(37) (a) went to Chicago (b) went to Chicago
\[
\begin{array}{c}
vp/(vp/vp) /e & e \\
vp/(vp/vp) /e & e \\
vp/vp & FA \\
vp/vp & FA \\
vp & FA \\
vp & FA \\
\end{array}
\]

It has been proposed (e.g., McConnell-Ginet, 1982) that many 'VP-adverbs' and, presumably, also VP-modifying PPs, are really arguments of verbs, though on semantic and distributional grounds, there is no reason why at least this PP should not be considered an adjunct (cf. Dowty, 1979), so its status seems unclear. Some cases are known, of course, where an expression that is an adjunct with most verbs apparently must be a subcategorized argument for certain other verbs:

(38) (a) John read the book.
(b) John read the book on the table.
(c) *John put the book.
(d) John put the book on the table.
(e) John wrote the letter.
(f) *John wrote the letter poorly.
(g) *John worded the letter.
(h) John worded the letter poorly.

Type raising offers an explanation of how this situation can arise, for type raising would convert a verb taking a certain adjunct into a verb taking that adjunct as an argument, e.g., it would convert went in (37) from vp to vp/(vp/vp). While put and word appear only in the raised category, verbs like go, I assume, appear in both these categories. We begin with the analysis in (39):

(39) John went to Chicago on Monday
\[
\begin{array}{c}
e & vp/(vp/vp) /e & e \\
e & (vp/vp) /e & e \\
vp/vp & FA \\
vp/vp & FA \\
vp & FA \\
vp & FA(r-to-l) \\
vp & FA(r-to-l) \\
\end{array}
\]

With functional composition and type raising of Chicago, the VP can be regrouped to make Chicago on Monday a constituent,

(40) John went to Chicago on Monday
\[
\begin{array}{c}
e & vp/(vp/vp) /e & e \\
e & vp/(vp/e) /e & e \\
vp/e & FC \\
vp/vp & FA \\
vp/vp & FC(r-to-l) \\
vp/(vp/e) & FA(r-to-l) \\
vp & FA(r-to-l) \\
\end{array}
\]

and then (35a) is produced as in (41):

(41) John went to Chicago on Monday and Detroit on Tuesday
\[
\begin{array}{c}
e & vp/e \\
vp/e & vp/(vp/e) /e & e \\
vp/(vp/e) /e & e \\
vp/vp & Conj \\
vp/vp & C \\
vp/(vp/e) & FA(r-to-l) \\
vp & FA(r-to-l) \\
vp & FA(r-to-l) \\
\end{array}
\]

Although the phrase went to can be generated in cat vp/e, the category of transitive verb phrases, there is no reason to suppose that this predicts ungrammatical passives like *Chicago was gone to by John, because, as noted above, passive can be regarded as a lexical rule in Steedman's approach, and nothing here requires went to to appear in the lexical cat vp/e.

6. NON-CONSTITUENT CONJUNCTION AND EXTRACTION ISLAND CONSTRAINTS

In correspondence with Dick Hudson about examples like (35), Hudson pointed out to me that while PPs can in effect be split up by NCC, this does not happen with other, seemingly parallel cases involving NPs:
(42) (a) *John saw the girl in the evening and boy in the morning.
(b) (*John likes sweet jam at breakfast and coffee at supper. (* on reading '... likes sweet coffee at supper')

Surprising as it may seem, the present approach may also predict this fact. Since 'extraction' in Steedman's approach is carried out by means of the functional composition rule, island constraints on extraction are stated as constraints on the application of functional composition in his theory. For example, Steedman (1985) suggests that the NP Constraint of Horn (1974) and Bach and Horn (1976) be formulated as a prohibition on functional composition into a NP:

(43) Functional Composition (with NP-constraint):
\[ X/Y + Y/Z \Rightarrow X/Z, \quad \text{where } Y \neq \text{NP} \]

But as functional composition is crucially involved in NCC as analyzed above, the restriction in (43) would automatically block (42a) (type raising is here used on saw to show that the structure might otherwise be producible in the grammar):

(44) John \_ saw \_ the \_ girl \_ in \_ the \_ evening \_ and \_ boy \_ in \_ the \_ morning \_  
\[ e \quad \text{vp}/\text{np}_{[e]} \quad \text{np}_{[e]}/N \]  
\[ \quad \text{vp}/N \quad \text{FC} \quad \text{Conj} \quad \text{N} \]  
\[ \quad \text{N} \quad \text{C} \]  
\[ \quad \text{FA} \text{vp} \]

(Actually, it is not clear that (44) is in danger of being produced even under these assumptions, since I am not sure how phrases like girl in the evening can be generated.)

It is also known that the relevant extraction island constraint must somehow distinguish the structure in (45) from those in (46) and (47) (cf. Ross, 1967; Horn, 1974):

(45) Who did John read a book about?
(46) *Who did Mary read Sue's book about?
(47) *Who did Mary destroy a/Sue's book about?

There is of course considerable debate over just how the constraint or constraints involved in (45)—(47) should be formulated, i.e. is the constraint one against extraction from all NPs or only from complex NPs? The interesting thing about these examples from our point of view is that no matter how the constraint is stated (as a constraint on functional composition), it will correctly distinguish (48) from (49) and (50) if it distinguishes (45) from (46) and (47):

(48) John read a book about Nixon on Monday and (about) Reagan on Tuesday.
(49) *Mary read Sue's book about Nixon on Monday and (about) Reagan on Tuesday.
(50) *John destroyed a book about Nixon on Monday and (about) Reagan on Tuesday.

It has been pointed out to me that there are some examples parallel to (42) which are at least marginally acceptable to some speakers, e.g. (51):

(51) (a) *[Mary read John's report in the morning and letter in the afternoon.
(b) *[Mary saw the president in the morning and vice-president in the afternoon.

I am not sure how these cases might be distinguished from (42); it seems that phonological factors are involved (the length of the common noun in the second conjunct), and also pragmatic factors (the naturalness of referring to the denotations of the two nouns as a class) are involved. But if at least some examples like (51a, b) are acceptable, it is possible that Horn's NP constraint is not the one we should be appealing to here, but rather a complex NP constraint — in our terms, a constraint against functional composition into the modifier of a NP, and so should be formulated as (52):

(52) Complex NP constraint on Functional Composition:
\[ A/B + B/C \Rightarrow A/C, \quad \text{where } B \neq \text{NN}. \]

This constraint would still block (49) and (50), as well as (46) and (47) and all extractions from relative clauses (assuming relative clauses are a species of N\text{IN}), but would not per se rule out (51) or (44).

Somewhat unfortunately, I have not been able to find any other structures where the prediction can be tested that non-constituent conjunction obeys island constraints. The reason is that tests seem to be limited to structures of the form of (36) (repeated here),

(51) (a) *[Mary read John's report in the morning and letter in the afternoon.
in which (i) node $B$ is an extraction island, and (ii) node $C$ is non-empty (since otherwise conjunction of $E$ alone would be indistinguishable from ordinary constituent conjunction, or, where $B$ has more than two daughters, from NCC within a syntactic island, which one would not expect the constraint to block), and preferably (iii) there exists a parallel structure in which $B$ is not an extraction island, so that NCC can be shown possible there.

Thus while the predicted correlation between island constraints and constraints on non-constituent conjunction appears to be evidenced in certain cases (i.e. (48)—(50), in rather striking contrast to (35a—c)), the overall evidence for this correlation is limited and equivocal. In Section 9 below, we will consider a theory in which extraction is handled by a completely different mechanism from non-constituent construction, and in that theory, no such correlation would be predicted between these two domains.

7. STEEDMAN'S ANALYSES OF RIGHT NODE RAISING

Though Steedman (1985) includes no treatment of NCC in English (i.e. with incomplete conjuncts on the right and 'shared' material on the left), he does treat English Right Node Raising [RNR] (i.e. with 'shared' material on the right and incomplete conjuncts on the left), and it will be informative to review this briefly for comparison. The most familiar kind of example is produced as in (53) (using now my categorization rather than Steedman's):

(53) $\text{Harry cooked:} \quad \text{and Mary ate:} \quad \text{the beans that I bought from Alice.}$

\[ \begin{array}{llll}
& t/\text{up} & \text{up/np}_{[p]} & \text{Conj} & t/\text{up} & \text{up/np}_{[p]} \\
\hline
& FC & & FC & np_{[p]} \\
& t/\text{np}_{[p]} & \text{np}_{[p]} & C & t/\text{np}_{[p]} & FC \\
\end{array} \]

Steedman notes that extraction island constraints will prevent the formation of examples like (54):

(54) "I know the woman who painted, and you met the man who stole, the picture that Harry was so fond of.

Steedman correctly predicts that constituents can however be right-node-'raised' out of complement clauses when the clause is not an island:

(55) I believe (that) Harry and know (that) Mary will lend you the money.

But a kind of case which the traditional extraction analysis of RNR cannot account for but which Steedman's analysis can is one where two constituents rather than one are 'shared' on the right:

(56) [[Joan offered] and [Mary actually gave]](t/\text{pp}/\text{pp}) [a gold Cadillac](\text{np}) [to Billy Schwartz](\text{pp})

(57) John offered, and Mary actually gave, a very heavy policeman a rather pretty flower.

(Incidentally, these do not require type raising to produce an 'argument string' constituent on the right, as did the NCC examples treated earlier, since the conjunction category is one that takes two arguments anyway.)

Especially noteworthy is that sentences can be produced in which both a 'Right Node Raising' and a leftward extraction occur:

(58) [To which woman](t/\text{up}/\text{pp}) [did Harry offer, and will Mary actually give](t/\text{pp}/\text{np}) [an autographed copy of Syntactic Structures](\text{np})?

Since English does not in general permit multiple extractions, this kind
of example is apparently a problem for analyses like GPSG that treat extractions via a slash feature. (This example actually involves the generalized functional application rule of Ades and Steedman, 1982, and Steedman, 1985; cf. Note 1.) See Steedman (ms.) for still other kinds of RNR examples produced by his analysis.

Before leaving this section, I feel obliged to point out that one of Steedman's analyses of parasitic gap sentences in Steedman (ms.), reproduced here as (59),

\[
R_s/(S/NP) \rightarrow \text{NP/FA} \quad \text{NP/FA} \quad \text{NP/FA} \quad \text{NP/FA} \quad \text{NP/FA}
\]

violates Steedman's (1985) own formulation of the complex NP-constraint, in that it forms the constituent everyone who by functional composition into the relative clause category \( R_s \). But if we relax the formulation of the complex NP constraint to permit (59) to be produced, then as Gerald Gazdar has pointed out to me, we will also predict coordinated NPs such as (60):

\[(60) (a) \text{ a man who and robot which can solve this problem} \]
\[(b) \text{ an idea that and man who are much admired} \]

Since the NPs in (60) are manifestly ungrammatical, I conclude that Steedman's formulation of the complex NP constraint is in fact correct, and thus his analysis of subject parasitic gaps in (59) must be wrong.

8. NCC IS NOT HEAD-EXTRACTION (LEFT-NODE RAISING)

One possible kind of phrase-structural and slash-feature analysis of NCC that would not seem to have been ruled out by anything said above is that NCC might be described as the across-the-board leftward extraction of the verbal head from a VP. This analysis has been proposed by Schachter and Mordechay (1983) under the term Left Node Raising, and a similar analysis, though for a different class of sentences and for different reasons, was suggested by Jacobson (1983), who used the term Head Extraction. Such an analysis is exemplified by (61):

\[
\begin{array}{c}
\text{S} \\
\text{NP} \\
\text{John} \\
\text{VP} \\
\text{gave VP/V} \\
\text{Conj} \\
\text{VP/V} \\
\text{t a book PP} \\
\text{t a record PP} \\
\text{to Mary} \\
\text{to Susan}
\end{array}
\]

One clear reason why head-extraction cannot suffice to generate all NCC is that examples like (62) exist, in which not only the head but another constituent as well is 'shared' by both conjuncts; i.e. the 'extracted' portion of the VP (in this analysis) is not a constituent, thus the examples are problematic in a way parallel to (56) and (57) for RNR in GPSG:

\[(62) (a) \text{ Susan gave Mary a book on Monday and a record on Tuesday.} \]
\[(b) \text{ John gave a book to Bill on Monday and to Max on Tuesday.} \]
\[(c) \text{ Mary caught a fish on Monday with a fly rod and on Tuesday with a spear.} \]
\[(d) \text{ The portraits of her by Renoir in oils and by Degas in pastels are both in this gallery.} \]

The categorial analysis of course has no difficulty with these:
that occurs in Scandanavian, but rather a category bearing a higher-order slash feature VP/V, i.e., a slash feature that itself bears a slash feature. The \( (VP/V)/(VP/V) \) would then be a slash-feature-bearing category that bears as feature a slash-feature-bearing category. It would be unfortunate to have to complicate the theory in general and the grammar of English in particular in such a way for this one type of sentence to be produced.

In the present theory, rules generating the two kinds of conjunction involved in this sentence (RNR and NCC) have already been introduced, but they do not quite permit this example to be produced, as they now stand. The left half of the RNR sentence, generated according to Steedman's rules (cf. (56) above), would be of category \( (t/pp)/e \):

\[
\begin{align*}
\text{Bill} & \quad \text{gave} & \quad \text{and} & \quad \text{Max} & \quad \text{sold} \\
\quad & \quad (t/pp)/e & \quad \text{Conj} & \quad (t/pp)/e & \quad \text{FC (generalized)} \\
\quad & \quad (t/pp)/e & \quad \text{C} \\
\end{align*}
\]

And the right, as generated above, would be of cat \( (vp/pp)/e \):

\[
\begin{align*}
\text{a book} & \quad \text{to Mary} & \quad \text{and} & \quad \text{a record to Susan} \\
\quad & \quad (vp/pp)/(vp/pp)/e & \quad \text{Conj} & \quad (vp/pp)/(vp/pp)/e & \quad \text{C} \\
\quad & \quad (vp/pp)/(vp/pp)/e & \quad \text{FC} & \quad (vp/pp)/(vp/pp)/e & \quad \text{C} \\
\end{align*}
\]

In each case, these phantom constituents could combine with two arguments to form a sentence — a \( pp \) and an object NP in the first case, and a ditransitive verb and a subject NP in the second case. But obviously, the two categories \( (t/pp)/e \) and \( (vp/pp)/(vp/pp)/e \) cannot combine simply with each other to form (63). We can however generate (63) if we first apply the type raising rule (10b) to the ditransitive verbs, as in (67):

\[
\begin{align*}
\text{(67)} & \quad (vp/pp)/e + v p \rightarrow v p \\
& \quad v p / (v p / (v p / v p)) + v p / (v p / v p) \rightarrow v p
\end{align*}
\]
The left half of the example in question now proceeds as in (68),

(68) Bill gave and Max sold

\[
\begin{array}{ll}
\text{t/} & \text{v/}
\end{array}
\]

Conj t/ v/ ((up)(pp)/e) FC t/ v/ ((up)(pp)/e) FC

\[
\begin{array}{ll}
\text{t/} & \text{v/}
\end{array}
\]

FC t/ v/ ((up)(pp)/e) C

and now this category will take the expression in (66) as argument to form a sentence.

This is different from type raising as used before, however, in that the input FA rule in (67) is not a rule used by the basic grammar but only one that plays a role in the extended grammar (because its argument cat only has members by virtue of FC). In some abstract sense, perhaps, it might be regarded as a 'higher-order' type raising rule analogous to the higher-order slash feature in (64). The deeper significance of this analogy, if any, cannot be pursued here.

9. NON-CONSTITUENT CONJUNCTION WITHOUT STEEDMAN-STYLE EXTRACTION

The analysis of extraction developed in Ades and Steedman (1982) and Steedman (1985) has been assumed up to this point. While this is a highly interesting theory for several reasons, it must be conceded that it is not yet clear whether all extraction in English, much less in all natural languages, can be successfully treated by this method without overgenerating the class of truly well-formed sentences. If Steedman-type extraction is not ultimately successful, does this imply that the treatment of non-constituent conjunction is thereby also rendered unfeasible? The answer, it turns out, is no.

A complete categorial theory of grammar for natural languages will undoubtedly require a fairly elaborate theory of syntactic features, somewhat like that of Generalized Phrase Structure Grammar, to describe morphologically complicated languages in any case (cf., e.g., Bach, 1983), and I am not aware of any reason why a GPSG-style 'slash-feature' analysis of unbounded extraction could not be adopted, in some form, into a categorial grammar of English or other languages. In such a theory, a combinatorial operation of functional composition could still be used, for other syntactic purposes, without danger of losing the tight 'control' over extraction that GPSG affords by means of 'slash introduction' and 'slash elimination' syntactic rules, where 'slash' is a syntactic feature quite distinct from the categorial-grammar 'slash category' that is relevant for defining functional application and composition. For example, relative pronouns in such a theory would not be assigned to the category R/(S/NP) as suggested above but rather R/S[[+raising]], and the further 'propagation' and elimination of the feature [+slash] would be controlled by feature-passing conventions and slash-elimination rules, not via functional composition. Barbara Partee has suggested, in fact, that there may be various reasons for limiting functional composition to the description of 'bounded' syntactic phenomena while appealing to slash-features and feature-passing conventions for the description of unbounded phenomena. (The problem of 'clitic climbing' in French (Finer, 1982)\textsuperscript{8} might be a good example of a motivation for functional composition independent of the motivations in this paper or in Steedman's work.)

In this envisioned theory, there would be no reason to expect extraction-island constraints (which would be, in effect, limitations on the slash-feature-passing conventions) to be reflected in the non-constituent conjunction data (which would involve functional composition) in the way discussed in Section 6 of this paper.

There is, however, an interesting asymmetry here. I believe that it would not be reasonable to maintain a functional-composition analysis of extraction like Steedman's without also adopting a functional-composition analysis of non-constituent conjunction. The reason for this is simply that all the ingredients needed for the FC-analysis of non-constituent conjunction are already present in the FC-analysis of extraction — functional composition itself, plus the 'floating' type assignment to NPs, which Steedman (1985) has independently proposed for Dutch to treat the 'verb-raising' construction. In fact, it would seem difficult if not impossible to avoid this sort of analysis of non-constituent conjunction, once Steedman's analysis of extraction is adopted. This seems to imply that a defender of the FC-analysis of extraction is forced to predict the correlation between extraction island constraints discussed in Section 6 (because island constraints are constraints on FC in that analysis), though the defender of the FC-analysis of non-constituent conjunction is not necessarily committed to the prediction that this correlation will be found.
10. CONCLUSION

The two theories of coordination compared here, GPSG and Categorial Grammar *cum* functional composition, make very different predictions about the kinds of coordinate conjuncts we should expect to find in natural languages. The first predicts that conjuncts should essentially consist of constituents — the same constituents that the phrase structural rules produce. The second predicts that not only the 'basic' constituents (in the sense of basic grammar mentioned in Section 1) but also any 'extended' constituent can be a conjunct — i.e. any continuous group of words combinable by the basic rules, functional composition, and type raising (with island constraints possibly limiting the options somewhat). In either theory there is of course the possibility of adding a 'patch' to add or exclude further kinds of possible conjuncts, but each such patch detracts from the generality and therefore the appeal of the theory: it is only to the extent that the actual natural language facts come relatively close to the pure kinds of conjunction mentioned above that either theory has its predictive success.

The 'patch' that GPSG currently adds to constituent conjunction is the Gapping schema (69) (cf. Sag, Gazdar, Wasow, Weisler, to appear),

\[(69) \quad \forall_{[\text{[CON} \, \text{]}]} \alpha, X^{2+} \]

where \( \alpha \in \{\text{and, but, nor, or}\} \)

though at the price of an unformalized, non-compositional interpretive procedure that 'matches' constituents in the gapped conjunct with certain ones in the previous clause or VP in as yet unknown ways. But, at the same time, it is claimed that NCC can be reduced to Gapping, and thus (69) is supposed to produce NCC sentences as well. This approach can generate most of the NCC examples discussed here (modulo the unformalized interpretive rule), but it does not predict any interaction between Gapping/NCC and island constraints. Actually, this approach would distinguish between John drove to Chicago on Monday and Detroit on Tuesday and the ungrammatical *John saw the girls yesterday and boys today* because the remnant Chicago is an \( X^2 \) while boys is not. However, it would not predict the contrast in (45)–(47) (i.e. with read a book about Reagan vs read Bill's book about Reagan/ destroy a book about Reagan). Moreover, it would not obviously distinguish (70a) from the ungrammatical (70b) without further machinery,

\[(70) \quad \text{John drove to Chicago in the morning and Detroit in the afternoon.}\]

\[(70b) \quad \text{*John drove to Chicago in the morning and Detroit the afternoon.}\]

because nothing in (69) requires that any of the constituents in the schema correspond to adjacent constituents in the previous conjunct or sentence. (The present framework does require this, of course.)

Though an analysis of Right Node Raising is a prominent feature of Gazdar (1981), both Gazdar et al. (1985) and Sag et al. (1985) are completely silent on the subject of RNR; perhaps the extraction analysis of RNR in Gazdar (1981) interferes with some of the later theoretical developments in GPSG, such as IDLP format. But not even this extraction analysis can account for the examples in (54) and (55), where the right-node-raised phrase is not a constituent. The categorial functional composition analysis of NCC in this paper, on the other hand, covers both NCC and RNR by grammatical processes motivated elsewhere in the grammar; it interprets all these structures by the very same semantic rules used everywhere else; it predicts the interaction of both these processes with extraction island constraints and, in fact, accounts for all the data discussed in this paper. However, this analysis will not generate Gapped sentences, because of the adjacency property of Steedman's theory. To generate (71) for example,

\[(71) \quad \text{John ate rice, and Mary, beans.}\]

by the methods used in this paper, we would not only have to generate Mary beans as an 'argument string' constituent, but would also have to generate John rice as an argument string in the left clause so that we could conjoin it with Mary beans, and the adjacency property would prohibit us from doing this. Thus the present theoretical framework requires us to conclude that Gapping is a different process from NCC/RNR in English. An alternative analysis of Gapping (perhaps of the kind in Sag et al., 1985) is thus the 'patch' that this theory will need — though (69) is a patch which covers a smaller hole in the grammar's output than it covers in Gazdar et al.'s analysis.

On the matter of Gapping in other languages, it might well be pointed out that Gapping could be analyzed as a species of non- constituent in VSO and SOV languages in the present approach, as long
as the order of gapped and whole clauses is (72) in the first case and (73) in the second:

(72) VSO (Conj) SO
(73) SO (Conj) SOV

But of course, it was pointed out in Ross (1970) that exactly these orders of gapped and whole clauses appear to be universal properties of VSO and SOV languages.

How one views the 'exceptional' status of English Gapping that the present theory forces us to accord it depends on whether one is convinced, via Hudson's (1982) arguments, the considerations mentioned in Section 3, or other reasons, that Gapping should not be collapsed with NCC in English in the first place. If one already believes they are separate processes, then this theoretical result of the present framework merely confirms that view. If one firmly disbelieves this, then it suggests either that alternatives to Steedman's categorial framework should be sought which do not have the adjacency property, or that the whole approach is misguided. If one has no opinion either way, then I suggest that the success of the present approach to NCC and RNR might be one good reason to seek a separate treatment of English Gapping. But these are not questions to be any further pursued here.

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This paper has benefited, to a surprising degree, from timely and appropriate remarks and suggestions from a number of colleagues. When I showed Corbett's example ((29) in this paper) to Jerry Sadock, he suggested it was an instance of non-constituent conjunction; when I showed it to Mats Rooth, he proposed it was derived by type raising. It eventually occurred to me that perhaps both were right, and the present analysis was the result. For other helpful comments, on this analysis and its predecessor, I am indebted to Gerald Gazdar, Jack Hocksema, Dick Hudson, Geoffrey Huck, John Nerbonne, Richard T. Oehrle, Barbara Partee, Graham Russell, and Greg Stump. This research was supported by a Faculty Professional Leave from Ohio State University, NSF grant no. BNS-8306067, and a grant to the Center for Advanced Study in the Behavioral Sciences from the Alfred P. Sloan Foundation.

NOTES

1 Actually, these authors require not just the functional composition rule described here, but, for certain kinds of sentences, a generalized version of functional composition which they call "generalized partial combination." For any categories X_1 . . . X_n, the rule is:

\[ A/B + (\ldots (B/X_1)/\ldots)/X_n)/C \Rightarrow (\ldots (A/X_1)/\ldots)/X_n)/C \]

This form of functional composition is not needed for any examples discussed in this paper, except two sentences in Section 7 and Section 8, and will be ignored here; see Acheson and Steedman (1982) and Steedman (1985) for details, and Note 10 of the latter for the semantic interpretation of the generalized rule. Functional Composition has been proposed as an enrichment of categorial grammars in a large number of recent papers; see, again, these two works cited for references to many of these.

2 Steedman's NP-complement category does not appear to be of this type, however, but X/(X/NP), where NP is (I assume) the NP category that appears in Stage IIb below and X is a 'verbal' category.

3 This gives the higher-order readings, but it retains the different parses for grammatical functions of NPs. An alternative which uses the same category for all NPs at this stage but does not arise directly from Stage II via a type-lifting rule is the PTQ system Stage IIa: Here, I introduce the abbreviation NP for the PTQ category common to all NPs:

\[ \text{Stage IIa:} \]

\[ (2) \quad \text{up}/(t/\text{up}) \quad + \quad t/\text{up} \Rightarrow \text{up} \quad (t/\text{up}) \quad \quad (1) \quad t/\text{up} \quad + \quad \text{up} \Rightarrow \text{t} \]

\[ \text{TVP} \quad \text{NP} \quad \text{NP} \]

\[ (3) \quad \text{TVP}/(t/\text{up}) \quad + \quad t/\text{up} \Rightarrow \text{TVP} \quad \quad (3) \quad \text{TVP} \quad \text{NP} \quad \text{t/\text{up}} \quad \text{VP} \]

\[ (4) \quad \text{pp}/(t/\text{up}) \quad + \quad t/\text{up} \Rightarrow \text{pp} \quad \quad (4) \quad \text{pp} \quad \text{t/\text{up}} \quad \text{NP} \]

I will not pursue the question whether Stage IIa or Stage IIa' is the more appropriate next step for the grammar. After adding the rule in (17), the grammar could then be further systematized by replacing up in the object-taking categories in Stage IIa or IIa' by VP; when this is done to Stage IIa', the result is the so-called 'Universal Grammar' type system, which is also that of Keenan and Faltz (1978).

4 The reason I suggest including definite and indefinite descriptions at this stage is that I believe such NPs do not have the properties, in their first use by children, that require us to treat them as generalized quantifiers for 'adult' grammars. Also, the proposal below that (adult) grammars actually involve 'floating' types for NPs suggests that a possible way of building a bridge between generalized quantifier theory and Kamp's Discourse Representation Theory (and Heim's Elm Card Semantics), in which indefinite NPs are treated like names, would be to treat indetermines and definites as of type \( \varepsilon \) in 'Donkey' sentences and cases where they need to establish discourse referents, but of the generalized quantifier types in cases where their quantificational properties become essential.
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