
 B: Too large to do what?
 A: Too large to lift.

It is natural to view these facts in terms of the head-complement relation; specifically, *too* and *enough* select the infinitive, as well as the AP. We might then project them into DegP structures analogous to those of comparatives. *Too* would undergo simple raising (137a), whereas *enough* would combine raising with the cliticization operation already observed with *-er* (137b).³⁸



A confident analysis in these terms evidently awaits an explicit semantic analysis. However, it seems at least clear what direction such an analysis should take: *too* and *enough* should be analyzed as relational Degs quantifying over degrees, with AP providing the restriction on this quantification.

5.3.2. *Light Predicate Raising in DegP?*

In addition to extensions to *too* and *enough*, it is also interesting to consider phenomena discussed earlier in connection with VP and DP, and ask whether the equivalents for DegP may also occur. Specifically, we noted that Light Predicate Raising, in which a head and its complement jointly raise around a higher specifier, seemed to occur in both (138a,b).

- (138) a. [_{VP} John [gave to Mary] all the books in his bookcase t].
 b. [_{DP} every boy [t except John] that we talked to t].

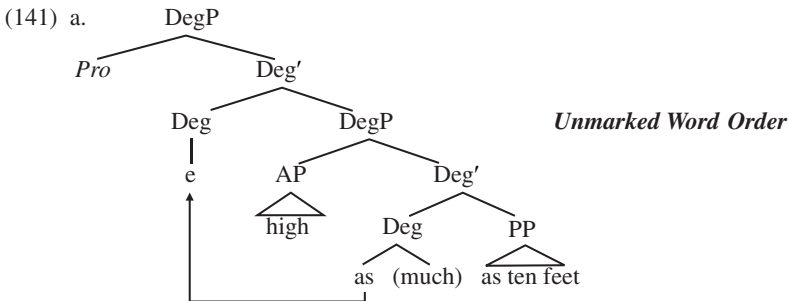
Consider in this light the pair of sentences in (139), which appear to be synonymous, and in which a complex degree modifier appears to the left of the adjective *high*.

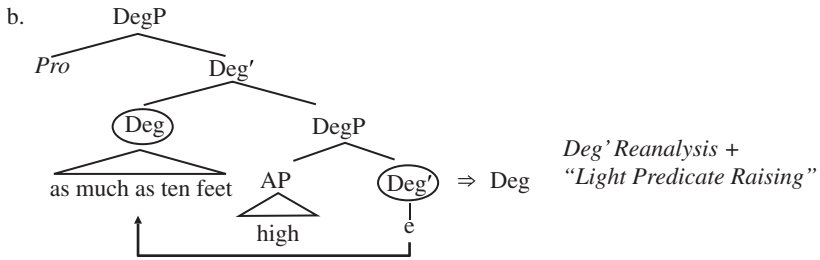
- (139) a. The porch was **as high as ten feet**.
 b. The porch was **as much as ten feet high**.

Under the proposals made above, (139a) would be analyzed as involving a simple DegP, in which Deg first selects an equative complement and subsequently raises away from it (140a,b):

- (140) a. [_{DegP} e [_{DegP} [_{AP} high] as [_{PP} as ten feet]]
 b. [_{DegP} as [_{DegP} [_{AP} high] t [_{PP} as ten feet]]

The derivation of (139b) might be taken as similar, but with Deg and its complement undergoing “Deg’ Reanalysis” and raising together around *high* (141). Evidently, the possibility for this depends on the presence of the adjectival *much*, which appears to satisfy certain requirements of *as* that would not otherwise be met (**as as ten feet high*):





I will not attempt to develop these proposals further, but it should be clear that the relational semantic analysis of DegP, taken together with the theory of projection developed here, offers rich possibilities for syntactic analysis.

6. CONCLUSION

Following work by Szabolsci (1983) and Abney (1987), many researchers have pursued the idea that clauses (CP/TPs) and nominals (DPs) are parallel in structure. Despite its overwhelming popularity, however, this view is not well supported by semantic analysis. Indeed, under generalized quantifier theory (Barwise and Cooper 1981; Keenan and Stavi 1983), which provides the basis of nearly all recent work on quantification, C/T and D have little in common.

In this paper, I have discussed the syntactic projection of DP from the standpoint of generalized quantifier theory and have argued that, under the latter, the most appropriate analogy is not between DP and CP/TP, but rather between DP and VP. Specifically, I have suggested (i) that DP can be understood as projecting arguments according to a thematic hierarchy that is parallel to (but different in role-content from) that found in VP; (ii) that Ds sort themselves into intransitive, transitive, and ditransitive forms, much like Vs; and (iii) that nominal modifiers, including relative clauses, project in the DP very much like adverbial elements in VP. A surprising consequence of this view concerns prenominal genitives, which have (since at least Chomsky 1970) been taken to be sentence-like in many cases. I have suggested that, on the view argued for here, prenominal genitive constructions are fundamentally parallel to double object forms in the VP, arising by a form of "genitive shift."

Finally, I have briefly sketched how, under a quantificational/relational analysis of degree elements, conclusions about DP might be extended to DegP. If correct, these proposals suggest that many of the putative parallels between DP and CP/TP claimed over the last 15 years merit serious rethinking.

NOTES

1. Material in this paper was presented at MIT (1988), at CUNY (1991), and in the 1991 Syntax Colloquium series at University of Indiana–Bloomington. I am grateful to audience members for helpful comments and suggestions, including Bob Fiengo, Janet Fodor, Steve Franks, Jerry Katz, Richard Kayne, David Pesetsky, Ken Safir, and Laurie Zaring.
2. See Barwise and Cooper (1981) for discussion of the non-first-order character of *most* and related quantifiers.
3. The relational view, which treats quantifiers as full-fledged lexical items with independent meaning, has a number of virtues beyond expressive richness. Importantly, it permits us to talk

about lexico-semantic properties of specific determiners, such as (in)definiteness and directional entailment, and universal properties of determiners, such as conservativity. For more on this see Barwise and Cooper (1981), Keenan and Stavi (1983), and Larson (1990b).

4. The equivalent is adopted in Relational Grammar in the form of a Relational Hierarchy (see Perlmutter 1981; Perlmutter and Rosen 1984).
5. The term Q_{OBLIQUE} is a cover term embracing the various adverbial elements. In Larson (1990a) it is suggested that these might be further ordered as:

$$Q_{\text{MANNER}} > Q_{\text{LOC}} > Q_{\text{TEMP}} > Q_{\text{CAUSE/PURPOSE}}$$

See section 3 for discussion of adjunct projection in DP.

6. The standard Montague Grammar analysis of quantification takes (the equivalent of) DP to apply to its scope S as function to argument (i) (ignoring intensions):

$$(i) \quad [[[DP, S]]]^{M_g} = [[DP]]^{M_g}(\lambda x_i. [[S]]^{M_g})$$

Under the syntax proposed here, *Pro* denotes a distinguished variable R over characteristic functions, and we specify:

$$(ii) \quad [[[DP, S]]]^{M_g} = 1 \text{ iff } [[DP]]^{M_g} = 1, \text{ where } g' \text{ is that R-variant of } g \text{ such that } g'(R) = (\lambda x_i. [[S]]^{M_g})$$

7. It is natural to ask whether there are also “unaccusative determiners.” Presumably this would be a D whose scope arose in the position of the restrictive term. To answer this question would require a better understanding than I have at present of the hierarchy by which D arguments are projected.
8. The dyadic-triadic alternation proposed here may be viewed as roughly analogous to that found with the verb *write*. The latter has a dyadic form *write(x,y)* that means (approximately) ‘x produces y by writing characters’. But *write* also has a triadic form *write(x,y,z)* that means (approximately) ‘x communicates with z using y produced by writing characters’. This alternation might be analyzed as the result of a regular lexical valence alternation process.
9. Lappin (1988) presents (ia–b) as arguing against a discontinuous analysis of exceptives like that proposed here:

- (i) a. Bill saw no student but John, although Mary saw **several**.
b. No students other than the radicals participated in the demonstrations, although **many** supported it.

Lappin analyzes *several* in (ia) as an elliptical NP containing an N' anaphorically dependent upon the N' in *no student but John*. He states: “The second conjunct of [(ia)] can *only* [my emphasis] be understood as asserting that Mary saw several students other than John” (p. 987). Lappin concludes that *student but John* must be a constituent in order to furnish an appropriate antecedent. Similar reasoning is applied to (ib). I have two points in response.

First, I do not share Lappin’s judgments, and I have found no one else who does. For myself and every speaker I have consulted, the *only* reading of (ia) is one in which Mary saw several students, which may or may not have included John. In other words, for these speakers, and for me, (ii) is perfectly coherent.

- (ii) Bill saw no student but John, although Mary saw several, including John.

Exactly the same results obtain with (ib). *Many* refers to “many students,” not “many students other than the radicals.” The analysis proposed here predicts these judgments; since *student but John* and *students other than the radicals* are not constituents, they should not offer natural antecedents.

Second, Lappin’s analysis of the phenomenon in (ia,b) as ellipsis is highly questionable, as opposed to the alternative (by Hoeksema (1984)) that *several*, *many*, *none*, and so on. are pronominal determiners, and the relevant relation one of simple anaphora. Consider (iia–c):

- (iii) a. There were men present and women present. **Many** were under the age of twenty.
b. I bought three presents for Alice and two gifts for Sue. **Several** were under \$20 in price.
c. Several Korean nouns and Japanese adjectives were analyzed. **None** were dismissed.

Clearly, *many* in (iia) can be read as referring to “men or women,” despite the fact that it has no explicit N' antecedent that picks out this set. Similar remarks apply to (iiib,c). This argues for anaphora, not ellipsis.

10. Bach and Cooper (1978) offer a Montague Grammar–style compositional semantics for the NP-S relative clause syntax that assigns determiner interpretations containing a variable R for the meaning of the relative.

- (i) a. $\lambda Q\lambda P\forall x[[Q(x) \ \& \ R(x)] \rightarrow P(x)]$
 b. $\lambda Q\lambda P\exists x[[Q(x) \ \& \ R(x)] \ \& \ P(x)]$

This represents, in effect, an Article-S analysis since the underlying composition is between the determiner and the relative clause. For more see section 3.2.2.

11. The analysis of examples like (51a) as Right Node Raising constructions is first proposed (to my knowledge) by McCawley (1981).
12. See McCawley (1982) and McCloskey (1986) for discussion.
13. A more traditional Montague Grammar version of (53) employing Montague's Intensional Logic is given below, where (following Dowty, Wall, and Peters (1981)), the categorial definition of determiners is T/CN , and where RC is the category of *wh*-relative clauses:

$$\begin{array}{l} S_{RC} \quad \text{If } \delta \in P_{T/CN} \text{ and } \varphi \in P_{RC}, \text{ then } F_{1000,n}(\delta, \varphi) \in P_{T/CN}, \text{ where } F_{1000,n}(\delta, \varphi) = \delta \wedge \varphi \\ T_{RC} \quad \text{If } \delta \in P_{T/CN} \text{ and } \varphi \in P_{RC}, \text{ and } \delta \text{ and } \varphi \text{ translate into } \delta' \text{ and } \varphi', \text{ respectively, then} \\ \quad F_{1000,n}(\delta, \varphi) \text{ translates into } \lambda Q[\delta'(\wedge \lambda x_n[Q\{x_n\} \ \& \ \varphi'])] \end{array}$$

14. Larson (1982) extends Bach and Cooper's account of determiners and relative clauses to the relation between tenses and temporal adverbial clauses in analyzing certain readings of Warlpiri adjoined relatives.
15. The adjective *red* in this example is to be understood restrictively. Under a nonrestrictive reading, the discourse can be continuous.
16. Vendler's sentence actually continues "attached to the noun," but he seems to mean this only in the general sense of accompanying the noun, rather than as a definite syntactic proposal of NP-relative clause constituency. In any case, his observations are most compatible with the view expressed in the text.
17. Vendler states: "[57a] is continuous. *The* is the sign of the deleted clause (*whom*) I see. In [57c], the possibility of this clause is precluded by the presence of the actual clause (*whom*) you know. *The* in [57c] belongs to this clause and any further restrictive clauses are excluded. Consequently, there is no reason to think that the man you know is the same as the man I see" (p. 53).
18. Note that although *every* differs from *most* in allowing its restriction to be understood via a preceding clause, it still seems to differ from *the* insofar as an overt relative doesn't produce discontinuity. Thus it appears possible to understand *Every linguist you know* in (ib) as referring to every linguist whom you know and whom I met:

- (i) a. I met some linguists. **Every linguist** was educated in California.
 b. I met some linguists. **Every linguist you know** was educated in California.

To my knowledge, such "Vendler effects" with quantifiers have not been explored systematically in the literature.

19. In a very general sense, the definite determiner might be viewed as analogous to a verb like *word*, which appears to take a manner adverbial as its complement, whereas other verbs of similar meaning are merely compatible with such a modifier:

- (i) a. John worded the letter *(carefully).
 b. John wrote the letter (carefully).

In a similar way, *the* takes a restrictive modifier as its complement, whereas other determiners are merely compatible with such a modifier.

20. I am grateful to C. de Cuba for this example.
21. The term "referential use" is adapted from Ludlow and Neale (1991), where it refers to the use of a description in which the speaker has singular grounds for his/her assertion, and where the proposition that he/she intends to convey is also singular. See Ludlow and Neale (1991) for details.
22. Reanalysis is conceived as a consequence of the X-bar theory in (13), which creates an association between the notions of transitive predicate and head. The idea is that phrases that are thematic transitives (i.e., having two unassigned θ -roles) can be reanalyzed as structural transitives (i.e., X^0 s). The Light Predicate Raising analysis is explored in detail in Larson (1989).
23. The point is even clearer in a pair like (ia,b). In Larson (1989), presentational *there* examples like (ia) are analyzed as deriving through Light Predicate Raising:

- (i) a. There [_{VN} was in the room] a tall, dark stranger.
 b. Was there [_{VN} t in the room] a tall, dark stranger?

The fronting of the verb in (ib) indicates that V (*be*) must be able to raise out of a reanalyzed V' even in surface form.

24. Apparent prenominal PPs like (ia–c) are plausibly analyzed as some form of compound formation, whose surface head-initial structure is not visible to the syntax:

- (i) a. an **under the counter** deal
- b. **this over the counter** medication
- c. three **off the wall** ideas

25. There is an interesting, well-known question as to whether postnominal PPs and APs are uniformly bare categories or contain "hidden" relative clause structure, at least in certain instances (i):

- (i) a. the books printed
 (cf. *the books that have been printed*)
- b. the books in print
 (cf. *the books that have been in print*)

One potential consideration (noted by Hudson 1973) is the fact that these elements accept PP modifiers whose presence otherwise requires an aspectual verb (ii)–(iii):

- (ii) a. the books printed since 1980
- b. the books in print since 1980
- (iii) a. *?These books were printed/in print since 1980.
- b. These books have been printed/in print since 1980.

The need for *have* illustrated in (iii) argues for the presence of a concealed *have* in (ii), hence a concealed relative.

26. In Larson (1988a) it is proposed that the dative preposition (*to*) normally accompanying the goal phrase is "absorbed" by *give* in the double object construction, equivalently to the Case absorption that occurs in a passive. Lack of Case marking on the goal triggers NP Movement. After raising of *give*, the lower V' reanalyzes as V, yielding a structure equivalent (up to the layered V-trace) to (i):

- (i) [_{VP} Mary gave [_{VP} John [_V t a briefcase]]]

27. Postnominal genitives with a definite determiner, like that in (97a), have the often-noted property of requiring a restrictive modifier (relative clause, PP, or postnominal adjective) in order to occur smoothly (Lyons 1986). On an account where relative clauses are arguments of definite Ds (recall section 3.2.2), this might be understood as follows: whereas definite D typically allows the deictic determination of its restrictive argument, the presence of the postnominal genitive blocks this possibility, forcing structural realization. This proposal appears sensible given the semantics for thematic genitives adopted below, in which the definite D in genitives contains its own relational variable R, whose value is deictically or structurally determined. In essence, structural (nondeictic) determination of R forces structural (nondeictic) determination of the restrictive argument as well. This leaves open the question of why prenominal genitives show the opposite requirement: why an overt restrictive element is blocked in the latter case (**John's briefcase that Alice lost*). I have no proposal to make at this point.

28. Another claim of the present analysis is that prenominal genitive DPs occupy an (indirect) object-like position in DP. Consider the fact that for many speakers (including myself) the verb *award* allows *to*-datives, double objects, and *with*-PPs. In the latter, *with* seems to be associated with the possession relation holding between *Mary* and *the prize*:

- (i) a. John awarded the grand prize to Mary.
- b. John awarded Mary the grand prize.
- c. John awarded Mary with the grand prize.

Rothstein (1988) observes that *with*-PPs also appear to play a specifically possessive role within DP. She notes that although (iia,b) look superficially similar, the locative PP can be paraphrased with a copular relative clause, but the *with*-PP requires a possessive relative (iii):

- (ii) a. The plate **on the table**
- b. The plate **with the gold rim**
- (iii) a. The plate that **is** on the table
- b. The plate that **has** the gold rim
 (cf. **The plate that is with the gold rim*)

Given this, it is interesting to observe certain possession/position alternations in DP reminiscent of those found with *award*. For example, consider (iv), which exhibits an *of*-variant (iva) parallelling the *to*-dative, a prenominal variant (ivb) parallelling the double object structure, and a *with*-variant (ivc):

- (iv) a. the gold rim (of the plate
 (that the plate has
 b. the plate's gold rim
 c. the plate with the gold rim

29. Compare also analyses like Siegel (1974) and Drescher and Hornstein (1979) in which the postnominal genitives are derived from prenominal forms by rightward movement.
30. This section was written after the remainder of the paper (including section 5). It was not until Burton (1995) (discussed below) that a semantics became available to execute the conclusions drawn at the end of 4.2.2, that is, that so-called thematic genitives do not receive a θ -role directly from N.
31. Cooper (1979) develops a closely related proposal in which definite descriptions contain a free property variable Π , whose value is fixed by context and that can be elaborated as a variable over relations. Burton's analysis can be considered an extension of Cooper's general proposal to the specific case of possessive definites.
32. Note that reading (109b) is compatible with the woman in question being John's wife. Imagine a bridge party for married couples in which husbands and wives are paired as partners by drawing lots. By chance John is paired off with the woman to whom he is in fact married. In these circumstances, the sentence *John's wife is his wife* is not redundantly true.
33. On reading ((110b)/(110c)), the sentence *John's wife is his wife* is redundantly true.
34. In prose, (111c) may be read: "the event e such that e is a destruction of Rome by some x , and e is a destroying of Rome by Nero." See also Higginbotham (1983) for an alternative version of this proposal.
35. See also Postal (1974) and Drescher (1977).
36. This notion of degree is familiar in contexts like carnival rides, with signs saying "you must be this tall to go on this ride." "This tall" is understood as expressing a degree or extent; anyone measuring that height or higher is understood to have that extent of height.
37. In brief, and updating Larson (1988b) somewhat, adjectives occur in DegPs that take DPs as their subjects (see below for discussion of DegP). The derivation for a basic case like *Kenton is tall* goes as in (ia–d), which analyzes the sentence as true just in case Kenton has some (contextually relevant) degree of tallness.

- (i) a. $[_{AP} [_A \text{ tall}]] \Rightarrow \lambda \mathcal{P} \exists d [\mathcal{P}(\text{tall}'(d))]$
 b. $\lambda \mathcal{P} \exists d [\mathcal{P}(\text{tall}'(d))] (\lambda P [P(\text{Kenton}')])$
 c. $\exists d [\lambda P [P(\text{Kenton}')]] (\text{tall}'(d))]$
 d. $\exists d [\text{tall}'(d) (\text{Kenton}')]$

DegP traces are then assigned the Intensional Logic-translation in (iia) where P_i is a variable of type $\langle e, t \rangle$ a set of individuals. Clausal comparative complements are analyzed as abstracting over this variable, yielding a set of sets (iib,c) and making them appropriate arguments for degree morphemes:

- (ii) a. $\lambda \mathcal{P} [\mathcal{P}(P_i)]$
 b. $[_{CP} \text{ Kenton is } [_{\text{DegP}} t]] \Rightarrow \lambda \mathcal{P} [\mathcal{P}(P_i)] (\lambda P [P(\text{Kenton}')]) \Rightarrow P_i(\text{Kenton}')$
 c. $[_{PP} \text{ than } [_{CP} \text{ Kenton is } [_{\text{DegP}} t]]] \Rightarrow \lambda P_i [P_i(\text{Kenton}')]$

The same assumptions can be used to interpret the DegP trace left by the raising of comparatives and equatives. See Larson (1988b) for details.

38. Nikiforidou (1987) considers several different constituencies for *too* and *enough* constructions, including ones similar to (137a,b), in which *too* and *enough* combine initially with an infinitive that subsequently extraposes rightward. Nikiforidou questions this analysis for *enough* on grounds that it would require an added positioning rule for the morpheme. The point is correct so far as it goes, but the operation seems to be exactly the same one required for *-er*. So it is not clear that any additional cost is incurred. Nikiforidou's own proposal (following a suggestion by Fillmore) is that *too* and *enough* constitute "valence-changing" morphemes, which combine with A, altering its selectional requirements to include an infinitive argument. It is difficult to evaluate this proposal in the absence of an accompanying semantics. While the structures in (137) are also given without an explicit semantics, the general character of the latter is nonetheless clear, as discussed below.

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