L2 Syntax-Semantics Interface of Wh-Questions*

Youngjae An

(Jeonju University)

An, Youngjae. "L2 Syntax-Semantics Interface of Wh-Questions." *Studies in English Language & Literature* **45.1 (2019): 349-366.** This article reports the results from a truth-value judgement task that investigates Korean speakers' interpretation of complex and ambiguous wh-questions in English to identify the role of first language knowledge and Universal Grammar (UG) in second language (L2) acquisition. I examine this in the context of strong crossover (SCO) configurations in English. The findings demonstrate that the SCO effect is operative at the advanced levels of acquisition but not at the intermediate levels of acquisition, supporting the Feature Reassembly Hypothesis (Ladiere, 2009). I interpret this as indicating that L2 knowledge of phenomena at the syntax-semantics interface is constrained by UG. (Jeonju University)

Key Words: strong crossover, wh-movement, Condition C, L2 English, Universal Grammar

I. Introduction

This study investigates second language (L2) knowledge of phenomena at the syntax-semantics interface, attempting to broaden out into how grammar and meaning interact in L2 acquisition. More specifically, it examines how Korean

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speakers of English make use of target grammatical knowledge to resolve complex and ambiguous wh-questions in English. To this end, this study explores a strong crossover (SCO) effect in Korean-English interlanguage grammar.

Where languages involve wh-movement, they give rise to the SCO effect (Postal, 1971; Wasow, 1972). This is illustrated in (1).

(1) a. Who does he think Yengmi loves?
    b. Who thinks he loves Yengmi?

While the SCO question (1a) is unambiguous, the non-strong crossover (NSCO) question (1b) is ambiguous; that is, in (1a), *he* cannot be the same person referred to as *who*, but in (1b), *he* and *who* can be the same person. This is held to be because in (1b) *who* has not moved across *he*; that is, it is generated in the matrix subject position. In (1a), however, *who* has moved across *he* from the embedded subject position.

Given the assumption that semantic knowledge is facilitated by the syntactic knowledge (Slabakova, 2008), it is intuitive to make a prediction that the SCO phenomenon would be a source of L2 divergence. For example, L2 speakers with wh-in-situ languages such as Korean do not have wh-movement realised in questions; accordingly, if their interlanguage grammar does not involve genuine wh-movement then Korean speakers of English would not be sensitive to the allowed and disallowed interpretation of wh-questions as in (1).

Korean-English interlanguage grammar is then predicted by two current competing models of L2 acquisition: the Interpretability Hypothesis (IH; Tsimpli & Dimitrakopoulou, 2007) and the Feature Reassembly Hypothesis (FRH; Ladiere, 2009). The IH predicts lack of L2 syntactic representations due to L1 interference in L2 development if uninterpretable features are not shared by the L1 and the L2. The FRH, on the other hand, predicts global development of L2 syntactic representations by reconfiguration, despite the marked contrasts in features between

the L1 and the L2. From the IH perspective, Korean speakers of English may be expected to exhibit non-native-like sensitivity to the SCO constraint. From the FRH perspective, by contrast, the SCO constraint may be expected to be unproblematic for Korean speakers of English. With respect to this, the following general research question is formulated.

(2) When a target language phenomenon exhibits marked contrasts in the featural composition, are L2 speakers able to overcome the learning challenge and acquire the target grammar?

If the findings provide an affirmative answer to (2), this conveys the implication for the involvement of Universal Grammar (UG) in L2 acquisition, a long-standing issue in generative L2 acquisition. If they don't, this conveys the implication for L1 interference in L2 development, and the role of UG is limited in L2 acquisition.

II. Background

2.1 Q-based approach to wh-question formation

Q(uestion)-particles have been centred on the analysis of wh-ex-situ languages in addition to wh-in-situ languages; that is, wh-ex-languages such as English have covert Q-particles for questions, whereas wh-in-situ languages such as Korean have overt Q-particles for questions (Baker, 1970; Cable, 2010; Hagstrom, 1998).

Cable (2010), in particular, proposes that wh-parameterisation is determined by Q-particles' strategies for merge operation with wh-words. According to Cable, the Q-particle in English takes the wh-word as its complement. After merging with the wh-word, the Q-particle projects a QP (hence classified as Q-projection languages); consequently, it is the entire QP that undergoes movement to Spec of CP. The

Q-particle in Korean, on the other hand, is adjoined to the wh-word (hence classified as Q-adjunction languages); for that reason, the Q-particle alone lands in the C head, leaving the wh-word in situ. This is held to be because a wh-word in English bears an uninterpretable Q-feature, whereas a wh-word in Korean does not carry any instance of Q-feature.

However, I depart from Cable's view on the featural composition of wh-words between wh-ex-situ and wh-in-situ languages; rather, I suggest that the featural composition of wh-words between the two languages is identical since wh-words across languages are variables void of inherent quantificational forces, and their quantificational forces are determined by Q-particles (Cheng, 1991). Furthermore, it is reasonable to assume that head-initial languages such as English would have head-initial Q-particles, whereas head-final languages such as Korean would have head-final Q-particles (Yeo, 2010). I thus assume that the Q head in English carries an EPP, a formal syntactic property that has an effect on the PF outcome (Alexiadou & Anagnostopoulou, 1998). A parametric difference between English and Korean wh-questions is then reduced to whether or not a Q head carries an EPP that is responsible for a functional projection QP (see An, 2017 for a more detailed explanation). The difference in the derivation of wh-questions between English and Korean is sketched below under Chomsky's (2000, 2001) probe-goal system.

(3) a. Q-projection in English

$[_{QP} [_{DPi} WH_{[\text{u}\cancel{\text{QWH}}\cdot\text{QWH}]}] [_{Q'} [Q_{[QWH, \cancel{\text{EPP}}]}] [_{DPi} t]]]$

b. Derivation of simplex wh-question in English by QP-movement

$[_{CP} [_{QPi} WH_{[\cancel{\text{uQWH}}\cdot\text{QWH}]} Q_{[QWH, \cancel{\text{EPP}}]}] [_{C'} C_{[\cancel{\text{uQWH}}\cdot\text{QWH}, \cancel{\text{EPP}}]} ... [_{vP} v [_{QPi} t]]]]$

(4) a. Q-adjunction in Korean

$[_{DP} [_{DP} WH_{[\cancel{\text{uQWH}}\cdot\text{QWH}]}] [Q_{[QWH]}]]$

b. Derivation of simplex wh-question in Korean by Q-movement

$[_{CP} [_{C'} C_{[\cancel{\text{uQWH}}\cdot\text{QWH}, \cancel{\text{EPP}}]} Q_{i[QWH]} ... [_{vP} v [_{DP} [_{DP} WH_{[\cancel{\text{uQWH}}\cdot\text{QWH}]}] t_i]]]]$

In (3), the Q-particle takes the wh-word as its complement, and the $[uQ_{WH}]$ on the wh-word is valued by the $[Q_{WH}]$ on the Q-particle, projecting the QP. Then the wh-word undergoes movement to Spec of QP to satisfy the EPP on the head Q for PF consideration. This QP is probed by the $[uQ_{WH}]$ on the interrogative C, attracting the entire QP to Spec of CP.

In (4), on the other hand, the Q-particle is adjoined to the wh-word; thus, it is the DP that merges with the vP. The $[uQ_{WH}]$ on the wh-word is valued by the $[Q_{WH}]$ on the Q-particle. The $[uQ_{WH}]$ on the interrogative C probes and agrees with the $[Q_{WH}]$ on the Q-particle. The EPP on the C is satisfied by moving the Q-particle to C head position.

2.2 Condition C account of the SCO effect

It has been generally assumed that the SCO effect is reduced to Condition C of the Binding Theory, treating a wh-trace as a phonetically null R-expression (Chomsky, 1981). That is to say, a wh-trace cannot be c-commanded by a pronoun that has the same index. This explains the contrast in (6).

(6) a. Who$_i$ does he$_{*i/j}$ think Yengmi love t_i?
    b. Who$_i$ t_i thinks he$_{i/j}$ loves Yengmi?

In (6a), the wh-trace is c-commanded by the pronoun *he* that has the same index, violating Condition C. In (6b), on the other hand, the wh-trace c-commands *he*, and so the coreferential interpretation is available on the basis of Reinhart's generalisation, which states that a pronoun can only be bound from a c-commanding A-position (Reinhart, 1983).

Within the minimalist framework, however, features are basic materials for structure building. I adopt the minimalist feature-based approach to binding advanced by Hicks (2009). On this account, a binding relation involves a

[VAR(IABLE)] feature. Building on Hicks (2009), I suggest that the features relevant to binding in SCO configurations involve a [VAR] feature, and an [OP(ERATOR)] feature. In this system, a wh-word is argued to have a set of variables (e.g. x, y, z) since the [VAR] value for a wh-word is underspecified for referents; the [VAR] value for a pronoun, by contrast, is assumed to be specified for referents. A Q-particle is assumed to bear the [OP] feature. I further assume that Condition C serves as an evaluator to review whether a derivation yields proper interpretation at LF (Chomsky & Lasnik, 1993). To form a proper binding relation at LF, I adopt the LF binding condition defined in Lasnik and Stowell (1991).

(7) The LF Binding Condition (LBC)
    A pronoun P is construed as a variable bound by a quantifier Qu only if Qu binds P at LF. X binds Y if and only if X and Y are coindexed, and X c-commands Y.

In case of the SCO, for example, the LBC will check whether the wh-word c-commands the pronoun. In addition to this, Condition C will evaluate whether the copy of the wh-word is c-commanded by the pronoun at LF, assuming Chomsky's (1995) Copy Theory of movement.

The above-mentioned binding algorithm is now ready for the SCO configuration (6a) with its LF representation.

(8) a. Who$_i$ does he$_{*i/j}$ think Yengmi loves t_i?
    b. [$_{CP}$ [$_{QPi}$ Who$_{[VAR:\ x,\ y,\ z]}$ Q$_{[OP:\ QWH]}$] [$_C$ [$_{TP}$ [$_{DPj}$ he$_{[VAR:\ x]}$] [$_T$ [$_{vP}$ [$_{DPj}$ t] [$_v$ think] [$_{CP}$ [$_{QPi}$ t] [$_C$ [$_{TP}$ Yengmi [$_T$ [$_{vP}$ [$_v$ loves] [$_{QPi}$ t]]]]]]]]]]]]]

In (8), *who* is assumed to carry a valued [VAR: x, y, z] feature, and *he* is assumed to carry a valued [VAR: x] feature. At LF, *who* c-commands *he*, and yet

the interpretation of (8) cannot be determined since there are still the copies left by QP-movement for further scrutiny. The indexical values on the copies of *who* and *he* is now evaluated for interpretation. Upon detecting the same [VAR: x] between *who* and *he*, Condition C kicks in and excludes the coreference between *who* and *he* since the copy of *who* (i.e. t_i) is c-commanded by the copy of *he* (i.e. t_j) within its binding domain. As a result, the coreferential interpretation between *who* and *he* cannot be achieved; instead, by filtering the [VAR: x] out at LF, *he* is interpreted as disjoint in reference.

On the other hand, no crossover effect is assumed to be observed in Korean wh-questions. The sentences (9a)-(9b) are equivalent to English sentences (6a)-(6b) in meaning respectively.

(9) a. Ku$_{*i/j}$-nun   Yengmi-ka   nwukwu$_i$-t_k-lul   salanghan-ta-ko
       he-Top   Yengmi-Nom   who-Acc   love-Ded-Comp
       sayngkakha-ni$_k$?
       think-Q
       'Who does he think Yengmi loves?'

   b. Nwu(kwu)$_i$-t_k-ka   ku$_{*i/j}$－ka   Yengmilul   salanghan-ta-ko
       who-Nom   he-Nom   Yengmi-Acc   love-Dec-Comp
       sayngkakha-ni$_k$?
       think-Q
       'Who thinks he loves Yengmi?'

It appears that Korean does not allow coreference between *nwukwu* 'who' and *ku* 'he'; the interpretation of *ku* 'he' is disjoint in reference (Hong, 1985). Since Q-movement in Korean permits the wh-word to remain in situ, the SCO constraint is not responsible for the absence of coreference between the wh-word and the pronoun in Korean. The unavailability of the coreference between *ku* 'he' and *nwukwu* 'who' in Korean can be attributed to Montalbetti's (1984) Overt Pronoun

Constraint.

    (10) Overt Pronoun Constraint (OPC)

        An overt pronoun cannot link to a formal variable if and only if the alternation empty/overt obtains.

  Put simply, the OPC disallows an overt pronoun to be construed as a variable bound by a wh-word or a quantifier in pro-drop languages. Korean is a pro-drop language where an overt pronoun is replaced by a null pronoun *pro*, and so the OPC is applicable to (9).

  A possible learning problem ahead of Korean speakers of English is then reduced to whether they project a QP that is responsible for a binding relation in SCO configurations; otherwise, Korean speakers of English may not distinguish the allowed and disallowed interpretation of wh-questions in English.

III. Experiment

3.1 Participants

  56 participants participated in the experiment: 37 monolingual Korean speakers of English to serve as an experimental group and 19 monolingual native speakers of British English to serve as a control group. All the control participants were students at UK universities. As for the experimental participants, 34 were students at universities in the UK or Korea, and the other three were working professionals living in the UK. The participants' background information is summarised in Table 1.

Table 1 Summary of Participants' Background Information

Group[a]	Age M	Age Range	Gender Male	Gender Female	OE M	OE Range	LOR M	LOR Range
Korean	31.5	18-52	12	25	10.4	6-14	3.1	0.9-16
English	23.9	20-41	14	5	N/A	N/A	N/A	N/A

Note. OE = onset of English learning in year; LOR = length of residence in English-speaking countries in year. [a]Korean (n = 37); English (n = 19).

The Korean speakers were further divided into two subgroups on the basis of their performance on the proficiency test. Their proficiency in English was determined by the Quick Placement Test (QPT, Oxford University Press, 2001). The results of the QPT are present in Table 2.

Table 2 Mean Scores on the QPT

Group[a]	M	SD	95% CI LB	95% CI UB	Min	Max
KA	52.2	3.5	40.3	54.0	48	58
KI	42.4	2.3	41.4	43.4	38	46

Note. CI = confidence interval; LB = lower bound; UB = upper bound. [a]KA = Korean advanced (n = 15); KI = Korean intermediate (n = 22).

The data in Table 2 show that the KA group (mean score = 52.5) has a high level of competence compared with the KI group (mean score = 42.2). An independent-samples t-test performed on the QPT scores confirms that the KA group's QPT scores differ significantly from the KI group's scores, $t(35) = 9.93$, $p = .000$.

3.2 Test design and procedure

A truth value judgement task, adopted from Crain and Thornton (1998), was

designed to test the SCO constraint in Korean-English interlanguage grammar. Each test item consisted of a brief story and a corresponding question-answer pair. 12 experimental items were created and combined with 24 fillers, giving a total of 36 items. The test items were manipulated by two variables: question type (SCO question vs. NSCO question) and answer type (disjoint referent vs. coreferent). Both variables were balanced. The target stimuli are illustrated in Figures (1) and (2).

The SCO question (11) appeared with either a disjoint referent answer (12a) or a multiple coreferent answer (12b). The question-answer pair was accompanied by the context given in Figure 1. In the SCO trials, the disjoint referent answer was set up as a true judgement; the multiple coreferent answer was set up as a false judgement. The purpose of the SCO questions is to establish whether the participants disallow the coreferential interpretation between the pronoun and the wh-word.

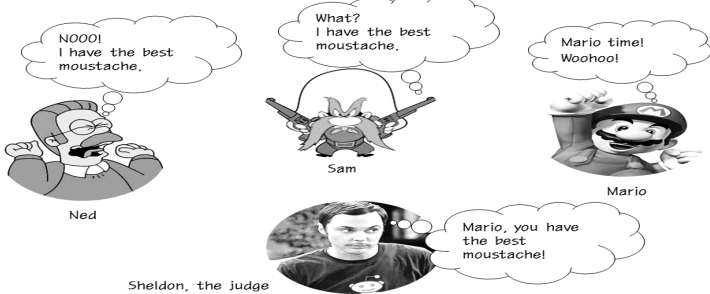

Figure 1. A Sample Context for SCO Trials

(11) Question Type

Who did he say had the best moustache? (SCO question)

(12) Answer Type

a. Mario. (disjoint referent)

b. Ned and Sam. (multiple coreferent)

On the other hand, the NSCO question (13) appeared with either a single coreferent answer (14a) or a multiple coreferent answer (14b). The question-answer pair co-occurred with the context given in Figure 2. In the NSCO trials, both single and multiple coreferent answer were set up as a true judgement. The purpose of the NSCO questions is to investigate whether the participants allow the coreferential interpretation between the pronoun and the wh-word.
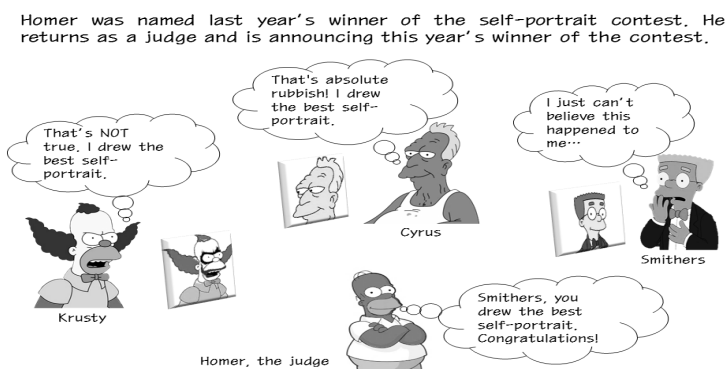

Figure 2. A Sample Context for NSCO Trials

(13) Question Type

Who said he drew the best self-portrait? (NSCO question)

(14) Answer Type

a. Homer. (single coreferent)

b. Krusty and Cyrus. (multiple coreferent)

The experiment was run on a laptop PC, using PowerPoint presentation with animated slides. Each test item consisted of two slides: a story and a corresponding question-answer pair. Participants were then asked to judge whether the question-answer pair is true or false, based on the story. If they chose false, participants were asked to write a correct answer on the answer sheet. During the

experiment, participants were allowed to go back to the story that they just read in order to check their understanding, but they were not allowed to navigate the previous items they had already judged. The target items were presented with the fillers in a quasi-random order.

IV. Results and Discussion

Consider, first, whether Korean speakers of English allow coreference between the pronoun and the wh-word, which is absent from their L1. The results for NSCO trials, where coreference between the pronoun and the wh-word is permitted, are shown in Table 3.

Table 3 Mean Rates of Acceptance for Disjoint Referent and Coreferent Answers in NSCO Questions

| Group[a] | Disjoint referent answers | | | Coreferent answers | | |
| | *M* (*SD*) | 95% CI | | *M* (*SD*) | 95% CI | |
		LB	*UB*		*LB*	*UB*
NC	2.7% (6.4)	-0.4	5.8	94.7% (9.7)	90.0	99.4
KA	2.3% (6.0)	-1.0	5.6	94.4% (10.3)	88.7	100.1
KI	1.5% (5.0)	-0.7	3.8	88.6% (20.2)	79.6	97.6

Note. CI = confidence interval; *LB* = lower bound; *UB* = upper bound. [a]NC = native control (n = 19); KA = Korean advanced (n = 15); KI = Korean intermediate (n = 22).

A noticeable observation is that all the three groups accept coreferent answers in NSCO questions at considerably high rates: 95% in the NC group, 93% in the KA group, and 89% in the KI group. By contrast, disjoint referent answers in NSCO questions are accepted at notably low rates: 2.7% in the NC group, 2.3% in the KA

group, and 1.5% in the KI group. A one-way ANOVA performed on the answer types shows that the between-group effect is not significant for coreferent answers, $F(2, 53) = 1.07$, $p = .35$, and for disjoint referent answers, $F(2, 53) = .021$, $p = .82$.

Importantly, Korean speakers' performance on the NSCO questions is worth noting. As discussed in Subsection 2.2, Korean does not allow bound use of pronouns; nevertheless, both KA and KI group have substantially higher rates of acceptance of coreferent answers than disjoint referent answers in the NSCO questions. Wilcoxon signed rank tests confirm that the within-group differences are statistically significant ($p = .000$). This indicates that a target-like application of binding mechanism is operative in Korean-English interlanguage grammar.

Turning to SCO trials where coreference between the pronoun and the wh-word is not allowed, the relevant data are presented in Table 4.

Table 4 Mean Rates of Acceptance for Disjoint Referent and Coreferent Answers in SCO Questions

| Group[a] | Disjoint referent answers | | | Coreferent answers | | |
| | M (SD) | LB | UB | M (SD) | LB | UB |
		95% CI			95% CI	
NC	83.3% (30.9)	68.4	98.2	13.3% (26.4)	0.5	26.0
KA	61.0% (39.1)	39.4	82.6	34.6% (35.8)	14.8	54.4
KI	25.8% (35.5)	10.0	41.5	63.7% (40.3)	45.8	81.5

Note. CI = confidence interval; *LB* = lower bound; *UB* = upper bound. [a]NC = native control (n = 19); KA = Korean advanced (n = 15); KI = Korean intermediate (n = 22).

The data in Table 4 reveal that the NC group accepts disjoint referent answers but rejects coreferent answers in SCO questions: the NC group has considerably higher rates of acceptance for disjoint referent answers (83.3%) compared with coreferent answers (13.3%). A Wilcoxon signed rank test shows that this within-group difference is statistically significant ($p = .001$). The KA group also

appears to distinguish between disjoint referent answers and coreferent answers in SCO questions: the KA group has relatively high rates of acceptance for disjoint referent answers (61%) compared with coreferent answers (34.6%), yet the within-group difference is not statistically significant ($p > .05$).

By contrast, no differentiation between the two answer types in SCO questions is observable in the KI group. This group has considerably lower rates of acceptance for disjoint referent answers (25.8%) compared with coreferent answers (63.7%). The within-group difference is statistically significant ($p < .05$). In addition, the KI group's low rates of acceptance for disjoint referent answers are quite distinct from the high rates of acceptance for disjoint referent answers by the other two groups. A one-way ANOVA performed on the answer types confirms that the between-group effect is significant for disjoint referent answers, $F(2, 53) = 14.05$, $p = .000$, and for coreferent answers, $F(2, 53) = 10.78$, $p = .000$. Games-Howell *post hoc* tests show that the KI group significantly differs from the other two groups ($p < .05$). No significant difference is found between the KA and NC group ($p > .05$).

Descriptively, however, the KA group's rates of acceptance for disjoint referent answers are relatively low compared with the NC group. One factor contributing to this quantitative variation may be due to computational complexity or processing difficulties; that is, L2 speakers may have target syntactic representation, but in certain interface phenomena their performance is affected by computational complexity of the target structure (Hawkins, 1999; Hopp, 2007; Reinhart, 2006). In fact, the computational complexity occurs in parsing SCO questions due to filler-gap dependency. By way of explanation, wh-extraction from the matrix subject position is less complex than wh-extraction from the embedded subject position; that being so, processing of SCO questions is not cost-free. For this reason, some of the advanced speakers may be tempted to use the options available in their L1 such as wh-scrambling. By employing wh-scrambling, they may apply Condition B to the pronoun at the surface structure as in NSCO questions. Thus

the quantitative variation between the KA and NC group on SCO trials can be attributed to performance factors such as processing difficulties or computational complexity.

Additional evidence is found by examining the KA group's distinct response patterns between SCO and NSCO questions. The relevant data are given in Table 5.

Table 5 Response Patterns between SCO and NSCO Questions

Group[a]	Disjoint referent answers		Coreferent answers	
	NSCO	SCO	NSCO	SCO
NC	2.7% ⟶	83.3%	94.7% ⟶	13.3%
KA	2.3% ⟶	61.0%	94.4% ⟶	34.6%
KI	1.5% ⟶	25.8%	88.6% ⟶	63.7%

Note. Arrows indicate the changes of acceptance rates in each question type. [a]NC = native control (n = 19); KA = Korean advanced (n = 15); KI = Korean intermediate (n = 22).

The data in Table 5 show that the KA group's acceptance rates of coreferent answers decrease sharply in SCO questions. Looking at the response pattern the other way around, their acceptance rates of disjoint referent answers increase significantly in SCO questions. This conveys the implication that coreference between the pronoun and the wh-word is reanalysed by the SCO effect. The KA group is sensitive to the structural distinction between SCO and NSCO questions. The KA group does not answer randomly.

In short, the KI group is seen to assign the same interpretation to both SCO and NSCO questions. The SCO constraint is not operative at the intermediate levels of acquisition due to the lack of QP-movement (i.e. movement of wh-word). By contrast, the KA group demonstrates target-like response patterns on both question types. At the advanced levels of acquisition, the SCO constraint operates in a very straightforward manner. The L2 groups' performance on SCO trials is exactly as expected according to Ladiere's FRH discussed in Section I.

V. Conclusion

The present study demonstrates that the SCO constraint is operative in Korean-English interlanguage grammar. The findings have the implication that L1 knowledge is not the main determinant of L2 development. Furthermore, the present study provides the empirical evidence that feature reconfiguration is attainable at the advanced levels of acquisition, supporting the FRH perspective on L2 acquisition (Ladiere, 2009). In other words, high experience L2 speakers utilise target grammatical knowledge into interpretive interface knowledge, which in turn conveys the implication of UG involvement in L2 syntax-semantics interface. Importantly, the findings suggest that L2 speakers have an immediate access to knowledge of phenomena at the syntax-semantics interface of the target language while L2 parsing difficulties intervene their performance.

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Youngjae An (Jeonju University/Instructor)
Address: Department of British and American Language and Culture
         Jeonju University, 303, Cheonjam-ro, Wansan-gu, Jeonju-si, Jeollabuk-do, 55069, South Korea
Email: youngjae.an@gmail.com