

# On the Absence of Superiority Effects in Scrambling Languages

Masakazu Kuno

University of Tokyo

masakazu-kuno@nifty.com

## Abstract

*This paper investigates why superiority effects are absent or extremely weak, if any, in scrambling languages. Two potential explanations will be compared that arise if we adopt Hornstein's (1995) proposal to reduce the superiority condition to a condition on pronominal binding, which underlies WCO phenomena. The explanations differ as to which of the two (or more) WH-phrases involved in a multiple question is affected by scrambling. Based on the data drawn from German, Dutch and Spanish, I will argue that scrambling affects an in-situ WH-phrase, rather than an overtly moved one, in case superiority effects are attenuated.*

*Keywords: Scrambling, Superiority, WCO, D-linking*

## 1. Introduction

It is well known that superiority violations do not show up in multiple questions in scrambling languages such as Polish, German and Japanese, as shown in the (b)-examples in (1-3), regardless of the number of WH-phrases that are fronted overtly.<sup>1</sup> Here, Polish represents scrambling languages with multiple WH fronting, German ones with single WH fronting, and Japanese ones with no overt WH fronting.<sup>2</sup>

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<sup>1</sup> Bulgarian is an exceptional language that allows scrambling but shows superiority effects. See Section 4 for some discussion.

(i) Bulgarian (Rudin 1988: (54))

a. Koj koga vizda

who whom sees

b. \*Koga koj vizda

whom who sees

<sup>2</sup> This characterization is a pre-theoretical one. See Watanabe (1992) for the view that in interrogatives in Japanese, an invisible part of a WH-phrase (an empty operator in Watanabe's term) undergoes WH-movement in overt syntax. On this view, Japanese is regarded as an instance of a scrambling language with single WH fronting like German. However, I will not touch upon the exact mechanism of the A'-system in Japanese since the main point of this paper is independent of it.

(1) Polish (Rudin 1988: (60))

a. Kto co robil  
who what did

b. Co kto robil  
what who did

(2) German (Wiltschko 1997: (1-2))

a. Wer hat was behauptet  
who has what claimed

b. Was hat wer t behauptet  
*what has who claimed*

(3) Japanese (Takahashi 1993: (14), taken from Nishigauchi 1990)

a. Dare-ga nani-o tabeta no  
who-NOM what-ACC ate Q

b. Nani-o dare-ga t tabeta no  
what-ACC who-NOM ate Q

By contrast, in non-scrambling languages such as English, a superiority violation does arise in the corresponding case as in (4b).

(4) a. Who bought what

b. \*What did who buy t

Therefore, it is highly likely that something related to scrambling is going on in the above apparent superiority violating cases. For ease of exposition, among the two WH-phrases that take the same absolute scope, I will assign the label WH1 to the WH-phrase whose base-position is higher than the other, namely, *kto* in (1), *wer* in (2), *dare-ga* in (3) and *who* in (4), whereas the lower one will be labeled as WH2. Thus, the superiority condition can be defined as in (5).

(5) Superiority Condition on Multiple Question

WH1 must be the first that undergoes WH-movement.

The goal of this paper is to identify what it is that attenuates superiority effects in scrambling languages. The issue is, of course, not new but seems to be unsettled, hence worth scrutiny. Investigating this issue will lead to a better understanding of the nature of both the superiority condition and scrambling. For the sake of discussion, I will focus on two hypotheses, though not mutually exclusive, that try to explain why superiority effects are absent or extremely weak, if they exist at all, in scrambling languages: One position is that

scrambling affects WH2 and the other is that scrambling affects WH1. We will review these analyses in section 2. In section 3, I will argue for the second hypothesis based on five pieces of empirical evidence. In section 4, I will consider some implications of this decision for the nature of scrambling.

## 2. Two Hypotheses

In this paper, I will adopt an attempt made by Hornstein (1995), extending Chierchia's (1991) treatment of WH-quantifier interactions, to reduce the superiority condition to a condition on pronominal binding. On this conception, the reason for superiority violations is essentially the same as that for so-called Weak Crossover (WCO) violations. Given Hornstein's proposal, two potential explanations obtain as to why superiority effects do not surface in scrambling languages.

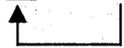
### 2.1. Deriving Superiority from WCO

Let us first observe a simplified version of Hornstein's approach to WCO and then see how it can be carried over to the analysis of superiority effects. Consider (6) and (7). In (6), the pronoun can be construed as an expression bound by the quantificational element coindexed with it, whereas in (7), which is a standard WCO configuration, the interpretation intended by the coindexation is unavailable.

- (6) a. Who<sub>1</sub> likes his<sub>1</sub> mother  
 b. Everyone<sub>1</sub> likes his<sub>1</sub> mother  
 (7) a. \*Who<sub>1</sub> does his<sub>1</sub> mother like t  
 b. \*His<sub>1</sub> mother likes everyone<sub>1</sub>

As Hornstein takes the implementation of binding as linking rather than coindexation, let us follow his manner. The choice is not crucial for our purposes. The condition on pronominal binding is cited in (8), and the linking relations of (6a-b) and (7a-b) are represented in (9a-b) and (10a-b), respectively.

(8) If a pronoun P links to a variable V then V c-commands P (Hornstein 1995: 118)

- (9) a. Who <sub>t<sub>who</sub></sub> likes his mother  

 b. Everyone <sub>t<sub>everyone</sub></sub> likes his mother  


- (10) a. Who does his mother like  $t_{who}$   
           └──────────────────┬──────────────────┘  
                                   ↑  
       b. Everyone his mother likes  $t_{everyone}$   
           └──────────────────┬──────────────────┘  
                                   ↑

In (9), *who* and *everyone* undergo A'-movement (the former WH-movement and the latter QR), leaving an A'-trace, which turns into a variable to which the pronoun is linked. In both cases, the variable c-commands the pronoun in conformity with the condition on pronominal binding (8), and we thus obtain licit binding relations. In (10), on the other hand, the A'-traces to which the pronouns are linked do not c-command them, so the pronoun fails to satisfy condition (8). The failure to meet condition (8) is regarded as a violation of WCO.

Let us now consider how the contrast in (4) can be accounted for with this approach.

- (4) a. Who bought what  
       b. \*What did who buy t

In an attempt to reduce the superiority condition to the condition on pronominal binding (8), Hornstein (1995) proposes, following Chierchia (1991), to “decompose” an in-situ WH-phrase into an implicit pronoun and a restriction. On this analysis, the linking relations of (4a-b) will be represented as in (11a-b), respectively.

- (11) a. Who  $t_{who}$  bought [pro N]  
           ↑                  └──────────┘  
           └──────────┘  
       b. What did [pro person] buy  $t_{what}$   
           └──────────┘                  ↑

In (11a), the WH2 *what* is “decomposed” into [pro N], where the implicit pronoun acts as a bound pronoun, linking to a variable left by the WH-phrase that has undergone WH-movement to Spec-CP. This is what Chierchia calls functional interpretation of a WH-phrase. In the meanwhile, the restriction N provides a range for mapping from elements that satisfy the variable to things bought so that we obtain a pair-list interpretation. Notice that in this representation, the variable to which the implicit pronoun is linked c-commands it, hence satisfying condition (8). In (11b), on the other hand, where the WH1 *who* is “decomposed” into [pro person], the variable which the implicit pronoun links to does not c-command it, and therefore condition (8) fails to be satisfied. Under this approach, we can deduce the superiority condition from the condition on pronominal binding by assimilating

superiority violations to WCO violations.<sup>3</sup>

## 2.2. First Hypothesis: Scrambling Affects WH2

Assuming that the superiority condition is a species of WCO, it is predicted that superiority violations are nullified with the mediation of a movement operation that has the two properties described in (12):

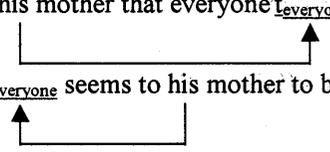
- (12) a. It cancels WCO;  
b. It can move WH2 to a position higher than WH1 before application of WH-movement.

We will see that A-movement as well as scrambling is such a movement.

Let us first consider the contrast in (13). As is well known, A-movement cancels WCO. Thus, the WCO violation in (13a) can be remedied by A-moving the quantifier into a position higher than the pronoun that it binds as in (13b).

- (13) a. \*It seems to his<sub>i</sub> mother that everyone<sub>i</sub> is handsome  
b. Everyone<sub>i</sub> seems to his<sub>i</sub> mother t to be handsome

The linking relations of (13a-b) are represented in (14a-b), respectively.

- (14) a. It seems to his mother that everyone t<sub>everyone</sub> is handsome  
b. Everyone t<sub>everyone</sub> seems to his mother to be handsome
- 

<sup>3</sup> For those who doubt the validity of the underlying assumption that the pair-list interpretation of multiple questions makes use of an implicit pronoun, it is worth observing that there are three ways to answer a WH-question that involves a WH-Quantifier interaction as in (i), one of which contains an overt bound pronoun as shown in (i-A2).

(i) Q: Who does everyone like?

A1: Mary (Individual Answer)

A2: His mother (Functional Answer)

A3: Tom likes Mary, John likes Emily, and Bill likes Elena. (Pair-list Answer)

It is sufficient for our purpose to understand a pair-list answer to be a special case of a functional answer involving an overt bound pronoun. As regards the pair-list interpretation of multiple questions, Hornstein suggests that one of the two (or more) WH-phrases acts as a binder in much the same way as the universal quantifier does in (i). For the view of interpreting a WH-phrase as a distributive universal quantifier, see Kiss (1993) and note 8.

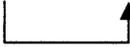
(14a) involves an illicit linking relation because the pronoun is linked to a variable that does not c-command it. In (14b), however, thanks to the A-movement of the embedded subject, the hierarchical relation between the pronoun and the variable is reversed, with the result that the latter c-commands the former, which meets condition (8).

The contrast in (13) proves that A-movement has the ability to cancel WCO violations, the property in (12a). Furthermore, it has the property in (12b) as well, which we can clearly see in (15a).

- (15) a. What seemed to Mary *t* to fall off the shelf  
 b. What seemed to whom *t* to fall off the shelf  
 c. \*What did it seem to whom *t* fell off the shelf

In this example, the embedded subject *what* first undergoes A-movement into Spec-TP in the matrix, whence it further undergoes WH-movement into Spec-CP. The second step demonstrates that A-movement has the property in (12b).

Given this nature of A-movement and Hornstein's analysis of the superiority condition, it is predicted that A-movement alleviates superiority violations, which is borne out by the grammaticality of (15b), which is minimally different from (15a) in that the experiencer phrase is replaced by a WH-phrase *whom*. In this instance, the WH2 *what* first undergoes A-movement beyond WH1 into Spec-TP and then undergoes WH-movement. Compare this with the superiority violating case in (15c), where WH2 undergoes WH-movement beyond WH1 into Spec-CP through no medium of A-movement. Here, we will have the linking relations illustrated in (16a-b) for (15b-c), respectively.

- (16) a. What <sub>t<sub>what</sub></sub> seemed to [pro person] to fall off the shelf  
  
 b. What did it seem to [pro person] <sub>t<sub>what</sub></sub> fell off the shelf  


In (16b), the WH2 *whom* is functionally interpreted by being “decomposed” into [pro person], and the implicit pronoun is linked to a variable that does not c-command it. This linking relation runs afoul of the condition (8). In (16a), on the other hand, the A-movement of WH2 reverses the hierarchical relation between the implicit pronoun and the variable so that the latter c-commands the former, hence condition (8) is met.

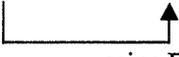
With this background in mind, let us consider how scrambling mitigates superiority violations. The following exposition is based on German but the same holds of Polish and

Japanese.<sup>4</sup> It is well known that scrambling in German has the ability to remedy WCO violations. Consider (17). In (17a), the pronoun *seine*, being outside of the c-command domain of its antecedent, fails to be bound, and the reading intended by the coindexation does not obtain. In (17b), by contrast, this reading is made available by virtue of the scrambling of the quantificational object to a position higher than the pronoun that it binds.

(17) German (Webelhuth 1992: 206)

- a. \*weil seine<sub>1</sub> Eltern jeden Studenten<sub>1</sub> besuchten  
 since his parents every student visited  
 ‘Since his<sub>1</sub> parents visited every student<sub>1</sub>.’
- b. weil jeden Studenten<sub>1</sub> seine<sub>1</sub> Eltern t besuchten  
 since every student his parents visited

We can represent the linking relations of (17a-b) as in (18a-b), respectively, where only the linking relation in (18b) obeys the condition on pronominal binding (8).<sup>5</sup>

- (18) a. weil jeden Studenten seine Eltern t<sub>jeden Studenten</sub> besuchten  

- b. weil jeden Studenten t<sub>jeden Studenten</sub> seine Eltern besuchten  


Now that it is proved that scrambling in German cancels WCO, what we have to show next is that it can move WH2 to a position higher than WH1 prior to an application of WH-movement. Indeed, there is evidence for this property. Consider (19). (See also Grewendorf and Sable 1999: (35-37)).

(19) German (van Wyngard 1989: (39))

- Wen<sub>1</sub> mag seine<sub>1</sub> Mutter t  
 who likes his mother  
 ‘Who<sub>1</sub> does his<sub>1</sub> mother like?’

This instance is a German counterpart to (7a) though it does not manifest a WCO effect. We can interpret this fact as an indication that *wen* first undergoes scrambling to a position higher than the subject, say TP-adjoined position, as shown in (20a), and then undergoes WH-movement, as shown in (20b).

<sup>4</sup> See Hornstein (1995) for an analysis of Polish and Japanese data.

<sup>5</sup> I assume that the quantificational object undergoes QR from the base-position in (18a) and from the landing site of scrambling in (18b).

- (20) a. [TP *wen* [TP *seine Mutter t<sub>wen</sub> mag*]]  
 (Scrambling of the object to TP-adjoined position)  
 b. [CP *wen* [C' *mag<sub>j</sub>* [TP *t<sub>wen</sub>* [TP *seine Mutter t<sub>wen</sub> t<sub>j</sub>*]]]]  
 (WH-movement of the object and verb raising to V2 position)

If (20b) is the correct structural representation of (19), we can account for the lack of a WCO violation in this instance by assigning the linking relation in (21), where the A'-trace of *wen* left at the TP-adjoined position is interpreted as a variable to which the pronoun is linked.

- (21) [CP *wen* [C' *mag<sub>j</sub>* [TP *t<sub>wen</sub>* [TP *seine Mutter t<sub>wen</sub> t<sub>j</sub>*]]]]  


It should also be noted that German does show a WCO effect when scrambling provides no remedy in cases like (22), where the pronoun is never c-commanded by its antecedent WH-phrase at any stage of the derivation.

- (22) German (van Wyngard 1989: (40))

\**Wessen<sub>1</sub> Mädchen mag ihm<sub>1</sub>*  
 whose girl likes him  
 'Whose<sub>1</sub> girl likes him<sub>1</sub>?'

We are now prepared to answer the question of why the superiority condition is lifted in (2b).

- (2) German (Wiltschko 1997: (1-2))

b. *Was hat wer behauptet*  
 what has who claimed

Let us consider the derivation of (2b), dividing it into three steps illustrated as in (23).

- (23) a. [TP *wer hat was behauptet*]  
 (Derivation up to subject raising to Spec-TP)  
 b. [TP *was* [TP *wer hat t<sub>was</sub> behauptet*]]  
 (Scrambling of the object to TP-adjoined position)  
 c. [CP *was* [C' *hat<sub>j</sub>* [TP *t<sub>was</sub>* [TP *wer t<sub>j</sub> t<sub>was</sub> behauptet*]]]]  
 (WH-movement of the object and verb raising to V2 position)

(23a) illustrates the stage where TP is formed just after the WH1 *wer* is moved into Spec-TP;

(23b) is the next derivational step in which the WH2 *was* undergoes scrambling into the TP-adjoined position; finally in (23c), the scrambled WH-phrase undergoes WH-movement into Spec-CP, leaving a trace at the TP-adjoined position and the auxiliary verb moves into the V2 position. If (23c) is the correct structural representation of (2b), we can represent the linking relation as in (24).

(24) [CP was [C' hat<sub>j</sub> [TP t<sub>was</sub> [TP [pro person] t<sub>j</sub> t<sub>was</sub> behaved]]]]



The TP-adjoined A'-trace is construed as a variable to which the implicit pronoun of the WH1 is linked. Since the former c-commands the latter, the condition on pronominal binding (8) is satisfied and no superiority violation shows up.

### 2.3. Second Hypothesis: Scrambling Affects WH1

Let us now turn to the other possibility that scrambling affects WH1 rather than WH2 in cases in which superiority violations are alleviated. Before considering the exact alleviation process, it may be helpful to observe that D-linked WH-expressions typified by *which-N* in English need not obey the superiority condition as shown in (25).

- (25) a. Which man read which book  
 b. Which book did which man read t

In an attempt to explain the lack of a superiority effect in cases like (25b), Hornstein suggests that in multiple questions, the domains that a WH-phrase singles out must be discourse familiar to produce a pair-list interpretation and that this condition is satisfied either if (i) a WH-phrase moves into Spec-CP or (ii) a WH-phrase is inherently D-linked.<sup>6</sup> From the viewpoint of the linking theory, we may informally take this as meaning that only WH-phrases that meet either one of the two conditions can be a binder.<sup>7</sup> In (25b), the WH1 is inherently D-linked so that it provides the domains for the man-book pair interpretation

<sup>6</sup> The term D-linkedness used here is basically identical in meaning to but different in its role from that in Pesetsky (1987). In the present context, D-linkedness is a necessary condition to yield a pair-list interpretation of multiple questions. On the other hand, under Pesetsky's system, D-linkedness is a necessary condition for a WH-phrase to take scope via unselective binding, and therefore it comes into play whether a pair-list interpretation is required or not.

<sup>7</sup> Thus far I have implicitly assumed that non-D-linked WH-phrases can be a binder only when they move into Spec-CP. This assumption is vital in explaining the ungrammaticality of (4b) and (15b) because if non-D-linked WH-phrases could be a binder without moving into Spec-CP, these examples would be grammatical, contrary to fact, with the WH2 "reconstructed" and linked to the WH1 just as in (26) as we will see below.

without moving into Spec-CP. Accordingly, the linking relation of (25b) can be represented as in (26), where the WH2 is “reconstructed” (i.e., to be functionally interpreted at the base position), with the implicit pronoun linked to the WH1.<sup>8</sup> This meets the condition on pronominal binding (8).

(26) Which book did which man read [pro book]



If this approach is on the right track, then we can account for why superiority violations do not arise in scrambling languages under the assumption that scrambling has the capability of turning a WH-phrase into a D-linked expression. Importantly, this underlying assumption has been well-established, especially based on Germanic languages, in works by Heim (1982), Diesing (1992) and many others. Below I limit the discussion to German but the essential part of the analysis can be carried over to Japanese and Polish, I believe.

Let us consider how the lack of a superiority violation in (2b) can be explained by dividing its derivation into the three steps illustrated in (27).

(2) German (Wiltschko 1997: (1-2))

b. Was hat wer behauptet  
 what has who claimed

(27) a. [<sub>vP</sub> wer was behauptet]

(Derivation up to merge of the subject)

b. [<sub>vP</sub> wer [<sub>vP</sub> t<sub>wer</sub> was behauptet]]

(Scrambling of the subject to vP-adjoined position)

c. [<sub>CP</sub> was [<sub>C'</sub> hat<sub>i</sub> [<sub>TP</sub> [<sub>T'</sub> t<sub>i</sub> [<sub>vP</sub> wer [<sub>vP</sub> t<sub>wer</sub> t<sub>was</sub> behauptet]]]]]]]

(WH-movement of the object and verb raising to V2 position)

(27a) illustrates the stage where vP is formed with the merge of the WH1 *wer*; then as is illustrated in (27b), *wer* undergoes scrambling to the vP-adjoined position so that it becomes D-linked; finally as is shown in (27c), the WH2 *was* undergoes WH-movement into Spec-CP

<sup>8</sup> The linking relation represented in (26) matches the interpretation of multiple questions of type (25b) because it can be interpreted only as a question asking the “man-book” pairs such that the man read the book. It should be noted that the answer-hood expected under the linking approach is in line with Kiss’s (1993: 99) proposal about the semantics of multiple questions. She proposes that one of the WH-phrases in a multiple question is interpreted as a distributive universal quantifier and that in cases like (25b), the in-situ WH-phrase must be interpreted as such. According to this analysis, (25b) can (and in fact must) be paraphrased as (i), where the WH1 is interpreted as a universal quantifier, taking scope over the WH2. This amounts to asking the “man-book” pairs, as is expected under the Hornstein-style account.

(i) For each man, which book did he read?

and the auxiliary verb moves into the V2 position.<sup>9,10</sup> If (27c) is the correct structural representation of (2b), the linking relation can be represented as in (28).

(28) [CP was [C' hat<sub>i</sub> [TP [T' t<sub>i</sub> [vP wer [vP t<sub>wer</sub> [pro N] behaupted]]]]]]

The diagram shows a box containing the text "[vP t<sub>wer</sub> [pro N] behaupted]]". An arrow points from the word "wer" in the text above to the "t<sub>wer</sub>" in the box.

Here, WH2 is “reconstructed” and its implicit pronoun is linked to WH1, which has become D-linked by virtue of the scrambling illustrated in the second step in (27).<sup>11</sup> This meets condition (8) just like the English multiple question that involves inherently D-linked WH-phrases seen in (25b).

### 3. Evidence for the Hypothesis that Scrambling Affects WH1

In the previous section, we adopted Hornstein’s claim that superiority and WCO stem from the same condition, namely, the condition on pronominal binding (8), and have seen that given this analysis, two hypotheses obtain that explain why superiority effects are mitigated in scrambling languages. These two differ from each other as regards which of WH1 and WH2 is affected by scrambling so as to be a binder of an implicit pronoun decomposed from the other. The first hypothesis states that scrambling affects WH2. More specifically, scrambling

<sup>9</sup> I assume following Diesing (1992) that non-specific subjects may remain within vP in German.

<sup>10</sup> The second hypothesis presupposes that in German, in-situ WH-phrases can undergo scrambling. However, this is often considered impossible as shown in (i-b). If so, the second hypothesis cannot be maintained.

(i) German (Grewendorf and Sternefeld 1990, See also Fanselow 1990)

- a. Wie hat der Mann gestern was repariert  
how has the man yesterday what fixed  
‘How did the man yesterday fix what?’
- b. \*Wie hat was der Mann gestern t repariert  
how has what the man yesterday fixed

However, Costa (1997) observes that in-situ WH-phrases may undergo scrambling to the right of subjects as shown in (ii).

(ii) German (Costa 1997: (26), See also Grohmann 1998)

- a. Wer glaubt dass sie wen/Hans gestern t besucht hat  
who thinks that she whom/Hans yesterday visited has  
‘Who thinks that she visited whom/Hans yesterday?’
- b. ?Wer glaubt dass sie womit/mit Blumen gestern t Hans besucht hat  
who thinks that she with what/flowers yesterday Hans visited has  
‘Who thinks that she visited Hans with what/flowers yesterday?’

In order to reconcile these data, I would like to suggest that in-situ WH-phrases may undergo VP-internal scrambling but not TP-internal scrambling. If so, the ungrammaticality of (i-b) does not undermine the second hypothesis because VP-internal scrambling suffices to render WH1 a D-linked expression.

<sup>11</sup> I do not know whether (2b) can be interpreted as a question asking the “claimer-claimed thing” pairs or vice versa or both. If the first is the only possible interpretation, then it will give substantial support to the second hypothesis (See note 8).

moves WH2 to a position higher than WH1 before an application of WH-movement, and the landing site of scrambling provides a position that is interpreted as a variable that binds an implicit pronoun “decomposed” from WH1. The second hypothesis states that scrambling turns WH1 into a D-linked expression so that it can be a binder without moving into Spec-CP, in which case a licit linking relation results if WH2 is “reconstructed,” with its implicit pronoun linked to the WH1. At this point, it is natural to raise the following question: which of the two hypotheses is correct? The data so far covered do not enable us to distinguish them, but below I will argue for the second hypothesis on the grounds of five pieces of empirical evidence.

First, we will see that in German, the parallelism between superiority and WCO breaks down in cases involving extraction out of a non-finite CP. Let us consider (29).

(29) German (Haider 2000: (29))

- a. Wen hast du überredet [was dir zu verkaufen]  
 who have you persuaded what to-you to sell  
 ‘Who did you persuade to sell what to you?’
- b. Was hast du wen überredet [t dir zu verkaufen]  
 what have you who persuaded to-you to sell  
 Lit. ‘What did you persuade who to sell to you?’

As is shown in (29b), WH-extraction out of a non-finite CP beyond a matrix WH-phrase does not yield a superiority effect. This makes a clear contrast with the corresponding case in English. (The translation of (29b) is ungrammatical.) If we are to account for the grammaticality of this example under the first hypothesis, it must be the case that scrambling out of a non-finite CP has the ability to cancel WCO, the property of (12a). However, as is pointed out by Haider (2000), when WH1 in (29b) is replaced by a nominal expression containing a bound pronoun, a WCO effect does arise as in (30).

(30) German (Haider 2000: (30))

- \*Was<sub>1</sub> hast du seinen<sub>1</sub> Besitzer überredet [t dir zu verkaufen]  
 what have you its owner persuaded to-you to sell  
 Lit. ‘What have you persuaded its owner to sell to you?’

Haider (2000) takes this fact as an indication that scrambling out of a non-finite CP provides no remedy for WCO violations. Although I agree with Haider on the conclusion, I would like to note that example (30) is not decisive as to whether such a long-distance scrambling really lacks the property of (12a), since the reason for the unavailability of the relevant reading in (30) might be that the long-distance scrambling in German cannot precede WH-movement,

the property of (12b). Therefore, it worth noting that in German, an NP scrambled out of a non-finite CP cannot bind an anaphor as shown in (31b).

(31) German (Grewendorf and Sable 1999: (20))

- a. \*Weil [der Vater von sich<sub>1</sub>] [dem Jungen<sub>1</sub> ein Geschenk zu machen] versucht hat  
 since the father of himself the boy a present to make tried has  
 Lit. 'The father of himself<sub>1</sub> tried to give a present to the boy<sub>1</sub>.'
- b. \*Weil dem Jungen<sub>1</sub> [der Vater von sich<sub>1</sub>] [t ein Geschenk zu machen] versucht hat  
 since the boy the father of himself a present to make tried has

Assuming as usual that anaphor binding and pronominal binding can be collapsed under the name of A-binding, we can interpret the unavailability of the intended reading in (31b) as evidence that long-distance scrambling in German lacks the capability of canceling WCO. Consequently, example (29b) would be wrongly predicted to be ungrammatical under the first hypothesis. On the other hand, the second hypothesis can account for its grammaticality if we assume that WH<sub>1</sub> undergoes string-vacuous scrambling to the *v*P-adjoined position and becomes D-linked.

Second, it is well known that Dutch is a language that allows only VP-internal scrambling but does not show superiority violations as shown in (32b).

(32) Dutch (Koster 1987: 229)

- a. Wie heft wat gekocht  
 who has what bought
- b. Wat heft wie t gekocht  
 what has who bought

In order for the first hypothesis to account for the grammaticality of (32b), the VP-internal scrambling in Dutch must have both properties given in (12). Indeed, it has the ability to cancel WCO and can precede WH-movement, as is shown in (33) and (34), respectively. (33a) is suffering from a WCO effect because the pronoun *zijn* is not c-commanded by the quantificational object with which it is coindexed whereas in (33b), the VP-internal scrambling moves the object to the left of the pronoun, making possible the bound reading. The availability of the intended reading in (34) reveals that the WH-object has undergone WH-movement into Spec-CP through the mediation of VP-internal scrambling, not in one-fell-swoop fashion; otherwise, the bound pronoun would never be c-commanded by any appropriate A-binder throughout the derivation.

- (33) Dutch (van Wyngard 1989: (6, 10))
- a. \*Ik heb in zijn<sub>1</sub> tuin elke buurman<sub>1</sub> ontmoet  
 I have in his garden each neighbor met  
 'I met each neighbor<sub>1</sub> in his<sub>1</sub> garden.'
- b. Ik heb elke buurman<sub>1</sub> in zijn<sub>1</sub> tuin t ontmoet  
 I have each neighbor in his garden met
- (34) Dutch (van Wyngard 1989: (32))
- Wie<sub>1</sub> heb je in zijn<sub>1</sub> tuin t gezien  
 who have you in his garden seen  
 'Who<sub>1</sub> did you see in his<sub>1</sub> garden'

In contrast to (34), however, when a bound pronoun is contained within a subject, the mediation of VP-internal scrambling does not mitigate a WCO effect as shown in (35).

- (35) Dutch (van Wyngard 1989: (27))
- \*Wie<sub>1</sub> heft zijn<sub>1</sub> meisje t gekust  
 who has his mother liked  
 'Who<sub>1</sub> did his<sub>1</sub> mother like?'

The contrast between (34) and (35) indicates that the landing site of VP-internal scrambling in Dutch is higher than non-subjects but lower than a subject for the purpose of binding.

With this in mind, let us return to the apparent superiority violating case in (32b), where WH1 is a subject. It is by now clear that the first hypothesis cannot handle the grammaticality of this example because the VP-internal scrambling does not cancel a WCO violation induced by a pronoun contained within a subject. In the case of (32b), the implicit pronoun decomposed from the WH1 is no exception in this regard. On the other hand, the second hypothesis can correctly capture the grammatical status of (32b) because VP-internal scrambling is enough to render WH1 D-linked.

Third, we can highlight the significance of the scrambling of WH1 by disambiguating its structural position with the help of *vP*-adjoined adverbs. Let us assume that WH1 is taken to undergo scrambling and become D-linked only when it appears to the left of a *vP*-adjoined adverb. The prediction goes as follows: if the second hypothesis is correct, superiority violations will be circumvented only when WH1 appears to the left of a *vP*-adjoined adverb; on the other hand, if the first hypothesis is correct, superiority violations will not show up regardless of the linear order between WH1 and a *vP*-adjoined adverb because on this hypothesis, superiority effects are alleviated solely due to scrambling of WH2. Keeping these predictions in mind, let us now consider the contrast in (36).

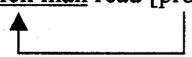
- (36) German (Wiltschko 1997: (20-21))
- a. Wen<sub>j</sub> hat [<sub>VP</sub> wer<sub>i</sub> [<sub>VP</sub> oft [<sub>VP</sub> t<sub>i</sub> t<sub>j</sub> gesehen]]]  
 whom has who often seen
- b. \*Wen<sub>j</sub> hat [<sub>VP</sub> oft [<sub>VP</sub> wer t<sub>j</sub> gesehen]]  
 whom has often who seen

This contrast suggests that the structural position of WH1 matters for the grammaticality, which supports the second hypothesis, on which we can attribute the ungrammaticality of (36b) to the failure of the WH1 to assume a D-linked status.

Fourth, I will show that when superiority violations are removed, the D-linkedness of WH1 plays a crucial role in English as well, which can be interpreted as indirect but strong evidence for the second hypothesis. Recall that in Section 2.3, the grammaticality of the apparent superiority violating case in (2b) is analyzed on analogy with the English multiple questions of type (25b), where both WH-phrases appear in an inherently D-linked form, *which-N*.

- (2) German (Wiltschko 1997: (1-2))
- b. Was hat wer behauptet  
 what has who claimed
- (25) b. Which book did which man read t

In that section, it was suggested following Hornstein that the D-linked WH1 can be a binder without moving into Spec-CP and that WH2 is “reconstructed,” with its implicit pronoun linked to the WH1 as repeatedly shown below.

- (26) Which book did which man read [pro book]
- 

However, there is an alternate account for the lack of a superiority effect in examples of this kind. Lewis (1999) proposes that a D-linked WH-phrase has the ability to undergo QR prior to WH-movement and that the QR site provides a position to be interpreted as a variable. Let us see how his analysis works with (25b), the derivation of which is illustrated in three steps in (37).

- (37) a. [<sub>TP</sub> which man read which book]  
 (Derivation up to subject raising to Spec-TP)
- b. [<sub>TP</sub> which book [<sub>TP</sub> which man read t]]  
 (QR of WH2 to TP-adjoined position)

- c. [<sub>CP</sub> which book [<sub>C'</sub> did [<sub>TP</sub> t [<sub>TP</sub> which man read t]]]]  
 (WH-movement of WH2 and do-insertion)

(37a) is the step where the subject is raised into Spec-TP; (37b) illustrates the QR of the WH-object to the TP-adjoined position; (37c) is the final stage of the derivation, where the WH-object undergoes WH-movement into Spec-CP and do-support takes place. Lewis argues that (37c) is mapped into a legitimate semantic representation, which I recapitulate using the linking notation as in (38).<sup>12</sup>

- (38) [<sub>CP</sub> which book [<sub>C'</sub> did [<sub>TP</sub> t<sub>which book</sub> [<sub>TP</sub> [pro person] read t]]]]
- 

Here, the trace of WH2 left at the QR site, namely the TP-adjoined position, is construed as a variable to which the implicit pronoun “decomposed” from the WH1 is linked. Since the former c-commands the latter, (38) satisfies the condition on pronominal binding (8).

This account is very similar to the first hypothesis in that when superiority effects are attenuated, WH2 instead of WH1 is affected, though the alleviator is QR not scrambling in the present case. Should this analysis be on the right track, we would lose the basis which the second hypothesis is built upon. Therefore, if we are to argue for the second hypothesis, we will have to prove that it is the D-linkedness of WH1 rather than that of WH2 that plays an essential role in nullifying superiority effects in English multiple questions as well. In order to confirm this, we have to examine cases where only one WH-phrase, not both as in (25b), has an inherently D-linked form as in (39).

- (39) a. (?)What did which man read  
 b. ?\*/??Which book did who read

In (39a), WH1 has an inherently D-linked form whereas WH2 does so in (39b). As is pointed out by Kiss (1993), there is a sharp contrast in acceptability between these two examples. The deviance of (39b) casts doubt on the validity of Lewis’s account because the D-linked status of WH2 does not help improve the grammatical status. On the other hand, the near perfect grammaticality of (39a) shows that the D-linkedness of WH1 suffices to mitigate superiority

<sup>12</sup> There are two problems with Lewis’s account, in addition to the one that I will point out below: first, the semantic representation mapped from (37c) in fact is illegitimate because the QR site is normally taken as an A’-position which cannot function as a binder of a pronoun as is indicated by the ungrammaticality of (7b); second, the LF representation that obtains in this fashion does not coincide with the semantics of multiple questions, asking the “book-man” pairs such that the man read the book. See also note 8.

effects. This fact can be taken not only as the basis of but as evidence for the second hypothesis.

Fifth and finally, let us consider, in favor of the second hypothesis, why multiple questions in Spanish are immune from superiority effects as shown in (40b).

(40) Spanish (Hornstein 1995: 141, taken from Jaeggle 1981)

- a. Quién dijo qué  
wh said what
- b. Qué dijo quién  
what said who

Spanish is generally considered an SVO language, which nevertheless allows subjects to appear post-verbally either before or after objects, hence obtaining VSO or VOS orders. In the literature on Romance languages such as Rizzi (1982) and Torrego (1984), it is widely held that the VOS order is derived via the right adjunction of subjects to VP. However, Ordóñez (1998) disagrees to the traditional view and claims that the VOS order is derived from the VSO order via leftward scrambling of objects. Ordóñez (1998) provides several pieces of empirical evidence for his analysis, among which most relevant to the present discussion is the fact that there is an asymmetry between the VSO and VOS orders in the availability of a bound reading for a pronoun contained within a subject. The examples in (41) illustrate the point.

(41) Spanish (Ordóñez 1998: (9-10))

- a. \*Este libro se lo regaló su<sub>1</sub> amigo [a cada niño]<sub>1</sub>  
this book cl-gave his friend to each boy  
Lit. 'This book, his<sub>1</sub> friend gave it to each boy.<sub>1</sub>'
- b. Este libro se lo regaló [a cada niño]<sub>1</sub> su<sub>1</sub> amigo  
this book cl-gave to each boy his friend

(41a) is an instance of the VSO order, where the pronoun *su* contained within the subject fails to be bound by the quantified phrase coindexed with it, hence a WCO violation, whereas (41b) illustrates the VOS order, in which the WCO violation disappears. If the VOS order were derived via the right adjunction of subjects, then it would be impossible to come up with any easy account for the contrast because under such an analysis, subjects would always occupy a higher structural position than objects. On the other hand, the scrambling proposal provides a straightforward account: in (41b) the quantified object undergoes scrambling to a position c-commanding the subject, with the result that the licit configuration for pronominal binding obtains.

Assuming the scrambling proposal to be correct, let us now return to the apparent superiority violating case in (40b). Given that scrambling of objects can cancel a WCO effect induced by a pronoun contained within a subject, it may seem that the first hypothesis can account for the grammaticality of (40b) by assigning the structural representation in (42). (Here, I assume that the landing site of the object scrambling is outer Spec-*v*P and that the subject remains within *v*P, with Spec-TP occupied by a null expletive.)

(42) [<sub>CP</sub> Qué<sub>i</sub> [<sub>C</sub> dijo<sub>i</sub> [<sub>TP</sub> expl [<sub>vP</sub> t<sub>qué</sub> [<sub>v'</sub> quién [<sub>VP</sub> t<sub>i</sub> t<sub>qué</sub>]]]]]]

If (42) is the correct structural representation of (40b), then we will have a licit linking relation as represented in (43).

(43) [<sub>CP</sub> Qué<sub>i</sub> [<sub>C</sub> dijo<sub>i</sub> [<sub>TP</sub> expl [<sub>vP</sub> t<sub>qué</sub> [<sub>v'</sub> [pro person] [<sub>VP</sub> t<sub>i</sub> t<sub>qué</sub>]]]]]]



In this representation, the implicit pronoun “decomposed” from the WH1 is linked to the variable left at the landing site of the scrambling of WH2. Since the latter c-commands the former, the condition on pronominal binding (8) is satisfied, and no superiority violation comes out as expected. However, there is a problem with this account. Recall that in order for the first hypothesis to hold, the scrambling operation that affects WH2 must have not only the ability to cancel WCO but also the ability to precede WH-movement. The unavailability of a bound reading in example (44) indicates that scrambling in Spanish cannot precede WH-movement.

(44) Spanish (Ordóñez 1998: (38))

\*A quién<sub>1</sub> vio su<sub>1</sub> madre  
 to whom saw his mother  
 Lit. ‘Who<sub>1</sub> did his<sub>1</sub> mother see?’

If it could, the bound pronoun *su* contained within the subject would successfully be bound by the trace of the WH-phrase left at the landing site of scrambling, which is not the case. Therefore, the analysis of (40b) given in (42) cannot be maintained.

How do we account for the grammaticality of (40b)? As for the question of how to derive the VOS order in Spanish, I would like to suggest a compromise between the scrambling proposal and the traditional right adjunction analysis. To put it more concretely, I suggest that the VOS order is derived via both scrambling of objects and right adjunction of subjects. Though these two movements are effectively redundant as regards surface word order, they are not mutually exclusive. Let us assume that the right adjunction of subjects is a

kind of rightward scrambling and that it gives subjects a D-linked status so that they can be a binder. Under this assumption, the second hypothesis can accommodate the grammaticality of (40b) by assigning the syntactic structure shown in (45), where the WH1 *quién* undergoes rightward scrambling to the  $\nu$ P-adjoined position and becomes D-linked.

(45) [<sub>CP</sub> Qué [<sub>C'</sub> dijo<sub>i</sub> [<sub>TP</sub> expl [ <sub>$\nu$ P</sub> [ <sub>$\nu$ P</sub> t<sub>quién</sub> [ <sub>$\nu$ P</sub> t<sub>i</sub> t<sub>qué</sub>] *quién*]]]]]]]]

This representation will yield a licit linking relation as in (46).

(46) [<sub>CP</sub> Qué [<sub>C'</sub> dijo<sub>i</sub> [<sub>TP</sub> expl [ <sub>$\nu$ P</sub> [ <sub>$\nu$ P</sub> t<sub>quién</sub> [ <sub>$\nu$ P</sub> t<sub>i</sub> [<sub>pro</sub> N]]] *quién*]]]]]]]]



Here, the WH2 *qué* is “reconstructed,” with the implicit pronoun linked to WH1 at the  $\nu$ P-adjoined position. Since the latter linearly follows but c-commands the former, the condition on pronominal binding (8) is satisfied.

If this compromise is on the right track, we can assimilate the absence of a superiority violation in the Spanish example (40b) to that in canonical scrambling languages such as German and Dutch. The only difference is the directionality of scrambling. To the extent that this speculation is on the right track, the Spanish data can be made use of as supporting evidence for the second hypothesis.

To sum up, the five pieces of empirical evidence that we have so far seen prove that scrambling (or D-linkedness) of WH1 is a sufficient condition to remedy superiority violations while scrambling (or D-linkedness) of WH2 is neither a necessary nor a sufficient condition. Accordingly, I conclude that the second hypothesis is correct.

#### 4. Conclusion

In this paper, I have considered why superiority violations are absent or extremely weak in scrambling languages. Adopting Horstein’s attempt to reduce the superiority condition to the condition on pronominal binding, I compared two potential explanations, which differ with respect to whether scrambling affects WH1 or WH2. I conclude that scrambling affects WH1 in case superiority violations are attenuated. To put it more concretely, scrambling renders WH1 D-linked so that it can be a binder of WH2 when the latter is “reconstructed.” This conclusion has three implications. First, it supports the view that scrambling has interpretational effects, as has been discussed by Heim (1982), Diesing (1992) and many others, mainly based on Germanic languages. Second, the absence of superiority effects in Japanese suggests that scrambling in this language also has interpretational effects, which has not so often discussed in the literature of generative grammar, although see Ishihara (2001)

and Ishii (2001). Third, the relevance of D-linking suggests that scrambling in Bulgarian, which does not tolerate a superiority violation, lacks the ability to assign D-linkedness. Whether scrambling allows this kind of typological variation awaits future research.

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