The Double Object Construction

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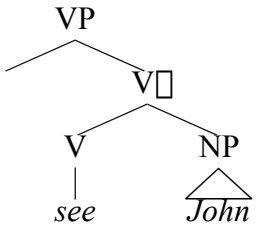
Introduction

Despite the advances made in syntactic theory in the past half century of research, the constituency of deceptively simple sentences containing double object constructions, like (1), remains a point of controversy among researchers:

(1) I gave John a book.

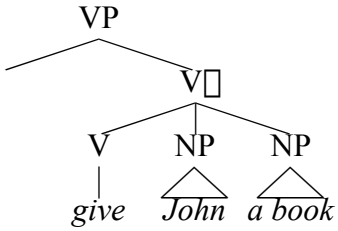
It is generally agreed that at some level of representation, some constituent structure like (2) is the structure of single object constructions like *saw John*, with the object as the sister of the verb:

(2)



For many decades, double object constructions received a similar analysis in which both objects were treated as sisters of the verb, with the first object linearly preceding the second object (cf. Oehrle 1976):

(3)



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As c-command (Reinhart 1974, 1976, 1981) and single complement binary branching (Kayne 1984) have increased in popularity, proposals for the structure of double object constructions have moved farther away from flat linearly ordered ternary structures like (3) and have grown more complex, with deeper embedding inside functional categories and little or no reliance on linear precedence. Various analyses of double object constructions have been offered in the last twenty years, but none have enjoyed quite the same level of acceptance that (3) did in its heyday or that (2) currently does for single object constructions, and thus the constituent structure of double object constructions remains a prime area of research.

In Section 1 of this paper, I give a summary one of the more widely accepted analyses of double object constructions, based on work by Larson (1988, 1990) and developed in Hale and Keyser 1993, and Chomsky 1995, among others. This analysis relies on the following two assumptions:

(4) (i) Hierarchical relations (such as dominance and c-command) are sufficient to describe syntactic domains, so linear relations (such as precedence and adjacency) are irrelevant to syntactic theory.[1]

(ii) Every head has a limit of one complement[2] (i.e. no maximal projection may have more than one intermediate projection[3]).

For ease of reference, I refer to this analysis as the hierarchical single complement analysis, or HSC analysis. The essence of the HSC analysis can be seen in the underlying structure for *give John a book* in (5), in which the direct object *a book* is the sole complement of the verb *give*, while the indirect object *John* is the specifier of *give*. This lexical VP is itself the complement of

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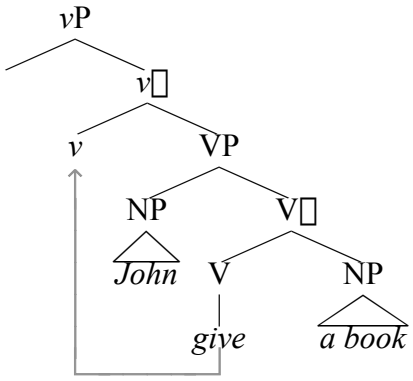
[1] Except of course when the structure is linearized for the phonology, but I am not concerned here with phonology.
[2] Additionally, the HSC analysis does not allow multiple specifiers, but this is not relevant to this paper.
[3] Adjuncts to intermediate projections are allowed, but the node immediately dominating the adjunct and the intermediate projection does not count as a new intermediate projection. Some method of distinguishing adjuncts from arguments is needed to account for the many asymmetries that are known to exist between adjuncts and arguments. Such an account can be designed to prevent adjunction from creating nodes that count as intermediate projections distinct from their daughters.

the so-called light verb *v*, which is an empty functional head. Subsequent movement raises the lower verb *give* to *v*:

(5)



Although the HSC analysis has a significant following, many empirical and theoretical problems with it have been discussed in the literature (for example, Jackendoff 1990, Napoli 1992, and Ernst 1994). In this paper, I present two problems faced by the HSC analysis and offer an alternative analysis of double object constructions that overcomes these problems.

In Section 2, I show how the HSC analysis makes incorrect predictions about the possible location of certain adverbs which adjoin to verb phrases, and I show how revising the HSC analysis to account for these data is problematic. In Section 3, I explore the effects of reconstruction on Q-binding between QPs and pronouns in various configurations. I introduce new, previously unanalyzed data from English, Danish, and Serbian which show that double object constructions have unexpected behavior with respect to reconstruction effects and Q-binding. I provide an account of these data in Section 4 by assigning a linearly ordered ternary structure like (3) to the double object construction, and I show how this analysis succeeds where the HSC analysis fails. Finally, I conclude in Section 5 with a summary of the major results of this paper and further issues to be explored.

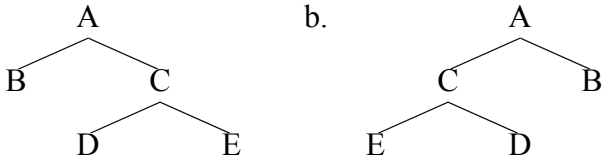
1 The HSC Analysis of Double Object Constructions

The hierarchical constituency of syntactic elements has been shown to be an important factor in many aspects of syntactic theory. Various command relations have been proposed to account for the domains of constituency which seem to play a role in syntax (for example, the precede-and-command relation of Langacker 1969, Lasnik's 1972 kommand, and of course c-command in Reinhart 1974, 1976, and 1981; see Barker and Pullum 1990 for discussion and formal definition of command relations). Hierarchical relations (command relations, dominance, sisterhood, etc.) have been shown to be the sole relations on constituent structures needed to accurately describe many syntactic phenomena. It has therefore been assumed that hierarchical relations can describe *all* syntactic phenomena, and thus that linear relations (precedence, adjacency, proximity, etc.) play no role in the syntax (other than when determining word order for the phonology). This assumption is one of the axioms of the HSC analysis, summarized below (see the Appendix for explicit formalizations of hierarchical relations and linear relations):

(6) *first axiom of the HSC analysis*
Hierarchical relations are sufficient to describe syntactic domains; linear relations are irrelevant to the syntax.

Thus, the following constituent structures have identical syntactic behavior when viewed in the HSC analysis since (7a) and (7b) are distinguished only by the linear order of their constituents:

(7) a. b.



The hierarchical relation most often used in the HSC analysis is c-command (originating in Reinhart 1974, 1976, and 1981, modified many times since):

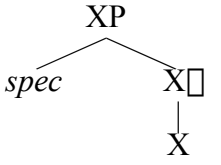
(8) A node α <u>c-commands</u> a node β iff the first branching node that dominates α (and is not α itself) also dominates β (cf. Barker and Pullum 1990).

However, as noted in Pullum 1986 and Barker and Pullum 1990, the relation IDC-command (9) is a simpler and more natural command relation than c-command is, and no known data forces a choice to be made between the two:

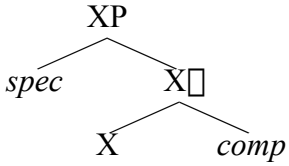
(9) A node α IDC-commands a node β iff the mother of α dominates β.

In fact, c-command makes unusual and undesirable predictions about the behavior of heads with no complements (10a) versus those with one complement (10b):

(10) a.



b.



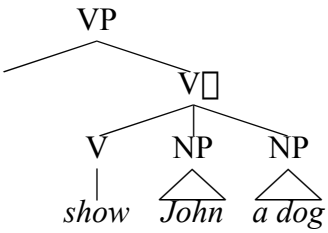
In (10a), the first branching node that dominates the head X is the maximal projection XP, so the c-command domain of X is the entire XP. Since the specifier is dominated by XP, it is in the c-command domain of the head. But in (10b), the head does not c-command the specifier, since the first branching node which dominates X is X', which does not dominate the specifier. Thus, the c-command domain of the head depends on whether the head has a complement. But a head's IDC-command domain does not fluctuate with the absence or presence of a complement; in both structures in (10), the mother of X is X', which does not dominate the specifier. Thus, the head does not IDC-command its specifier in either structure. To my knowledge, there are no syntactic phenomena that treat specifiers differently depending on whether or not the head has a complement, so I employ IDC-command instead of c-command in this paper.[4]

When one of the sisters is a head and the other is its complement, the level of projection of each node is sufficient to distinguish the two nodes from each other, since complements are

[4] One might think that c-command could be saved if all non-terminal nodes are required to branch, thus making (10a) an illicit structure. If this were the case, c-command reduces to IDC-command anyway, since the first branching node dominating a node will always be its mother. Using IDC-command instead of c-command eliminates any need of positing empty complement positions (without prohibiting them if independently required).

taken to be maximal projections and cannot be heads themselves. However, in a structure with *two* complements and a head, like the ternary structure in (11), there is nothing in the representation that can syntactically distinguish one NP from the other NP. As Barss and Lasnik (1986) note, a number of syntactic phenomena require an asymmetry in the structural (hierarchical or linear) relation that holds between the first object and the second object. Without reference to linear order, it is impossible to know whether the phrase with the constituent structure in (11) has the same meaning as *show John to a dog* or *show a dog to John*:

(11)

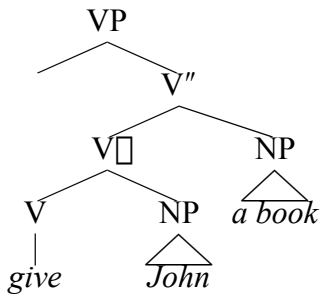


Thus, heads in HSC structures simply cannot have more than two sisters. Combined with the widely accepted assumption the heads cannot have more than one specifier, each node in HSC structures has a limit of two on the number of daughters it may have. This result is an important theorem of the HSC analysis. I summarize it below and provide a proof in the Appendix:

(12) *binary branching theorem*
Branching nodes are strictly binary.

Even with binary branching, heads may have more than one complement. For example, in the constituent structure in (13), the possibility of more than one intermediate projection between the head and the maximal projection would allow multiple complements to exist. In this case, complements have to be defined as maximal projections that are daughters of intermediate projections, rather than as sisters to the head (see Ernst 1994 for arguments in favor of this type of structure for double object constructions):

(13)

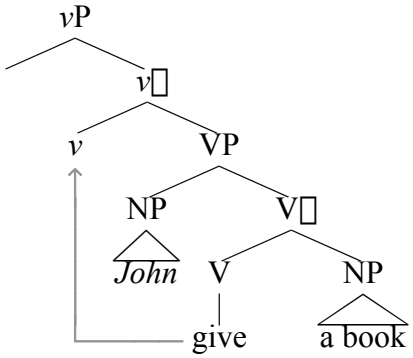


In (13), both objects are complements of the verb, but only the lower indirect object *John* is a sister of the verb. Such structures do not necessarily require access to linear order to distinguish the objects from each other, since the direct object *a book* asymmetrically IDC-commands the indirect object *John*. However, the HSC analysis does not allow such structures by assumption, requiring a limit of one on the number of complements any head may have (or alternatively, restricting the number of intermediate projections in a phrase to one). This is the second axiom of the HSC analysis relevant to this paper:

(14) *second axiom of the HSC analysis*
Every head has a limit of one complement (i.e. no maximal projection may have more than one intermediate projection).

The axioms in (6) and (14) are often implied rather than explicitly stated, but they are fundamental assumptions of the HSC analysis nonetheless. The following underlying structure for *give John a book* satisfies both axioms and represents the standard HSC analysis of double object constructions (Larson 1988, 1990, Hale and Keyser 1993, Chomsky 1995, *et seq*.):

(15)



Linear precedence is not needed to distinguish the two objects from each other because the indirect object *John* IDC-commands the direct object *a book*, but *a book* does not IDC-command *John*. The structure is also purely binary with only one complement per head. Combined with movement of *give* to the light verb *v*, this structure accounts for a wide range of data concerning double object constructions.[5] However, as I show in the next two sections, there are two sets of data that seem problematic for the HSC analysis.

2 Adverbial Adjunction in the HSC Analysis

Many manner and time adverbials like *quickly*, *sometimes*, and *just now* can occur on either the left (16) or right (17) of the verb phrase in a sentence:

(16) a. John quickly [$_{VP}$ finished his homework].
b. Mary sometimes [$_{VP}$ brings her lunch].
c. I just now [$_{VP}$ closed the door].

(17) a. John [$_{VP}$ finished his homework] quickly.
b. Mary [$_{VP}$ brings her lunch] sometimes.
c. I [$_{VP}$ closed the door] just now.

However, these adverbials cannot occur inside the verb phrase:

(18) a. * John [$_{VP}$ finished quickly his homework].
b. * Mary [$_{VP}$ brings sometimes her lunch].
c. * I [$_{VP}$ closed just now the door].

The usual analysis of these facts is that an adverbial may adjoin to a verb phrase on either the left or the right but cannot adjoin to any lower projection, such as V′. This analysis of adverbial adjunction holds cross-linguistically, and I accept it without question here.[6]

The HSC analysis potentially provides two verb phrases for an adverbial to adjoin to, the outer *v*P and the inner VP. With the option of adjoining to the left or to the right, there are four

[5] See Kayne 1984, Pesetsky 1995, and Torrego 1998 for similar structures with different analyses.
[6] But see Runner 1995 for an example of adverbial adjunction to a maximal projection other than VP.

possible ways to combine an adverbial with a double object construction. Two of these, (19b) and (19d), result in the same word order, but nonetheless have different structures:

(19) a. John [$_{vP}$ quickly [$_{vP}$ sent [$_{VP}$ Mary a letter]]].
b. John [$_{vP}$ [$_{vP}$ sent [$_{VP}$ Mary a letter]] quickly].
c. * John [$_{vP}$ sent [$_{VP}$ quickly [$_{VP}$ Mary a letter]]].
d. John [$_{vP}$ sent [$_{VP}$ [$_{VP}$ Mary a letter] quickly]].

As clearly seen in (19c), left adjunction of an adverbial to the inner VP is ungrammatical. Since linear order is not relevant in the HSC analysis, the only reasonable conclusion is that adverbials can adjoin to *v*P and but not to VP (and thus (19d) is actually equivalent to (19c) and therefore is an ungrammatical structure). This is an entirely coherent solution, especially since adverbials can also adjoin to IP, which is the maximal projection of a functional head, like *v*P is:

(20) a. [$_{IP}$ Quickly [$_{IP}$ John finished his homework]].
b. [$_{IP}$ Sometimes [$_{IP}$ Mary brings her lunch]].
c. [$_{IP}$ Just now [$_{IP}$ I opened the door]].

However, there is no theoretical motivation to restrict adverbial adjunction to maximal projections of functional heads. It is not clear why the grammar should be structured this way, rather than say, restricting adverbial adjunction to maximal projections of lexical heads. Indeed, no such restriction seems to exist for other types of phrasal adjunction, such as relative clause adjunction to NP (21a) and PP modifiers adjoined to NP (21b):

(21) a.. [$_{NP}$ People [$_{NP}$ who live in glass houses]] shouldn't throw stones.
b. Don't eat [$_{NP}$ candy [$_{NP}$ from strangers]]!

If the verb phrases for double object constructions were composed of only one maximal projection with verbal character instead of two, there would be no need to posit an otherwise unmotivated syntactic restriction on adverbial adjunction. This is a problem for the HSC analysis, but it is not insurmountable. In the next section, I discuss a more difficult problem for the HSC analysis.

3 Reconstruction Effects in Q-Binding

3.1 Single Object Constructions

There are two possible readings of sentences such as (22), based on how the pronoun *his* is interpreted:

(22) Every man lost a picture of his dog.

In the so-called unbound reading, in which the interpretation of *his* is not dependent on any QP in the sentence, there is one salient male (call him *x*) such that every contextually relevant man in lost a picture of *x*'s dog. This reading can be represented by the logical formula in (23):[7]

(23) $\exists x \forall y(\text{MAN}(y) \rightarrow \exists w \exists z(\text{LOST}(y,z) \,\&\, \text{PICTURE}(z,w) \,\&\, \text{OWN}(x,w) \,\&\, \text{DOG}(w)))$

The outer existential quantifier $\exists x$ in this reading is supplied by the discourse and not by any particular constituent in the sentence itself (cf. Heim 1982), so the individual variable *x* (which corresponds to the pronoun *his*) is not bound[8] in this formula by a quantifier associated with any QP in the sentence. In this reading, *his* is said to be Q-free.

There is a second reading of (22) in which the interpretation of *his* is dependent on the QP *every man*. In this reading, each contextually relevant man lost a picture of a dog that he himself owns. This reading can be represented by the logical formula in (24):

(24) $\forall x(\text{MAN}(x) \rightarrow \exists w \exists z(\text{LOST}(x,z) \,\&\, \text{PICTURE}(z,w) \,\&\, \text{OWN}(x,w) \,\&\, \text{DOG}(w)))$

The discourse does not need to supply an existential quantifier to bind *x* (corresponding to *his*) in this reading, since *x* is bound by the universal quantifier $\forall x$ associated with the QP *every man*.

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[7] There are of course other possible logical formulas with different scopes for the quantifier $\exists x$, which are associated with slightly different readings. The crucial property of (23) that I am concerned with is the fact that $\exists x$ does not correspond to any QP in the sentence. The actual location of the quantifier that binds *x* in the logical formula is unimportant.

[8] A variable *x* is said to be bound in a logical formula iff all occurrences of *x* fall within the scope of some quantifier **Q***x* (where **Q** could be $\forall$ or $\exists$). A variable that is not bound in a logical formula is said to be free.

In this reading, *his* is said to be Q-bound by the QP *every man*. I represent the relation of Q-binding via identical subscripts on the Q-bound pronoun and the QP that Q-binds it.[9] Generally, a QP can only Q-bind a pronoun when the QP IDC-commands the pronoun, as in (22) above. For most types of sentences, when the QP does not IDC-command the pronoun, Q-binding is not possible:[10]

(25) a. * A picture of him$_i$ fell out of [every man]$_i$'s wallet.
b. * Admirers of her$_i$ met [every singer]$_i$.
c. * Criticism of it$_i$ angered [every film]$_i$'s producer.

However, there are some sentences that have readings in which Q-binding is grammatical even though the QP does not IDC-command the pronoun it Q-binds. Specifically, if the pronoun is located inside a *wh*-phrase that has been fronted due to *wh*-movement, a QP can still Q-bind the pronoun if the QP IDC-commands a trace of the *wh*-movement. In the following sentences, the QPs in subject position do not IDC-command the pronouns in the *wh*-phrases, yet Q-binding is possible:

(26) a. Which picture of his$_i$ dog did [every man]$_i$ lose *t* ?
b. Which admirers of her$_i$ music did [every singer]$_i$ meet *t* ?
c. Which criticism of its$_i$ plot did [every film]$_i$ deserve *t* ?
d. Which picture of him$_i$ did [every man]$_i$ lose *t* ?
e. Which admirers of her$_i$ did [every singer]$_i$ meet *t* ?
f. Which criticism of it$_i$ did [every film]$_i$ deserve *t* ?

This phenomenon is known as reconstruction (see Barss 1986, Aoun and Li 1989, Lebeaux 1990, Heycock 1992, Chomsky and Lasnik 1993, Huang 1993, Munn 1993, and Safir 199X, among others). Any phrase that undergoes A-movement, including *wh*-movement, can be interpreted (for the purposes of some syntactic phenomena like Q-binding) as if it occupies a position

[9] Note that Q-binding is an asymmetric relation, despite the symmetry of the subscript notation. However, since pronouns cannot Q-bind QPs, there is no real ambiguity in this notation.
[10] More accurately, readings with Q-binding are significantly more difficult to obtain for these sentences than for sentences like (24) in which the QP IDC-commands the pronoun.

marked by an A-trace of its movement. Thus, the QPs in (26) can Q-bind the relevant pronouns because the QPs (in subject position) IDC-command the A-traces (in object position, indicated with *t*) of the *wh*-phrases containing the pronouns. Via reconstruction effects, the moved *wh*-phrase, including the pronoun, can be interpreted as if it occupied the position occupied by the A-trace. There are many competing theories of reconstruction. For the purposes of this paper, I employ a representational analysis of reconstruction in which reconstruction effects of Q-binding are encoded directly into the definition of Q-binding itself, rather than positing a separate derivational process, such as the copy-and-delete theory of Chomsky and Lasnik 1993.

3.2 Double Object Constructions

3.2.1 English

Just as in single object constructions, when a QP is in subject position in a double object construction, reconstruction effects allow the QP to Q-bind a pronoun in a *wh*-moved second object because the subject unquestionably IDC-commands the A-trace of the *wh*-phrase second object:

(27) a. Which picture of his$_i$ dog did [every man]$_i$ give John *t* ?
b. Which evaluations of his$_i$ performance did [every employee]$_i$ send Pam *t* ?
c. Which biography of her$_i$ childhood did [every actress]$_i$ show you *t* ?
d. Which picture of him$_i$ did [every man]$_i$ give John *t* ?
e. Which evaluations of him$_i$ did [every employee]$_i$ send Pam *t* ?
f. Which biography of her$_i$ did [every actress]$_i$ show you *t* ?

Since a basic assumption of most analyses of double object constructions is that the first object IDC-commands the second object (see Ernst 1994 for an analysis in which the second object asymmetrically IDC-commands the first object, requiring Q-binding to be defined in terms of m-command and linear precedence rather than IDC-command), a QP in the first object position is correctly predicted to be able to Q-bind a pronoun in the second object.

(28) a. John gave [every man]$_i$ a picture of his$_i$ dog.
b. Pam sent [every employee]$_i$ an evaluation of his$_i$ performance.
c. I showed [every actress]$_i$ my biography of her$_i$ childhood.
d. John gave [every man]$_i$ John's favorite picture of him$_i$.
e. Pam sent [every employee]$_i$ an evaluation of him$_i$.
f. I showed [every actress]$_i$ my biography of her$_i$.

One would therefore expect that the reconstruction effects that allow (26) to be grammatical should also allow a QP in first object position to Q-bind a pronoun in the second object when the second object has undergone *wh*-movement. However, in the following sentences with exactly that structure, Q-binding is surprisingly ungrammatical. To my knowledge, these data have never been discussed in the literature:

(29) a. * Which picture of his$_i$ dog did John give [every man]$_i$ *t* ?
b. * Which evaluations of his$_i$ performance did Pam send [every employee]$_i$ *t* ?
c. * Which biography of her$_i$ childhood did you show [every actress]$_i$ *t* ?
d. * Which picture of him$_i$ did John give [every man]$_i$ *t* ?
e. * Which evaluations of him$_i$ did Pam send [every employee]$_i$ *t* ?
f. * Which biography of her$_i$ did you show [every actress]$_i$ *t* ?

As I show in the remainder of this section, this pattern of reconstruction effects in Q-binding is not a special property of English; other languages with double object constructions, like Danish and Serbian, also show this same pattern.

3.2.2 Danish

Like English, Danish has double object constructions (30a) that alternate with NP-PP constructions (30b):

(30) a. Hver mand gav [$_{NP}$ Herluf][$_{NP}$ et billede af sin hund].
every man gave Herluf a picture of his dog
'Every man gave Herluf a picture of his dog.'

b. Hver mand gav [$_{NP}$ et billede af sin hund] [$_{PP}$ til Herluf].
every man gave a picture of his dog to Herluf
'Every man gave a picture of his dog to Herluf.'

Additionally, Danish shows the same pattern of reconstruction effects in Q-binding that English does. The grammaticality judgments for the following data are the same as for their corresponding sets of English sentences:

(31) a. Hvilket billede af sin_i hund mistede [hver mand]$_i$ *t* ?
which picture of his dog lost every man
'Which picture of his dog did every man lose?' (cf. (26))

b. Hvilket billede af sin_i hund gav [hver mand]$_i$ Herluf *t* ?
which picture of his dog gave every man Herluf
'Which picture of his dog did every man give Herluf?' (cf. (27))

c. * Hvilket billede af sin_i hund gav Herluf [hver mand]$_i$ *t* ?
which picture of his dog gave Herluf every man
'Which picture of his dog did Herluf give every man?' (cf. (29))

These data show that a QP subject (*hver mand* 'every man') can Q-bind a pronoun (*sin* 'his') that is in a *wh*-moved single object (31a) or in a *wh*-moved second object (31b), but a QP first object cannot Q-bind a pronoun in a *wh*-moved second object (31c). This is the exact pattern seen in the English data.

3.2.3 Serbian

Like both English and Danish, Serbian has double object constructions (32a) that alternate with NP-PP constructions (32b):

(32) a. Svaki čovjek jesi dao [$_{NP}$ Avdo] [$_{NP}$ sliku od njegovog cuku].
every man PAST.3SG *give*.3SG *Avdo picture*.ACC *of his dog*
'Every man gave Avdo a picture of his dog.'

b. Svaki čovjek jesi dao [$_{NP}$ sliku od njegovog cuku] [$_{PP}$ ka Avdo].
every man PAST.3SG *give*.3SG *picture*.ACC *of his dog to Avdo*
'Every man gave a picture of his dog to Avdo.'

The same pattern of grammaticality for reconstruction effects in Q-binding for both English and Danish can be seen in the following Serbian data:

(33) a. Koju sliku od njegovog$_i$ cuku jesi [svaki čovjek]$_i$ isgubio *t* ?
which picture of his dog PAST.3SG *every*.NOM *man*.NOM *lose*.3SG
'Which picture of his dog did every man lose?' (cf. (26) and (31a))

b. Koju sliku od njegovog$_i$ cuku jesi [svaki čovjek]$_i$ dao Avdo *t* ?
which picture of his dog PAST.3SG *every*.NOM *man*.NOM *give*.3SG *Avdo*
'Which picture of his dog did every man give Avdo?' (cf. (27) and (31a))

c. * Koju sliku od njegovog$_i$ cuku jesi Avdo dao [svekom čovjeku]$_i$ *t* ?
which picture of his dog PAST.3SG *Avdo give*.3SG *every*.DAT *man*.DAT
'Which picture of his dog did Avdo give every man?' (cf. (29) and (31a))

These data show that a QP subject (*svaki čovjek* 'every man') can Q-bind a pronoun (*snjegovog* 'his') that is in a *wh*-moved single object (33a) or in a *wh*-moved second object (33b), but a QP first object cannot Q-bind a pronoun in a *wh*-moved second object (31c). This is the exact pattern seen in both the English and the Danish data, which is summarized in (34):

(34) *English (and Danish and Serbian) pattern of reconstruction effects in Q-binding*
a. Which picture of his$_i$ dog did [every man]$_i$ lose *t* ? ≡ (26a) □ (31a),(33a)
b. Which picture of his$_i$ dog did [every man]$_i$ give John *t* ? ≡ (27a) □ (31b),(33b)
c. * Which picture of his$_i$ dog did John give [every man]$_i$ *t* ? ≡ (29a) □ (31c),(33c)

Thus, it is safe to conclude that the inability of the first object in a double object construction to Q-bind a pronoun in the *wh*-moved second object lies not with any idiosyncratic property of English. Rather, it is a genuine cross-linguistic phenomenon of double object constructions and their interaction with Q-binding.

3.3 The Stipulative Nature of the HSC Analysis

It is unclear how reconstruction effects can be prevented from occurring in double object constructions under the HSC analysis. One solution might be to capitalize on the differences between *v*P and VP, and stipulate that a phrase cannot reconstruct to a position inside VP. in effect, VP would be defined as a barrier to reconstruction effects. While this stipulation would correctly prevent reconstruction effects from allowing Q-binding in the (c) examples in

(31)–(34), it would also incorrectly block reconstruction effects in the (a) and (b) examples (since every verb projects a VP regardless of its number of objects). Thus, simply marking the VP node as a barrier to reconstruction effects will not work.

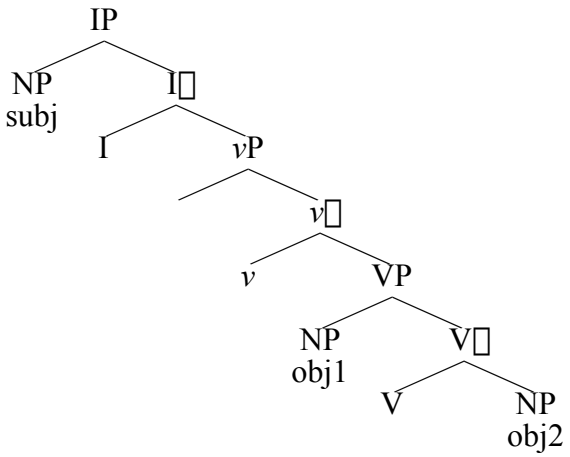
There are two crucial descriptive generalizations that must be captured:

(35) a. A QP may directly Q-bind a pronoun in the second object if the QP is either the subject or the first object, but a QP cannot Q-bind a pronoun in either the subject or first object if the QP is the second object.

b. Via reconstruction effects, a QP may also Q-bind a pronoun in the second object if the QP is the subject but not if the QP is the first object.

Generalization (35b) suggests that the structural relations that hold between the subject and second object must be different than those which hold between the first object and the second object. But in the HSC analysis as discussed so far, the only relevant structural relation is IDC-command. Consider the following HSC structure:

(36)



The subject and first object both IDC-command the second object, which IDC-commands neither the subject nor the first object. That is, the subject and first object both asymmetrically IDC-command the second object, which means the IDC-command relation is not sufficient to capture generalization (35b). A different hierarchical relation is needed, such as m-command (proposed in Aoun and Sportiche 1982 as a new definition for c-command):

(37) A node α m-commands a node β iff the first maximal projection that dominates α (and is not α itself) also dominates β.

The subject in (36) asymmetrically m-commands the second object, whereas the first object and second symmetrically m-command each other. This provides the necessary distinction between subject and first object to account for generalization (35b): a QP may Q-bind a pronoun in a *wh*-moved second object iff the QP asymmetrically m-commands the *wh*-trace of the second object. Asymmetric IDC-command is still required to account for generalization (35a) as usual since the first object and the second object have identical m-command domains. Adding m-command to the HSC analysis in this way accounts for all of (31)–(34):

(38) A QP may Q-bind a pronoun iff:
   a. the QP asymmetrically IDC-commands the pronoun, or
   b. the QP asymmetrically m-commands an A-trace of a phrase that contains the pronoun.

The stipulative nature of using both IDC-command (38a) and m-command (38b) for defining Q-binding is worrisome. There are no obvious properties of reconstruction, Q-binding, and command relations that would cause reconstruction effects to be sensitive to m-command and also cause Q-binding to be sensitive to IDC-command. Put another way, it would not be surprising if the command relations were reversed as in (38′):

(38′) A QP may Q-bind a pronoun iff:
   a. the QP asymmetrically m-commands the pronoun, or
   b. the QP asymmetrically IDC-commands an A-trace of a phrase that contains the pronoun.

While (38′) does not accurately describe the data, there is no principled reason why it could not be the definition of Q-binding in some mirror universe. In the next section, I offer an analysis of Q-binding in double object constructions which accounts for the data in this section in such a way that reversing the structural relations in the analysis does not create a reasonable mirror universe analysis.

4 An Alternative Analysis of Double Object Constructions

4.1 The Return of Precedence and Multiple Complements

Moosally (1999) presents data from Ndebele, a Bantu language, which require access to a linear relation. In Ndebele, predicates show class and number agreement with both the subject and the object. When the conjuncts have different class/number features, various methods of resolution are used to determine the agreement on the predicate. For conjoined subjects with different class/number features, the predicate agrees with the closest (rightmost) conjunct. In the following data, agreement is indicated by boldface, and 5/6, 7/8, and 9/10 are noun classes:

(39) a. I-xhegu **leza**-lukazi **zi**-yahamba.
5/6SG-*old man* **7/8PL**.*and-old woman* **7/8PL**-*going*
'The old man and old women are going.'

b. * **Ama**-xhegu lesa-lukazi **a**-yahamba.
5/6PL-*old man* 7/8SG.*and-old woman* **5/6PL**-*going*
'The old men and old woman are going.'

In the case of conjoined objects with different class/number features, if the objects follow the predicate (*in situ* object position), the predicate agrees with the closest (leftmost) conjunct (40); if the conjoined objects are preposed, the predicate may agree with either conjunct (41):

(40) a. Ngi-ya-**yi**-thanda **I**-nja le-hashi.
I-PRES-**9/10SG**-*like* **9/10SG**-*cat* 5/6SG.*and-horse*
'I like the dog and horse.'

b. * Ngi-ya-**li**-thanda I-nja **le**-hashi.
I-PRES-**5/6SG**-*like* 9/10SG-*cat* **5/6SG**.*and-horse*
'I like the dog and horse'

(41) a. **I**-nja le-hashi ngi-ya-**yi**-thanda.
9/10SG-*cat* 5/6SG.*and-horse* *I*-PRES-**9/10SG**-*like*
'The dog and horse, I like.'

b. I-nja **le**-hashi ngi-ya-**li**-thanda.
9/10SG-*cat* **5/6SG**.*and-horse* *I*-PRES-**5/6SG**-*like*
'The dog and horse, I like.'

The predicate agrees with the rightmost conjunct when the conjoined structure is on the left of the predicate left (subject and preposed object), and the predicate agrees with the leftmost conjunct when the conjoined structure is on the right of the predicate (*in situ* object).[11]

Morgan (1972) presents data that suggest a similar result for English. In existential constructions of the form *There is/are X*, where X is a coordinated NP, the verb tends to agree with the leftmost conjunct, which is the closest conjunct to the verb. But when the subject is an *or*-coordination, the verb agrees with the rightmost conjunct (which is again the closest conjunct to the verb). In Spanish, coordinated NPs usually trigger plural agreement rather than partial agreement, but when the coordinated NP is post-verbal (as in existentials, clefts, and other constructions), a singular left conjunct can trigger singular agreement on the verb (Runner 1989). Johannessen (1996) offers a survey of partial agreement in a variety of languages, and though none of her examples exhibit the peculiar behavior that Ndebele does, in the cases she cites, partial agreement occurs with the closest conjunct. Moosally also points to data from Swahili (Corbett 1991) and Arabic (Aoun, Benmamoun, and Sportiche 1994) which display similar effects, ultimately claiming that cases of partial agreement to a coordinated structure are "always…with the closest conjunct, regardless of word order."

Moosally argues that these data cannot be accounted for without reference to a linear relation (closeness is simply a measure based on precedence and its inverse with no reference to dominance or any other hierarchical relation). Following Moosally, I take these data as support for rejecting the first axiom of the HSC analysis, repeated below for reference, which states that linear relations are not needed for syntax:

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[11] The dual behavior of preposed objects suggests that agreement on the predicate can be triggered by either the surface structure word order or the deep structure word order, perhaps via reconstruction effects (Moosally 1999).

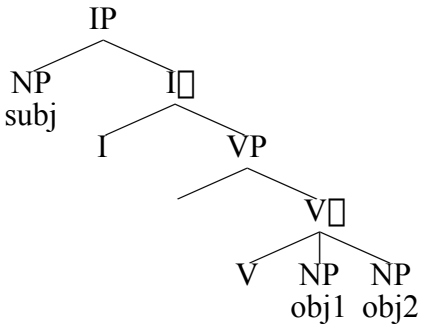
(6) *first axiom of the HSC analysis*
Hierarchical relations are sufficient to describe syntactic domains; linear relations are irrelevant to the syntax.

With linear relations allowed in my analysis, the binary branching corollary can also be discarded. Without a restriction on the number of daughters a node may have, I also reject the second axiom of HSC, thus allowing multiple complements:

(14) *second axiom of the HSC analysis*
Every head has a limit of one complement (i.e. no maximal projection may have more than one intermediate projection).

By eliminating the HSC axioms, other structures for double object constructions become available. The structure I adopt here is based on the ternary structure in Oehrle 1976, in which both the first and second object are sisters of the verb:

(42)



As discussed in the previous section, this structure requires some linear relation to distinguish the two objects since hierarchical relations are not sufficient. For simplicity, I adopt the precedence relation. Additionally, I maintain the use of IDC-command as the main hierarchical relation relevant to syntactic phenomena (in particular, Q-binding). The crucial aspect of these structural relations is their asymmetric properties. Precedence is always asymmetric since no node can both precede and be preceded by another node. Sisters symmetrically IDC-command each other since they both have the same mother, but all other IDC-command relationships must be asymmetric. Specifically, the two objects in (42) symmetrically IDC-command each other while the subject asymmetrically IDC-commands the two objects.

4.2 Adverbial Adjunction

Recall that under the HSC analysis of double object constructions, there are potentially two sites of adverbial adjunction to a verb phrase, but adjunction to the lower VP must be banned to account for the ungrammaticality of (19c), repeated here:

(19) c. * John [$_{vP}$ sent [$_{VP}$ quickly [$_{VP}$ Mary a letter]]].

As discussed in Section 2, banning adjunction to VP presents some theoretical problems for the HSC analysis. However, in my analysis of double object constructions, there is only a single VP node in the structure for double object constructions, so there is only one site of adjunction for adverbials. Thus, the adverbial can adjoin on the left (43a) or the right (43b) of VP, but it cannot adjoin to the interior of VP (43c), since adjunction does not allow that structure to occur (separate constituents cannot be interleaved):

(43) a. John [$_{VP}$ quickly [$_{VP}$ finished his homework]].
b. John [$_{VP}$ [$_{VP}$ finished his homework] quickly].
c. * John [$_{VP}$ [$_{VP}$ finished quickly his homework]].

Because I do not posit two types of verbal nodes, I have no need to add further restrictions on adverbial adjunction. Thus, my analysis does not encounter the same problems that the HSC analysis does. Both the standard analysis of adverbial adjunction to VP and my analysis of double object constructions may co-exist without need to make modifications to either analysis.

4.3 Reconstruction Effects in Q-Binding

The data discussed in Section 3 are not as straightforwardly accounted for as the adverbial adjunction is. First, I provide a provisional definition of Q-binding that accounts for normal cases of Q-binding without reconstruction effects. As noted in Barss and Lasnik 1986, there is an asymmetry between the first and second objects with respect to Q-binding. If the first object

is a QP, it may Q-bind a pronoun in the second object, but the second object cannot Q-bind a pronoun in the first object. This can be seen in the following pair:

(44) a. I showed [every actress]$_i$ her$_i$ biography.
b. * I showed its$_i$ subject [every biography]$_i$.

In my analysis, the only asymmetric structural relation that can distinguish the first object from the second object is linear precedence. Thus a QP may Q-bind a pronoun if the QP precedes the pronoun. Additionally, as has already been established, a QP may Q-bind a pronoun if the QP IDC-commands the pronoun it Q-binds. In my analysis then, both IDC-command and linear precedence are required in order for Q-binding to occur in the absence of reconstruction effects. Provisionally:

(45) A QP may Q-bind a pronoun iff the QP IDC-commands and precedes the pronoun.

To account for reconstruction effects, a second clause must be added to the definition of Q-binding. Consider the pattern of reconstruction effects in (34), repeated here:

(34) a. Which picture of his$_i$ dog did [every man]$_i$ lose *t* ?
b. Which picture of his$_i$ dog did [every man]$_i$ give John *t* ?
c. * Which picture of his$_i$ dog did John give [every man]$_i$ *t* ?

In (34a,b), the QP in subject position can Q-bind the pronoun in the *wh*-moved object, but in (34c), the first object cannot. Linear precedence is of no use here, since both the subject and the first object precede the second object. The required asymmetry comes from IDC-command: the subject asymmetrically IDC-commands the second object, whereas the first object symmetrically c-commands the second object. The definition in (46) represents the final definition of Q-binding in my analysis, which accounts for both normal instances of Q-binding as well as reconstruction effects in Q-binding:

(46) A QP may Q-bind a pronoun iff:
   a. the QP IDC-commands and precedes the pronoun, or
   b. the QP asymmetrically IDC-commands an A-trace of a phrase that contains the pronoun.

Clause (46a) allows a QP subject to Q-bind a pronoun in a single, first, or second object, and it also allows QP first object to Q-bind a pronoun in the second object. The same clause prevents a QP second object from Q-binding a pronoun in the subject or the first object since the pronoun would always precede the QP. The second clause of the definition (46b) captures the effects of reconstruction, since the trace of *wh*-movement of an object (single, first, or second) will always be asymmetrically IDC-commanded by a QP subject. Crucially, (46b) prevents a QP first object from Q-binding a pronoun in a *wh*-moved second object. The two object positions IDC-command each other in the structure I have assumed for double object constructions, so the QP first object does not asymmetrically c-command the A-trace in the second object position.

Unlike the mirror universe version of the postulated HSC analysis of reconstruction effects in Q-binding (38′), the mirror universe version of my analysis (46′) makes less sense than the regular version:

(46′) A QP may Q-bind a pronoun iff:
   a. the QP asymmetrically IDC-commands the pronoun, or
   b. the QP IDC-commands and precedes an A-trace of a phrase that contains the pronoun.

Consider the crucial properties that distinguish the clauses of (46) and (46′): precedence, asymmetric IDC-command, pronouns, and A-traces.[12] Precedence is a linear relation, oblivious to constituent structure, and can be determined concretely without knowledge of any syntactic facts. In contrast, asymmetric IDC-command is a more abstract relation based completely on

constituency. Without being intimately familiar with the grammar of the language, it would be extraordinarily difficult to determine domains of asymmetric IDC-command. Similarly, pronouns and A-traces split along concrete/abstract lines. Pronouns are overt elements whose locations in an utterance can be singled out without hierarchical knowledge. On the other hand, A-traces are unpronounced abstract elements that require knowledge of constituent structure and the workings of A-movement to pinpoint them. In the first clause of my final definition of Q-binding (46a), precedence and pronouns are paired together, while in (46b), asymmetric IDC-command and A-traces are paired together. These pairings are quite natural with respect to their level of abstractness. But the mirror universe definition in (46′) pairs these units unnaturally; it would be surprising to discover that language conformed to this definition rather than (46).

As discussed in Section 3.3, there are no such external grounds to compare the regular definition (38) and the mirror universe definition (38′) of Q-binding for the HSC analysis. There is nothing about asymmetric m-command or asymmetric IDC-command that would make either relation a more or less natural choice to be paired with pronouns rather than A-traces, or vice versa. In short, the definition in (38) is completely stipulative; it exists solely to account for the data and has no independent support. This problem is not encountered by my analysis, in which the clauses of the definition of Q-binding are built from natural relation-element pairs. Since both my analysis and the HSC analysis can account for the data, the stipulative nature of the HSC analysis makes it somewhat less desirable than the analysis I have developed.

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[12] The unrestricted IDC-command relation can be ignored here, since it is required by both clauses, explicitly with "IDC-commands and precedes", and implicitly by asymmetric IDC-command (if α asymmetrically IDC-commands β, α necessarily IDC-commands β; this is vacuously true for any relation).

5 Conclusion

In this paper, I have shown that the HSC analysis of double object constructions, which is based on a rejection of linear relations and a restriction on the number of complements a head may have, faces problems with respect to adjunction of adverbials and reconstruction effects in Q-binding. Plausible solutions to these problems within the HSC analysis are stipulative, with no independent theoretical motivation. I have presented an alternative analysis of double object constructions that utilizes both linear precedence and multiple complements. My analysis of double object construction accounts for both sets of data which prove to be problematic for the HSC analysis. Additionally, I have argued that my analysis is also superior to the HSC analysis on theoretical grounds, given the lack of stipulation required by analysis in comparison to the HSC analysis.

It would be worth further study to see if other syntactic phenomena with asymmetric behavior between the two objects in double object constructions could also be analyzed in the same way as I analyze reconstruction effects in Q-binding in this paper. For example, the data set could be expanded to cover the coreference with reflexives and reciprocals, which is known to behave similarly to Q-binding. Additionally, more concrete cases of data that show a sensitivity to linear relations would further strengthen the argument against the axioms of the HSC analysis. It would also be fruitful to see if an analysis of double object constructions along the lines of Ernst 1994 (which also rejects both axioms of the HSC analysis) can also account for the data discussed in this paper.

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