Non-ATB Violations of the CSC in English: A Constraint-Based Approach*

Sae-Youn Cho

(Honam University)

Cho, Sae-Youn. 2004. Non-ATB Violations of the CSC in English: A Constraint-Based Approach. *The Linguistic Association of Korea Journal, 12*(3), 191-205. This paper is mainly concerned with non-ATB violations of the CSC in English. Though previous analyses have attempted to account for the phenomena related to coordination in a systematic way, they do not seem to provide a neat explanation for the non-ATB violation phenomenon at issue. In this paper, I claim that following Postal (1998), whether or not ATB violations can be allowed depends on the lexical information of 'and' which can be ambiguous between a conjunctive and an adjunct complementizer. I claim that the ATB and the CSC hold as syntactic constraints in English, since non-ATB violations of the CSC are attested only when the phrases with *and* instantiate a *head-adjunct* structure.

Key Words: the ATB, the CSC, coordination, sequential, adjuncts, 'and'

1. Issues

It is well known that in disallowing an illegal extraction from a coordinate structures such as (1), Ross (1967) has proposed the use of the so-called Coordinate Structure Constraint (CSC) as in (2).

(1) a. *Who is Johnny proud of his mother and tired of ___ ?
    b. *What did Marcia see the lion and ____ ?

---

(2) The Coordinate Structure Constraint (CSC)
    In a coordinate structure, no conjunct may be moved, nor
    may any element contained in a conjunct be moved out of
    that conjunct.

The fact that coordinate structures such as (3), where all conjuncts
containing a gap require the same filler, can be well-formed, however,
shows that the CSC is too strong. To avoid this difficulty, Ross (1967)
has provided the Across-The-Board (ATB) constraint as in (4).

(3) Which car did Susan buy __, OJ borrow __, and Tim wreck __ ?
(4) The Across-The-Board Rule (ATB)
    There is an important class of rules to which the CSC does
    not apply. These are rule schemata which move a constituent
    out of all the conjuncts of a coordinate structure.

                                                    Ross (1967:107)

But Lakoff (1986) has argued that the ATB constraint on extraction
from coordinate structures of Ross (1967) is not a syntactic constraint
but a semantic or pragmatic one, since ATB violations occur when
conjuncts are interpreted sequentially, as shown by the contrast between
(5a) and (5b).

(5) a. Which whisky did Johnny go to the store and buy __ ?
    b. *What does Johnny like apples and hate __ ?

Similarly, ATB violations of the CSC such as (5a) can also be found in
the data provided by Goldsmith (1985) as seen in (6).

(6) How many lakes can we destroy __ and not arouse public
    antipathy?

Though previous analyses have attempted to account for the
non-ATB violations of the CSC above in a systematic way, they do not

seem to provide a neat explanation for the phenomenon at issue. In this paper, we claim that following Postal (1998), whether or not ATB violations can be allowed depends on the lexical information of 'and'. Specifically, 'and' can be ambiguous between an adjunct complementizer, which maps the phrase with *and* into an adjunct phrase, and a conjunctive, which maps the phrase *and* into a coordinate structure. This can be summarized as follows:

(7) The distinction of two *and*s (English)

	Type A *and*	Type B *and*
1) Function (sequential)	adjunct complementizer	conjunctive
2) Meaning	*after, cause & effect, nonetheless*	*and*
3) Structure	Head-Adjunct(Modifier)	Coordinate
4) Constraints	N/A	CSC & ATB

Though it is true that the ATB violations are allowed only when the coordination receives a sequential reading, a claim made here is that the distinction between sequential and non-sequential reading in the coordination in (5-6) is a distinction made by syntax. This enables us to maintain the claim that the ATB and the CSC hold as syntactic constraints in English, since non-ATB violations of the CSC are attested only when the phrases with *and* instantiate a *head-adjunct* structure.

This paper is organized as follows: In section 2, I provide some linguistic properties of the phrase with *and* at issue to support the claim that the phrases with *and* can be ambiguous between a conjunct and adjunct analysis. In section 3, I briefly review the previous analyses of the phrase with *and* such as HPSG (1994) and Cho (1996), and point out the theoretical and empirical problems. Section 4 shows how to implement the generalizations from the properties of *and* into HPSG (2003). In conclusion, I suggest that the analysis proposed here can account not only for the non-ATB phenomenon but also the ATB and the CSC in syntax.

2. Properties of Phrases with 'and'

As Postal (1998) points out, there are at least 3 types of 'and' functioning as adjunct complementizers in English: 'after (=and then)', 'cause & effect' and 'and nonetheless'. The relevant data for each type of 'and' are as follows;

    (8) <u>'After (=And-Then)' Type (Type 1)</u>
        The stuff which$_i$ Arthur sneaked in and stole ___$_i$ ...
    (9) <u>'Cause & Effect' Type   (Type 2)</u>
        That is the drug which$_i$ athletes take ___$_i$ and become strong.
    (10) <u>'Nonetheless' Type   (Type 3)</u>
        How many dogs$_i$ can a person have ___$_i$ and still stay sane?
                                  (Lakoff (1986))

First of all, the 'After' Type can be iterated only if an event denoted by the preceding phrase and the following events denoted by the preceded phrases constitute a natural course of events. This constraint enables us to correctly predict that sentence (11) is grammatical.

    (11) What did he go to the store, buy, load in his car, drive home, and unload?

This iterability test shows us that the 'After' type *and* seems to be similar to the typical conjunctive *and* in the sense that both can be iterated. However, the 'After' type *and* disallows sentences like (12), where two events are hardly sequential.

    (12) *What does Mary like the glove and hate __ ?

Unlike the 'After' type, the others, i.e. 'Cause & Effect' and 'Nonetheless' type, may not be iterated.

Second, though a conjunction phrase is switched with another conjunction phrase in a coordinate structure, the reading of the whole

sentence generally does not change as in (13). But if a phrase with one of the three types of 'and' is switched with another phrase, i.e. main VP, in a sentence, the reading of the whole sentence can be either changed or be made unacceptable as in (14).

(13) a. Johnny likes apples and Marcia hates pineapples.
     b. Marcia hates pineapples and Johnny likes apples.
(14) a. *That is the drug which$_i$ athletes become strong and
       take ___$_i$.
     b. ??How many dogs$_i$ can a person stay sane and
       have ___$_i$?

Third, unlike typical coordination delivering non-sequential reading, the three types of 'and' share a common property of having a sequential reading, though they have their own specific meanings such as 'and-then'. In other words, the three types of adjunct complementizer *and* deliver 'And-then', 'Cause & Effect' and 'Nonetheless' which eventually form a sequential reading.

To be a preferred theory of Non-ATB phenomenon in English, the linguistic properties of the phrases with the adjunct complementizer *and* should be accounted for.

3. Previous Analyses: A Constraint-Based Approach

3.1. Pollard & Sag (1994)

Pollard & Sag (1994) have provided two alternative coordination principles to predict the grammaticality of coordinate structures. The strong and the weak versions of the coordination principle are outlined in (15) and (16), respectively.

(15) **Coordination Principle (strong version)**
     In a coordinate structure, the CATEGORY and NONLOCAL
     value of each conjunct is identical to that of the mother.

(16) **Coordination Principle (weak version)**
In a coordinate structure, the CATEGORY and NONLOCAL value of each conjunct daughter is subsumed by (is an extension of) that of the mother.

Pollard & Sag (1994: 202-203)

The strong version of the coordination principle in (15) wrongly predicts that non-ATB violations of the CSC like (17) are unacceptable, even though it correctly predicts the examples of ATB extraction such as (18) are acceptable while non-ATB violations of the CSC like (19) are not. Although (17) and (19) are the examples of non-ATB extraction, this version cannot differentiate one from the other, since by the definition of (15), both conjuncts should share the same SLASH (NONLOCAL) value. Hence, this version can deal with examples of the CSC and the ATB by Ross (1967), whereas it cannot correctly predict the grammaticality of non-ATB violations.

(17) Which glove did Johnny go to Macy's and buy __ ?
(18) The glove, Marcia likes __ and Johnny hates __ .
(19) *The glove, Marcia loves her voice and Johnny likes __ .

On the other hand, the weak version of the coordination principle in (16) wrongly predicts that non-ATB violations of the CSC like (19) are acceptable, though it correctly predicts that (17) and (18) are acceptable. This is because by the definition of (16), the SLASH value of the mother of the coordinate structure in (19) can subsume that of each conjunct daughter. Therefore, this version cannot distinguish (17) from (19).

In short, both principles cannot correctly predict the grammaticality of non-ATB violations of the CSC. They are either too weak or too strong.

3.2. Cho (1996) Based on Lakoff (1986)

Following Lakoff (1986), Cho (1996) has proposed a modified version of the coordination principle in HPSG in order to avoid the difficulties faced by Pollard & Sag (1994). On the basis of the observation that non-ATB violations are limited to VP coordination in English, Cho has questioned Lakoff (1986)'s claim that sequentiality is the only key factor.[2] Instead, his basic strategy of dealing with the phenomenon at issue is to adopt Lakoff's idea and the syntactic generalization that all apparent violation cases are VP coordination and implement them into a new Coordination principle in HPSG. Specifically, if *and* is assumed to encode no information about reading in the lexicon, and VP as a category value is specified in CATEGORY, and the fact that the events in conjunction can be sequential in the world is provided by CONTEXT and CONTENT, then the mother of VP coordination as in (20) is construed to be sequential VP coordination so that the sentence need not observe the CSC.

(20) Sequential VP Coordination (AVM)

$$
\begin{bmatrix}
\text{CAT} \begin{bmatrix} \text{HEAD} & verb[\ ] \\ \text{SUBCAT} & <[1]> \\ \text{MARKING} & and[\text{CONTEXT } [2]] \end{bmatrix} \\
\text{CONTENT} \ [3][([4],[5])] \\
\\
\text{CONTEXT}|\text{BK} \begin{bmatrix} \text{be stative} \\ \text{ARG } [4] \\ \text{POL } 0 \end{bmatrix}, \begin{bmatrix} \text{be stative} \\ \text{ARG } [5] \\ \text{POL } 0 \end{bmatrix}, [2]\begin{bmatrix} \text{be sequential} \\ \text{ARG } [3] \\ \text{POL } 1 \end{bmatrix}
\end{bmatrix}
$$

---

2) Though Cho (1996)'s claim is accurate, Lakoff (1986) might account for why the Non-ATB violations seem to be limited. In other words, the events involving the same agent can be easily construed sequentially. This is the justification for claiming that VP coordination might easily undergo Non-ATB violations.

If one of these conditions is not met, then the AVM of the coordination cannot be construed as that of a sequential VP coordination, and therefore extraction from coordination must be prohibited. The basic idea can be expressed in HPSG by postulating the new Coordination Principle in (21-i) which is related to Non-ATB violations of the CSC.

(21) **Coordination Principle (modified version)**
   (i) In sequential VP coordination, the NONLOCAL value of the mother subsumes that of each conjunct daughter.

(Cho (1996))

In conjunction with (20), the clause (i) of the coordination principle in (21) by Cho (1996) can predict the contrast in grammaticality between (17) and (19). However, this analysis shares the same problems as Lakoff (1986). As Postal (1998) illustrated, the word 'and' can be varied with respect to the possibility of iterability. Second, whether the replacement of one conjunct with another is possible heavily depends on the type of 'and'. Third, as *and* delivers various sequential meanings depending on contexts, it is unclear what types of predications can belong to the concept 'sequentiality' in English. Fourth, it is not desirable that Cho (1996) has posited a sort of special coordination principle only for Non-ATB violations of the CSC. To be a fuller account of non-ATB violations, Cho (1996) would explain why 'and' exhibits the linguistic behaviors above.

4. A New Constraint-Based Analysis

On the basis of the hypothesis that phrases with 'and' may be either adjuncts or conjuncts as shown in (7), we will now present an analysis of these constructions within HPSG (2003).[3] In HPSG, adjuncts, i.e. modifiers, select their heads so that the MOD value of the adjunct is

---

3) The idea of this section has been presented in Cho (2004). However, the data analyzed in Cho (2004) is mainly Korean. So if the claim made here is tenable, I can say that the Non-ATB violations can be syntactically accounted for in both languages.

token-identical to the SYNSEM value of its head. Hence, the *head-modifier* rule in (22) licenses sentences containing the adjunct complementizer *and.*
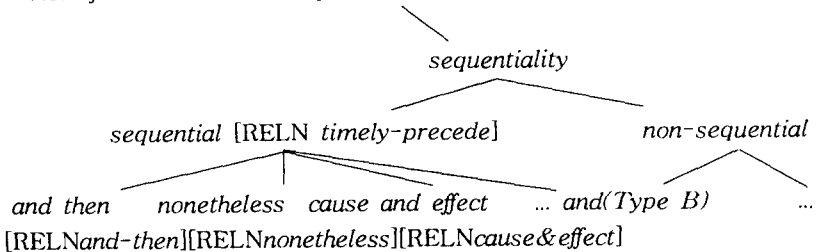
(7) The distinction of two *ands* (English)

	Type A *and*	Type A *and*
1) Function	(sequential) adjunct comp	conjunctive
2) Meaning	*after, cause & effect, nonetheless*	*and*
3) Structure	Head-Adjunct(Modifier)	Coordinate
4) Constraints	N/A	CSC & ATB

(22) **Head-Modifier Rule (Head-Adjunct Rule)**

$$[\textit{phrase}] \rightarrow H \; [1] \begin{bmatrix} \text{COMPS} & < \; > \\ \text{STOP-GAP} < \; > \end{bmatrix} \quad \begin{bmatrix} \text{COMPS} & < \; > \\ \text{MOD} & < 1 > \end{bmatrix}$$

Again, I need to specify what the RELATION of the adjunct *and* can have as its value, since the adjunct complementizer *and* may convey one of at least 3 different sequential readings. To do this, I propose the use of a partial type hierarchy for predication as in (23) and a lexical rule for the adjunct complementizer *and* whose type is 'and-then' as in (24).

(23) *feature structure - predication*

sequentiality

sequential [RELN *timely-precede*]   *non-sequential*

and then   nonetheless cause and effect   ... and(Type B)   ...
[RELN *and-then*][RELN *nonetheless*][RELN *cause & effect*]

(24) **Lexical Rule for Adjunct Complementizer *And***

$$
\text{INPUT} < [1], \begin{bmatrix} \text{SYN| HEAD} \begin{bmatrix} verb \\ \text{FORM} \ /non\text{-}finite \end{bmatrix} \\ \text{ARG-ST} \quad [B] \\ \text{SEM} \begin{bmatrix} \text{INDEX} \quad s1 \\ \text{RESTR} \quad [A] \end{bmatrix} \end{bmatrix} >
$$

$$
\text{OUTPUT} < [1], \begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} verb \\ \text{FORM} \quad /non\text{-}finite \\ \text{COORD} \quad - \end{bmatrix} \\ \text{VAL [MOD} <[4][verb \ s3\ ]>] \end{bmatrix} \\ \text{ARG-ST} \quad [B] \\ \text{SEM} \quad [\text{RELN} \ and \ then \ ] \oplus [A] \end{bmatrix} >
$$

The sequential reading of the sentence with any type of the adjunct complementizer *and* can be achieved in terms of (23), and a more specific reading would be based on which lexical rule is applied among 3 different *and* lexical rules.

As for the coordination cases, HPSG (2003) introduces a coordination rule as in (25), which can deal with the CSC and the ATB phenomena without an additional tool. In the lexicon, I assume the real conjunctive *and* as in (26).

(25) The Coordination Rule (Cf. HPSG (2003))

$$
\begin{bmatrix} \text{FORM} & [1] \\ \text{VAL} & [0] \\ \text{GAP} & [A] \\ \text{IND} & s0 \\ \text{RESTR} <[\text{ARGS} < s1...\ sn>]> \end{bmatrix} \quad \rightarrow
$$

$$
\begin{bmatrix} \text{FORM} & [1] \\ \text{VAL} & [0] \\ \text{GAP} & [A] \\ \text{IND} & s1 \end{bmatrix}
\begin{bmatrix} \text{FORM} & [1] \\ \text{VAL} & [0] \\ \text{GAP} & [A] \\ \text{IND} & sn\text{-}1 \end{bmatrix}
\left(\begin{bmatrix} \text{HEAD} & conj \\ \text{IND} & s0 \\ \text{RESTR}<[\text{ARGS}<s1 \ sn>] \end{bmatrix} \right)
\begin{bmatrix} \text{FORM} & [1] \\ \text{VAL} & [0] \\ \text{GAP} & [A] \\ \text{IND} & sn \end{bmatrix}
$$

(26) **Lexical Rule for Conjunctive _and_**

$$
\text{INPUT} \quad <[1], \quad
\begin{bmatrix} \text{SYN| HEAD} \ verb[\text{FORM} non\text{-}finite] \\ \\ \text{ARG-ST} \quad [B] \\ \text{SEM} \begin{bmatrix} \text{INDEX} & [4]s1 \\ \text{RESTR} & [A] \end{bmatrix} \end{bmatrix}
\quad >
$$

$$
\text{OUTPUT} < [1], \quad
\begin{bmatrix} \text{SYN} \begin{bmatrix} \text{HEAD} \begin{bmatrix} verb \\ \text{FORM} \quad non\text{-}finite \\ \text{COORD} \quad + \end{bmatrix} \\ \text{VAL} \quad [\text{MOD} \quad < \quad >] \end{bmatrix} \\ \text{ARG-ST} \ [B] \\ \text{SEM} \begin{bmatrix} \text{INDEX} \quad [2] \ s2 \\ \text{RESTR} < \begin{bmatrix} \text{RELN} & and \\ \text{SIT} & [2] \\ \text{ARG} <[4], \text{REST}> \end{bmatrix} >\oplus[A] \end{bmatrix} \end{bmatrix}
\quad >
$$

For clarity, I will demonstrate how the theoretical tools work for English Coordination. The coordination rule (25) enables us to represent a coordinate sentence as in (27). In the configuration of (27), the FORM value of the first conjunct, _finite_, is token-identical with that of the second conjunct. In addition, the VAL and GAP value of both conjuncts are the same. The GAP value can be construed as a trace value in the GB theory. This configuration satisfies all the requirements of the coordination rule, so the sentence, _Marcia likes apples and Johnny likes pineapples_, is predicted to be grammatical.

(27)

$$\begin{bmatrix} \text{FORM} & [0] \\ \text{VAL} & [1] \\ \text{INDEX} & s0 \\ \text{RESTR} & [A] \oplus [B] \oplus [C] \end{bmatrix}$$

$$\begin{bmatrix} \text{FORM} & [0] \\ \text{VAL} & [1] \\ \text{INDEX} & s1 \\ \text{RESTR} & [A] \end{bmatrix} \quad \begin{bmatrix} \text{HEAD} & conj \\ \text{INDEX} & s0 \\ \text{RESTR} & [B] \left\langle \begin{bmatrix} \text{RELN} & and \\ \text{SIT} & s0 \\ \text{ARGS} \langle s1, s2 \rangle \end{bmatrix} \right\rangle \end{bmatrix} \quad \begin{bmatrix} \text{FORM} & [0] \\ \text{VAL} & [1] \\ \text{INDEX} & s2 \\ \text{RESTR} & [C] \end{bmatrix}$$

Marcia likes apples   and   Johnny hates pineapples
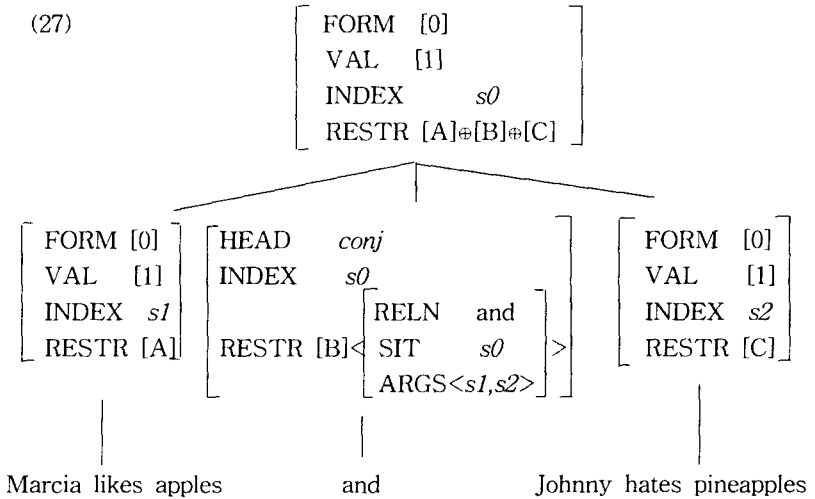
Sentence (12), where it violates the CSC, is also correctly predicted to be ungrammatical because the GAP value of the two conjuncts is different, as illustrated in (28).

(12) *What does Mary like the glove and hate __ ?

(28)   * VP[GAP ??]

VP[GAP [1] < >] CONJ   VP[GAP [2]< NP>]

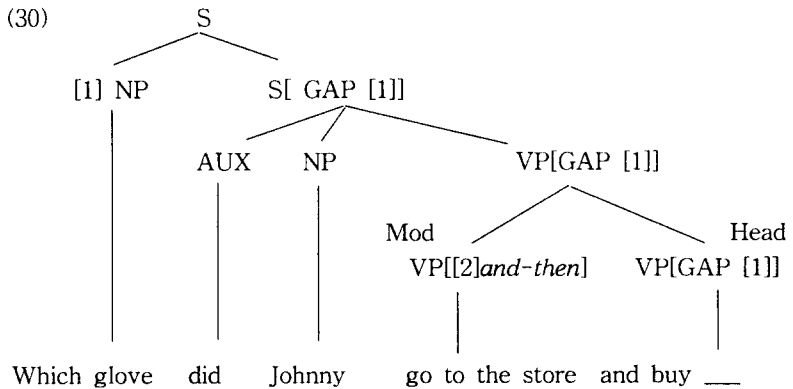like the glove   and   hate ___
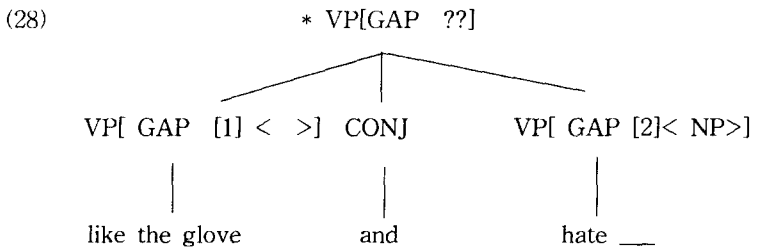
The ATB case in (18), in which all conjuncts have the same GAP value, is predicted to be grammatical by the definition of the coordination rule. Under this analysis, sentence (18) can be represented as in (29).

(18) The glove, Marcia likes ___ and Johnny hates ___ .

(29)   [GAP [1] <NP>]

     [GAP [1]<NP>] CONJ   [GAP [1] <NP>]

     Marcia likes ___   and   Johnny hates ___
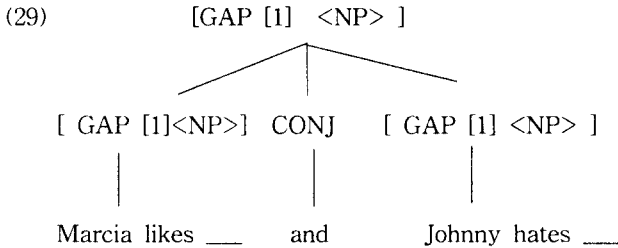
On the basis of a sort hierarchy, the Head-Modifier Rule and the Lexical rules in (22-24), I will provide an analysis of Non-ATB violations of the CSC in HPSG. An NP contained in a sequential adjunct phrase with *and* in a sentence can be preposed out of the phrase, only when the sentence receives a sequential reading. Further, I have claimed that the extraction is attested only when the phrases with *and* at issue instantiate *head-adjunct* structures conveying some predication as a subtype of *sequential* in (23). Given (22-24), I can represent sentence (17), an example of the so-called non-ATB violations of the CSC, as in (30).

(17) Which glove did Johnny go to Macy's and buy __ ?

(30)   S

     [1] NP   S[GAP [1]]

          AUX   NP   VP[GAP [1]]

                         Mod   Head
                         VP[[2]*and-then*]   VP[GAP [1]]

     Which glove did Johnny   go to the store and buy ___

Sentence (17), where an NP is extracted from the final VP, is predicted to be grammatical under my analysis, since it satisfies the requirements of (22-24). Specifically, the NP extracted out of the VP in (30) is permissible since the two VPs instantiate a *head-adjunct* structure so that it need not obey the coordination principle in HPSG (2003). Thus, extraction in (30) is legitimate.

5. Conclusion

On the basis of the hypothesis that the word 'and' may be either an adjunct complementizer or a conjunctive, I have argued that the Non-ATB violations of the CSC in English can be predicted by syntactic structures, rather than by appeal to semantics or pragmatics. This explains various linguistic behaviors of 'and' in non-ATB violations of the CSC. This shows that English coordination cannot be accounted for in the manner suggested by Lakoff (1986), though his key concept 'sequentiality' still plays an important role. Hence, English coordination observes the ATB and CSC constraints as syntactic constraints. Furthermore, Postal (1998) has claimed that the three types of *and* suggested by Lakoff (1986) can be syntactically defined, which is summarized in (7). If Postal (1998)'s analysis is on the right track, I could claim that the Non-ATB violations of the CSC can be explained in HPSG (2003), which enables us to account for the CSC and the ATB in English without additional constraints. Therefore, I might claim that coordination in English observes the ATB and CSC constraints as syntactic constraints, suggesting that Non-ATB violations are a subcase of extraction out of *head-adjunct* structures.

References

Cho, Sae-Youn. (1995). Untensed phrases in Korean verbal coordination. *Harvard Studies in Korean VI*, 157-172. Department of Linguistics, Harvard University, Cambridge.

Cho, Sae-Youn. (1996). *Non-Constituent Coordination As A Subtype of Constituent Coordination.* Ph. D dissertation. University of Illinois at Urbana-Champaign.

Cho, Sae-Youn. (2004). Sequentiality and Non-tensed Verbal Coordination in Korean. To appear in the Proceedings of the 30th *BLS*.

Goldsmith, John. (1985). A Principled Exception to the Coordinate Structure Constraint. *CLS 21*, Part I. Chicago: Chicago Linguistic Society.

Lakoff, George. (1986). Frame Semantic Control of the Coordinate Structure Constraint. *CLS* 22. Chicago: Chicago Linguistic Society.

Pollard, Carl and Ivan Sag. (1994). *Head-Driven Phrase Structure Grammar.* Chicago: University of Chicago Press.

Postal, P. Martin. (1998). *Three Investigations of Extraction.* MIT Press, Cambridge, Mass.

Ross, John. (1967). *Constraints on Variables in Syntax.* Ph.D dissertation. MIT. Distributed by Indiana University Linguistics Club: Bloomington.

Sag, Ivan A., T. Wasow, and Emily M. Bender. (2003). *Syntactic Theory: A Formal Introduction.* 2nd Edition. CSLI Publications.

Sae-Youn Cho
Department of English Language and Literature
Honam University
59-1, Seobong-dong, Gwangsan-gu,
Gwangju, 506-714, Korea
E-mail: sycho@honam.ac.kr
Fax: +82-62-940-5116