Locality of QR and Scrambling*

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Lee, Hyeran. 2010. Locality of QR and Scrambling. *The Linguistic Association of Korea Journal. 18*(3). 17-36. This paper aims to analyze the locality of Quantifier Raising (QR), using Scope Economy (Fox 1995, 2000). Johnson (2000) and Miyagawa (2006) who view QR as scrambling are discussed. Johnson's data of English counterparts and Miyagawa's Japanese data of Long-Distance (LD) scrambling and their Korean counterparts are put to test for Scope Economy. It is agreed that QR as an optional operation observes the same locality of scrambling, in particular, German/Dutch scrambling. However, based on Korean/Japanese data, it is argued that QR is different in that it observes Scope Economy in every step of movement while scrambling is subject to output effects of scope-discourse properties by Chomsky (2001, 2008). It is also argued that overt scrambling feeds QR as long as it observes Scope Economy. QR with no feature checking is motivated to satisfy the scope-discourse properties and its distance for raising is constrained by Scope Economy. QR is thus claimed to be an optimal operation at the interface to provide scope properties.

Key Words: quantifier raising, QR, scrambling, Scope Economy, extraposition, Extraposition from NP, inverse scope

1. Introduction

QR has long been discussed with no unified solution that accounts for a broad range of data. Especially it has been problematic as the Minimalist Program (MP) emerges since MP requires all movements to be a last resort operation. May (1977, 1985) analyzes QR as an LF adjunction operation,

* I am very grateful to anonymous reviewers for their valuable comments and criticism. All remaining errors are solely mine.

observing ECP (Empty Category Principle) and PCC (Path Containment Condition). Criticizing May, Hornstein (1994, 1995) argues for an A-movement analysis of QR where he says that scope ambiguity is caused by object raising to the Case position and subject lowering to the vP-internal position. His accounts are agreeable to minimalism eliminating QR from the grammar but cannot explain many data as demonstrated by Kennedy (1997) and Johnson (2000). Johnson (2000) argues for a scrambling analysis of QR in which he analyzes QR as German/Dutch scrambling showing that possibilities of scrambling are in parallel with possibilities of QR in terms of locality. Miyagawa (2006) independently argues that QR is a covert version of scrambling using Japanese data. In this paper, I would like to show that QR observes locality like scrambling but it is an independent operation observing the Scope Economy by Fox (2000). I also argue that QR is motivated to satisfy a dual semantics at the C-I Interface providing scope-discourse properties in addition to generalized argument structure based on Chomsky (2008).

Section 2 provides the theoretical basis for the analysis of QR based on Fox (2000) and Chomsky (2008). I suggest that QR is semantically motivated to satisfy the C-I interface and the distance of QR is determined by Scope Economy. Section 3 reviews Johnson (2000) in which QR is analyzed as German/Dutch scrambling and his data (English counterparts) are reanalyzed using Scope Economy. In section 4, Korean counterparts of Johnson's data are discussed. It is observed that short scrambling feeds QR in this language. In section 5, Miyagawa's (2006) Interpretation Economy is discussed. It is suggested that Chomsky's output effects of scope-discourse properties can cover Interpretation Economy. It is shown that scrambling can feed QR as long as Scope Economy is observed. Further movement not feeding QR is allowed as long as it motivated by scope-discourse properties. Finally in section 6, concluding remarks are provided.

2. Theoretical Basis

2.1 QR

Sentences with multiple quantifiers show scope ambiguity in their

interpretation. Scope ambiguity is caused by the fact that quantifiers of a sentence can be subject to QR (May 1977, 1985) in any order.

(1) a. Some man loves every woman
b. [S some man$_i$ [S every woman$_j$ [S t_i loves t_j]]
c. [S every woman$_j$ [S some man$_i$ [S t_i loves t_j]]]]

With the modern phrase structure based on the vP-internal subject hypothesis, Fox (1995, 2000) suggests Scope Economy in analyzing quantifiers.

(2) Scope Economy (Fox 1995, 2000)
Scope shifting operations that are not forced for type considerations must have a semantic effect.
(3) a. A boy loves every girl
b. [IP a boy$_i$ ... [VP every girl$_j$ [t_i loves t_j]]]
c. [IP every girl$_j$ [IP a boy$_i$ ... [VP t_i loves t_j]]]
(4) a. John loves every girl
b. [IP John$_i$ ... [VP every girl$_j$ [VP t_i loves t_j]]]
c. *[IP every girl$_i$ [IP John$_j$ ... [VP t_i loves t_j]]]

Fox says that both (3b) and (3c) are LFs by QR since both are not logically equivalent: the logical relations of scope expressed by the syntactic structures are different. (4b) is a proper LF for (4a), but (4c) is blocked due to economy considerations in (2). There is no semantic effect by the scope change in (4c) so that QR is blocked by Scope Economy.

2.2 QR as an Optional Operation to Satisfy Scope-Discourse Properties

Heim and Kratzer (1998) assume that QR is motivated by the need to repair a type mismatch with the transitive verb. This is adopted by Fox (2000) in which he argues for an obligatory short QR to Spec-vP followed by an optional QR.

Under the minimalism, QR as an optional operation could be motivated by the Conceptual-Intentional (C-I) interface that requires a semantic duality. Chomsky (2001: 34) suggests the following for an optional operation.

(5) Optional operations can apply only if they have an effect on outcome.

According to Chomsky, an effect on outcome involves the scope-discourse interpretation such as new/old information, specificity-definiteness, focus, topic, scope, and etc. Icelandic Object Shift (OS) is one of optional operations which results in an effect on outcome such as specificity in the interpretation of an object. Scrambling is another optional operation that may affect focus potentials of a sentence. Without such optional operations, sentences still converge but optional operations expand the range of the interpretation of sentences, bringing in specificity or focus interpretations. In the same way, QR belongs to an optional operation that has an effect on outcome such as the scope change. Without QR, the sentence still converges, but with QR sentences could have diverse as well as proper interpretations with the scope change.

Chomsky (2008: 141) says that languages use Internal Merge (IM) to express semantic properties apart from generalized argument structure. He hypothesizes the following.

(6) C-I interface incorporates a dual semantics, with generalized argument structure as one component, the other being discourse-related and scopal properties. Language seeks to satisfy the duality in the optimal way, EM serving one function and IM the other, avoiding additional means to express theses properties.

Chomsky claims that a semantic duality must be expressed by only EM (argument structure) and IM (scope-discourse properties), avoiding additional means. It seems clear that quantifiers in question are related with scopal properties, not with generalized argument structure and they have to make use of IM rather than EM. While IM in Chomsky involves an overt IM, IM in QR is a covert IM since the surface order does not change in spite of the scope change.

If an optional operation like QR is assumed to undergo a covert IM for scope-discourse properties, the questions are what target is involved to motivate such a movement and where quantifiers actually raise. Difficulty in seeking for the answer, unlike focus, topic, and *wh*-features, lies in the fact that there is no morphological evidence for quantifier features cross-linguistically. Beghelli and

Stowell (1995, 1997) and Szabolcsi (1997) argue for the specialized functional projections that check and attract quantifiers. Surányi (2004) however provides conceptual and empirical evidence against their claim and suggests that quantifier scope involves QR, not feature checking. For this paper, it is assumed that a covert IM may be possible especially when there is no functional category realized and no feature involved. In such a case, moving elements should be pronounced in the original position though the syntactic structure for semantic interpretations is formed in the higher position, in particular, in the left periphery where scope-discourse properties are expressed. It is also assumed that an overt IM such as scrambling can feed QR as long as it observes Scope Economy.

It may thus be reasonable to unify optional operations, in particular, QR and scrambling, since (i) quantifier features are not obvious, (ii) scrambling, in particular, short scrambling, is arguable between feature checking and non-feature checking, and (iii) both operations take place to satisfy scope-discourse properties, not generalized argument structure. Johnson (2000) and Miyagawa (2006) attempt to unify QR and scrambling with regard to locality. In what follows, each claim is reviewed and reanalyzed in the view of the semantic motivation (Scope Economy and scope-discourse properties), showing that the locality of QR is correlated with the locality of scrambling and the former is constrained by Scope Economy while the latter is constrained by scope-discourse effects.

3. Johnson (2000)

3.1 QR as Scrambling

In this section, John's scrambling examples that show the locality of QR are analyzed to find out if they observe Scope Economy. Johnson (2000) claims that a QR type movement which cannot be accounted for by A-movement as in Hornstein (1994, 1995) is found in scrambling, in particular, in German/Dutch scrambling. He says that compared to Topicalization (A'-movement) that is represented as cleft sentences in English, quantifiers are subject to a tighter

locality constraint, not escaping the finite clause boundary unlike Topicalization. He also says that quantifiers on the other hand enjoy a freer locality, being escaped from subjects, which Topicalization does not allow. In sum, Johnson argues that QR, like scrambling, is such a movement that is subject to a tighter locality in terms of the finite clause boundary and to a less strict locality in terms of the subject NP boundary and that scrambling and QR are the same kinds of movement observing the same locality.

Consider the English counterparts of Dutch scrambling data from Johnson as below.

(7) A different student wanted to read every book. every>a
(8) A different student wanted for you to read every book. *every>a
(9) A different student said that I had read every book. *every>a
(10) A different student stood near every visitor. every> a

Johnson observes that all structures above with (im)possibility of inverse scope are present in Dutch scrambling: If inverse scope is possible as in (7), scrambling across the infinitive clause is possible in Dutch; if inverse scope is possible as in (10), scrambling of adjuncts is possible in Dutch; If inverse scope is not possible as in (8, 9), scrambling across the complementizer or the finite clause is not possible in Dutch. He tries to show that the distance that quantifiers move is the same with the distance that scrambling moves in Dutch, analyzing QR as scrambling.

Johnson's data can be analyzed by Scope Economy as below.

(11) [every book [a different student [every book [wanted to read every book]]]]
(12) [a different student wanted [for [every book* [you to [every book [read every book]]]]]
(13) [a different student said that [every book* [I had [every book [read every book]]]]]
(14) [[every visitor [a different student [every visitor [stood near every visitor]]]]

If we adopt the restructuring analysis[1] by Hornstein (1995), the universal quantifier in (11) can cross over the indefinite DP to the periphery position, creating inverse scope. Inverse scope in (12-13) is not possible since it crosses over a referential DP as in Fox's example (4) violating Scope Economy. Inverse scope in (14) is possible since the universal quantifier can raise to the periphery position crossing over the indefinite DP.

3.2 QR as Extraposition from NP

Johnson shows the following scope possibilities with German scrambling data and their English counterparts. See the corresponding English sentences as below.

(15) a. A resident of almost every California city$_i$ curses its$_i$ traffic.
every> a

b. *My report about almost every California city$_i$ curses its$_i$ traffic.
*every> my report

(16) a. A report appeared today about almost every California city.
every> a

b. *My report appeared today about almost every California city.
*every> my report

Based on the pronoun binding in (15a), Johnson says that the quantifier moves to a higher place where it can c-command and bind the pronoun while in (15b) such a raising is not permitted out of DPs with a genitive. He maintains that this covert operation is visibly manifested in the overt operation in (16). Extraposition from NP is allowed in (16a) but it is not in (16b) with a genitive as the covert operation is not permitted in (15b) with a genitive. He thus claims that QR patterns after Extraposition from NP (scrambling in English) which shows the same pattern with German scrambling: QR undergoes a covert

1) Hornstein's (1994, 1995) restructuring analysis for English has been refuted by Kennedy (1997) and Johnson (2000). However, Cecchetto (2006) argues that the restructuring exists in italian with a visible clitic climbing and it interacts with QR. Though evidence is not clear for English, Hornstein's restructuring analysis is adopted for our analysis.

movement in (15a) while it undergoes an overt extraposition in (16a).

Johnson's examples of English counterparts are explained using Scope Economy in the following.[2)]

(17) a. [almost every California city [[a resident of almost every California city$_i$] curses its$_i$ traffic]]
b. [almost every California city* [[my report about almost every California city$_i$] curses its$_i$ traffic]]

(18) a. [a report [~~about almost every California city~~]] appeared today [about almost every California city]
b. [my report [~~about almost every California city~~] appeared today about almost every California city*.

QR to the periphery position is made in (17a) and (17b). (17a) observes Scope Economy with the universal quantifier phrase crossing over the indefinite *a resident*, providing inverse scope while (17b) violates it since the universal quantifier crosses over the referential DP my. In (18a), extraposition provides inverse scope but in (18b) it cannot do so since such a movement violates Scope Economy crossing over the referential DP my, assuming that the extraposed constituent is adjoined to the higher position than the subject DP in Spec-TP. Here we know that Scope Economy can account for the locality of QR whether covert or overt. In the covert component, QR observes Scope Economy in (17a) and (17b). Likewise, in the overt component, QR observes Scope Economy blocking the possibility of crossing over the referential DP my overtly.

3.3. X-Files Reading vs. Anti X-Files Reading

Using data from Rochemont and Culicover (1990), Johnson (2000) illustrates the following sentences to provide evidence for a scrambling analysis of QR. The fact that Extraposition from NP has an effect on the relationship between adjectives in the host DP and the extraposed PP leads Johnson to argue that the same applies to constructions with quantifiers in (20).

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2) Though Scope Economy is used to account for the data, movement constraints in which an element cannot escape out of a DP with a genitive also of course apply.

(19) a. I dissected an alleged insect from Saturn yesterday.
alleged> from Saturn (the anti-X-files reading)
from Saturn> alleged (the X-files reading)
b. I dissected an alleged insect yesterday from Saturn.
from Saturn> alleged (the X-files reading only)

(20) I dissected an alleged insect from every planet in our solar system.
every> alleged (the X-files reading only)

(21) ??It's Saturn$_i$ that I dissected [an alleged insect from t_i]
alleged> from Saturn
from Saturn> alleged

According to Johnson, while (19a) has both the X-files reading (there was a creature from Saturn, alleged to be an insect, that I dissected) and the anti-X-files reading (there was a creature, alleged to be an insect from Saturn, that I dissected), (19b) has the X-files reading only. He analyzes the sentence with Extraposition from NP in (19b) as a kind of A-scrambling that does not reconstruct and thus the X-files reading is the only possible interpretation. He says that the Extraposition/ scrambling case in (19b) is different from (21) which is considered as Topicalization in English: The former has the X-files reading and the latter has both the X-files and anti-X-files reading.[3] Likewise, (20) with a quantifier assimilating (19b) is different from Topicalization in (21), he says, concluding that QR is like Extraposition from NP, not like Topicalization.

(20) is crucial evidence that Extraposition in English feeds QR as a kind of scrambling. While QR is a kind of scrambling for the extraposed constructions in English, it is not analyzed as the same as Topicalization: (21) does not provide the QR interpretation as in (20) but the reconstructed interpretation as in (19a). In terms of Fox' Scope Economy, (20) is analyzed as below.

(22) [I [dissected [an alleged insect ~~from every planet in our solar system~~] [from every planet in our solar system]] *every planet in our solar system]. every > alleged

3) Johnson uses the topicalized sentence to show a contrast with (19b), claiming that Extraposition from NP is different from Topicalization and that QR follows Extraposition, not Topicalization. He acknowledges that the topicalized sentence is quite odd, but he says that it has two readings to the extent that it is grammatical.

The universal quantifier undergoes Extraposition above the quantificational adjective expression where the X-file reading is obtained, and further movement crossing over the subject DP *I* is not allowed due to Scope Economy.

4. Korean Counterparts[4)]

In this section, it is examined how scrambling in Korean is related with QR in terms of locality. Korean scrambling is much freer than German/Dutch scrambling with scrambled elements crossing over the clause boundary. Short scrambling is first dealt with in comparison with Johnson's English data.

(23) a. Nwukwunka-ka motun salam-ul man-ass-ta
someone-NOM every person-ACC meet-PAST-DEC
'Someone met every person' someone > every person
b. Motun salam-ul nwukwunka-ka t man-ass-ta
every person-ACC someone-NOM meet-PAST-DEC
Every person, someone met t'
someone > every person, every person >someone
c. Nwukwunka-ka t man-ass-ta, motun salam-ul
someone-NOM meet-PAST-DEC every person-ACC
'Someone met t, every person' someone > every person

The canonical sentence in (23a) does not provide inverse scope in Korean. Inverse scope[5)] is obtained, when scrambling takes place as in (23b). (23c)[6)] is similar to Extraposition in English, and unlike English, inverse scope is not possible in this case. It seems that leftward movement in (23b) feeds QR while rightward movement in (23c) does not. Ko and Choi (2009: 3) provide the reason why this is so, arguing that rightward movement targets the inner-edge of vP

4) Thanks to a reviewer, this section is expanded with Korean data.
5) The term 'inverse scope' is used in terms of the canonical sentence.
6) This construction is arguable between movement (with deletion) and base-generation and mono-clausal and bi-clausal analysis. For our analysis, it is assumed that movement is involved in this construction.

while leftward movement targets the outer-edge of vP. If we adopt their argument, the right dislocated element *motun salam-ul* in (23c) always stays under the subject quantifier with no inverse scope possible. QR assimilating German/Dutch scrambling and English Extraposition from NP is thus possible with leftward short scrambling in Korean.

Next comes another example to demonstrate that short scrambling brings about inverse scope.

(24) a. Mary-ka nwukwunka-eykey motun chayk-ul ponay-ss-ta
Mary-NOM someone-DAT every book-ACC send-PAST-DEC
'Mary sent someone every book' someone > every book

b. Mary-ka motun chayk-ul nwukwunka-eykey t ponay-ss-ta
Mary-NOM every book-ACC someone-DAT send-PAST-DEC
'Mary sent every book to someone'
someone > every book, every book > someone

(24b) shows that inverse scope follows short scrambling.
See the following NP constructions.

(25) a. Na-nun [nwukwunka-uy motun chyak-eytaehan nonphyeng-ul]
I-TOP someone-GEN every book-about comments-ACC
ilk-ess-ta
read-PAST-DEC
'I read someone's comments about every book'
someone > every book

b. Na-nun [motun chyak-eytaehan nwukwunka-uy t nonphyeng-ul]
I-TOP every book-about someone-GEN comments-ACC
ilk-ess-ta
read-PAST-DEC
'I, about every book, read someone's comments t'
someone > every book, every book > someone

(25b) shows that inverse scope is caused by short scrambling within the noun phrase. In sum, (23), (24), and (25) exhibit that short scrambling causes the scope change. It amounts to say that short scrambling goes in parallel to QR in terms of locality. The distance the scrambled elements move is the same with the distance quantifiers move.

LD-scrambling across the clause boundary is allowed in Korean while it is not allowed in German/Dutch. English is not a scrambling language so that Extraposition from NP has been taken as a scrambling-like construction in Johnson's data. The locality of QR has been in parallel to the locality of scrambling in these three languages. Korean is quite different in this respect. See the following sentences.

(26) a. Nwukwunka-ka motun chayk-ul ilk-ko sipheha-yss-ta
someone-NOM every book-ACC read-to want-PAST-DEC
'Someone wants to read every book' someone > every book

b. Motun chayk-ul nwukwunka-ka t ilk-ko sipheha-yss-ta
every book-ACC someone-NOM read-to want-PAST-DEC
'Every book, someone wants to read t'
someone > every book, every book > someone

(27) a. Nwukwunka-ka [ne-ka motun chayk-ul ilk-ki-lul]
someone-NOM you-NOM every book-ACC read-KI-ACC
wuenha-n-ta
want-PRES-DEC
'Someone wants you to read every book' someone > every book

b. Motun chayk-ul nwukwunka-ka [ne-ka t ilk-ki-lul]
every book-ACC someone-NOM you-NOM read-KI-ACC
wuenha-n-ta
want-PRES-DEC
'Every book, someone wants to read t' someone > every book

(28) a. Nwukwunka-ka [ne-ka motun chayk-ul ilk-ess-ta-ko]
someone-NOM you-NON every book-ACC read-PAST-DEC
malha-yss-ta
say-PAST-DEC
'Someone said that you read every book' someone > every book

b. Motun chayk-ul nwukwunka-ka [ne-ka t ilk-ess-ta-ko]
every book-ACC someone-NOM you-NON read-PAST-DEC
malha-yss-ta
say-PAST-DEC
'Every book, someone said that you read t' someone > every book

While (26) shows inverse scope following scrambling, (27) with the non-tensed embedded clause and (28) with the tensed embedded clause show no inverse scope following scrambling. We thus know that short scrambling feeds QR in Korean while LD-scrambling does not go in parallel with QR. QR that provides inverse scope must be very local conforming to short scrambling while LD-scrambling stretches out across the clause boundary through local steps. LD-scrambling in relation to QR is discussed in the next section.

5. Miyagawa (2006)

5.1 Interpretation Economy

Adopting Fox's (2000) Scope Economy and Tada's (1993) application of Output Economy, Miyagawa (2006) argues that QR, as an optional operation, is viewed as a covert version of scrambling, observing Interpretation Economy.

(29) Interpretation Economy ((17) in Miyagawa (2006)
The movement is licensed in the new position iff it alters the interpretation of the string.

The critical data come from Moltmann and Szabolci (1994), discussed by Fox (2000) and cited again by Miyagawa (2006).

(30) a. One girl knows that every boy bought a present for Mary.
one > every, *every > one
b. One girl knows what every boy bought for Mary.[7]
one > every, every > one

(30a) cannot take inverse scope since there is no scope-bearing element that the universal quantifier can cross over to change the scope in the embedded clause. (30b), on the other hand, can take inverse scope across the clause boundary since *what* is a scope-bearing element so that the quantifier can change its scope when it crosses over *what* in the first step of movement. Then the next step of

movement is possible since crossing over the subject NP also changes the scope. As a result, inverse scope is possible in (30b) in contrast to (30a).

Miyagawa provides Japanese counterparts which he says behave identically.

(31) a. Daremo-ni$_i$ dareka-ga [John-ga t_i kisusita to]
everyone-DAT someone-NOM John-NOM kisusita C
omotteiru
thinks
'Everyone, someone thinks that John kissed'
*everyone > someone, someone > everyone

b. Daremo-ni$_i$ dareka-ga [futari-no-kodomo-ga t_i
everyone-DAT someone-NOM 2-GEN-kids-NOM
kisusita to] omotteiru[8)]
kisusita C thinks
'Everyone, someone thinks that John kissed'
OK/?? everyone > someone, someone > everyone

Miyagawa says that movement in (30) and (31) are identical since both are optional operations and both are subject to Interpretation Economy. He says that two types of movement are exactly the same movement, though one is covert and the other is overt. As *wh*-movement has covert and overt movement versions, QR, he claims, is a covert version of scrambling that is overt.

If we take a look at (31b), the universal quantifier, as in (30b), crosses over

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7) A reviewer commented that inverse scope may not be possible with the following sentence.
(i) One girl knows that some boy bought every present for Mary.
one > every, *every > one
Though it is not very clear how to analyze sentences like (30) and (i), the position of the scope bearing element may involve with the inverse scope possibility. In (i), the universal quantifier could have inverse scope within the embedded clause, but it cannot raise over the matrix subject *one girl* assuming that it is covertly located in the TP adjoined position which is not the phase edge position. On the other hand, *what* in (30b) is located in the phase edge position and the universal quantifier is adjoined to the outer edge of CP by QR which is accessible to the higher phase.

8) The same reviewer continued to mention that (31b) is ungrammatical in Korean counterpart. I agree with the reviewer's judgement in that inverse scope is not possible with regard to the matrix subject quantifier while it is possible within the embedded clause.

the numeral quantifier within the embedded clause to make the scope change possible. With the first step of movement allowed by Scope Economy, the second step of movement crossing over the subject quantifier is also permitted by Scope Economy. On the other hand, (31a) seems to be different from (30a). In (31a), the first step of movement should not be allowed by Scope Economy since the subject NP *John* is not a scope-bearing element so that the second step of movement should not be allowed either. However, differently from (30a), the actual overt movement over the matrix subject NP is executed in (31a). To account for this fact, Miyagawa says that there is a difference between scrambling and QR. He maintains that QR can affect only scope while scrambling can affect not only scope but also the focus potential of a sentence. What he claims is that though LD-scrambling of the embedded object violates Scope Economy in the lower clause, it observes Interpretation Economy in a broader sense by altering the focus potential. The second step of raising over the matrix subject NP in (31a) is thus permitted by Interpretation Economy.

Miyagawa provides a sentence for LD-scrambling of a quantifier that does not lead to a new scope relation.

(32) Daremo-ni dareka-ga [Mary-ga e atta to
everyone-DAT someone-NOM Mary-NOM met that
omotteiru
thinks
''Everyone, someone thinks that Mary met t'
someone> everyone, *everyone> someone

Miyagawa argues that the LD-scrambling of the embedded object violates Scope Economy in the embedded clause though it does not violate Interpretation Economy by altering the focus potential in the matrix clause, and hence no radical reconstruction is needed. He says that scrambling in the above sentence is preserved under focus alteration, and not under scope alteration.

Miyagawa's Interpretation Economy does not seem to be a new idea since Chomsky's (2001, 2008) output effects of scope-discourse properties on optional operations in (5) and (6) can cover the idea. Assuming that scope shifting operations by Scope Economy are not a feature checking operation, elements

that underwent scope shifting operations can further move in scrambling languages like Korean/Japanese as long as there is some scope-discourse effect on outcome. Korean data corresponding to Japanese data are given in the following section, showing that Miyagawa's Interpretation Economy is replaced with Chomsky's output effects of scope-discourse properties.

5.2 QR More Restricted than Scrambling

See the following LD-scrambling examples in Korean with no scope change.

(33) a. Nwukwunka-ka [Mary-ka motun salam-ul
someone-NOM Mary-NOM every person-ACC
mana-ss-ta-ko] sayngkakha-n-ta
meet-PAST-DEC-COMP think-PRES-DEC
'Somebody thinks that Mary met every person'
someone > every person *every person > someone

b. Motun salam-ul nwukwunka-ka [Mary-ka t
every person-ACC someone-NOM Mary-NOM
mana-ss-ta-ko] sayngkakha-n-ta
meet-PAST-DEC-COMP think-PRES-DEC
'Every person, somebody thinks that Mary met t'
someone > every person *every person > someone

The quantifier *motun salam-ul* in (33b) cannot cross over *Mary* in the embedded clause by Scope Economy, which results in the impossibility of inverse scope[9] (*every person > someone). However, the quantifier can cross over the embedded clause to the sentence initial position by scrambling, not bringing in scope change but bringing in focus alteration which is one of discourse properties. QR fed by scrambling stops within the embedded clause while scrambling is free to apply across the embedded clause through intermediate positions as long as there is some discourse effect. The scrambled element occupies the final landing site legitimately since scrambling brings discourse

9) The term 'inverse scope' is used in terms of the canonical sentence. Inverse scope is actually surface scope in the scrambled constructions.

effects on outcome such as focus.

Consider more Korean LD-scrambling examples with the scope change.

(34) a. Mary-ka nwukwunka-ka motun salam-ul
Mary-NOM someone-NOM every person-ACC
cohaha-n-ta-ko malha-yss-ta
like-PRES-DEC-COMP say-PAST-DEC
someone > every person, *every person > someone
'Mary said that someone likes every person'

b. Motun salam-ul Mary-ka nwukwunka-ka t
every person-ACC Mary-NOM someone-NOM
cohaha-n-ta-ko malha-yss-ta
like-PRES-DEC-COMP say-PAST-DEC
every person > someone, someone > every person
'Every person, Mary said that someone likes t'

In contrast to (33b), (34b) shows inverse scope when the universal quantifier undergoes scrambling to the sentence initial position. See the following scrambling structure of (34b).

(35) [CP motun salam-ul [TP Mary-ka [vP motun salam-ul* [CP
motun salam-ul [TP nwukwunka-ka [vP motun salam-ul [vP t_s t_o
cohaha-n-ta-ko]]]] malha-yss-ta]]]

The universal quantifier moves through each phase such as the embedded vP, the embedded CP, the matrix vP, and the matrix CP. The first step of movement is the same as the obligatory QR in the sense of Fox, and the second step of movement to the embedded Spec-CP feeds the optional QR crossing over another quantifier producing inverse scope. The following scrambling movement to the matrix vP cannot feed QR since the universal quantifier does not cross any quantifier, assuming that the subject trace (the A-movement trace) in Spec-vP is invisible for interpretation based on Chomsky (1995). Scrambling continues to move to the sentence initial position to satisfy discourse properties such as focus while scrambling feeding QR stops at the embedded Spec-CP. We

thus find that overt scrambling can feed QR as long as each step observes Scope Economy. The embedded CP is the place in which QR stops by Scope Economy. The apparent inverse scope between the embedded quantifier and the scrambled matrix quantifier is actually the inverse scope obtained within the embedded clause. It is thus observed that QR is very local in scrambling languages like Korean, observing Scope Economy.

From LD-scrambling of a quantifier, it has been discussed that Chomsky's output effects of scope-discourse properties on optional operations can cover both scrambling and QR. However, the difference is that QR must be constrained by Scope Economy for each step of movement while scrambling is constrained by output effects of scope-discourse properties in that the final step of movement must brings scope-discourse effects such as focus. It is also found that an overt movement like scrambling including Extraposition from NP (English scrambling) feeds QR as long as Scope Economy is satisfied. Scope Economy is thus independently needed for QR in overt component as well as in covert component to ensure the locality of quantifier movement. This is a desired result since there should be no constraints that work only in the covert component.

6. Conclusion

So far we have shown that QR is very similar to scrambling in that (i) both operations are subject to optional operations, (ii) both operations should bring semantic effects such as scope or focus alteration, (iii) both operations are subject to the same locality (German/Dutch scrambling and Korean/Japanese short scrambling), and (iv) when it come to Korean/Japanese LD-scrambling, QR is more local than scrambling so that Scope Economy is independently need for QR while output effects of scope-discourse properties in general are needed for LD-scrambling. We have seen that English counterparts of German/Dutch scrambling and Korean scrambling feed QR so that Scope Economy applies to overt QR as well as covert QR. It has been argued that QR, whether covert or overt, should observe Scope Economy in every step of movement. QR is thus motivated as an optimal operation at the interface providing semantic effects of scope-discourse properties in the left periphery under MP.

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