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On Shell Structure

Richard K. Larson

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Richard K. Larson

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On Shell Structure

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 The volume includes five previously published papers together with two major unpublished works from the same period: “Light Predicate Raising” (1989), which explores the interesting consequences of a leftward raising analysis of “NP Shift”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 In addition to published, unpublished and limited-distribution work, the volume includes extensive new introductory material.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.

Richard K. Larson is Professor of Linguistics at Stony Brook University, US.

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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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General Introduction

The papers collected in this volume represent an approach to syntactic structure initially developed during the late 1980s while the author was at the Department of Linguistics and Philosophy at MIT. Five of the papers have previously appeared in print: "On the Double Object Construction" (1988), "Double Objects Revisited: Reply to Jackendoff" (1990), "*Promise* and the Theory of Control" (1991b), "Some Issues in Verb Serialization" (1991c), and "On Sentence-Final Adverbs and 'Scope'" (2004). The remaining two papers, "Light Predicate Raising" (1989) and "The Projection of DP (and DegP)" (1991a), have not been previously published. The material assembled here was first presented as a connected set of topics in 24.958 Linguistic Structure taught by the author at MIT in the fall of 1988.

The essays in this book are divided into three thematic groups: (i) papers on the dative construction, (ii) papers that explore the general complex predicate view resulting from shell structure, and (iii) a paper showing how the basic notions of shell structure might be extended to nominals (DPs, or determiner phrases) and degree phrases (DegPs). All of the topics discussed here have received considerable development in subsequent literature, and indeed the idea of VP shells itself has since been integrated into mainstream generative grammar following Chomsky (1993). Accordingly, I provide both a general introduction to the collection and introductions to the separate parts, in an attempt to explain the historical development of my own proposals, the modern theoretical context, and the ways in which the former might be accommodated within the latter.¹ I make no attempt at exhaustivity in the discussion of modern developments, however. A complete, up-to-date review of research on dative and double object constructions, for example, would require a volume of its own, and the same holds for the other core topics treated here. I also attempt no systematic comparison between shell structures and other theories adopting a broadly right-descending view of phrase structure, for example, the influential Antisymmetry Theory of Kayne (1994), the PredP Analysis of Bowers (1993), or the Cascade Theory of Pesetsky (1995). Again, such a goal would be too ambitious. Rather, I simply hope to provide a broader picture of shell structure, sketching its motivations and some of its empirical applications and properties, and noting its divergences from superficially similar ideas that have developed and some respects in which it might still remain an attractive alternative to them.

1. BACKGROUND

Many of the structures proposed in the essays of this book have counterparts in the earliest work in transformational generative grammar, particularly Chomsky (1955/1975). However, the direct debt of shell structure is to the work of David Dowty and Emmon Bach

within classical, Categorical Montague Grammar.² Indeed, shell structures represented my own attempt, following in the footsteps of Pauline Jacobson (1983, 1984, 1987), to import certain ideas from Montague Grammar into a more traditional approach to phrase structure.

1.1. Montague Grammar

A core feature of classical Montague Grammar is that syntactic and semantic composition proceed in parallel. Each basic expression is paired with an interpretation, and each syntactic rule putting together expressions to yield a larger expression is paired with a corresponding semantic rule putting together the interpretations of the first to yield the interpretation of the second (the so-called rule-to-rule hypothesis).

For example, a rule-to-rule analysis of the sentence *John walks* might begin by assigning *John* and *walks* the individual interpretations **John'** and **walk'**, where the former denotes an individual and the latter a function from individuals to truth-values (the denotation of a sentence). A syntactic rule (A) concatenating *John* and *walks* to form a sentence might then be matched to a semantic rule (X) applying **walk'** to **John'** (1a). Similarly, a rule-to-rule analysis of *John kisses Mary* might interpret *kiss* by a function from pairs of individuals to truth-values. As shown in (1b), a syntactic rule (B) performing the complex concatenation might then be matched by a semantic rule (Y) that applies the interpretation of the verb to a pair consisting of the interpretations of the nominals (in the appropriate order).

(1)	<u>Syntax</u>		<u>Semantics</u>	
a.	$\begin{array}{c} \textit{John walks} \\ / \quad \backslash \\ \textit{John walk} \end{array}$	A	$\begin{array}{c} \text{walk}'(\text{John}') \\ / \quad \backslash \\ \text{John}' \quad \text{walk}' \end{array}$	X
b.	$\begin{array}{c} \textit{John kisses Mary} \\ / \quad \quad \backslash \\ \textit{John kiss Mary} \end{array}$	B	$\begin{array}{c} \text{kiss}'(\langle \text{John}', \text{Mary}' \rangle) \\ / \quad \quad \backslash \\ \text{John}' \quad \text{kiss}' \quad \text{Mary}' \end{array}$	Y

Taken on its own, rule-to-rule correspondence imposes few constraints on either syntax or semantics. However, it is not hard to appreciate that when they are imposed, constraints in one domain will immediately be reflected in the other. For example, in Montague Grammar, the functions that interpret verbs and other predicational expressions are constrained to combine with a *single* argument at a time. This means that transitive verbs cannot actually work as shown in (1b), where they combine directly with their two arguments to yield a sentence. Rather, the derivation must proceed more indirectly. The function corresponding to the verb is analyzed as combining first with its direct object argument to yield another function, which *then* combines with the subject argument to yield a truth-value (2b):

(2) a.	<u>Syntax</u>	b.	<u>Semantics</u>
	$\begin{array}{c} \textit{John kisses Mary} \\ / \quad \backslash \\ \textit{John kiss Mary} \\ / \quad \backslash \\ \textit{kiss Mary} \end{array}$		$\begin{array}{c} (\text{kiss}'(\text{Mary}'))(\text{John}') \\ / \quad \backslash \\ \text{John}' \quad \text{kiss}'(\text{Mary}') \\ / \quad \backslash \\ \text{kiss}' \quad \text{Mary}' \end{array}$

The constituencies expressed by the derivation trees in (4) may appear odd at first, but they had attractions that were actively explored by Montague Grammarians. Consider, for example, control and predication relations. In (4a) *Mary* constitutes the first argument that combines with the predicate after the control complement has been merged in; in other words, it is derivationally the closest argument. *Mary* is also understood to control the complement; *leave* applies to *Mary*. The same is true of the relation between the direct object *the metal* and the inner predicate *flat* in (4b). The former is the argument closest to the latter, and the latter is understood as predicating of the former. Accordingly, we can obtain something like Rosenbaum's (1970) Minimal Distance Principle in this framework. (4c) is even more interesting: here the object *the book* is understood simultaneously as the object of *buy* and the object of *read*, and the subject *John* is understood simultaneously as the subject of *buy* and the subject of *read*. In other words, *buy-to-read* can be understood semantically as forming a kind of complex transitive verb.

Derivation trees like those in (4) also promised insight into selectional relations and idioms. In (4b), the verb (*hammer*) combines directly with resultative predicate (*flat*), presumably exercising selection on it. This at least suggested an approach to the familiar observation that whereas certain adjectives could appear as resultatives, other apparently similar ones could not (cf. **John hammer the metal curved*).⁴ Consider also the point, noted by Bach (1979), that composition of the kind in (4) allows us to understand in a simple way certain kinds of surface-discontinuous VP idioms first observed by Emonds (1976). Expressions like *put-on-the-spot*, meaning 'confront,' will in fact form an underlying syntactic constituent with which the direct object composes (4d). Hence what is understood as a semantic unit will also occur as a syntactic, derivational unit.

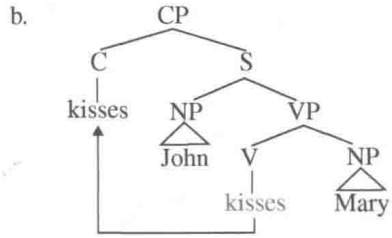
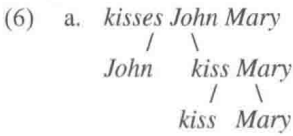
1.2. "Right Wrap" and Merge

In examining the Montague Grammar composition trees in (3)–(4), one is immediately struck by the operation merging the direct object. Unlike what occurs with the subject or the lowest complement of V, the form of Merge present here is not simple Right or Left Concatenation. Instead, the direct object phrase is inserted *into* the predicate. Alternatively, the predicate is "wrapped around" the direct object so that the latter ends up just to the right of the predicate's head (5):

- (5) a. *persuade Mary to leave*
 / \
 Mary persuade to leave
- b. *hammer the metal flat*
 / \
 the metal hammer flat
- c. *buy the book to read*
 / \
 the book buy to read
- d. *put Mary on the spot*
 / \
 Mary put-on-the-spot

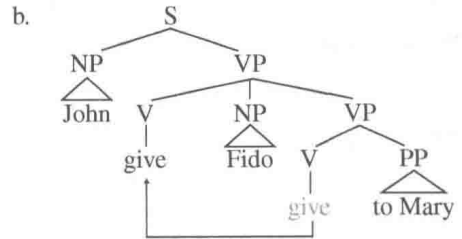
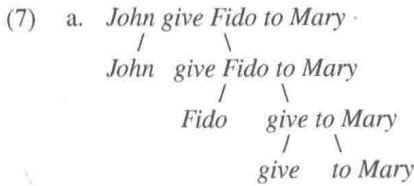
This syntactic operation was in fact recognized to be special and was given its own name: "Right Wrap." Right Wrap is interesting insofar as it has no clear counterpart in traditional phrase structure. Whereas the derivations in (1) and (2), which involve only concatenation, can be matched with equivalent phrase markers, no such counterpart is evident with (3)–(4). Suppose, then, that one wished to retain the general compositional structure of Montague Grammar-style sentence derivations, importing them into more standard phrase structure representations. How would one do it?

Dowty (1982) suggested a general answer when he observed that the order of arguments in VSO languages might be achieved by Right Wrap, as indicated in (6a). In transformational grammar, VSO ordering had been widely analyzed as due to an operation of verb raising (6b), following ideas by Joseph Emonds (1980).



A natural idea, then, was to try to extend the equivalence $\text{Right Wrap} \approx \text{V-Raising}$ into VP, analyzing that too as the product of V-Raising.

Pauline Jacobson (1983, 1984, 1987) was the first to propose such an extension. Compare the Montague Grammar derivation in (7a) (= (3)) with the counterpart phrase marker in (7b) suggested by Jacobson (1987). In both diagrams the verb *give* is first composed with the indirect object argument (*to*) *Mary* to form a small predicate phrase *give to Mary*. In Jacobson's tree, the latter is analyzed as a VP. A larger predicate phrase is then formed by combining the direct object in such a way that the verb ends up to the left of the object. In the former case this is done with the familiar Right Wrap operation; in the latter case it is done by raising the verb from the smaller VP to a larger one of which it becomes the head (7b):



Jacobson thus offered the first translation from Montague Grammar-style composition inside the VP to standard phrase structure, achieving this by appeal to V-Raising.

1.3. Questions and Puzzles

My own work entered the scene at this point. I arrived as an assistant professor at MIT in 1985, having been trained in classical Montague Grammar as a PhD student at the University of Wisconsin–Madison. I had heard two public talks by Jacobson (1983, 1984) and was intrigued by the general idea of bringing the results of Montague Grammar into the Extended Standard Theory. At the same time I had doubts and questions, both about the specific structures that Jacobson had proposed and about certain broader assumptions within Montague Grammar generally.

One difference immediately apparent in comparing (7a,b) is that whereas the former is binary branching, the latter is not: Jacobson's upper VP is ternary. This constitutes a significant departure from Montague Grammar derivation trees and connects to a wider

question about the source of binary branching in the theory. As noted above, Montague Grammar derives binary branching from its semantics. Predicates are analyzed as expressing *unary* functions—functions taking a single argument—and thus semantic composition must be binary. Imposing structure on the semantic objects induces the same structure in the corresponding expressions in the syntax. Hence syntactic composition must be binary as well.

But what sense does it make to locate binary branching structure in the semantics? In what sense is this structure *semantic structure*? On reflection, the answer was (and is) far from clear to me. If by “semantic structure” we mean structure indispensable to deriving the correct truth conditions for a sentence, then the structure in unary functions is plainly not essentially semantic.⁵ This is clear from the fact that first-order logic and other logical languages typically make no appeal to this device. It can also be seen in alternative formal analyses of natural language (e.g., Larson and Segal 1995), where appropriate truth conditions are compositionally derived but where predicates are analyzed as “flat” relations in the usual way.⁶

A more basic question, however, was simply the source of the VP structures in (7b) in the first place. Jacobson was working within an early Generalized Phrase Structure Grammar framework in which rules of the form $VP \rightarrow V NP VP$ could be stipulated. But research in the Extended Standard Theory had moved steadily away from such devices, attempting to reduce the contribution of phrase structure rules to a general templatic format, with particular configurations the product of specific, local properties of the individual elements being combined (selectional features, Case, agreement, etc.).⁷ What, then, was the status of the V element/position that was the target of raising in (7b)? What was its relation to the phrases (NP and VP) within the larger VP that it headed? How was the core configuration for the V-Raising structure “licensed,” in the popular jargon of the day?

2. VP SHELLS

In a paper on the double object construction (Larson 1988), I attempted to formulate a theory of syntactic projection that would allow one to capture Montague Grammar-style composition using conventional phrase markers with verb raising and would address the core questions noted above. This account had three basic parts.

First, the assumption of binary branching was extracted from the semantics (where it didn't seem to belong) and made a part of syntax. At the time, the general templatic structure of expressions was assumed to be fixed by an independent X-bar theory. Hence I proposed a restricted X-bar format requiring heads and predicates to combine with only a single phrase at a time. In point of fact, predicates were already assumed to take a unique subject (SpecX') under X-bar theory (8a); hence all that was needed was to assume that heads could take a unique complement as well (ZP). This was done by means of the X-bar rule in (8b):

- (8) a. $XP \rightarrow \text{SpecX}' \quad X'$
 b. $X' \rightarrow X \quad ZP$ (Single Complement Hypothesis)

(= (76) in Larson 1988, p. 381)

Second, there was a principle of locality (P1) determining the domain in which thematic roles could be assigned by a head:

- (9) P1: If α is a predicate and β is an argument of α , then β must be realized within a projection of α . (Larson 1988, p. 382)

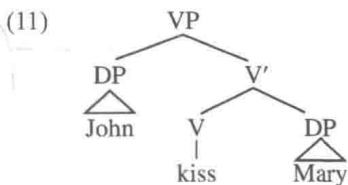
Finally, as mentioned in note 4, all semantic theories must assume that relations have a “direction” that determines the role that a given argument plays in the relation. It is often assumed that the arguments of a relation can be distinguished according to their thematic roles. In Larson (1988) the following principle was assumed to map the thematic roles of a predicate to the arguments that received them in structure.

- (10) a. Thematic Hierarchy

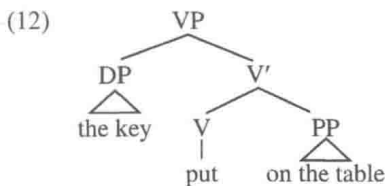
$\theta_{\text{AGENT}} > \theta_{\text{THEME}} > \theta_{\text{GOAL}} > \theta_{\text{OBLIQUE}}$ (manner, location, time, ...)

- b. P2: If a verb determines θ -roles $\theta_1, \theta_2, \dots, \theta_n$, then the lowest role on the Thematic Hierarchy is assigned to the lowest argument in constituent structure, the next lowest role to the next lowest argument, and so on. (Larson 1988, p. 382)

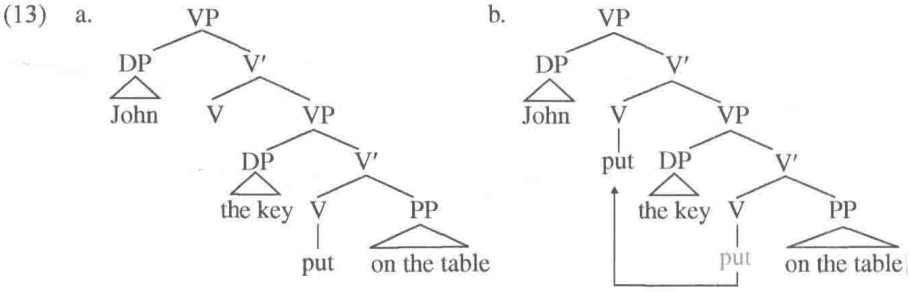
To illustrate these principles, consider first the transitive verb *kiss*, which assigns an agent and a theme role. (8)–(10) determine a VP headed by *kiss*, as in (11). This structure conforms to the restricted X-bar theory (8); all arguments of V are contained within a projection of V (9); finally, the argument bearing the agent role is projected into a position c-commanding the argument bearing the theme role, in compliance with (10b) and the fact that $\theta_{\text{AGENT}} > \theta_{\text{THEME}}$



Ditransitive *put*, which assigns an agent, theme, and location, presents a more complicated and more interesting case. Assuming $\theta_{\text{AGENT}} > \theta_{\text{THEME}} > \theta_{\text{LOC}}$, we project a minimal VP as in (12), containing arguments corresponding to θ_{THEME} and θ_{LOC} , with the former higher than the latter:



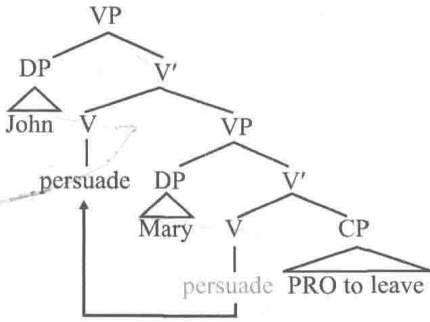
This structure leaves θ_{AGENT} unassigned, with no position for its bearer. Larson (1988) proposes that such circumstances license the projection of a “VP shell,” as in (13a), which contains a higher specifier for the agent and brings along an empty verbal head position purely as a consequence of X-bar theory. (13a) was suggested to constitute something like the “minimal structural elaboration of (12),” allowing the principles in (8)–(10) to be met. The surface word order then is derived by raising the verb to [v e] (13b), basically following the idea of Jacobson:



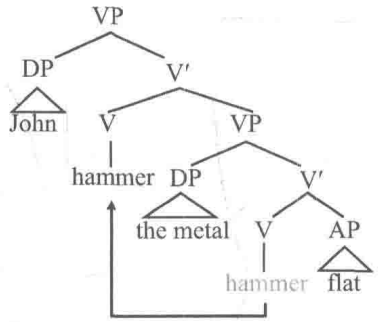
The resulting structure now achieves full binary branching (no ternary structures) and a composition that directly matches Montague Grammar-style derivations using Right Wrap.

This general account of shell licensing appeared extensible to the full range of configurations within the framework of classical, Categorical Montague Grammar noted earlier, so long as the lowest phrases (CP, AP, PP) were analyzed as oblique verbal complements, projected below agents and themes. Compare (4a–d) to (14a–d), respectively:

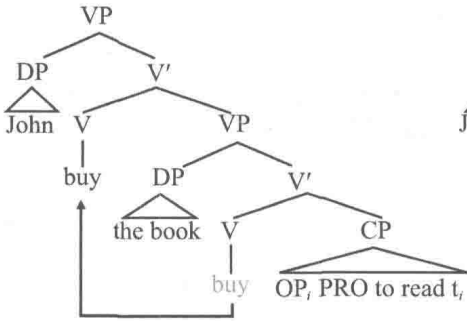
(14) a. Control Complements



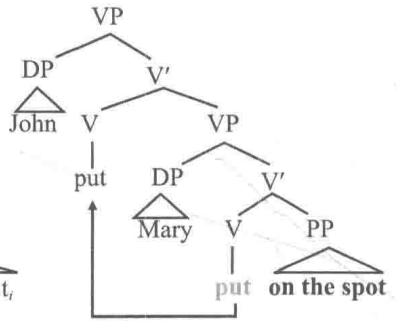
b. Complex Predicates (Resultatives)



c. Control Adjuncts



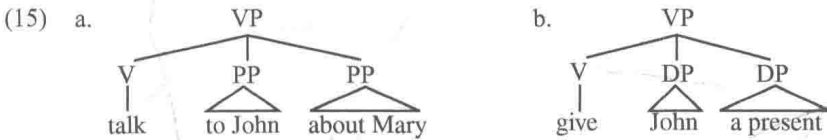
d. Discontinuous Idioms



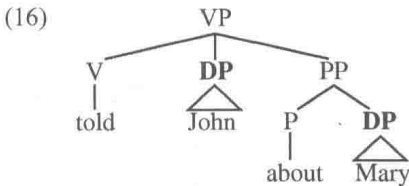
2.1. Properties of Shell Structures

The specific attractions of structures like (13a) and (14a–d) were pursued and developed in the papers in this book, and by others in their own work as well. Without rehearsing particular points, it's worth noting certain general features of the analysis, especially in light of related proposals that came afterwards.

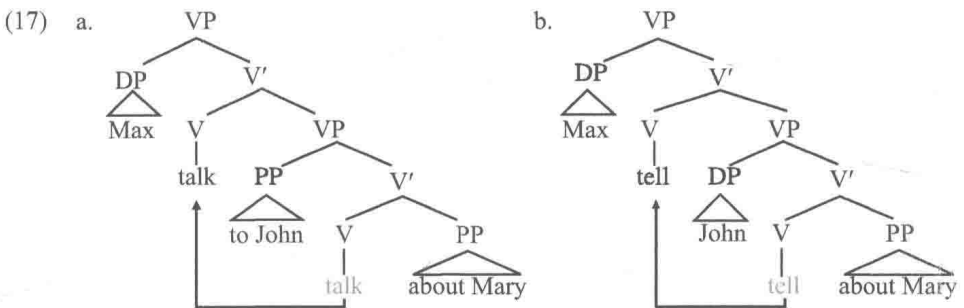
One feature immediately apparent in (13a) and (14a–d) is the **generalized structural asymmetry** imposed on the arguments of the predicate. At the time, such asymmetry was widely recognized to hold between subjects and complements but was not hypothesized among complements themselves. Thus, double PP sentences like *Max talked to John about Mary*, or double object sentences like *Mary gave John a present*, were routinely assigned VP configurations like those in (15a,b), respectively, in which the complements were basically symmetric:



And even where two complement elements were known to behave asymmetrically with respect to well-known domain relations, for example, the two boldfaced DPs in (16), this was widely assumed to result from the structure of the complements themselves—here the additional PP structure imposed by the *about*-PP:⁸

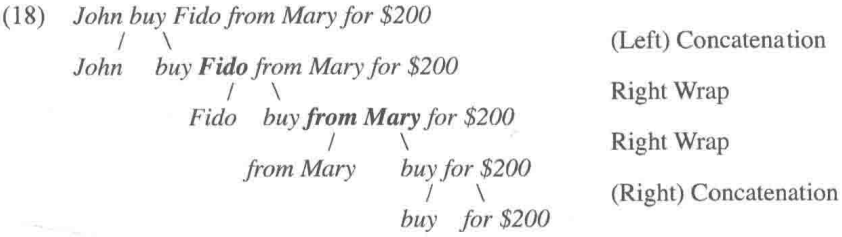


By contrast, with shell structures, subject-object asymmetry is generalized across all arguments. Thus double PPs receive a structure like (17a), in which the first PP is structurally superior to the second. DP–PP constructions get a structure like (17b), in which an asymmetry between *John* and *Mary* is imposed that is fully independent of the presence of PP:



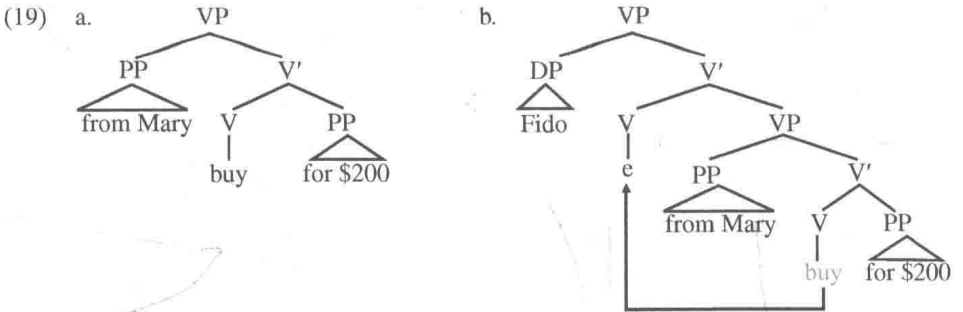
A second feature of shell structures is their **recursive potential**. As we saw earlier, Right Wrap in classical Montague Grammar is a general structure-building operation, a form of complex merger between strings. This operation was hypothesized as taking place in the combination of complex TVPs with their objects, and in the combination of VPs with their subjects under Dowty's approach to VSO languages. But these by no means exhausted the operation's possibilities. Consider the use of Right Wrap in analyzing the

buy-construction in (18), where the verb is assumed to select four arguments: a subject, an object, a *from*-phrase, and a *for*-phrase:



The lowest complement (*for \$200*) merges by (Left) Concatenation, followed by *two* applications of Right Wrap: one to form the complex DVP *buy from Mary for \$200*, and another to form the complex TVP *buy Fido from Mary for \$200*. The derivation is coherent, and indeed quite natural given the example. In classical Montague Grammar, nothing blocks Right Wrap from applying recursively in the same derivation.⁹

This feature is inherited by Jacobson's (1987) approach to shells, given the recursive nature of its core rule: $VP \rightarrow V NP VP$. It is also inherited by the approach in Larson (1988). Assuming oblique thematic roles for the *for*- and *from*-phrases, where the first ranks lower than the second, and both rank lower than that of the object, we build the initial VP tree shown in (19a). This leaves *buy's* θ_{THEME} role unassigned and provides no position for its bearer. Hence we project (19b), the minimal structural elaboration of (19a) allowing the principles in (8)–(10) to be met; the verb raises.



(19b) still leaves *buy's* θ_{AGENT} role unassigned, with no position for its bearer. Hence we project (20), the minimal structural elaboration of (19b) allowing the principles in (8)–(10) to be met; again the verb raises:

