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Bound and Free TVP

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0. Introduction

There are apparently different phenomena in English involving the verbal anaphor do and some auxiliaries. (1), (2), and (3) below are called Pseudo-gapping (PG), Comparative deletion, and Antecedent Contained Deletion (ACD), respectively. Incidentally, Levin (1979) calls (1) a case of Pseudo-gapping (or non-comparative PG) and (2) a case of comparative Pseudo-gapping. In this way, she hints that (1) and (2) are related to each other. But she does not implicitly or explicitly generalize the relation between the two.

(1) John picked up a newspaper, and Mary did a magazine.
(2) It hurts John ten times more than it does Mary.
(3) John met every student that Mary did.

In this paper, I will argue that do's in these cases are closely related to each other, and I will propose that there be bound TVP anaphora and free TVP anaphora. I will conclude from this that do's in (1), (2), and (3) are same in that they are all TVP variables; different in that the variable in (1) is free while the ones in (2) and (3) are bound. Specifically I will focus on ACD and defend the position taken in Cormack (1985) and Jacobson (1991), claiming that LF Movement (Quantifier Movement) is unnecessary in explaining ACD.

Moreover, I will propose theory-independently that the TVP approach (transitive verb-phrase approach) should be taken seriously, in order to adequately explain these and some other data. The formalism to be used in discussion is Combinatory Categorial Grammar (CG) developed in Ades and Steedman (1982). The following operations will be used in this paper:

Function Application(FA): $\alpha_{X/Y} : f + \beta_Y : a \Rightarrow \alpha\beta_X : f(a)$
(Backward FA as well: $\beta_Y : a + \alpha_{X\backslash Y} : f \Rightarrow \beta a \alpha_X : f(a)$)
Function Composition(FC): $\alpha_{X/Y} : f + \beta_{Y/Z} : g \Rightarrow \alpha\beta_{X/Z} : \lambda x[f(g(x))]$
Type Lifting(T): $\alpha_Y : a \Rightarrow \alpha_{X/(X\backslash Y)} : \lambda f[f(a)]$ or, $\alpha_{X\backslash(X/Y)} : \lambda f[f(a)]$

1. Pseudo-Gapping (PG)

As a descriptive term, this construction is similar to VP ellipsis in that PG has an auxiliary before an 'ellipsed' part. It is distinct from VP ellipsis in that PG has an overt object NP. PG is also similar to Gapping in that they both have overt subject and object NPs. But they are different in that PG has an auxiliary between the subject NP and the object NP. (1), an example of PG, is repeated below, along with one of Gapping (4), and VP ellipsis (5):

(1) John picked up a newspaper, and Mary did a magazine.
(4) John picked up a newspaper, and Mary, a magazine.
(5) John picked up a newspaper, and Mary did, too.

Even though (1) and (4) look similar, they show different grammaticality in examples like (6). The Gapping construction generally requires contrasts both in subject and object, while this is not necessary in PG:

(6) a. John picked up a newspaper, and he did a magazine, too.
b.??John picked up a newspaper, and he, a magazine, (too).

In fact, PG constructions favor coreferential subjects as in (6a), as Levin (1979) observes it. Another difference between the two is that the Gapped verb can never be c-commanded by its antecedent, while the ellipsis aux in PG often can as shown in (7):

(7) a. *John picked up a newspaper before Mary, a magazine.
b. John picked up a newspaper before Mary did a magazine.

I will not go further into explaining the differences between those elliptical constructions. Those who are interested are referred to Levin (1979).

There are a group of PG examples slightly different from the one above. These involve discontinuous constituents. Consider (8):

(8) a. It will make you happy. It will me.
b. That gives me more respect for her.
It certainly does me, too. (Levin 1979:16)
c. Cream rinse makes my hair get dirty faster.
It does mine, too. (Levin 1979:16)

d. Our first grade teacher sent you a card?
Yes. She did you, too. (Levin 1979:16)

The discontinuous strings such as *make .. happy*, *give .. respect*, and *send .. a card* are considered as constituents by most CG literature or akin to that as in Bach (1980), Dowty (1982), Pollard (1984), Jacobson (1987), and Hoeksema (1991). Let us call this type of constituents standard (complex) TVP's (cf. *complex predicates* is the term Hoeksema (1991) uses). Verbs like *make* and *persuade* are type TV/VP. (make has another type TV/AP, which undergoes the same process as TV/VP). Persuade, whose type is TV/VP, first applies to a VP type to give a TV type. Then it takes an NP as argument, involving a Wrapping operation. This is illustrated in (8'):

(8') persuade to go him
tv/vp vp np
----------FA
tv: *persuade to go*
----------FA (with Wrap)
vp: *persuade him to go*

These types of verbs lexically subcategorize for a VP as the first argument. They contrast with other complex TVP types which require function composition to be a type TVP. Take for example (9) below. (9a) is a common analysis of (9). But we could also analyze it as in (9b), where we use function composition to get the TV of *said he had read*.

(9) Tom said he had read *War and Peace*.

a. Tom said he had read *War and Peace*.
np vp/s np vp/vp vp/np np
----------FA
vp
----------FA
vp(=s\np)
----------FA
s
----------FA
vp
----------FA
s

b. Tom said he had read War and Peace.
np vp/s np vp/vp vp/np np
---T ----------FC
vp/np (= s\np/np)
s/(s\np)
----------FC
s/np
----------FC
vp/np (= tv)
----------FA
vp
----------FA
s

At the fourth step in (9b), *said he had read* is TV type in this derivation. Let us distinguish between *persuade to go* and *said he had read* by calling the former a standard TVP, the latter a composed TVP in the sense that the latter involves function composition.

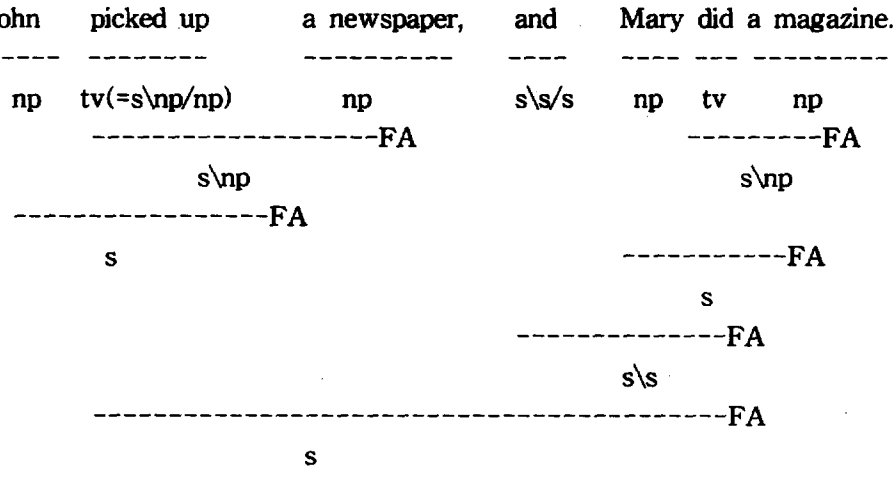
Now, coming back to PG, my analysis of PG is illustrated in (11) below. I assume that *did* in the second conjunct, being a free variable (in a following sentence, if PG is between two independent sentences), picks up for interpretation the meaning of a TVP in the previous conjunct or sentence which is linguistically most salient. So *did* takes the meaning of *picked up* in (11) below. Let us put it in a more formal way. The anaphoric auxiliary *did* in itself is empty in meaning until a meaning is provided by its linguistic context. This is very much analogous to the coreference of a definite NP and a free variable in non-c-commanding context and across sentences. Consider (10):

(10) a. The police saw the burglar. Then he ran away.
b. When the police saw the burglar, he was coming out of a house.

In both cases the variable *he* is not bound. But it manages to get the meaning of a definite NP in the context; it is coindexed with *the burglar* in this case.

With this interpretation process in mind, let us now look at (11):

(11) John picked up a newspaper, and Mary did a magazine.



(11') Semantics of (11): pragmatic coindexation

pick-up'(a-newspaper')(j) & v(a-magazine')(m)

=> pick-up'(a-newspaper')(j) & pick-up'(a-magazine')(m)

There are more severe restrictions on acceptiblility for PG than for other constructions similar to PG, namely Comparative deletion and ACD. I will return to this point.

2. Comparative Deletion

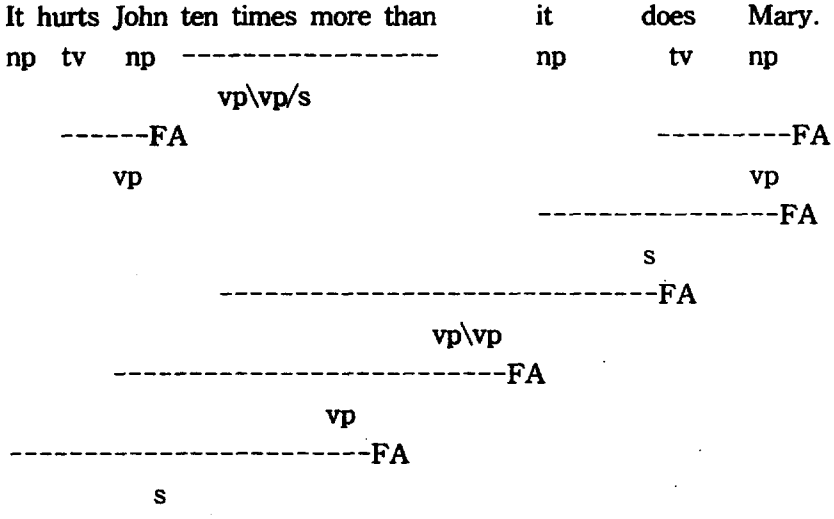
In fact, Comparative deletions are much wider range of constructions than what I am trying to address here. However, I will use this term exclusively for the cases like (2) repeated below, which is called Comparative Pseudo-gapping in Levin (1979), as was mentioned earlier.

(2) It hurts John ten times more than it does Mary.

This construction is similar to main clause PG and subject to the same process that we used for PG. (2) is analyzed as (12)[1]:

1) I assume here for simplicity that the category of *ten times more than* is VP\VP/S in that it appears as a VP adjunct combined with S. Even though its main functor *times* is of an NP category, it functions as a VP adjunct as *twice* in *John went there twice* does.

(12) It hurts John ten times more than it does Mary.



(12′) Semantics of (12):
ten-times-more-than′(hurt′(m)(it′))(hurt′(j))(it′)

This construction is different from PG in that the ellipsis relation is between the main clause and the subordinate one. *Does* is subordinate to *hurts* in (12). In PG they appear in conjoined clauses or in independent sentences. This difference will be crucial later in this paper.

3. Antecedent Contained Deletion (ACD)

3.1. Previous Approaches to ACD

Bouton (1970), Sag (1976), and May (1985) discuss a construction known as Antecedent Contained Deletion. (3) is an example of this, repeated below:

(3) John met every student that Mary did.

This ellipsis is presumably so dubbed because the most common analysis has been like (3′), which has the matrix VP as the antecedent of the VP in the lower clause, which is a part of the antecedent VP itself.

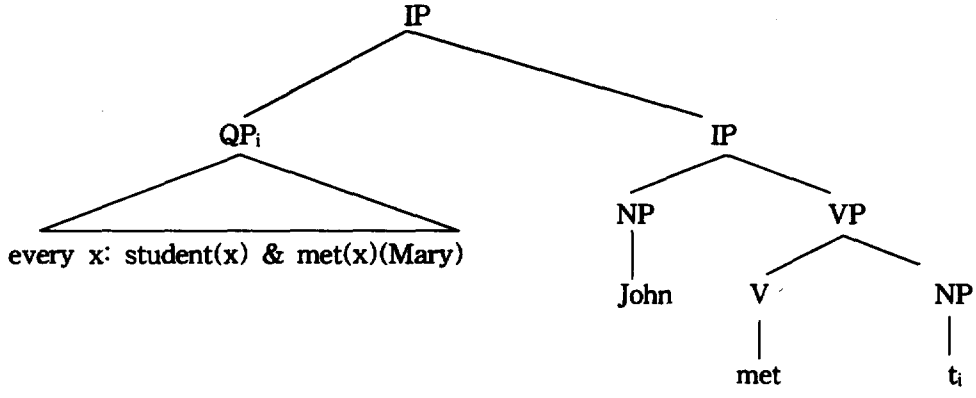
(3′) John [$_{VP}$ met every student that Mary did [$_{VP}$ e]].

According to this analysis, a construction like (3) poses a potentially serious

problem, since the antecedent of the VP in the subordinate clause is the matrix VP and it seems necessary to have the subordinate clause meaning to have a complete matrix VP meaning. Again, we need the matrix VP meaning for the VP in the subordinate one. Thus, we seem to fall into an infinite regress.

May (1985) claims from this observation that this gives a very strong argument for Quantifier Raising. His analysis is illustrated approximately in (13). On this approach, the interpretation is no longer in infinite regress. The matrix NP depends on QP, but the VP in the QP does not depend on the matrix VP for interpretation.

(13) John [$_{VP}$ met every student that Mary did [$_{VP}$ e]].



3.2. My adopted analysis of Cormack (1984) and Jacobson (1991)

The line of approaches in May (1985) and Baltin (1987) seem inevitable only if we assume the phenomenon as ellipsis of the whole VP. There seems no convincing reason that will make an analysis of ellipsis of the whole VP necessary. Looking at this type of construction from a different perspective, it ceases to be a problem which has to introduce Quantifier Raising for explanation. In the standard CG literature, a relative pronoun is regarded as a function from S/NP to another function from N to N; it takes a S/NP as argument, yielding a function, which in turn takes N to give N. This is shown in (14) for *John knows the student who Mary met.*

(14) John knows the student who Mary met.
np s\np/np np/n n (n\n)/(s/np) np s\np/np
---T
s/(s\np)
----------FC
s/np
----------FA
n\n
----------FA
n
----------FA
np
----------FA
s\np
----------FA
s

The subject *Mary* in the relative clause, which is of type NP with interpretation m, first type-raises to S/(S\NP) of interpretation λF[Fm] to function-compose with the following verb of type S\NP/NP to give S/NP. This is function-applied to the relative pronoun of type (N\N)/(S/NP).

The same analysis can be applied to (13) above. This time, however, there is an anaphoric *did*. If we adopt the same analysis as PG and Comparative Deletion and if we apply the standard CG analysis for relative clauses, we can account for (13). This line of approach is persuaded by Cormack (1984), and Jocobson (1991) shows this explicitly. (13') below is from Jacobson (1991) with some modifications which are not essential but are consistent with my analysis. Other auxiliaries such as *will*, *can*, etc. may appear in this construction as well. The basic type of auxiliaries is (S\NP)/(S\NP), or VP/VP for a short form, when they appear with a VP following. Jocobson leaves the type as it is and proposes a category changing rule which in effect amounts to the result from *did* functionally-composing with *met*. I will simplify the matter by regarding the type of *did* here as (S\NP/NP), or just TV as a short form. There is no essential difference occurring between the two except that her analysis predicts that the semantic interpretation of did is finished at the point of the category changing process. So this implies that the anaphoric verb in her approach somehow has to retrieve its meaning from the antecedent before it combines with its argument or functor. Consider (13').

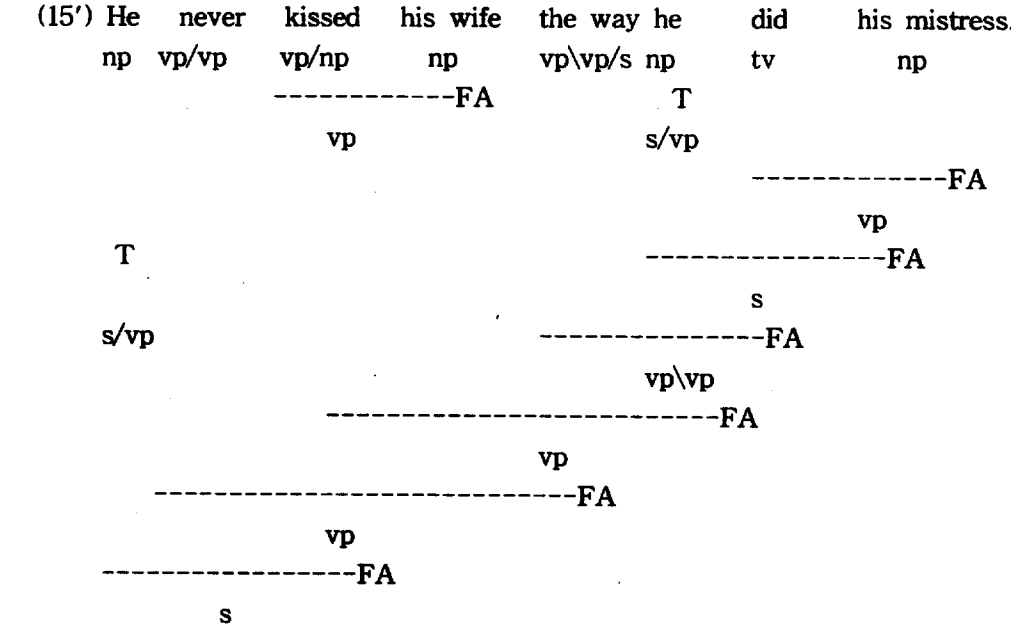
(13′) John met every student that Mary did
:j :met′ :every′ :student′ :that′ :m :v
np s\np/np np/n n (n\n)/(s/np) np s\np/np
----T
λ f[f(m)]
s/(s\np)
----------FC
λ y[v(y)(m)]
s/np
----------FA
λ Q[λ x[v(x)(m)&Q(x)]]
n\n
----------FA
λ x[v(x)(m)&student′(x)]
n
----------FA
λ Q[∀x[v(x)(m)&student′(x)-->Q(x)]]
np
----------FA
λ y ∀x[v(x)(m)&student′(x)-->met′(x)(y)]=>
λ y ∀x[met′(x)(m)&student′(x)-->met′(x)(y)]
s\np
----------FA
∀x[met′(x)(m)&student′(x)-->met′(x)(j)]
s

I assume that the auxiliary *did* is a variable. It is a bound variable in (13′). It obtains a value when the antecedent combines with it, i.e. in the derivation immediately preceding the last in (13′). Recall that I also assumed in Section 1 a pragmatic process at the end of the derivation which gives an appropriate value to a free variable from the discourse.

Now, if we look at Comparative deletion again, we see a similar process.

(15) = Levin (1979: 76)

He never kissed his wife the way he did his mistress.



This is very much parallel to ACD[2]. This parallelism leads us to propose that two constructions involving TVP anaphora be accounted for in the same way.

3.3. Non-restricted Relative Clauses with similar constructions

Unrestricted relative clauses such as (16) are superficially similar to normal relative clause constructions. One of the differences between the two is that unrestrictive relative clauses lack a quantificational force. As a result, they pose an interesting problem for the Quantifier Raising approach to ACD.

(16) John loves Mary, who Sue does as well.

Two seemingly plausible analyses do not work. First, we might try Quantifier Raising. But it cannot be applied under the standard assumptions about the nature of Quantifier Raising int the GB literature, since there is no quantificational force in a proper noun plus an unrestrictive relative clause. Therefore, (17) cannot avoid infinite regress. Fiengo and May (1991) mention a new version of Quantifier Raising, which applies to any NP. But they still admit that this will

2) Here I treat the way for simplicity as a VP adjunct of type VP\VP/S after combining with an S category. The same reason I gave for ten times more than applies to this case.

not work for a case like (17) with a proper noun and an non-restrictive relative clause.

(17) John [$_{vp}$ loves Mary, who Sue does [$_{vp}$ e] as well]. => infinite regress

Another option is to divide the VP into two subparts as shown in (18). In this way we can avoid the problem of infinite regress apparent in (17), since neither VP contains the other VP in this analysis. This is a similar approach to what Baltin (1987) pursues for ACD. But there is no variable that the wh-word *who* should bind this time. Therefore this is not a viable option with respect to the kind of theory on which this analysis is based.

(18) John [$_{vp}$ loves Mary,] who Sue does [$_{vp}$ e] as well.
=>AWh-word doesn't bind a variable

As a last resort, Fiengo and May treat this case as a Pseudo-gapping. In our approach this is not a surprising problem. Even though there are some differences between restrictive and nonrestrictive relative clauses, we can explain them in the same way.

4. More on the Parallel between Comparative Deletion and ACD

4.1. Haik's Argument against the Parallel

Haik (1987) points out that the deprepositionalized PG, or PG with a silent preposition, is less acceptable than the overt prepositional PG. (19) is from Haik (1987:509):

(19) a. ??Mary talked about Peter more often than she did Bill.
b. Mary talked about Peter more often than she did about Bill.

Her point is that since (19b) is better than (19a), we expect that a sentence with a relative clause structurally closer to (20b) would be more acceptable than the one closer to (19a) if we assume there exists a parallel between the Comparative sub-deletion and ACD. (20a) is structurally closer to (19a) than (20b) is because there is no preposition following *did* both in (19a) and (20a), while this is not true in (20b). However, (20) shows exactly the opposite. (20a), the one without a preposition, is good, whereas (20b) is bad:

(20) a. Mary talked about everyone that Peter did.
b. *Mary talked about everyone that Peter did about[3].

On the basis of this, she concludes that they are in fact not parallel.

However, the reason why the expected parallel between (19) and (20) is missing seems to be different from what Haik claims.

Kuno (1981) provides the following examples, attributed to Jessie Pinkham. (21) follows the same pattern as Haik's (19) above. The grammaticality judgments on the two are similar. However, (22) shows something quite different from Haik's point.

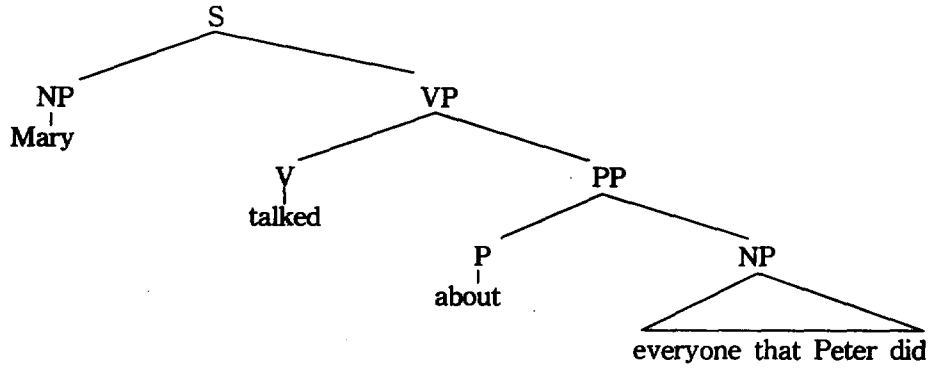
(21) a. John talked to Italians more often than he talked to Greeks.
b. ??John talked to Italians more often than he did Greeks.
c. John talked to Italians more often than he did to Greeks.
(22) a. John talked to many more Italians than he talked to Greeks.
b. John talked to many more Italians than he did Greeks.
c.*John talked to many more Italians than he did to Greeks.

(22) contrasts with (19) and (21) in that (22) gives exactly the opposite results. According to (19) and (21), (22b) would be bad and (22c) would be good. This leads us to rethink about the claim made by Haik that the TVP ellipsis in comparative construction is not related to the TVP in the ACD case.

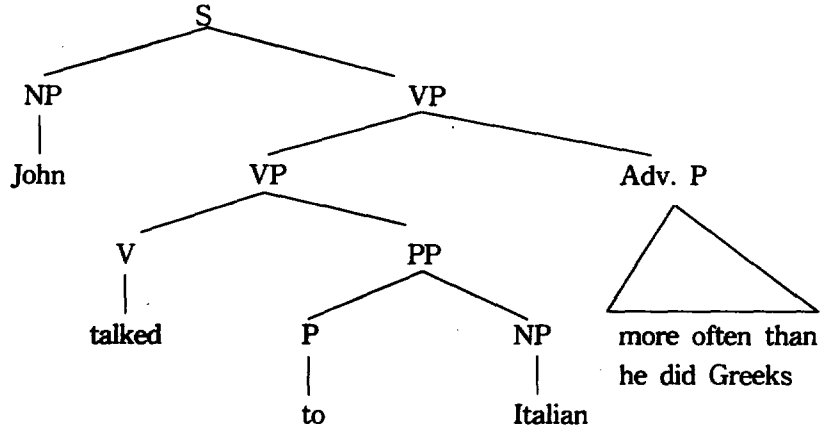
Let us consider (20a), (21b), and (22b) illustrated in approximate traditional phrase structure trees, in order to make their syntactic structures more perspicuous. They are numbered (20′), (21′), and (22′) respectively:

3) There seems to be some phonological reason to the ungrammaticality of (20b) in that a sentence does not sound good when one ends with preposition following an auxiliary. Hee-Rahk Chae pointed out that (ii) is bad for the phonological reason which appears to apply to (20b) above:
(i) A: John got married last week.
(ii) B: Yes, he did. ??I know who he did with.
Given that this is a consistent fact, it doesn't explain why (22c) is unacceptable, since there is an NP following the auxiliary and the preposition. My theory will predict that (20b) and (22b) are unacceptable for the same reason.

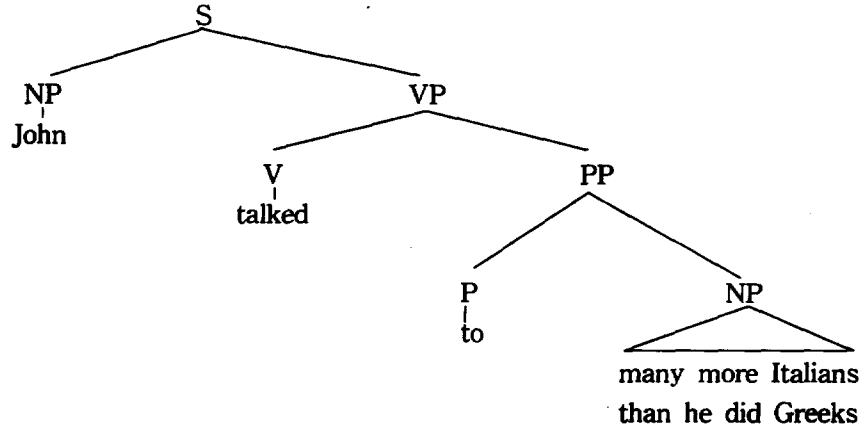
(20′)



(21′)



(22′)



The tree structures in (21′) and (22′) are standard for comparatives in the literature such as Bresnan (1975) and McCawley (1988). What the trees show here is in fact that the construction of ACD in (20) is structurally closer to (22) than to (21); in (20) and (22) the main clause verb and the preposition

"c-command" the ones in the subordinate clauses (cf. Reinhart 1976), while this is not true in (21).

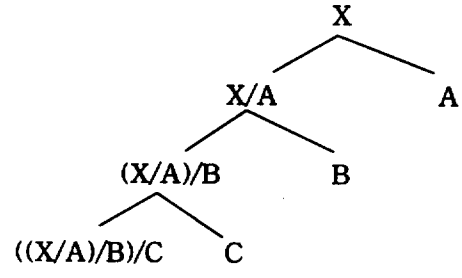
As illustrated above, the c-command relation is a key to the difference between Haik's examples and Kuno's. So we can conclude that Haik's examples which were provided for a claim against ACD analysis of the comparative construction need to be explained on independent grounds and are not therefore evidence against the identification of ACD with Comparative deletion and PG. Also we have noticed that the construction that Kuno mentioned not only disproves Haik의 argument but also serves as strong evidence for the tie between the Comparative deletion and ACD.

The c-command relation attested above can be expanded to answer, though indirectly, the question of why Pseudo-gapping is rare in main clauses and conjunctions. Namely, an antecedent in these clauses doesn't c-command the target clause.

4.2. F-Command

So far I have borrowed the term C-command from GB theory for descriptive purposes. We can also give a Categorial Grammar account for this relation based on functor-argument structure. There is a notion of "argument-command" or "F-command" in Chierchia (1988) and Hepple (1990), in the variant of Bach and Partee (1980). The generalization of F-command is that "an argument of a functor F-commands the 'earlier' arguments of the same functor and their subconstituents" (Hepple 1990:124). To illustrate this in a tree structure (23), following Hepple (1990):

(23)



A F-commands B and C, whereas B F-commands C only and C F-commands none. So F-command is in fact a relation between arguments. Since relations between functors are more relevant for my analysis, I will give a different definition of command. To distinguish my definition from the existing ones, let us

call my definition as 'f-command' in a lower case.

(24) f-command:
(i) A functor f-commands its argument.
(ii) If α f-commands β, then α also f-commands every subconstituent of β.

While it is possible for a functor to f-command its argument and an argument in the subconstituents of its argument, these relations are not relevant to our purposes. Therefore, I will not talk about those cases. Mainly we are concerned about f-command relations between functors, specifically between TVPs in this paper. Let us look at f-command relations in (20'), reanalyzed here in (20").

(20") Mary talked about everyone that Peter did
--- ----- ---- ----------
np s\np ((s\np)\(s\np))/np np
T
(s\np)/((s\np)\(s\np))
----------FC
(s\np)/np
----------FA
s\np

In (20") *talked about* f-commands *everyone that Peter did* by (24a): *talked about* is a functor and ***everyone that Peter did*** is the argument of the functor as shown in the last derivation in (20"). Consequently it f-commands *did* by (24b). Now consider (21'), reanalyzed as (21") here.

(21") ??John talked to Italians more often than he did Greeks
---- ----- -- ------ ----------
np s\np ((s\np)\(s\np))/np np (s\np)\(s\np)
T
(s\np)/((s\np)\(s\np))
----------FC
(s\np)/np

In (21") *talked to* in the main clause does not f-commands *did* in the adjunct clause, because the former and the adjunct containing the latter are not in a

functor-argument relation. Likewise, *talked to* in (22″) below f-commands *did* in the noun phrase in the same way as in (20″): the former is the functor of the latter as illustrated in the last derivation in (22″).

(22″) John talked to many more Italians than he did Greeks

---

np s\np ((s\np)\(s\np))/np np

T

(s\np)/((s\np)\(s\np))

----------FC

(s\np)/np

----------FA

s\np

In (21″), which is unacceptable, the function-composed TVP *talked to* does not f-command *did*. On the other hand, *did* in (20″) and (22″), which are grammatical, is f-commanded by their function-composed antecedent. Thus I hypothesize that only functionally composed TVPs are subject to the f-command condition; if the f-command condition is not met, then *did* can still take a verb or a standard TVP as argument.

According to this definition of f-command, the first underlined TVP does not f-command the second and predicts the awkwardness in the reading in which the first is understood as the antecedent.

(25) ??John said he should read books more often than he did magazines.

4.3 Standard PG vs. Functionally Composed PG

In this subsection I will show by providing some more relevant data that there are clear distinctions in acceptability of composed TVP antecedent PG between f-commanded vs. non-f-commanded anaphora. I will also give an account for different grammaticality judgements among speakers. (The underlines indicate the understood antecedent and anaphora relations.)

The sentences in (26) and (27) below follow the hypothesis that we put forth above in that the anaphoric auxiliaries in (26b) or (27b) cannot take the functionally composed antecedents, while (26a) and (27a) can. The antecedents in the grammatical sentences f-command their anaphora.

(26) a. His father said he should read every book which his teacher did. (Jacobson 1991: 27)
b. His father said he should read War and Peace and
*his friend did a Playboy magazine.
(cf. * On reading 'his friend said he should read a Playboy magazine')

(27) a. John wants to have every toy that Mary does.
b. John wants to have a toy gun. *Mary does a doll.

The sentences in (28)-(30) also show in a similar way as above that there is a consistent difference in grammaticality between PG in Comparative Deletion and coordinations(or independent clauses).

In (28) it is shown that the antecedent of speaker B's first sentence is *like*. Otherwise, the second sentence would not be infelicitous since the first and the second sentences would not contradict each other.

(28) = Levin (1979: 19)
Sp. A: Iris seems to like Nurit.
Sp. B: She doesn't me. #But actually, she does like me

(29) a. I'm sure I would like him to eat fruit more than I would cookies. (Levin 1979: 13)
b. I would like him to eat fruit. *I sure wouldn't cookies. (Levin 1979: 19)

(30) a. I think you need to show yourself more than you do anyone else. (Levin 1979:14)
b. You need to show yourself. *He does himself, too.

It might appear that (29) and (30) show the same patterns that we have discussed so far. There is no doubt that (29b) and (30b) are unacceptable. Sentences like (29a) and (30b) are still acceptable to many speakers as Levin (1979) reported. But this is unexpected according to our hypothesis in 4.2. A functionally composed antecedent is supposed to be subject to the f-command condition.
But as we can verify, neither antecedent in (29a) and (30a) f-commands their anaphor under our current definition of f-command. I suspect that the difference in the grammaticality judgements among speakers with respect to examples like (29a) and (30b) is contributed to different definitions of f-command adopted to speakers. In other words, the current definition of f-command applies to the speakers who reject sentences of type (29a). A less constrained definition of f-command seems to be needed for those speakers who accept sentences of type (29a).

If we add clauses (iii) and (iv) to the existing condition (24) as in (31) below, we can accommodate sentences like (29a). Now the antecedent in (29a) f-commands its anaphor under the definition in (31).[4]

(31) f-command (alternative):
(i) A functor f-commands its argument.
(ii) If α f-commands β, then α also f-commands every subconstituent of β.
(iii) An adjunct is f-commanded by its modified category.
(iv) A functor f-commands whatever its resulting category f-commands.

The data are consistent with our hypothesis that functionally composed antecedent is possible only if it f-commands its anaphor.

5. On Fiengo and May's Skepticism against PG approach to ACD

Fiengo and May (1991), F & M hereafter, claim that there are problems posed for the PG approach to ACD. And the assumption that these problems could not be explained adequately in PG approach, they conclude, will lead to an eventual disproof of the PG approach. Let us provide their points one by one and carefully evaluate them to see if their claim is really viable.

First, they observe the kind of sentence as in (32), where the matrix verb has presumably a different type from the understood verb in the subordinate clause.

(32) John fired everyone who should have been. (fn. 41, F & M: 231)

Namely, if active verbs and passive verbs are different in type, *fired* in (32) will have a different type from the understood PGed verb in the subordinate clause. As a result, it would violate the type requirement in CG, since *fired* is S\NP/NP, but the PGed verb is S\NP which is function-applied to (S\NP)/(S\NP) to give S\NP. While this is true, sentences of the type like (32) are generally awkward. Consider (33):

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4) There is a variant of c-command, sometimes called m-command (cf. Aoun and Sportiche 1983), which is less constrained than the standard c-command condition. For example, the verb *talked* doesn't c-commands the adverb phrase in (21') above, but it m-commands the phrase. Our new defintion seems to work similarly to the m-command relation, while the one before is close to the standard c-command.

(33) a.??John took every opportunity that should have been.
b.??The guests ate every noodle which should have been.

One difference between (32) and (33) is in the morphological forms each verb has. The past and past participle morphemes of fire in (32) are homophones: *fired* for past and for past participle. (33) is different: in (33a) *took* is the past form, *taken* is the past participial form; in (33b) *ate* is the past form, *eaten* is the past participial form. I conjecture from this that the morphological nature of the verb *fired* would make (32) somewhat accessible without *fired* in the relative clause and that it would be easier to process the sentence without the verb than (33) would, since the verbs in the former have the same morphology, while ones in the latter do not.[5)]

Therefore, (32) should be dealt apart from the canonical PG approach. Also we should be reminded that an ellipsis analysis of the whole VP does not solve the problem of this kind. For example, the sentences in (34) below show that a passive VP cannot stand as an antecedent for an active, as Hankamer and Sag (1976) point out.

(34) The children asked to be squirted with the hose, and
a. *we did.
b. they were. (Chierchia and McConnell-Ginet 1990)

Another point about which F & M express some worry (cf. F & M: fn. 41, 231) involves sentences like (35) below. If we assume that a transitive verb can stand as an antecedent for PG, we are not able to account for the ungrammaticality of (35).

(35) *John believed that Max did that Harry is heroic.

While this is correct to the extent that PG verbs are transitive, this observation is not enough to characterize the general PG phenomena. If we look at the sentences like (36), where there is no controversy in determining whether they are ACDs or PGs, we realize that the term 'transitive' is not enough since PG seems very sensitive to syntactic category. In other words, PG is only allowed for type S\NP/NP. A verb of type S\NP/S or S\NP/S' does not allow PG.

(36) a. John said that the earth is flat. *And Mary did that it is round.

5) This was pointed out by Andeas Kathol.

b. John believes he is a good student. *But Mary does he is mediocre.

Third, they make a false assumption that PG is as a form of Gapping and try to apply one of the restriction mentioned earlier in this paper: namely the non-c-commanding restriction (cf. F & M, p. 214). Let alone the claim that PG is a form of Gapping, which is obviously wrong according to Levin (1979), their claim is self-contradictory. They assert that the sentence (37) is clearly a case of PG (fn. 29 p. 215).

(37) John writes more books than Bill does articles.

It is obvious that *writes* c-commands *does* in this sentence. As a result this claim contradicts the one before.

The last point is made about the sentence (38). The correct interpretation of (38) is (38'). However, F & M argue that the only possible interpretation of PG analysis will be the reading of (39), i.e. (39').

(38) Dulles believed everyone that Angleton did to be a spy. (= 78c , F & M)
(38') For whomever Angleton believed to be a spy, Dulles believed him/her to be a spy.
(39) Dulles believed everyone that Angleton believed to be a spy.
(39') For whomever Angleton believed, Dulles believed him/her to be a spy.

Of course, (38) and (39) have different meanings. F & M claim that (38) cannot be analyzed by PG to give the reading (38'), since the antecedent then will have to be *believed* e *to be a spy*. They argue under the assumption that PG is possible only when the antecedent is a simple verb; so they claim that it has to be *believed* in (38). And *believed* e *to be a spy* is a VP in their sense. But as we mentioned in Section 2, this is a complex TVP and can be an antecedent for PG, as Levin (1979) show with examples like (40) and (41). Moreover, if they insist that PG be only possible with a simple verb and if they also keep the position that (37) is a case of PG, then they will not be able to account for the cases of PG like (40) and (41).

(40) It takes the audience less time to adjust to the image than it does co-star John Denver. (= 21, Levin 1979:14)
(41) John tried to write more books than he did articles.

They have the underlined Pseudo-gapped meanings. For example, *Tried to write* in (41) is not a verb in their sense and the structure is almost identical to (37), which they claim to be a case of PG. It is not clear at all how their claims could be reconciled on these examples and many more of this kind.

The points mentioned in this section seem to indicate that the claims in F & M do not repute my position that ACD, Comparative deletion, and PG belong to a natural class.

6. Hypothesis

6.1. Bound PG vs. Free PG

So far we have witnessed that (i) Levin (1979), Hoeksema (1991), and Fiengo and May (1991) implicitly or explicitly assume that main clause Pseudo-gapping is essentially the same as Comparative deletion, and (ii) there are a number of similarities between Comparative deletion and ACD in 4.1, which became clear when we examined the data discussed by Haik (1987), (iii) the f-command relation plays a crucial role in determining grammaticality of Pseudo-gapped constructions, as we saw also in 4.1, (4) the f-command relation in turn covaries with the admissibility of PG for composed TVP in 4.2 and 4.3.

If (i) is correct, then (i) and (ii) jointly indicate that the three constructions of PG, Comparative deletion, and ACD are closely related and in fact the three constructions may be just different instantiations of the same phenomenon as PG. Let us summarize the empirical generalization we have observed as (42):

(42) a. f-commanded vs. non-f-commanded target TVP correlates with the possibility of having a functionally composed antecedent.
b. this difference in behavior is common to main clause PG and Comparative deletion, and is consistent with ACD[6].

From this, I propose to analyze this bound PG vs. free PG classification, which is inspired by f-command relation playing an important role in PG admissibility.

(43) Theory of TVP Binding:
i. α_{TV} that is auxiliary is a variable over relations between individuals (i.e., TV-type meaning).

6) The difference in behavior is consistent with ACD in that ACD antecedents always f-command their target TVP.

ii. a variable α_{TV} can be bound by β_{TV} only if β f-commands α.

We hypothesize from this theory that a TVP variable f-commanded by its antecedent can be bound anaphora but a variable not f-commanded by its antecedent is free anaphora. This is not unnatural since it is known from NP anaphora that bound anaphora requires a c-commanding antecedent while free anaphora does not and can apply across sentence boundaries. Our f-command relation is only a reformulation of c-command in order to be appropriate to the Categorial Grammar framework.

If we give a name for each anaphora, a bound PG is one whose antecedent TVP f-commands its target TVP (i.e., the one in Pseudo-gapped position) and a free PG is one which doesn't show f-command relations. According to this classification, all ACD cases are bound PGs. And all main clause PGs, which we just call PG, are free PGs. The sentence discussed in Haik (1987) repeated here is a free PG, since *talked about*, the intended antecedent, does not f-command *did* in (44).

(44) ??Mary talked about Peter more often than she did Bill.

6.2. A Question

At this point, a question arises as to why only bound TVP variables should allow functionally composed antecedents while free TVP variables must have standard TVP antecedents.

My conjecture is as follows. It is true that every functionally composed constituent is a real constituent in CG. If there is a functionally composed TVP, it is also true that there are more than one candidate antecedent for a variable TVP. Let us take (45) for example.

(45) a. John wants to have more toys than Mary does dolls.
b. John wants to have a toy gun. ??Mary does a doll.

There are two apparently possible antecedents for *does* both in (45a) and (45b): *wants to have* and *has*. Both candidates are in fact possible as antecedent for *does* in (45a), while only the second is possible in (45b). We also know from Levin (1979) that a smaller constituent than a bigger one is favorable as antecedent in Comparative deletion like (a). It seems to be the case in ACD as well, considering some cases like (46).

(46) John thinks Bill suspected everyone which his teacher did.

It is clear in (46) that *suspected* is much better as antecedent than *thinks Bill suspected.* So candidates for antecedent are competing with each other with the tendency which Levin (1979) observed. If X is functionally composed from W and Y, and if X binds Z, then W and Y as subconstituents may have a stronger tie than they would have if X did not bind Z. As a result, the tie within the functionally composed constituent is reinforced and it may help survive the competition mentioned above.

7. Other Relevant Points for PG Approach

There are some problematic ACD sentences which are problematic in that we will not be able to account for them if we do not resort to PG analysis of anaphora . If we look at the sentences in (47) below (due to David Dowty) and try to explain them in terms of an ellipsis of the whole VP, it will not be a simple task.

(47) a. John interviewed everyone yesterday that Mary will today.
b. John interviewed everyone carefully that Mary did hurriedly.
c. John interviewed every candidate to please his boss that Mary did to please the new editor.
d. John can slice any stale bagel with a dull table knife that you can with a sharp breadknife.
e. Don Giovanni sang every aria for an aristocratic lady that Leporello did for peasant girl.

These sentences pose a problem for an ellipsis approach of the whole VP, if we assume that there are a group of adjuncts modifying a TVP, which seem to be needed for agent-oriented adverbs in passives and for reasons given by Lasersohn (1988).[7] Consider (48). The adverb *carefully* is agent-oriented in that it describes the agent's part of activity in the passive sentence (48b) as well as in the active one (48a). If we treat this adverb as a TVP adjunct rather than a regular VP adjunct, we can capture this behavior.

(48) a. John interviewed the applicants carefully.
b. The applicants were interviewed carefully by John.

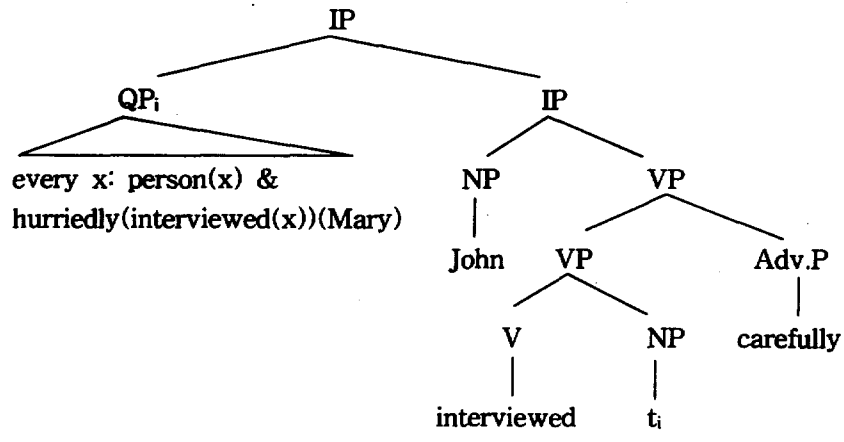
7) This was pointed out to me by David Dowty.

Lasersohn (1988) also observes that the adverb *together* has two uses. In (49a) the subject John and Mary are understood as working simultaneously, whereas the piano and the rock are understood as being lifted at the same time in (49b). He proposes that *together* in (49b) should be treated as a TV adjunct in order to get the correct group reading that the objects are involving.

(49) a. John and Mary lifted the piano together. (= 94a, p. 107)
b. John lifted the piano and the rock together. (= 93a, p. 107)

Given these, a F & M-type analysis to ACD sentences like (47b) will still involve the whole VP ellipsis with Quantifier Raising. Their putative analysis will be something like (50). Then the problem is there is no way to combine the verb *interviewed* with the adverb *carefully* before it combines with the object. The adverb always has to modify the VP, which is what we wanted to avoid in the discussions above.

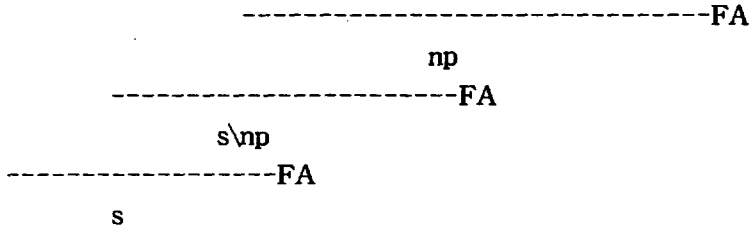
(50)



However, the data can be easily accounted for under our PG analysis. The verb *interviewed* is functionally composed with the adverb *carefully*, resulting a TVP category as illustrated in (51) below. And as before, the variable *did* is bound by the antecedent *interviewed*.

(51)

John	interviewed	everyone	carefully	that	Mary	did hurriedly
np	(s\np)/np	np	(s\np)\(s\np)		np\np	
	(s\np)/np		FC (W)			



8. Conclusion

After we have tested groups of relevant data, we are led to a conclusion that main clause Pseudo-gapping, Comparative deletion, and Antecedent Contained Deletion are accounted better by hypothesizing bound and free TVP anaphora which are analogous to bound and free NP anaphora with respect to the command condition on their coindexations. In doing so, we have proposed a new definition of f-command and it plays a role in TVP binding. I have not studied what other implications this new definition may bring out.

Also, we have reconfirmed that we do not need Quantifier Raising for ACD. As some of the linguistic terms do, ACD itself is somewhat misleading because there is no antecedent containment in those constructions we have tested.

References

Ades, Anthony E. and Mark Steedman. 1982. On the order of words. *Linguistics and Philosophy*, 4: 517-558.

Aoun, Y. and Dominique Sportiche. 1983. On the Formal Theory of Government. *The Linguistic Review* 2.3: 211-36.

Bach, Emmon and Barabara Partee. 1980. Anaphora and Semantic Structure. *CLS* 16: 1- 28.

Bach, Emmon. 1980. In defense of passive. *Linguistics and Philosophy* 3: 297-341.

Baltin, Mark. 1987. Do Antecedent-Contained Deletions exist? *Linguistic Inquiry* 18: 579-595.

Bouton, L. 1970. Antecedent Contained Pro-forms. *CLS* 6.

Bresnan, Joan. 1975. Comparative deletion and constraints on transformations. *Linguistic Analysis*, 1: 25-74.

Chierchia, Gennaro. 1988. Aspects of a categorial theory of binding. In Oehrle, R., Bach, E. and Wheeler, D. eds. *Categorial Grammars and Natural Language Structures*, D. Reidel, Dordrecht. pp. 125-151.

Cormack, Annabel. 1984. VP Anaphora: Variables and Scope. in F. Landman and F. Veltman. eds. *Varieties of Formal Semantics.* Foris Publications. Dordrecht, The Netherlands.

Dowty, David. 1982. More on the categorial analysis of grammatical relations. In *OSU WPL* 26: 102-133.

Fiengo, Robert and Robert May. 1991. *Indices and Identity.* MIT Press. Cambridge, MA.

Haik, Isabella. 1987. Bound VPs that Need to Be. *Linguistics and Philosophy.* 10: 503-530.

Hankamer, Jorge. and Ivan Sag. 1976. Deep and Surface Anaphora. *Linguisitc Inquiry* 7: 391-426.

Hepple, Mark. 1990. *The Grammar and Processing of Order and Dependency: a Categorial Approach.* Ph.D. diss. University of Edinburgh.

Hoeksema, Jack. 1991. Complex Predicates and Liberation in Dutch and English. ms.

Jacobson, Pauline. 1987. Phrase Structure, Grammatical Relations, and Discontinuous Constituents. *Discontinuous Constituency (Syntax and Semantics 20)* eds. by Huck et. al. Academic Press. New York.

Jacobson, Pauline. 1991. Flexible Categorial Grammars: Questions and Prospects. in R. Levine, ed., *Formal Linguistics: Theory and Implementation.* Vancouver Studies in Cognitive Science, University of British Columbia Press, Vancouver.

Kuno, Susumu 1981. The Syntax of Comparative Clauses. *CLS* 17: 136-155.

Lasersohn, Peter. 1988. *A Semantics for Groups and Events.* Ph.D. diss. Ohio State University.

Levin, Nancy. 1979. *Main-Verb Ellipsis in Spoken English.* Ph.D. diss. Ohio State University.

May, Robert. 1985. *Logical Form: Its Structure and Derivation.* MIT Press. Cambridge, MA.

McCawley, James D. 1988. *The Syntactic Phenomena of English.* Vol. 2 University of Chicago Press, Chicago.

Pollard, Carl. 1984. *Generalized Phrase Structure Grammars, Head Grammars and Natural Languages.* Ph.D. diss. Stanford University.

Reinhart, Tanya. 1976. *The Syntactic Domain of Anaphora.* Ph.D. diss. MIT.

Sag, Ivan. 1976. *Deletion and Logical Form.* Ph.D. diss. MIT.

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