Weaker Crossover in English Wh-Movement

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1. Introduction

As one can see in the English data (1), (2), (3), and (4), for many native speakers there seems to be three-way contrasts in Weak Crossover effects (henceforth wco effects) among three different wh-phrases, namely, bare wh-phrases (*who*), which N type wh-phrases, and partitive type wh-phrases.

(1) a.* Who_i did her_i mother love t_i ?

　　 b.(?) Which $girl_i$ did her_i mother love t_i ?

　　 c. Which of these $girls_i$ did her_i mother love t_i ?

(2) a.* Who_i did his_i father mistreat t_i ?

　　 b.(?) Which boy_i did his_i father mistreat t_i ?

　　 c. Which of these $boys_i$ did his_i father mistreat t_i ?

(3) a.* Who_i did her_i teacher scold t_i for misbehavior ?

　　 b.(?) Which $girl_i$ did her_i teacher scold t_i for misbehavior ?

　　 c. Which of these $girls_i$ did her_i teacher scold t_i for misbehavior ?

(4) a.* Who_i did you say her_i boss dislikes t_i ?

　　 b. (?) Which $woman_i$ did you say her_i boss dislikes t_i ?

　　 c. Which of these $women_i$ did you say her_i boss dislikes t_i ?

The key to an adequate account for the three-way contrast in the data (1) through (4) lies in finding out how the three different types of wh-phrases are semantically different. In this paper I will attempt to provide the relevant semantic characterization of the wh-phrases and argue for the

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existence of Weaker Crossover effects between Weak Crossover and Weakest Crossover (Lasnik and Stowell (1991)).

2. Mahajan (1991)

Mahajan (1991) used the notion of referentiality to account for the absence of wco effects and equated referentiality with specificity. He argued that assuming the VP-internal subject hypothesis, if specific/referential operators (*which* N type wh-phrases) necessarily move into [Spec Agr-o] position before reaching the final landing sites, typical wco configurations will be neutralized. To him, this is directly responsible for the absence of wco effects when the operators involved are specific (referential). This may be so because the trace of a specific operator in [Spec Agr-o] position will be able to c-command the relevant coindexed pronominal inside a subject NP, which is in the VP internal subject position. However, he does not make it clear exactly at which level of representation wco effects should be derived. VP internal subjects must further move into [Spec Agr-s] position according to him. Then wco configurations will be recreated between the pronominal inside [Spec Agr-s] position and the operator trace in [Spec Agr-o] position, because there will be no c-commanding relation between the two.

Furthermore, It is not clear how the semantic difference among the three different types of wh-phrases above, which triggers the three-way contrast, can be captured by Mahajan's (1991) notion of specificity, since specificity is a binary notion which provides only a binary distinction between a non-specific/non-referential NP (e.g. *who*) and a specific/referential NP (e.g. *which* N type or partitive type wh-phrases). In (3), for instance, the contrast between (a) and (b) examples can be accounted for by Mahajan's analysis. What is unexplainable even through his approach, however, is the slight contrast between the (b) and (c) examples, because there are no differences between *which girl and which of these girls* in terms of specificity/

referentiality.

Another problem for the specificity approach to the absence of wco effects may be found in the following data.

(5) * Every employee$_i$, her$_i$ friend came to visit t$_i$.

(6)   Every employee$_i$, the boss invited t$_i$ to his birthday party.

For many native speakers, quantifier topicalization like example (6) is acceptable. Then we may claim that example (5) may be ruled out solely by wco effects. According to Enc (1991), universally quantified NPs are specific. Then it is not clear how Mahajan (1991) can explain why *every employee*, which is specific/referential, triggers wco effects in example (5).

3. A Set-Theoretic Notion of Referentiality

Let us again consider the difference between *which* girl and *who* in (3) in terms of referentiality, and then the question as to what makes the former referential and the latter non-referential, since it is precisely the difference in referentiality between the two that would cause the contrast between the (a) and (b) examples in (3) according to Mahajan (1991). As discussed in section 2, since Mahajan's analysis would fail to adequately account for the three-way contrast found in the foregoing data, I will abandon his binary notion of referentiality and argue that referentiality should be a non-binary gradational notion by which one nominal expression can be more referential than another nominal expression which can in turn be more referential than another one. Then the above question should be rephrased as what makes *which girl* more referential than *who*.

As a starting point for properly defining referentiality, let us first assume that it is the specification of phi-features (person, number, gender) that makes the former more referential than the latter. But, this condition really

begs the fundamental questions why and how phi-features play a role in determining referentiality. The answer to these questions, I propose, may be explained if a set-theoretic notion of referentiality is introduced. For *who*, its denotation may possibly come from the set of human individuals. The denotation of *which girl*, however, may come from a far smaller subset of the set from which the denotation of *who* comes, namely, from the set of girls. Here the question is exactly what kind of features make the set from which the denotation of *which girl* comes smaller than that from which the denotation of *who* comes. There can be many different features associated with lexical information which function to make the former set smaller than the latter set. I propose that from the various lexical features, the phi-features can play a significant role in that function. Such being the case, if *which girl* contains more phi-features and thus can be regarded as more referential than *who*, we can establish some correlation between the amount of phi-features and a set-theoretic notion of referentiality by claiming that the more phi-features a wh-phrase has, the smaller the subset it carves out. Then it would be exactly in this sense that the amount of phi-features plays a role in determining referentiality. If it is the amount of phi-features that makes *which girl* more referential than *who*, we may claim that a nominal expression whose denotation comes from a smaller subset is relatively more referential since the addition of phi-features functions to carve out a smaller subset. Then an account of wco effects can be formulated using this set-theoretic notion of referentiality.

(7) Between two lexical nominal expressions A and B, A is regarded as more referential than B iff the denotation of A comes from a more narrowly defined set than B. Between two lexical nominal expressions A and B, if A locally binds B, then the set from which the denotation of A comes should be a subset of the set from which the denotation of B comes (i.e. B cannot be more referential than A.)[1]

The above condition states that a representation will be marked * (unacceptable) if the subset principle in (7) is not obeyed. As one can figure out, the condition (7) will correctly account for all the data in wco configurations I dealt with in section 1 and 2, and will also explain the general contrast between (a) and (b) examples of section 1.[2, 3]

In (3a) *who* locally binds *her*, but the set from which the denotation of the former comes, namely, the set of human individuals, is not a subset of the set from which the denotation of the latter comes, namely the set of female individuals, and therefore condition (7) is violated in (3a), hence the unacceptability. In the case of (3b), however, the subset condition is satisfied because the set from which the denotation of *which girl* comes, the set of girls, is a subset of the set from which the denotation of *her* comes, the set of female individuals, hence their relative acceptability. The sentence (3c) also satisfies the subset condition in the same manner and therefore it is correctly predicted to be acceptable.

Even though condition (7) correctly predicts the general contrast between (a) and (b) examples of the data (1) through (4), still the contrast between the (b) and (c) examples of the data must be explained. The answer to this problem may be obtained if one can find some difference between *which N* type wh-phrases and partitive type wh-phrases in terms of referentiality. Some evidence for the assumption that *which N* type and partitive type wh-phrases should be treated differently may come from the following discourse structures in Korean.

(8) Speaker A :

onul Russ Darrow-ey gottaowa-essoyo.

today Russ Darrow-to have been

'I have been to Russ Darrow today.'

gogi-eso nayil   cha handae-lul   sal-goeyo.

there   tomorrow car one-Acc   buy will

'I will buy a car there tomorrow.'

Speaker B :

possible question 1 : *muott-lul nayil   sal-goeyo ?

            what-Acc   tomorrow   buy will

            'What will you buy tomorrow ?'

possible question 2 : ettun   cha-lul   nayil   sal-goeyo ?

            which   car-Acc   tomorrow   buy will

            'Which car will you buy tomorrow ?'

possible question 3 : *geu jungeso ettun cha-lul nayil   sal-goeyo ?

            out of the   which car-Acc   tomorrow   buy will

            'Which of the cars will you buy tomorrow ?'

(9) Speaker A :

nul   Russ   Darrow-ey   gottaowa-essoyo.

today Russ   Darrow-to   have been

'I have been to Russ Darrow today.'

gogi-eso   nayil   cha handae-lul   sal-goeyo.

there   tomorrow   car one-Acc   buy will

'I will buy a car there tomorrow.'

maeum-ey deunun   ssan   cha-ka   nehdae iss-esseyo.

I like   inexpensive   car-Nom   four   were

'There were four inexpensive cars that I saw and liked.'

Nissan Stanza, Toyota Corrolla, Honda Civic, geurigo Ford Taurus ieyo.

'They are Nissan Stanza, Toyota Corrolla, Honda Civic, and Ford Taurus'

Speaker B :

possible question 1 : *muott-lul nayil   sal-goeyo ?

            what-Acc   tomorrow   buy wil

            'What will you buy tomorrow ?'

possible question 2 : ??/(*)ettun   cha-lul   nayil   sal-goeyo ?

            which   car-Acc   tomorrow buy will

            'Which car will you buy tomorrow ?'

possible question 3 : geu jungeso ettun cha-lul nayil sal-goeyo ?

            out of the which car-Acc tomorrow buy will

            'Which of the cars will you buy tomorrow ?

In (8), after the utterance of speaker A, question 1 by speaker B sounds very unnatural because it seems out of the related discourse context. Question 3 sounds odd because a specific set of cars was not clearly established in the previous discourse utterance of speaker A. This shows that the answer for Korean partitive wh-phrases should always come from a set of entities clearly established in the previous discourse (compare this with the naturalness of question 3 in (9)). Question 2 may be the only wellformed utterance in the discourse context of (8). In (9), speaker B' s question 1 sounds very unnatural again for the same reason, namely, that the question sounds completely unconnected to the speaker A' s utterance. Question 2 seems odd, too, because the question is not really asking for a choice among the four cars specified by the speaker A, even though it is strongly implied by speaker A in (9) that the person is going to buy one of the four specified cars tomorrow at Russ Darrow. Question 2 rather seems to be asking for a choice among any of those cars at Russ Darrow or some other place. This shows that the answer for *which N* type wh-phrases may come from a more broadly defined contextually relevant set than that for partitive type wh-phrases. Using the partitive wh-phrase in question 3 of (9) is very natural in the given context because there is a clear establishment of a specific set of cars in speaker A' s utterance.

In view of (8) and (9), the difference between *which N* and partitive wh-phrases can be that the denotation of the latter may come from a more narrowly defined set than the former.[4] Therefore we may claim that

partitivity in wh-phrases can function to carve out a smaller subset in comparison with non-partitive wh-phrases. As for bare wh-phrases like *who* and *what*, it may not be the case that they are non-referential. Instead, it may just be that since the membership of the set which a bare wh-phrase quantifies over is unknown, the denotation of the answer for bare wh-phrases *who* or *what* may come from a much more broadly defined set (perhaps, the set of humans and the set of non-human entities respectively) than *which N* and partitive wh-phrases.

If partitivity in wh-phrases functions to carve out an even smaller subset as I just attempted to show, then according to the definition of referentiality in (7), the partitive wh-phrase *which of these girls* would be more referential than the simple *which N* type wh-phrase *which girl*, since the denotation of the former will come from a more narrowly defined set than the latter. Then referential hierarchy among the three different types of wh-phrases can be established as :

(10) *who < which girl < which of these girls*

Given the hierarchy in (10), we may explain the three way contrast in the English data (1) through (4) in the following manner.[5] In (1) through (4), the (a) examples are unacceptable because of the violation of the subset principle in (7) : **Weak Crossover** effects. Between the (b) and (c) examples of the data which satisfy the above subset principle, (c) examples (**Weakest Crossover**) may be better than (b) examples (**Weaker Crossover**) perhaps because a referential gap is wider in the (c) examples between binder (e.g. *which of these girls*) and bindee (e.g. *her*) than in the (b) examples between binder (e.g. *which girl*) and bindee (e.g. *her*). In (3), for instance, the set which the denotation of *which of these girls* comes from would be more deeply embedded inside the set which the denotation of *her* comes from, compared to the set which the denotation of which girl comes from. The

contrast between the (b) and (c) examples of the data shows that (wh-) expressions higher on the referential hierarchy can more readily bind a given (pronominal) expression. Perhaps there may a generalization that the wider the referential gap between two lexical nominal expressions A (binder) and B (bindee), the more acceptable the (local) binding relation is. In other words, at least in wco configurations like (3), binder (crossing over elements) may have to be maximally referential whereas bindee (crossed over elements) may have to remain minimally referential with respect to its binder.

4. Summary

In this paper, I attempted to predict the existence of weak crossover effects by using the non-binary gradational notion of referentiality. Therefore I established the relation between weak crossover and referentiality as (7) : *Between two lexical nominal expressions A and B, A is regarded as more referential than B iff the denotation of A comes from a more narrowly defined set than B. Between two lexical nominal expressions A and B, if A locally binds B, then the set from which the denotation of A comes should be a subset of the set from which the denotation of B comes from (i.e. B cannot be more referential than A).* As for the distinction between Weaker Crossover and Weakest Crossover effects reflected in the three-way contrast in the data of section 1, It may be generalized separately as the following theoretical condition :

(11) The wider the referential gap between two lexical nominal expressions A (binder) and B (bindee), the more acceptable the (local) binding relation is.

Notes

[1]The underlying assumption behind this relation is Lasnik's (1991) prohibition against the binding of more referential expressions by less referential ones.

[2]At this point it must be considered how condition (7) may account for wco effects at LF.

(i) * his$_i$ mother loves every man$_1$

LF : [IP [every x]$_i$ [IP his$_i$ -------[x man]]]

(ii) * Its$_i$ owner opened every box$_i$.

LF : [IP [every x]$_i$ [IP its$_i$ ---- [x box]]]

In its LF lexical representation *[every x]*, since the quantifier *every*, with x inside *[every x]* being a variable, can in principle quantify over all different kinds of entities (animate or inanimate), then the denotation of *[every x]* may come from the most broadly defined set (the set of all entities). However, the denotation of the overt pronominals in (i) and (ii), which are locally bound by *[every x]*, may come from a more narrowly defined set than that of *[every x]*, namely, the set of male individuals (for *his*), the set of non-human entities (for *its*). Then in the above data (i) and (ii), between *[every x]* and the overt pronominals that are in a local binding relation, the bindee (the overt pronominals) will be more referential than the binder (*[every x]*) according to condition (7). Therefore the subset condition of (7) will be violated in data (i) and (ii). This being the case, the unacceptability of (i) and (ii) may be predicted by condition (7).

[3]In view of the contrast between the following two data, the subset condition of (7) may have to be further refined as a 'proper' subset condition.

(i) * What$_i$ does its$_i$ owner beat t$_i$ everyday ?

(ii) Which donkey$_i$/Which of these donkeys$_i$ does its$_i$ owner beat t$_i$ everyday ?

[4]There may be another difference between *which N* type and partitive type wh-phrases. Pesetsky (1987) notes that (D-linked) *which N* type wh-phrases may at times be "novel". In other words, the answer for them may not come from a contextually defined set established in previous discourse. According to him, this would apparently be a violation of Heim's felicity condition because D-linked *which N* type wh-phrases should introduce familiar entities. Pesetsky notes that this apparent violation may be taken care of by Heim's notion "accommodation". In this regard, as for partitive wh-phrases, however, they may not need to resort to the "accommodation" process, because the denotation of the Korean partitive wh-phrase may always come from a contextually defined set clearly established in previous discourse. This possible difference between the two may be related to my observation in (8) and (9) that the denotation of *eottun cha* ('which car') comes from a more broadly (or vaguely) defined set than that of *geu jungeso eottun cha* ('which of the cars'), the denotation of which comes from a clearly defined set of previous discourse.

[5]The subset condition may be strictly enforced, since the three-way contrast, shown among *who*, a *which N* type wh-phrase, and a partitive type wh-phrase in data (1) through (4), may not exist in the following data.

(i) a.* Who$_i$ did her$_i$ friend invite t$_i$ to lead the discussion?
   b.* Which person$_i$ did her$_i$ friend invite t$_i$ to lead the discussion ?
   c.* Which of these persons$_i$ did her$_i$ friend invite t$_i$ to lead the
       discussion ?
(ii) a.* Who$_i$ did her$_i$ friend come to visit t$_i$?
   b.* Which kid$_i$ did her$_i$ friend come to visit t$_i$?
   c.* Which of these kids$_i$ did her$_i$ friend come to visit t$_i$?

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