Cyclic Linearization and Asymmetry in Scrambling  
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1. Outlook

Goals of the paper:
• To discuss a certain asymmetry between scrambling of external vs. internal arguments in Korean. Old puzzles concerning floating quantifiers are revisited.
• To propose that scrambling does not occur randomly, but strictly constrained by a PF-Syntax Interface Condition, Cyclic Linearization (Fox and Pesetsky 2003).
• Implications.
  (i) A subject may undergo scrambling, contrary to some assumptions in the literature (cf. Saito 1985, Hoji 1985).
  (ii) Scrambling is restricted by the core property of cyclic Spell-out as much as Object Shift in Scandinavian languages.
  (iii) Holmberg’s Generalization, as captured by Fox & Pesetsky (2003), is not a language-specific constraint, but rather a universal principle that may extend to SOV scrambling languages.

2. Puzzles

Korean is a SOV scrambling language. Quantity of a noun (mass or count) is expressed by a Numeral Quantifier (NQ) followed by a classifier (CL). NQ can be floated.

(1) Haksayng sey-myeng  
Student 3-CL people  
‘three students’

2.1 Subject vs. Object Asymmetry in Scrambling

• As illustrated in (3a), the subject may intervene between the object and the object-oriented NQ (NQobj).
• However, the object may not intervene between the subject and the subject-oriented NQ (NQsubj), as in (3b). If the subject is able to scramble over the scrambled object, we expect that the subject would license the subject-oriented NQ (NQsubj), contrary to facts.

(3) a. [O S t₀ NQobj ] V  
Maykcwu-lul₁ John-i tᵢ sey-pyeng masi-ess-ta  
Beer-Acc John-Nom three-CL bottle drink-Past-Dec  
‘John drank three bottles of beer’

b. *[S adv O t₀ NQsubj t₀ V]  
*Haksayng-tul₁ maykcwu-lul₁ tᵢ sey-myeng tᵢ masi-ess-ta  
Student-PL-Nom beer-Acc three-CL person drink-Past-Dec  
‘Three students drank beer.’

(4) Saito (1985). Assume that a subject never undergoes scrambling.1

2.2. However, a subject does scramble!

(5) Saito (1985) claims that the subject cannot undergo scrambling because its trace cannot be lexically-governed by the verb. Given the vP-internal subject hypothesis, however, it is not obvious why a subject cannot undergo scrambling.2

(6) As shown in (7), an embedded subject may scramble over a matrix subject unless parsing difficulty arises: clause-external scrambling of a subject is possible (Lee 1992, Lee 1993, Sohn 1995, but see also Saito 1985).

(7) John-i [na-nun [ tᵢ Mary-lul tayli-ess-ta-ko ] sayngkakha-n-ta ]  
Maykcwu-lul₁ tᵢ sey-myeng maykcwu-lul₁ masi-ess-ta  
Beer-Acc evidently three-CL people drink-Past-Dec  
‘Evidently, three students drank beer.’

(8) Ko (2003a): CP-internal scrambling of a subject is also possible over high adverbs such as amato ‘probably’, pwunmeynghi ‘evidently’, and way ‘why’ (see also Miyagawa 1989, and Fujita 1994, and see the appendix in this handout).

a. A subject-oriented floating quantifier can be licensed across pwunmeynghi.

[ S adv tᵢ NQsubj O V ]  
Haksayng-tul₁ pwunmeynghi tᵢ sey-myeng maykcwu-lul₁ masi-ess-ta  
Student-PL-Nom evidently three-CL bottle beer-Past-Dec  
‘Evidently, three students drank beer.’

b. An object-oriented floating quantifier can be licensed across pwunmeynghi.

[ O adv S t₀ NQobj V ]  
Maykcwu-lul₁ pwunmeynghi John-i tᵢ sey-pyeng masi-ess-ta  
Beer-Acc evidently three-CL bottle drink-Past-Dec  
‘Evidently, John drank three bottles of beer’

(9) Importantly, however, the Subject Puzzle still remains as a problem.

*[O adv S t₀ NQsubj t₀ V]  
*Haksayng-tul₁ pwunmeynghi maykcwu-lul₁ tᵢ sey-myeng tᵢ masi-ess-ta  
Student-PL-Nom evidently three-CL bottle beer-Past-Dec  
‘Evidently, three students drank beer.’

(10) Question.

If the subject is able to undergo scrambling, why does the Subject Puzzle exist?

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1 Hoji (1985) also assumes that a subject cannot undergo scrambling, based on the fact that Japanese show scope rigidity between a subject and an unscrambled object. I will not discuss scope rigidity in this paper.

2 I thank Mamoru Saito for pointing out this problem.
Proposal

- Scrambling in Korean is constrained by a PF-Syntax Interface Condition, Cyclic Linearization.

(11) Cyclic Linearization (Fox and Pesetsky 2003)
   a. Certain syntactic domains created in a derivation are Spell-out Domains (i.e. Linearize applies to them). These may correspond to Chomsky’s notion of phase.
   b. The linear ordering of syntactic units is affected by Merge and Move within a Spell-out Domain, but is fixed once and for all at the end of each Spell-out Domain.

(12) a. \([vP X Y]: X<Y\) (X precedes Y)
   b. \([CP Z [vP X Y]: Z<X<Y\)
   c. \([CP X Z [vP t_1 Y]: X<Z<Y\)
   d. \([CP Y Z [vP t_1 X]: Y<Z<X\)

(13) a. \([vP Y [vP X t_1]]: Y<X\)
   b. \([CP Y_1 Z [vP t_1 X t_1]]: Y<Z<X\)

(14) Fox and Pesetsky (2003, p.2): Object Shift in Scandinavian (Holmberg 1999) is possible only when elements that preceded the object in VP still precede the object after it has shifted, as a consequence of other movement operations. (cf. similar proposals by Müller 2001, Sells 2001, Williams 2002, among others.)

   a. Jag kysste henne inte \([vP t_0, t_0]\)
      I kissed her not
   b. *Jag har henne inte \([vP kysst t_0]\).
      I have her not kissed
   c. *...att jag henne inte \([vP kyste t_0]\).
      ...that I her not kissed

   a'. (*)Jag kysste henne. I kissed her
   b'. Jag har inte kysst henne. I have not kissed her
   c'. ...att jag inte kysste henne.
      ...that I not kissed

4. Scrambling Paradigms

4.1 Object Scrambling

(18) \([vP S O NQ_{obj} V]\)
John-i maykcuwulul sey-pyeng masi-ess-ta
Masi-ess-ta John-Nom beer-Acc three-CL-Bottle drink-Past-Q

(19) \([vP [CP S O NQ_{obj} V]\)
Maykcuwulul, t1 John-nom t1 sey-pyeng masi-ess-ta
Masi-ess-ta Beer-Acc John-Nom three-CL-Bottle drink-Past-Q

a. The object scrambles to the edge of VP
b. Linearize \(vP: O=S, O<NQ_{obj}, O>V, S<NQ_{obj}, S<V\)
   [NB. Small letters in the diagram indicate traces]

4.2 Adjunct Scrambling

(20) \([vP S NQ_{adj} O]\)
John-i maykcuwulul sey-pyeng masi-ess-ta
Masi-ess-ta John-Nom beer-Acc three-CL-Bottle drink-Past-Q

a. *Jag har henne inte \([vP kysst t_0]\).
      I have her not kissed
b. *...att jag henne inte \([vP kyste t_0]\).
      ...that I her not kissed

(21) a. Jag kysste henne inte \([vP t_0, t_0]\)
      I kissed her not
b. Jag har henne inte \([vP kysst t_0]\).
      I have her not kissed
   c. *...att jag henne inte \([vP kyste t_0]\).
      ...that I her not kissed

2 Fox and Pesetsky (2003) for other empirical consequences of this proposal.
3 There are several possible reasons why (14b) may hold. First, there is no trigger/attactor/probe for this extremely local movement. Second, we have reasons to block merging an XP twice to the same head (Torrego and Pesetsky 2002); (cf. Richards (2001) and Takahashi (2003) for some potentially opposing considerations)

Maykcwu-lul, pwunmeynghi John-i t1 sey-pyeng masi-ess-ta Beer-Acc evidently John-Nom three-CL-beer drink-Past-Q
‘Evidently, John drank three bottles of beer.’

[Unimportant ordering statements are omitted for ease of presentation]

a. **Linearize CP**: Ordering statement O<adv, O<S, O<V, O<NQsubj, S<V
b. **No ordering contradictions between the vP domain and the CP domain!**

### 4.2 Subject Scrambling

<table>
<thead>
<tr>
<th>Case 1: When the object does not undergo scrambling within the vP domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Intermediate movement from SpecvP to SpecIP is omitted for the ease of presentation]</td>
</tr>
</tbody>
</table>

Result: **O cannot intervene between S and NQsubj.**

<table>
<thead>
<tr>
<th>a. [vP S NQsubj O V]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linearize vP</strong>: S&lt;NQsubj, S&lt;O, S&lt;V, O&lt;NQsubj, S&gt;V</td>
</tr>
<tr>
<td><strong>No ordering contradictions!</strong></td>
</tr>
</tbody>
</table>

The fact that the subject can license NQsubj across adverbs is correctly predicted in this approach (cf. Saito 1985).

### 4.3 Multiple scrambling

<table>
<thead>
<tr>
<th>a. [S adv s NQsubj O V]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linearize CP</strong>: S&lt;adv, S&lt;NQsubj, S&gt;V, O&lt;NQsubj</td>
</tr>
<tr>
<td><strong>No ordering contradictions!</strong></td>
</tr>
</tbody>
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Compare this with the following ill-formed construction:

<table>
<thead>
<tr>
<th>d. [O S adv s NQsubj O V]</th>
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</thead>
<tbody>
<tr>
<td><strong>Linearize CP</strong>: Ordering contradiction between O and NQsubj</td>
</tr>
<tr>
<td>O&lt;S, O&lt;adv, O&lt;NQsubj, O&lt;V</td>
</tr>
</tbody>
</table>

Result: **an object may not intervene between S and NQsubj.** Whenever O moves out of the vP domain, NQsubj should move over O to preserve the ordering statement of the vP domain.
Case 2: When the object undergoes scrambling within the vP-domain

(26) Result: Again, O cannot intervene between S and NQsub.

a. \[
  \text{vP} \quad O \quad [\text{vP} \quad \text{S} \quad \text{NQsub} \quad O \quad V]
\]

- Linearize vP: O<S, O<NQsub, O<V, S<NQsub, S<V, NQsub<V

b. \[
  \text{IP} \quad \text{adv} \quad [\text{vP} \quad O \quad [\text{vP} \quad \text{S} \quad \text{NQsub} \quad O \quad V]
\]

- Merge adv.

c. \[
  \text{CP} \quad O \quad [\text{IP} \quad \text{adv} \quad [\text{vP} \quad O \quad [\text{vP} \quad \text{S} \quad \text{NQsub} \quad O \quad V]
\]

- The object scrambles over the adverb.
- S/NQsub scrambling is now possible only when it does not end up preceding O, since the previous application of Linearize established the orderings [O<S, O<NQsub].

d. \[
  \text{CP} \quad O \quad S \quad \text{NQsub} \quad [\text{IP} \quad \text{adv} \quad [\text{vP} \quad O \quad [\text{vP} \quad \text{S} \quad \text{NQsub} \quad O \quad V]
\]

- Linearize CP:
  - O<S, O<NQsub, O<adv, O<V
  - S<NQsub, NQsub<adv,
  - NQsub<V

Compare this with other ill-formed constructions:

e. \[
  *[\text{CP} \quad \text{S} \quad O \quad \text{NQsub} \quad [\text{IP} \quad \text{adv} \quad [\text{vP} \quad O \quad [\text{vP} \quad \text{S} \quad \text{NQsub} \quad O \quad V]
\]

- Linearize CP: S<O: ordering contradiction!

f. \[
  *[\text{CP} \quad \text{NQsub} \quad \text{S} \quad [\text{IP} \quad \text{adv} \quad [\text{vP} \quad O \quad [\text{vP} \quad \text{S} \quad \text{NQsub} \quad O \quad V]
\]

- Linearize CP:
  - NQsub>O: ordering contradiction!
  - NQsub>S: ordering contradiction!

Result: an object cannot intervene between S and NQsub.

5. Summary and Implications

News. A subject does undergo scrambling and license NQsub (cf. Saito 1985). However, there exist systematic asymmetries between external vs. internal arguments in the licensing of NQ.

Proposal. Scrambling in Korean is subject to the PF-Syntax Interface Condition, Cyclic Linearization argued by Fox and Pesetsky (2003).

Analysis. O cannot intervene between S and NQsub due to the Linearization principle. If O precedes S, it should precede NQsub, too. If O follows S, it should follow NQsub. By contrast, S may intervene between O and NQobj because O may undergo order-shifting scrambling within the vP (before Linearize applies to the vP).

Implications. 1) A subject does undergo scrambling (cf. Saito 1985): The Linearization approach explains the subject vs. object asymmetry without stipulating that a subject cannot undergo scrambling, extending the empirical coverage. 2) Scrambling in Korean does not randomly occur, but obeys the core property of cyclic spell-out, i.e. the Linearization principle. 3) The cross-linguistic parallelism between Object Shift in Scandinavian languages and scrambling in Korean is captured under this analysis.

Consequence. This paper provides further empirical evidence for the thesis that the architecture of the grammar requires Linearization in phonology to be cyclically determined at syntax, in the spirit of Chomsky (1999).

Appendix.

1. High vs. low adverbs

(27) Prediction: Any elements (including IO, PP, and adjunct) within the vP would behave the same way as an object with respect to the Linearization. Furthermore, we predict the asymmetry between high vs. low adverbs.

(28) High adverbs: externally-merged above vP (e.g. epistemic adv.). Low adverbs: externally-merged within vP, below subject (e.g. manner adv.)

a. Prediction 1: A high adverb may intervene between the subject and the NQsub: \[[\text{S} \quad \text{Hadv} \quad [\text{vP} \quad \text{t1} \quad \text{NQsub} \quad \text{O} \quad \text{V}]
\]

Movement of the subject adds new ordering, but no contradiction!

b. Prediction 2: A low adverb may not intervene between the subject and the NQsub for the same reason that an object cannot intervene between the subject and the NQsub.
The predictions are borne out:

a. *S {manner, instrumental, resultatives } NQ subj ...  

b. S {sentential (e.g. certainly, probably, evidently), temporal (e.g. yesterday), locative, speaker-oriented (e.g. to my surprise), subject-oriented adv. (e.g. cleverly, stupidly, rudely)} NQ subj ...

The passive/unaccusative subject originates within the VP (not in [Spec,vP]). Thus, it may undergo movement from VP to the edge of vP (or TP), and end up with being separated from NQ by a PP within the vP (Linearize vP: S<PP<NQsubj).

Low adverbs cannot intervene between S and NQsubj while high adverbs can:


Three students received a ball with a baseball glove.’

Haksayng-tul-i [caki-uy ton-ulo] twu-myeng cenhwaha-yess-ta Cat-Nom this disease-by three-CL die-Past-Dec  

Three cats died from this disease’

An unaccusative subject and NQsubj may be separated by a PP.

Koyangi-ka i-pyeng-ulo sey-mari cwu-ess-ta Cat-Nom this disease-by three-CL die-Past-Dec  

An unergative (intransitive) subject and NQsubj may not be separated by a PP.

*Kahksayng-tul-i [caki-uy ton-ulo] twu-myeng cenhwaha-yess-ta Cat-Nom this disease-by three-CL die-Past-Dec

Students telephoned with their own money.’

References


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Yoon, James H-S. 2003. ‘How are Inflected Verbs Formed’, A handout distributed at Korean Syntax Class, LSA Summer Institute, East Lansing, MI.