0. Introduction

This paper investigates the syntax of comparative deletion and comparative subdeletion and
constrains that the apparently paradoxical behavior of these two English con-
structions can be explained by a simple distinction between overt and covert movement:

1. Perspectives on the Syntax of Comparison in English

1.1 Towards a Uniform Analysis of Comparatives

Comparative deletion (CD) is the term introduced by Bresnan (1973, 1977) to describe
expressions of comparison such as those in (1), which compare the relative
quantities of different sorts of stuff (number of scoring titles vs. number of tattoos, degrees
of carelessness vs. degrees of carefulness).

Compared to what, degrees of carefulness, degrees of carelessness.

The galaxy contains more stars than the eye can see.

a. My sister drives as carefully as I drive.
b. At that time, sea level was not as high as it later became.
c. My sister drives as carefully as I drive.

(1)

The galaxy contains more stars than the eye can see.

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Comparative (Sub)deletion

The hypothesis that CD and CSD reflect a single rule of comparative formation is most fully developed in Bresnan 1975. Bresnan argues that the rule of comparative formation in English is an unbounded deletion operation that obligatorily eliminates a degree term from the phrase in the comparative clause that is compared with the morphologically comparative constituent in the main clause. (I will henceforth refer to the former as the compared constituent and the latter as the head of the comparative.) Like other transformations, this operation is subject to the relativized A-over-A condition, which requires the additional removal of as much redundant material as possible, up to recoverability (see Bresnan 1975:68). The result is that in CD, where the compared constituent is fully identical with the head, the entire phrase must be deleted. In CSD, however, the lexical component of the compared constituent is distinct from the head, so only the degree term may be deleted. This is illustrated in (5) and (6), where brackets indicate the constituents that count as identical in Bresnan's analysis.

(5) a. The galaxy contains more stars than the eye can see [x-many stars]
b. Sea level was not as high as it later became [x-much high]

(6) a. Michael has more scoring titles than Dennis has [x-many tattoos]
b. The shapes are longer than I wondered whether they would be [x-much thick]

Subsequent analyses, building on the observation that CD and CSD have properties similar to A-bar movement constructions (Ross 1967, Chomsky 1977), recast Bresnan's analysis in terms of movement or binding of a degree term. While there are important differences between these various approaches, they all share the assumption that CD and CSD are derived in fundamentally the same way, and so predict that both types of comparatives should show a clear set of similar properties, particularly properties relating to movement or unbounded deletion.

Initial confirmation of this prediction comes from island effects. First, both CD and CSD are ill-formed when the deletion site is embedded in an extraction island (see Ross 1967, Chomsky 1977, and Postal 1998), as shown by the examples in (7)-(9), which illustrate complex-NP, WH-, and adjunct islands, respectively.

(7) a. *Michael has more scoring titles than Dennis is a guy who has.
b. *The shapes were longer than I wondered whether they would be.

(8) a. *The shapes were longer than I wondered whether they would be.
b. *The shapes were longer than I wondered whether they would be.

(9) a. *My sister drives as carefully as I avoid accidents when I drive carelessly.
b. *My sister drives as carefully as I avoid accidents when I drive.

A second piece of evidence for a uniform analysis of CD and CSD comes from crossover effects. As shown by the examples in (10)-(11), which illustrate complex-NP, WH-, and adjunct islands, respectively:

(10) a. *Michael has more scoring titles than Dennis is a guy who has.
b. *The shapes were longer than I wondered whether they would be.

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b. *My sister drives as carefully as I avoid accidents when I drive.
interpretation stems from the interaction of the semantics of comparison and adjectival polarity.

Examples of CSD involving adjectives of opposite polarity, such as (i), are an exception.

1. Against a Uniform Analysis

Similarly, this would follow.

While the uniformity assumption (in the relevant sense) is not a sufficient condition for a uniform analysis, it is a necessary one: if CD and CSD have essentially the same syntactic derivations and involve the same functional vocabulary, then they are clearly distinct between the two types of constructions and suggest that they are syntactically different in ways that go beyond the superficial difference in the amount of suffixed material. These facts have led a number of researchers to develop uniform derivations of CD and CSD, which are dependent on the amount of suffixed material.

A third, somewhat weaker, argument in favor of a uniform analysis comes from the interpretation of CD and CSD. In most contexts, CD and CSD constructions have exactly the same type of truth conditions: both involve comparison of two amounts, differing only in that CD compares amounts of the same sort of stuff, while CSD compares amounts of different sorts of stuff.

If sensitivity to islands and crossover effects are indicative of a similar derivational history, then facts like the ones illustrated here provide strong support for the view that CD and CSD should be analyzed in the same way.

A fourth, somewhat weaker, argument in favor of a uniform analysis comes from the interpretation of CD and CSD.

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Examples of CSD involving adjectives of opposite polarity, such as (i), are an exception.

(i) Michael's hands are as wide as my feet are short.

(ii) Michael has more scoring titles than Dennis has tattoos.

(iii) Michael's hands are as wide as my feet are long.

(iv) The number of Michael's scoring titles is greater than the number of Dennis's scoring titles.

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Examples of CSD involving adjectives of opposite polarity, such as (ii), are an exception.
Comparative (Sub)deletion

assumption that CD is derived in one of the ways specified above (unbounded deletion or

The crucial empirical differences between CD and CSD can be summarized as follows. First, in languages that prohibit preposition stranding, such as Czech, CD behaves like movement constructions and obeys this constraint, but CSD does not. (Thanks to Hana Filip for supplying the Czech data; this point was originally made in Corver 1990 for Dutch.) This is illustrated by the contrast between (15a) and (15b); (14) demonstrates the unacceptability of preposition stranding in a comparable Czech question.

(14)*Ktery!ch me&stech Václav bydlel ve?
which city did Vaclav live in?

PL
LOC
Vaclav live.
PAST.3
SG
in

'Which city does Vaclav live in?'

(15)a.*Bydlel jsem ve více me&stech nez& ty jsi bydlel v
live. aux in more city. PL.1 SG aux live. PAST.1 SG in

PL
LOC
than you aux live. PAST.2 SG in

'I have lived in more cities than you have lived in.'

b.Chci bydlet ve více americky!ch me&stech nez& jsem bydlel v
I want.1 live. INF in more American city. PL.1 GEN than aux live. PAST.1 SG in

PL
LOC
'Ve want to have lived in more American cities than I have lived in European cities.'

Second, CD shows COMP-trace effects in English, but CSD does not (Grimshaw 1987), as shown by the contrast between the (a) and (b) sentences in (16) and (17).

(16)a.More books were published than the editor said (*that) would be.

b.More boys flunked than I predicted (*that) would pass.

(17)a.More books were published than the editor said (*that) articles would be.

b.More boys flunked than I predicted (*that) girls would pass.

Third, like other types of movement and deletion operations, CD blocks contraction of an immediately preceding auxiliary; contraction before a CSD site is perfectly acceptable, however (Grimshaw 1987):

(18)a.I thought there was more meat than there is/*'s.

b.John was more upset than he is/*'s now.

c.She was as happy about it then as she is/*'s now.

(19)a.There's more meat than there's rice.

b.John was more upset than he's angry now.

c.She was as happy about it then as she's sad now.

For example, Grimshaw (1987) claims that CSD structures are base-generated in their surface form, and Hendriks (1995) and Kennedy (1998, 1999) analyze CSD in terms of across-the-board movement. Kennedy (1993) claims that CSD are base-generated in their surface form.
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Fourth, CD licenses parasitic gaps, a fact that has been taken as further evidence for its status as a type of wh-movement construction (see Postal 1998 for recent discussion), but CSD does not (Grimshaw 1987):

(20) a. I threw away more books than I kept without reading.
    b. Jerome followed more suspects than Arthur interrogated without arresting.

(21) a. *I threw away more books than I kept magazines without reading.
    b. *Jerome followed more leads than Arthur interrogated suspects without arresting.

A fifth contrast comes from so-called multiply-headed comparatives, such as the CD constructions in (22).

(22) a. Christmas makes as many children as happy as it makes adults unhappy.
    b. Max persuaded more men to buy more cars than you persuaded women to buy.

The semantic analysis of these constructions is exceedingly complex (see von Stechow 1984, Hendriks 1995, and Kennedy 1999).

The problem with this proposal is that such movement is impossible when the displaced phrase has protracted content, as shown by the examples in (26), which violate the Left Branch Constraint. The semantic properties of these constructions are relatively clear, however: multiply-headed CD and CSD differ in the way in which they phrase the degree of comparison:

(23) The number of children that Christmas makes happy equals the number of adults that it makes unhappy.

(24) a. Max persuaded more people to buy more cars than you persuaded to buy.

A final argument for treating CD and CSD differently is relevant only to accounts that seek to analyze both constructions in terms of movement. According to such analyses, CSD involves A'-movement of a degree term from inside the nominal or adjectival projection to SpecCP, as in (25). (I assume adjectival projections to be Degree Phrases (DegPs); see Abney 1987, Grimshaw 1991, and Kennedy 1999.)

(25) a. Michael has more scoring titles than [CP Op i Dennis has [DP t tattoos]]
    b. The shapes are longer than [CP Op i they are [DegP t thick]].

The syntactic properties of these constructions are relatively clear, however: multiply-headed CD constructions are structurally parallel to the examples of CSD in (22) and are unattainable (Cover 1990, Hendriks 1995):

(26) a. *[CP How many i does Dennis have [DP t tattoos]]?
    b. *[CP How much i were the shapes [DegP t thick]]?

Chomsky (1977:123) suggests that the examples in (25) may involve feature movement only, and so may somehow avoid the Left Branch Constraint (a proposal recently revived by Ross 1987).
Comparative (Sub)deletion by Donati (1998)). Given Corver's (1990) arguments that the moved elements in (26) are heads, however, and that the actual reason that (26a-b) are unacceptable is that they violate the Head Movement Constraint, Chomsky's proposal is untenable: movement of formal features alone in (25a-b) would violate Generalized Pied Piping (see Chomsky 1995:262-264). Thus the apparent absence of left branch in CSD effects remains a problem for most movement-based approaches to comparatives.

1.3 Summary
The facts discussed in this section indicate that while there are compelling arguments in favor of assigning similar syntactic analyses to CD and CSD, there are also clear empirical differences between the two types of constructions that must be resolved in order to maintain a minimum level of descriptive adequacy. One conclusion that could be drawn from this is that CD and CSD have distinct syntactic representations; indeed, this is the position adopted by the researchers who have addressed the data discussed in section 1.2 (see note 5). An alternative conclusion is that CD and CSD are the same in their basic syntactic representations, but that they differ with respect to how exactly these representations apply – that is, there is some difference in how the facts observed in the previous section can be explained in terms of differences in representation, but not in terms of differences in derivation. This is the hypothesis that I will pursue in the next section.

2. A New Look at an Old Idea
2.1 Overt vs. Covert Movement in Comparatives
The goal of this section is to present and motivate a uniform analysis of comparatives that accounts for the apparently paradoxical properties of CD and CSD in a principled way. I begin by outlining the proposal and showing how it explains the facts, and then in section 2.2 I present and motivate a uniform analysis of comparatives that accounts for the apparently paradoxical properties of CD and CSD in a principled way.

Izvorski (1995) develops a movement account that does not suffer from this problem, because it claims that the term targeted by movement in comparatives (both CD and CSD) is not syntactically parallel to how (many/much) in (26), but rather to the adjuncts in what quantity and to what degree in (1).

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Precisely this problem constitutes Bresnan's (1975) central argument against a movement analysis and in favor of the unbounded deletion approach, which she claims is not subject to the Left Branch Constraint. However, as mentioned in section 1, Pinkham (1982) provides compelling arguments against an unbounded deletion analysis, demonstrating that it overgenerates in comparatives involving attributive adjectives (see also Kennedy and Merchant 2000). Izvorski (1995) develops a movement account that does not suffer from this problem, because it claims that the term targeted by movement in comparatives (both CD and CSD) is not syntactically parallel to how (many/much) in (26), but rather to the adjuncts in what quantity and to what degree in (1).

While this analysis also succeeds in explaining some of the differences between CD and CSD, it runs into problems with parasitic gaps. Parasitic gaps are licensed by movement; therefore, if CD and CSD involve the same sort of movement, we would expect both to license parasitic gaps, contrary to fact. More importantly, the type of movement that Izvorski assumes to be operating in CD does not license parasitic gaps, as shown by (iia), while the type of movement that she claims is is subject to the Left Branch Constraint does:

(iia) In what quantity did you throw away books without reading?

b. How many books did you throw away without reading?

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I argue that my specific claims about comparatives follow from more general principles governing movement and deletion in a model in which syntactic constraints are ranked and violable. The analysis also supports a single compositional semantic analysis for both CD and CSD. These claims are summarized in (27).

(27) English Comparative Formation (version 1)

i. CD involves overt movement of the compared constituent plus deletion under identity with the head of the comparative (cf. Chomsky 1977).

ii. CSD involves covert movement of the compared constituent.

Focusing on nominal and adjectival comparatives (I assume adverbial phrases to also be DegPs; see Larson 1987), this analysis assigns the structures in (28a-b) to (1a-b), where struck-through text indicates lexical material that is deleted from the PF representation.

(28)a. The galaxy contains more stars than the eye can see.
b. Sea level was not as high as it later became.

(29)a. Michael has more scoring titles than Dennis has.
b. Michael has more scoring titles than Dennis has tattoos.

(30)a. The shapes are longer than they are.
b. The galaxy contains more stars than they are.

More generally, the analysis claims that the two types of comparatives are structurally identical at LF, but they differ at PF. This analysis leads to two predictions: (1) CD and CSD should behave the same with respect to constraints on LF representations, and (2) all syntactic differences between the two constructions should be localized to PF. As it turns out, the similarities and differences between the two constructions break down in exactly this way.

The analysis also supports a single compositional semantic analysis for both CD and CSD, allowing us to account for their similarity in meaning without positing differences in LF representations.
Comparative (Sub)deletion

(31) a. Michael's hands are wider than my feet are.
    b. Michael's hands are wider than my feet are long.

(32) a. Michael's hands are wider than \( CP[DegP[Deg0[C[P]]]] \) my feet are
    b. Michael's hands are wider than \( CP[DegP[Deg0[C[P]]]] \) my feet are

Following Kennedy 1999, I assume that gradable adjectives denote functions from objects to degrees and combine with degree morphology to generate properties of individuals. The degree morphemes that head the compared constituent and the head of the comparative can then be assigned the interpretations in (33), respectively (\( \text{less} \) and \( \text{as differ from} \) \( \text{more} \) only in the nature of the ordering relation), where \( G \) is a function from objects to degrees, \( Q \) is a function from properties to truth values (the semantic value of a clausal constituent with an extracted \( \text{DegP} \)), and \( \iota \) is an operator that returns the maximal element of an ordered set of degrees or amounts (see von Stechow 1984, Rullmann 1995, Kennedy 1997b).

(33) a. \( \text{Deg}0[C[P]]' = \lambda G \lambda Q[\iota d[Q(\lambda x[G(x)] = d)]] \)
    b. \( \text{er/more}' = \lambda G \lambda d \lambda x[G(x) > d] \)

Without going through the details of semantic composition (see Kennedy 1999), the interpretations that we end up assigning to (32a-b) are shown in (34), which are equivalent to the informal representations given above in (12b) and (13b).

(34) a. \( \text{wide}(\text{michael's-hands}) > \iota d[\text{wide}(\text{my-feet}) = d] \)
    b. \( \text{wide}(\text{michael's-hands}) > \iota d[\text{long}(\text{my-feet}) = d] \)

Nominal comparatives can be analyzed in essentially the same way. The examples in (35) have the LFs in (36).

(35) a. MJ has more scoring titles than Dennis has.
    b. MJ has more scoring titles than Dennis has tattoos.

(36) a. MJ has more scoring titles than \( CP[DP[D0[C[scoring-titles]]]] \) Dennis has
    b. MJ has more scoring titles than \( CP[DP[D0[C[tattoos]]]] \) Dennis has

Building on the semantic similarity between the vague determiners \( \text{many} \) and \( \text{much} \) and gradable adjectives (see Klein 1980 for discussion), I will assume that part of the meaning of nominal degree morphology is a function \( \text{MANY} \) from plural objects to amounts. We can then assign the meanings in (37) to the compared constituent and \( \text{more} \), respectively, where \( P \) is a (plural) NP meaning and \( Q \) a function from plural objects to truth values (as above, the semantic value of a clausal constituent with an extracted \( \text{DP} \)), and \( \iota \) as above.

(37) a. \( D0[C[P]]' = \lambda P \lambda Q[\iota n[\exists X[P(X) & \text{MANY}(X) = n & Q(X)]]] \)
    b. \( \text{more}' = \lambda P \lambda n \lambda Q[\exists Y[P(Y) & \text{MANY}(Y) > n & Q(Y)]] \)

The interpretations that this analysis assigns to (35a-b) are given in (38), which accurately characterize the truth conditions of these sentences.

(38) a. \( \exists Y[\text{scoring-titles}(Y) & \text{MANY}(Y) > \iota n[\exists X[\text{scoring-titles}(X) & \text{MANY}(X) = n & \text{have}(\text{dennis}, X) & \text{have}(\text{MJ}, Y)]]] \)
    b. \( \exists Y[\text{scoring-titles}(Y) & \text{MANY}(Y) > \iota n[\exists X[\text{tattoos}(X) & \text{MANY}(X) = n & \text{have}(\text{dennis}, X) & \text{have}(\text{MJ}, Y)]]] \)
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Moving to the properties that differentiate CD and CSD, the first three – the COMP-trace filter, P-stranding, and contraction – clearly involve conditions on overt but not covert movement, as shown by the fact that situ-phrases do not violate the relevant constraints:

(39) a. Which editor said that how many books would be published this year?
   b. Who predicted that how many boys would flunk?

(40) Kdo bydlel ve kterých městech?

Czech

(41) a. Who said there's how much rice?
   b. Who's how angry now?

While the details of these constraints need to be worked out (see e.g. Chomsky and Lasnik 1977 and Honegger 1996 for PF analyses of COMP-trace effects), at this point it is enough to observe that if CSD involves covert movement, then the examples in (39)-(41) are acceptable means that CSD should also be acceptable, since it would involve multiple A'-movement. This is illustrated by (44b), the PF assigned to (44a).

(44) a. Who lives in which city?
   b. Which children/girls happy, Christmas make it

(45) a. Christmas makes as many children as happy as it makes adults unhappy.
   b. Christmas makes as many children as happy as it makes adults unhappy.

Although multiply-headed CD is ruled out, the analysis correctly predicts that English typically does not allow multiple instances of overt A'-movement, however, as shown by examples like those in (43).

(43) a. *The children quite happy Christmas will make
   b. *Which children how happy will Christmas make

It follows that in multiply-headed CD should also be impossible, since it would involve multiple A'-movement. This is illustrated by (45b), the PF assigned to (45a).

(45) a. *Christmas makes as many children as happy as birthdays make.
   b. *Christmas makes as many children as [CP [DP children] i [DP happy] j [DegP unhappy] it makes t]

Although multiply-headed CD is ruled out, the analysis correctly predicts that "mixed" multiply-headed comparatives involving both CD and CSD, such as (45a-b), should be acceptable. Such examples involve only one instance of overt movement, namely the one that targets the deleted constituent, as shown in (46a-b).
Comparative (Sub)deletion

(45) a. Christmas makes as many people as happy as it makes unhappy.
   b. Max persuaded more people to buy more cars than you persuaded to buy trucks.

(46) a. Christmas makes as many people as happy as it makes unhappy.
   b. Max persuaded more people to buy more cars than you persuaded to buy trucks.

The differing acceptability of parasitic gaps in CD and CSD also follows from the overt/covert distinction. The fact that CD allows parasitic gaps is not surprising: the movement postulated to occur in (47a) is exactly the same as the movement in a wh-question like (47b); the only difference is that in the former, the moved constituent is deleted. (The analysis developed here thus avoids the problems for Izvorski's (1995) proposal discussed in note 6.)

(47) a. I threw away more books than [CP I kept without reading] e
   b. How many books did you keep without reading e

A well-known property of parasitic gaps is that they are dependent on overt A'-movement (see Nissenbaum 1998 for a new analysis of this requirement). It follows that the compared constituent in (48a), like the in situ wh-phrase in (48b), should fail to license a corresponding parasitic gap.

(48) a. *I threw away more books than [CP I keep without reading] e
   b. *Who kept how many papers without reading e

There is one context in which a parasitic gap may be associated with a phrase that is moved covertly, however. As shown by Nissenbaum (this volume), covert A'-movement can license a parasitic gap only if a first parasitic gap is already licensed by overt movement. This is illustrated by the contrasting (49).

(49) a. [DP Which senator did you convince to buy which car after getting an opponent of to put a bomb in] e
   b. *Which senator did you persuade to buy which car after putting a bomb in e

CSD also license parasitic gaps in such contexts, providing further support for the claim that involves covert A'-movement (many thanks to Jon Nissenbaum for bringing this fact to my attention):

(50) a. I persuaded as many senators to buy as many cars as [CP [DP senators] i you persuaded to buy [DP trucks] j after getting opponents of to put bombs in e]
   b. *I persuaded as many senators to buy as many cars as [CP [DP senators] i you persuaded to buy [DP trucks] j after putting bombs in e]

Both examples in (50) are "mixed" multiply-headed comparatives, in which one of the compared constituents undergoes overt movement (CD) and the other remains in situ (CSD). As shown by the contrast between (50a-b), the CSD phrase licenses a parasitic gap only if the CD phrase also licenses a parasitic gap, just as with wh-in situ in (49a-b).

(51) a. I threw away more books than [DP papers without reading] e
   b. I threw away more books than [CP [DP papers] i I keep without reading e]
Finally, the proposed analysis avoids the problems that arise with respect to the Left Branch Constraint, even though it postulates A'-movement for both CD and CSD. The crucial difference between the analysis proposed here and earlier movement analyses is that neither CD nor (crucially) CSD involve movement of a left branch degree term out of DP/DegP; instead, movement targets the entire compared constituent (cf. Rivero 1981). In other words, the comparatives in (51) are structurally analogous not to the questions in (52), as on standard movement analyses, but to those in (53) (or more accurately, questions in which these phrases remain in situ), which are perfectly well-formed.

(51) a. Michael has more scoring titles than Dennis has tattoos.
    b. The shapes are longer than they are thick.
(52) a.*How many discs does Dennis have?
    b.*How (much) were the shapes thick?
(53) a. How many tattoos does Dennis have?
    b. How thick were the shapes?

The end result is that the Left Branch Constraint, however it is formalized (see Kennedy and Merchant 2000 for a recent proposal), does not come into play.

The previous section demonstrated that the analysis of comparatives summarized in (27) achieves the goal of explaining both the similarities and the differences between CD and CSD, achieving a level of descriptive adequacy not matched by earlier uniform approaches. However, the assumption that is crucial to achieving this result – the claim that CD involves overt movement plus deletion, while CSD involves covert movement – is, at this point, a stipulation. The question that must now be addressed is whether there is a principled explanation for this derivational difference between the two types of comparatives.

In fact, an analysis very similar to the one I have proposed here is considered by Bresnan (1975), who rejects it precisely because of its stipulative and apparently ad hoc nature (Borsley (1984:281) makes a similar objection). In particular, Bresnan (1975:63) points to the unacceptability of pairs like those in (54), and objects that "[t]o guarantee that only the maximally recoverable constituent is moved, one would have to place a special identity condition in the rule itself.... [T]he maximally recoverable constituent is moved. We would have to place a special identity condition in the rule itself," while the assumption that can achieve this result – the claim that CD involves overt movement plus deletion (as in (52)), and the relativized A-over-A condition (as in (53)) – will not produce a similar result. Bresnan (1975:63) observes that "the moved constituents undergo deletion and that the elements moved just happen to be those which would be maximally recoverable if deleted," which would be maximally recoverable if deleted.

Put another way, Bresnan's criticism is that the fact that we get deletion whenever we have movement and identity, but neither movement nor deletion when we don't have identity, remains unexplained under standard assumptions about constraints on movement. What I will argue in the rest of this section is that Bresnan's objection can be overcome by modifying the assumptions underlying deletion and that the constraints on movement are such that the maximally recoverable constituent is moved. We would have to place a special identity condition in the rule itself...

In Bresnan's original analysis, these facts are explained by the assumption that comparatives involve deletion, not movement (which rules out (54b)), and the relativized A-over-A condition (which rules out incomplete deletion in (54a)).

7 Finally, the proposed analysis avoids the problems that arise with respect to the Left Branch Constraint, even though it posits A'-movement for both CD and CSD. The crucial difference between the analyses proposed here and earlier movement analyses is that neither CD nor (crucially) CSD involve movement of a left branch degree term out of DP/DegP; instead, movement targets the entire compared constituent (cf. Rivero 1981). In other words, the comparatives in (51) are structurally analogous not to the questions in (52), as on standard movement analyses, but to those in (53) (or more accurately, questions in which these phrases remain in situ), which are perfectly well-formed.

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(53) a. How many tattoos does Dennis have?
    b. How thick were the shapes?

The end result is that the Left Branch Constraint, however it is formalized (see Kennedy and Merchant 2000 for a recent proposal), does not come into play.

The previous section demonstrated that the analysis of comparatives summarized in (27) achieves the goal of explaining both the similarities and the differences between CD and CSD, achieving a level of descriptive adequacy not matched by earlier uniform approaches. However, the assumption that is crucial to achieving this result – the claim that CD involves overt movement plus deletion, while CSD involves covert movement – is, at this point, a stipulation. The question that must now be addressed is whether there is a principled explanation for this derivational difference between the two types of comparatives.

In fact, an analysis very similar to the one I have proposed here is considered by Bresnan (1975), who rejects it precisely because of its stipulative and apparently ad hoc nature (Borsley (1984:281) makes a similar objection). In particular, Bresnan (1975:63) points to the unacceptability of pairs like those in (54), and objects that "[t]o guarantee that only the maximally recoverable constituent is moved, one would have to place a special identity condition in the rule itself.... [T]he maximally recoverable constituent is moved. We would have to place a special identity condition in the rule itself," while the assumption that can achieve this result – the claim that CD involves overt movement plus deletion (as in (52)), and the relativized A-over-A condition (as in (53)) – will not produce a similar result. Bresnan (1975:63) observes that "the moved constituents undergo deletion and that the elements moved just happen to be those which would be maximally recoverable if deleted."

Put another way, Bresnan's criticism is that the fact that we get deletion whenever we have movement and identity, but neither movement nor deletion when we don't have identity, remains unexplained under standard assumptions about constraints on movement. What I will argue in the rest of this section is that Bresnan's objection can be overcome by modifying the assumptions underlying deletion and that the constraints on movement are such that the maximally recoverable constituent is moved. We would have to place a special identity condition in the rule itself...

In Bresnan's original analysis, these facts are explained by the assumption that comparatives involve deletion, not movement (which rules out (54b)), and the relativized A-over-A condition (which rules out incomplete deletion in (54a)).

7 Finally, the proposed analysis avoids the problems that arise with respect to the Left Branch Constraint, even though it posits A'-movement for both CD and CSD. The crucial difference between the analyses proposed here and earlier movement analyses is that neither CD nor (crucially) CSD involve movement of a left branch degree term out of DP/DegP; instead, movement targets the entire compared constituent (cf. Rivero 1981). In other words, the comparatives in (51) are structurally analogous not to the questions in (52), as on standard movement analyses, but to those in (53) (or more accurately, questions in which these phrases remain in situ), which are perfectly well-formed.

(51) a. Michael has more scoring titles than Dennis has tattoos.
    b. The shapes are longer than they are thick.
(52) a.*How many discs does Dennis have?
    b.*How (much) were the shapes thick?
(53) a. How many tattoos does Dennis have?
    b. How thick were the shapes?

The end result is that the Left Branch Constraint, however it is formalized (see Kennedy and Merchant 2000 for a recent proposal), does not come into play.
Comparative (Sub)deletion

ifying the standard assumptions about these constraints. In particular, I will show that by adopting a model in which the constraints governing movement and deletion are ranked and violable, and syntactic derivations are evaluated according to how well they satisfy such constraints, the derivational difference between CD and CSD follows. In short: deletion is good and overt movement is bad, but it's better to delete than to avoid overt movement.

Using the tools of Optimality Theory (Prince and Smolensky 1993), the basic idea can be implemented as follows. First, assume two well-motivated constraints: DELETE, which requires minimization of the PF representation (cf. Economy of Representation); and STAY, which forbids overt movement (Grimshaw 1997; cf. Economy of Derivation, Procrastinate, etc.). The derivational difference between CD and CSD can then be derived by ranking these two constraints in English as in (55).

(55)

DELETE >> STAY

Consider first the case of CD, as illustrated in Tableau 1, in which the compared constituent moves and deletes is preferred to options in which no deletion occurs.

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<table>
<thead>
<tr>
<th>DELETE</th>
<th>STAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>d. The galaxy contains more stars than [CP [DP stars] the eye can see]</td>
<td></td>
</tr>
<tr>
<td>c. The galaxy contains more stars than [CP [DP stars] the eye can see]</td>
<td></td>
</tr>
<tr>
<td>b. The galaxy contains more stars than [CP [DP stars] the eye can see]</td>
<td></td>
</tr>
<tr>
<td>a. The galaxy contains more stars than [CP [DP stars] the eye can see]</td>
<td></td>
</tr>
</tbody>
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This tableau is incomplete, however. A fourth candidate in which the compared constituent is deleted in situ, satisfying both DELETE and STAY, must also be considered.

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Christopher Kennedy

operations (VP-deletion, for example, is possible in a relatively small number of languages, while "sluicing" is possible in quite a large number of languages; see Merchant 1999). In English, deletion of nominals is generally impossible, even when the information they convey is recoverable, except in certain contexts. One such context is when the nominal material is the complement of certain overt determiners ("N'-deletion"), as in (56a).

(56)a. Kim could see stars, but I couldn't see any stars.

b. *Kim could see stars, but I couldn't see stars.

Examples like (56b) indicate that null determiners cannot license deletion of nominal material, however. Assuming that this type of deletion is forbidden by a highly-ranked constraint, candidate (d) in Tableau 1 is correctly ruled out.

The obligation of deletion in CD, and in movement more generally, represents an important difference between "movement deletion" and "ellipsis deletion". A second crucial difference between these two types of deletion is that the former is local (Kennedy 1998, 1999; cf. Williams 1977). This is illustrated for comparatives by examples like (58), which is contradictory.

(58) Now that the remodeling has been completed, the space station is longer than it used to be, and it's even wider than it is.

For simplicity, I will continue to represent the base position of the moved comparative in (59a), not the one in (59b),

(59)a. ...the space station is longer than [CP [DegP long it used to be], and it's even wider [CP [DegP long it is]].

b. *...the space station is longer than [CP [DegP long it used to be], and it's even wider than it is.

In essence, I am claiming that CD can be analyzed as ordinary A'-movement in which both copies of a moved phrase – the compared constituent – are deleted. More precisely, if DELETE requires redundant material to be eliminated from the PF representation, then in comparatives both copies must be deleted. The analysis thus explicitly makes deletion of a compared constituent mandatory, so that the PF representation is deprived of the relevant material. This is illustrated in (57), where the compared constituent has been moved (copied) to a clause-initial position, and both of the resulting copies are deleted by the copy and delete mechanism.

The galaxy contains more stars than [CP [DegP long the eye can see it]].

Examples like (56b) indicate that null determiners cannot license deletion of nominal material, however. Assuming that this type of deletion is forbidden by a highly-ranked constraint, candidate (d) in Tableau 1 is correctly ruled out.

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Comparative (Sub)deletion

even though the reading represented by (59a) is the more sensible of the two. If deletion of the moved phrase could be licensed nonlocally, then (59a) ought to be possible, where long in the second clause is deleted under identity with the occurrence of long in the first clause.

The fact that this reading is unavailable indicates that deletion of the compared constituent is licensed only by the head that it is in construction with.

In contrast, deletion in ellipsis may be licensed nonlocally. This is most clearly illustrated by an example like (60).

(60) Jones didn't meet all the candidates she wanted to, but I bet she liked the ones she did [verb]

The surface string corresponding to (60) is actually ambiguous, but only the reading shown is informative (the reading in which the deleted VP is headed by like is a tautology), hence it is preferred.

These facts indicate that the simple notion of "minimizing the PF representation" used to define DELETE above needs to be refined. On the one hand, we need to fobid nonlocal deletion in comparatives (and movement in general). These results could be accomplished in a number of ways; for now, I will adopt the following two assumptions. First, I assume that DELETE specifically refers to (possibly trivial) chains, requiring all elements of chain to be eliminated from the PF representation.

Since ellipsis is distinct (functionally and grammatically) from chain formation, it does not interact with this constraint. In other words, an elliptical clause is licenced if and only if the PF representation of the compared constituent is not identical with the head. This property of the clause is vacuous in the case of identity, the examples of (59a) and (59b) illustrating why.

These assumptions do not entail that DELETE can only be satisfied through movement. The constraint is satisfied as long as all elements of a chain are deleted; it does not matter how deletion is brought about. This leads to a clear prediction: if a compared constituent identical to the head is part of a constituent that is targeted by ellipsis, then it should remain in its base position (as in (d) in Tableau 1), since by definition it would otherwise be deleted.

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2.3 Summary: Movement and Deletion in English Comparatives

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>a. The flooding was less than [CP we had thought it would be what] the trees would be in July.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. The flooding was less than [CP we had thought it would be what] the trees would be.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The basic principle of English comparative formation that emerges from the proposals outlined in 2.1 can be succinctly stated as in (62).

(62) **English Comparative Formation** (final)

Adjoin the compared constituent to the complement of *than*.

Table 3

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Michael has more scoring titles than [CP Dennis has [DP Chronos]].</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Michael has more scoring titles than [CP Dennis has [DP Chronos]].</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tableau 2
Comparative (Sub)deletion

(62) is of course not a grammatical rule in the standard sense, since it describes a movement operation that is driven by independent properties of the compared constituent, which I assumed above to be semantic in nature.

12

The crucial point is that within the analytical framework developed in the previous sections, (62) is all that needs to be said about the syntax of comparatives; the derivational distinction that crucially differentiates CD and CSD (i.e., overt vs. covert movement) follows from the interaction of the constraints that govern these operations. Further research needs to address the question of whether such comparatives display properties of covert movement.

3. Additional Evidence for Ranked Constraints in Comparatives

3.1 Cross-linguistic Variation in Comparatives

An expectation of any optimality-theoretic analysis is that constraint re-ranking should correspond to typological variation. In the case of expressions of comparison, this is a difficult expectation to evaluate, because of the sheer level and variety of cross-linguistic variation they display (see Stassen 1985 for a survey). In many languages, strategies of movement and deletion are arguably not operative, making the possibility of capturing typological variation in terms of the relative ranking of constraints governing these syntactic options remote at best. However, it is still worth considering what we might expect to find in languages where these principles do play a role in the syntax of comparison.

In Banda and Ilocano, movement of the compared constituent is either not moved or deleted, or else not moved but deleted by some other deletion operation. So-called "conjoined comparative" languages such as Banda and Ilocano may fit this description, as illustrated by the examples in (63) and (64) (data from Stassen 1985).

(63) Anda ne mo gere nini, e ne ze gere.  
Banda  
"Your house is bigger than my house."

(64) Nasayaat ni Dolores, sumangka-sayaat pay ni Enkarnasion.  
Ilocano  
"Enkarnasion is prettier than Dolores." 

Further research is needed to address the question of whether such comparatives display properties of covert movement.

A second kind of typological variation could emerge from the interaction of the crucial constraints with other constraints in the language. For example, if STAY is outranked by a constraint that forces overt movement in contexts that include comparatives, we would expect to find examples of CSD in which movement of the compared constituent is driven by independent properties of the compared constituent. In Banda and Ilocano, movement of the compared constituent is either not moved or deleted, or else not moved but deleted by some other deletion operation. So-called "conjoined comparative" languages such as Banda and Ilocano may fit this description, as illustrated by the examples in (63) and (64) (data from Stassen 1985). In Ilocano, movement of the compared constituent is either not moved or deleted, or else not moved but deleted by some other deletion operation. So-called "conjoined comparative" languages such as Banda and Ilocano may fit this description, as illustrated by the examples in (63) and (64) (data from Stassen 1985).

Further research is needed to address the question of whether such comparatives display properties of covert movement.

3.1 Cross-linguistic Variation in Comparatives

3.1.1 Additional Evidence for Ranked Constraints in Comparatives

Types of evidence that provide additional support for the analysis.

Evidence that comparative constraints are ranked and violable. In the next section, I will introduce two other types of evidence that suggest constraints are ranked and violable. In English, when neither possibility is available, I make a very strong case for adopting a model in which the syntactic distribution of comparatives on movement and deletion is explained by differences in the strength of constraints on movement and deletion, as illustrated by the comparative examples in (65) to (67). In all these cases, the constraint on movement is stronger than that of deletion, which is consistent with the analysis presented here. The crucial point is that within the framework of Minimalist assumptions about movement, it is not possible to describe a language in which movement is not a grammatical rule in the standard sense.
Christopher Kennedy

compared constituent is overt. As reported in Rivero 1981, Knowles 1984, and Price 1990, Castilian Spanish is just such a language (data from Price 1990:43; Borsley 1984 describes similar facts in Polish equatives):

(65) a. Mi padre vende más libros que mi madre compra discos.  
'b. Mi padre vende más libros que mi madre compra discos.'

(66) a. La mesa es más larga que la puerta.  
'b. La mesa es más larga que la puerta.'

(67) a. El crío gatea más cuidadosamente que su hermana anda descuidadamente.  
'b. El crío gatea más cuidadosamente que su hermana anda descuidadamente.'

The Spanish data alone do not constitute an argument in favor of ranked and violable constraints in syntax, since the facts could also be accounted for in a standard model by assuming that the compared constituent is not identical to the head, otherwise strong. This proposition is not only ad hoc but also completely devoid of explanatory power. In contrast, provided we can construct a principled characterization of the constraint that forces violation of stay in Spanish CSD, both the typological difference between English and Spanish and the English-specific difference between CD and CSD in English can be handled in a straightforward and explanatory way by providing a principled approach to the problem of overt movement. The prediction of this approach is that the compared constituent should not undergo overt movement, for example, in (68a), in which the embedded VP is deleted, since VP-deletion has the effect of deleting the compared constituent from the PF representation, this constituent can satisfy DELETE without undergoing overt movement. The prediction is also that overt movement of the compared constituent should not occur when it is not identical to the head, otherwise strong. This type of approach would have the advantage that it would be able to explain why the compared constituent is not identical to the head, otherwise strong. This type of approach would also be able to explain why the compared constituent is not identical to the head, otherwise strong.

3.2 Hidden Subdeletion

Recall that the final definition of DELETE requires only that elements of a chain be deleted; it does not specify how this deletion should be accomplished. The prediction of this approach is that the compared constituent should not undergo overt movement, for example, in (68a), in which the embedded VP is deleted, since VP-deletion has the effect of deleting the compared constituent from the PF representation, this constituent can satisfy DELETE without undergoing overt movement.
Comparative (Sub)deletion

a. Dennis has more tattoos than Michael does.

b. Dennis has more tattoos than Michael does. 

Tableau 4 illustrates the analysis. Even though both candidates correspond to identical surface strings, deletion of the compared constituent in (b) is “parasitic” on VP-deletion, simultaneously satisfying both STAY and DELETE. The tableau above shows that the compared constituent in (b) cannot remain in situ, as in the case of the VP-chains in (a), because it must be deleted. The result is that a “hidden subdeletion” structure is assigned to an example of CD.

Tableau 4

<table>
<thead>
<tr>
<th>Sentence</th>
<th>[DP [head]]</th>
<th>[CP [head]]</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a.</td>
<td>Denis has more tattoos than Michael does [Vp have]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Denis has more tattoos than Michael does</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DELETE</td>
<td></td>
</tr>
</tbody>
</table>

Despite being assigned in an example of CD, the compared constituent is well-formed. This constraint is not absolute, however. Multiple CD is possible only if the compared constituents are contained in a larger deleted constituent, an observation made by Izvorski (1995) but as yet unexplained (see also Andrews 1985):

This constraint is not absolute, however. Multiple CD is possible only if the compared constituents are contained in a larger deleted constituent. The first involves from.

The candidate in Tableau 4 is non-optimal.

The compared constituent is deleted whether or not the head is deleted. Since the alternative, “standard” CD analysis (corresponding to the (a) candidate in Tableau 4) is non-optimal, the constraint on hidden subdeletion can be satisfied if the compared constituent is deleted. The result is that the “hidden subdeletion” structure is assigned to an example of CD.

Tableau 4 illustrates the analysis. Even though both candidates correspond to identical surface strings, deletion of the compared constituent in (b) is “parasitic” on VP-deletion, simultaneously satisfying both STAY and DELETE. The result is that a “hidden subdeletion” structure is assigned to an example of CD.
Even stronger evidence for hidden subdeletion comes from the interaction of comparative deletion, VP-deletion, and parasitic gaps. As shown by (72) and (73), VP-deletion and other types of ellipsis can bleed otherwise acceptable parasitic gaps. (Kennedy and Merchant 2000 observe, but do not explain, similar facts in attributive comparatives.)

(72)

(a) Mo interviewed more suspects than Art interviewed without arresting e.
(b) *Mo interviewed more suspects than Art did without arresting e.

(73)

(a) I actually liked more of the films that came out this year than I expected to enjoy before seeing e.
(b) *I actually liked more of the films that came out this year than I expected to enjoy before seeing e.

This is not a property of VP-deletion in general: a wh-phrase extracted out of a deleted VP can license a parasitic gap, as shown by (74).

(74)

I don't know which films Hillary enjoyed after seeing e; but I know which books she did [VP enjoy].

If deletion of the VP forces a subdeletion-like analysis of CD, however, then the contrasts in (72) and (73) would have analyses involving overt movement of the compared constituent, which would license otherwise unacceptable parasitic gaps. (This type of analysis was first suggested for comparatives in Schachter 1973 and Schachter 1974.)

4. Derived-head Analyses

In terms of empirical coverage, the analyses proposed here fares better than other uniform approaches, since it explains a range of phenomena that would have to be explained in analyses that do not make reference to a notion of optimality. The result that follows directly from the analysis I presented earlier does not move. This result has been noticed before, but I have not yet explained it.

(a) Mo interviewed more suspects than Art did [VP interview [DP suspects] i] without arresting e.
(b) I actually liked more of the films that came out this year than I expected to enjoy before seeing e.

Recent work by Winfried Lechner (1999) represents a stronger challenge to the approach I have advocated here, however. This work, which I will refer to as derived head, assumes that the compared constituent moves into the position of the compared constituent, as shown in (75), and the parasitic gap is not licensed.

(75)

VAd [VP enjoy] after seeing e.

I actually liked more of the films that came out this year than I expected to enjoy before seeing e.

This is not a property of VP-deletion in general: a wh-phrase extracted out of a deleted VP can license a parasitic gap, as shown by (74).

(74)

I don't know which films Hillary enjoyed after seeing e; but I know which books she did [VP enjoy].
comparative (sub)deletion

Although Lechner does not discuss CSD, the most natural assumption is that both the head and the compared constituent are generated in their surface positions, as in (77).

a. Michael has more [DP scoring titles] than [CP Dennis has tattoos].

b. Michael’s feet are [DegP [AP wide]] than [CP my feet are long].

14 There are at least three compelling arguments against this type of approach, two of which come from data we have already seen. Recall from the previous section that multiply-headed CD is possible because VP-deletion allows an example like (78a) to be assigned the hidden subdeletion analysis in (78b), in which the compared constituents do not move overtly.

(78) a. Christmas doesn’t make as many children as happy as birthdays do.
   b. Christmas doesn’t make as many children as happy as birthdays do.

The interaction of parasitic gaps and VP-deletion in comparatives provides a similar argument against a derived head approach. In section 3.2, the unacceptability of (79a) was derived from the fact that VP-deletion forces a hidden subdeletion analysis of the comparative: since no overt movement occurs, the parasitic gap is not ascended.

(79) a.*Mo interviewed more suspects than Art did [VP without arresting them].
   b. Mo interviewed more suspects than Art did [VP without arresting them].
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not involve VP-deletion, such as (72a) above. The result is that the explanation for the contrast between the two examples disappears.

The only way to save the derived head analysis from these two arguments would be to make essentially the same claim I have made here: that deletion of a phrase that contains the compared constituent somehow licenses a hidden subdeletion analysis. At the same time, it must be the case that only deletion of a containing phrase licenses a hidden subdeletion analysis, since otherwise all examples of CD would be incorrectly predicted to have (at least) an alternative syntactic analysis as CSD. In my proposal, this result follows from principles of optimality, in particular, the emergence of the lower-ranked constraint STAY as the crucial constraint differentiating examples in which DELETE is satisfied in different ways (as well as examples in which DELETE must be violated, such as standard cases of CSD). If this is correct, then the structure in (80a) from the comparative construction that deletes in (80b) would not be able to account for the acceptability of (81a) if we assume that the derived head analysis should also violate Condition C. A third argument against a derived head analysis comes from disjoint reference effects in the comparative clause. Lechner (1999) argues that the impossibility of coreference in (80a) provides an argument in favor of a derived head approach, since this type of analysis, in conjunction with the copy theory of movement, derives (80a) from the structure in (80b), which violates Condition B. A problem for this hypothesis is that the structure assigned to (81a) by the derived head analysis should also violate Condition C. The acceptability of (81a) is a problem for this hypothesis, though, since the structure assigned in (80a) by the derived head analysis would also violate Condition C.

The acceptability of (80a) is a problem for this hypothesis, though, since the structure in (80b) from the comparative construction that deletes in (80a) would not be able to account for the acceptability of (81a) if we assume that the derived head analysis should also violate Condition C. A third argument against a derived head analysis comes from disjoint reference effects in the comparative clause. Lechner (1999) argues that the impossibility of coreference in (80a) provides an argument in favor of a derived head approach, since this type of analysis, in conjunction with the copy theory of movement, derives (80a) from the structure in (80b), which violates Condition B. A problem for this hypothesis is that the structure assigned to (81a) by the derived head analysis should also violate Condition C. The acceptability of (81a) is a problem for this hypothesis, though, since the structure assigned in (80a) by the derived head analysis would also violate Condition C.

The only way to save the derived head analysis from these two arguments would be to make essentially the same claim I have made here: that deletion of a containing phrase licenses a hidden subdeletion analysis, since otherwise all examples of CD would be incorrectly predicted to involve VP-deletion, such as (72a) above. The result is that the explanation for the

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Crucially, it must not be the case that there is an alternative syntactic analysis of (80a) in which he is replaced with a reflexive pronoun, as in (84), since such a structure would not violate Condition B.

\[\text{Louise is prouder of Frank than [Deep pronoun of himself]}, \text{ but he doesn't think she is.}\]

\[\text{If we adopt e.g. Reinhart and Reuland's (1993) approach to reflexivity, then referring expressions of reflexive pronouns would not violate Condition B.}\]

\[\text{Compare (sub)deletion}\]

References


Bhatt, Rajesh. This volume. Adjectival modifiers and the raising analysis of relative pronouns in syntax. makes a very clear point, focusing on the properties of adjacent (sub)deletion, and the surprising properties of (sub)deletion in complex constructions. Such a relative clause, its particular, is that relative pronouns are different sorts of pronouns, and that the former refer to entities, the latter to phrases. This paper has presented an analysis of the syntax of English comparatives, in which strong case for ranked and violable constructions in syntax.


