Korean auxiliary verb constructions have led to much controversy concerning how they can be analyzed. In analyzing this construction there have been at least two approaches: one is a syntactic approach, including the bi-clausal analysis and the VP analysis. The other is a lexical approach, including the compound verb analyses. Recently many papers on this auxiliary construction have taken either the bi-clausal analysis or the compound verb analyses without specifying why other alternatives cannot be good candidates. This paper presents the VP hypothesis to account for auxiliary constructions and argue that this analysis provides a simpler explanation of various phenomena related to this construction than the bi-clausal or the compound verb analyses.

1. Introduction

This paper provides an analysis of Korean auxiliary verb constructions under the Head-Driven Phrase Structure Grammar (hereafter, HPSG) framework. The data in (1) show various types of auxiliary constructions in Korean where the first one of the bold strings in the data is either a verb (e.g. ilk-e in (1a)) or an adjective (e.g. yeypass-e in (1b)), and the second one is an auxiliary verb (e.g. po-ass-ta in (1a)).

   -N book-A read-Comp try-P-Dec
   'Mary tried to read a book.'

   -N pretty-Comp become-P-Dec
   'Mary became pretty.'

c. Mary-ka yeypass-e poi-ass-ta.
   -N pretty-Comp seem-P-Dec
   'Mary seemed to be pretty.'

d. Mary-ka chayk-ul ilk-na po-ta.
   -N book-A read-Comp seem-Dec
   'Mary seems to read a book.'

e. Mary-ka chayk-ul ilk-eya ha-n-ta.
   -N book-A read-Comp must-Pres-Dec
   'Mary must read a book.'

f. Mary-ka chayk-ul ilk-ko iss-ta.
   -N book-A read-Comp be-Pres-Dec
   'Mary is reading a book.'
There has been much controversy concerning the constructions in (1), centering on two problems. One is the question of which phrasal categories, such as VP or S, each auxiliary verb subcategorizes for. The other is how to handle the morphological requirements for the subcategorized elements by each auxiliary verb (AUX). For example, po-ass-ta in (1a) always requires a preceding verb with the suffix -e. If the preceding verb has a different suffix such as -eya in (1e), the sentence is ungrammatical, as in *Mary-ka chayk-ul ilk-eya po-ass-ta. Recently many papers on Korean linguistic phenomena in HPSG, including Yoo 1993, assume that the two italicized strings in (1) are a compound verb, where the AUX is only a part of the compound verb, without specifying any reason why AUX does not constitute an independent category.

This paper will show that if AUX is assumed to be an independent category which subcategorizes for a VP and a NP (=Subject), the AUX constructions in (1) can be sufficiently explained in the HPSG framework. In addition, this analysis can deal with the morphological requirements for the subcategorized elements, such as the restrictions on the occurrence of tense suffix and the suffix form (Comp).

The arguments of this paper are organized in three main sections. In section 2, three competing hypotheses, the compound verb hypothesis, the bi-clausal hypothesis and the VP hypothesis, are presented. The primary claim of the VP hypothesis, that the AUXs in (1) are an independent category, will be motivated by arguments regarding the scope interpretation in coordination structures in section 2.1.1, the distributional properties of kuray+verb constructions in section 2.1.2, and verbal fronting (V^2) in section 2.1.3.

Section 2.2 argues for AUX as an independent category by presenting arguments showing that AUX subcategorizes for a VP rather than a S in various environments. Section 2.2.1 demonstrates that negative polarity item (NPI) requirements do not provide evidence that AUX would subcategorize for a S. Section 2.2.2 also demonstrates that the reflexive caki-ka + Verb in the AUX constructions does not necessarily constitute a S, thus posing no problems for the AUX subcategorization proposal. Rather, the arguments can be used as evidence that AUX subcategorizes for a VP.

Section 3 identifies two required verbal suffixes, Comp and tense, for the subcategorized VP, which will be integrated into a formalized account of AUX subcategorization in section 4. Consequently, if an AUX subcategorizes for a VP and a NP, a unified and intuitive explanation for the AUX constructions is possible.

2. Constituency tests

There have been at least three analyses of the AUX constructions in (1): bi-clausal analysis by many early transformationalists, VP analysis by Park 1990 and compound verb analyses by Cho 1988, Sells 1991 and Yoo 1993. For each analysis described below, there is a representation of (1a), which demonstrates that analysis's structural claims.
The bi-clausal analysis regards AUX as a category subcategorizing for a S and a NP (Subject) where the S has a trace or PRO depending on the AUXs; if the AUX is an equi-verb, the gap is a PRO but if it is a raising verb, then it is a trace. The analysis treats the verb ilk-e as the verb of the embedded clause [ø chayk-ul ilk-e], whereas the AUX po-ass-ta is treated as the verb of the main clause, as shown in (2).

(1a) Mary-ka chayk-ul ilk-e po-ass-ta. -N book-A read-Comp try-P-Dec
'Mary tried to read a book.'

(2) Bi-clausal analysis

\[
\begin{array}{c}
S \\
\mid NP \downarrow VP \\
\mid S \downarrow V \\
\mid NP \downarrow VP \\
\mid NP \downarrow V \\
\end{array}
\]

Mary-ka PRO chayk-ul ilk-e po-ass-ta

In this analysis the correct surface structure can be derived in terms of Equi-NP Deletion, since the AUX po-ass-ta is an equi-verb.7 On the other hand, if the AUX in a sentence is a raising verb like iss-ta the surface structure can be derived by Subject-to-Subject Raising. This analysis is called bi-clausal because (1a) has two sentences where one is a main clause and the other is an embedded one, as shown in (2).

The VP analysis regards the AUX as a category subcategorizing for a VP and a NP. This analysis treats the VP chayk-ul ilk-e as a complement of the AUX po-ass-ta, so that the constructions like (1a) have no embedded sentence as shown in (3) on the next page.

Unlike the bi-clausal analysis this does not postulate on empty category in the constructions. The difference between equi and raising AUXs can be distinguished by the semantic CONTENT of AUXs.

Finally, there are two different Compound analyses: Cho 1988 and Sells 1991. Sells 1991 claims that the AUX and the preceding verb syntactically form a compound verb so that the compound verb subcategorizes for two NPs to account for the example in (1a). In this analysis ilk-e and po-ass-ta are each members
(3) VP analysis

of a lexical category but syntactically form a compound verb *ilk-e po-ass-ta* as shown in (4).

(4) Complex verb analysis by Sells 1991

Similarly to Sells 1991, Cho’s 1988 analysis also regards two verbs as a compound verb, where the compound verb subcategorizes for two NPs to explain the example in (1a). However, Cho claims that the suffixed element *ilk-e* is a gerundive nominal and that this gerundive nominal and the verb *po-ass-ta* morphologically form a compound verb *ilk-e-po-ass-ta* as in (5).

(5) Compound verb analysis by Cho 1988

Both compound verb analyses differently predict the possibility of the occurrence of adverbs between the AUX and the preceding verb since they have dif-
ferent compound formations. Under Sells' 1991 analysis any adverb modifying the AUX can occur between the two because each part of the compound verb is a bar-level 0 category. But Cho's 1988 analysis predicts that no adverb modifying the AUX can occur between the two because the compound verb is morphologically formed so that nothing can be placed in front of the AUX.

Despite their differences in category assignment and compound formation, they make similar claims about constituency of the AUX constructions. Therefore, they will be grouped together as the Compound Verb analysis.

The following sections will argue that the VP analysis is more plausible than the compound verb or bi-clausal analysis in accounting for the AUX constructions in (1).

2.1. Evidence against compound verb analysis

2.1.1. Coordination and scope problems

The VP analysis provides a simpler analysis for the ambiguity of sentences with VP coordination than does the compound verb analysis. VP coordinations with AUX are possible in Korean as shown in (6). A sentence with VP coordination like (6) can have two different interpretations. (7) and (8). To have the correct readings the AUX in (7) must have scope over the VP *pap-ul mek-e* while the AUX in (8) must have scope over the whole conjoined VP *chayk-ul ilk-ko pap-ul mek-e*.

-N book-A read-and rice-A eat-Comp try-P-Dec

'John read a book and tried to have a meal.' OR

'John tried to read a book and have a meal.'

-N book(s)-A read-and rice-A eat-Comp try-P-Dec

'John read a book and tried to have a meal.'

'John tried to read a book and have a meal.'

John-i chayk-ul ilk-ko pap-ul mek-e po-ass-ta

-N book-A read-and rice-A eat-Comp try-P-Dec

'John tried to read a book and have a meal.'
If *po-ass-ta* in (6) is an AUX which subcategorizes for a VP, the structures and their interpretations like (7) and (8) can both be derived from (6). If the object of the AUX *po-ass-ta* in (6) is the VP *pap-ul mek-e*, then its interpretation must be *John read a book and tried to have a meal*, like (7), whereas if the AUX takes the whole conjoined VP *chak-ul ilk-ko pap-ul mek-e* as its object its interpretation must be *John tried to read a book and have a meal*, as in (8).

However, the compound verb analysis cannot predict that the sentence in (6) can have two interpretations, since it provides a representation as shown in (9). Under the compound verb analysis *po-ass-ta* is a part of the verb *mek-e po-ass-ta* as shown in (9), not an independent constituent.

Thus, the structure and meaning in (8) cannot be derived from (6). If the compound verb analysis is taken as correct, an additional explanation for why (7) is possible while (8) is not must be provided. Such an explanation will not be needed under the VP analysis to deal with VP coordination with AUX.

### 2.1.2. Kuray substitution

The VP analysis predicts the possibility of substituting a VP for the word *kuray+suffix* in Korean while the compound verb analysis does not. An interroga-
tive like (10a) may be answered with a sentence like (10b), where a VP like *pap-ul mek-ess-ni* may be replaced with the word *kuray+suffix*. Thus the word *kuray-ess-e* in (10b) as an answer for the interrogative sentence (10a) can be used instead of the VP *pap-ul mek-ess-e*, which is like *do so* constructions in English.

(10) a. Mary-ka [pap-ul mek-ess-ni]VP?
   -N rice-A eat-P-Q
   'Did Mary have a meal?'

b. ung, Mary-ka kuray-ess-e.
   yes, -N do so-P-Dec
   'Yes, Mary did so.'

Similarly, VPs with AUXs can also be replaced by the word *kuray+suffix* as shown in (11b-c), while AUXs alone cannot be replaced by it, as in (11d).

(11) a. Mary-ka [(pap-ul mek-e)VP cwu-ko]VP iss-ni?
   -N rice-A eat-Comp give-a-favor-of be-Q
   'Is Mary giving a favor of having a meal?'

b. ung, Mary-ka kule-ko iss-e.\(^9\)
   yes, -N do so be-Dec
   'Yes, Mary does so.'

c. ung, Mary-ka kuray cwu-ko iss-e.
   yes, -N do so give-a-favor-of be-Dec
   'Yes, Mary gives a favor of doing so.'

d. *ung, Mary-ka pap-ul mek-e kule-ko iss-e.
   yes, -N rice-A eat do-so be-Dec
   'Yes, Mary does so of having a meal.'

As answers for the interrogative sentence containing a raising AUX *iss* in (11a), the sentence (11b) has the word *kule-ko* replacing the VP *pap-ul mek-e cwu-ko* in (11a) and the sentence (11c) has the word *kuray* replacing the VP *pap-ul mek-e* in (11a). On the other hand, the AUX *cwu-ko* in (11a) cannot be replaced by the word *kule* in (11d) since it is not a VP. Thus the distributional behavior of *kuray* can be accounted for if the VP analysis is chosen.

In addition, the fact that sentences (12b-c) are acceptable answers for (12a) but (12d) is not also shows that the word *kuray+suffix* can replace only VPs, not AUXs alone.

(12) a. Mary-ka [(pap-ul mek-e)VP po-ass-ni]?
   -N rice-A eat-Comp try-P-Q
   'Did Mary try to have a meal?'

b. ung, Mary-ka kuray po-ass-e.
   yes, -N do so try-P-Dec
   'Yes, Mary did try to do so.'

c. ung, Mary-ka kuray-ass-e.
   yes, -N do so-P-Dec
   'Yes, Mary did so.'
d. *ung, Mary-ka pap-ul kuray po-ass-e.
  yes, -N rice-A do-so try-P-Dec
  'Yes, Mary did so of having a meal.'

As answers for the interrogative sentence containing an equi AUX po-ass-ta in (12a), the sentence (12b) has the word kuray replacing the VP pap-ul mek-e in (12a) and the sentence (12c) has the word kuray-ass-e replacing the VP pap-ul mek-e po- in (12a). But the AUX mek-e in (12a) cannot be replaced by the word kuray in (12d) because it is not a VP. Again, the distributional behavior of kuray can be sufficiently explained if the VP analysis is taken as the correct analysis.

However, if the compound verb analysis is chosen, an explanation must be provided for how a part of a verb can be replaced by the word kuray as in (11b-c) and (12b-c) and why the verb cwu-ko or mek-e cannot be replaced by kule or kuray in (11d) and (12d).

Furthermore, there is another compound verb, cap-e mek-ess-ni as in (13a), whose constituents cannot be replaced by the word kuray as seen in (13b-c).

(13) a. John-i thokki-lul [cap-e mek-ess-ni?].
   -N rabbit-A catch-(Comp) eat-P-Q
   'Did John catch and eat a rabbit?'
    yes, -N do so eat-P-Dec
    'Yes, John did so and ate.'
    yes, -N catch do so-P-Dec
    'Yes, John caught and did so.'

Under the VP analysis, (13b) and (13c) are not possible answers to the interrogative sentence (13a) because cap-e mek-ess-ni in (13a) is not a phrase (VP) but a single word (verb). Thus a part of the verb, like cap-e or mek-ess-e, cannot be replaced by the word kuray as in (13b) or (13c). Again, the compound verb analysis requires additional restrictions in order to account for why a part of a compound verb in (13a) cannot be replaced by the word kuray as in (13b) and (13c).

Therefore, the distributional restrictions of the word kuray under the VP analysis follow from the generalization that VPs can be replaced by the word kuray.

2.1.3. V^2 fronting

The VP analysis also provides a simpler analysis of verb phrase fronting than the compound verb analysis. Verbal phrases like a VP or S can be fronted when the gap is filled with the verb ha- as in (14), whereas the lexical category V^0, mek-ki-nun, cannot be fronted as shown in (15).

(14) a. Mary-ka pap-ul mek-nun-ta.
    -N rice-A eat-Pres-Dec
    'Mary has a meal'
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b. \(\text{[pap-ul mek-ki-nun]}_{\text{VP}}\) Mary-ka \(\emptyset\) han-ta.\(^{10}\)
   rice-A eat-NM-T ......N do-Dec
   'It is Mary who has a meal.'

c. \([\text{Mary-ka pap-ul mek-ki-nun}]_{\text{S}}\) \(\emptyset\) han-ta.
   -N rice-A eat-NM-T do-Dec
   'Mary has a meal.'

\[\text{(15) *[mek-ki-nun]}_{\text{V}}\] Mary-ka pap-ul \(\emptyset\) han-ta.
   eat-NM-T -N rice-A do-Dec
   'Mary has a meal.'

Since the VP \(\text{pap-ul mek-nun-ta}\) in (14a) is fronted, (14b) is acceptable. In the same way, (14c) is also acceptable because the S \(\text{Mary-ka pap-ul mek-nun-ta}\) in (14a) is fronted. However, (15) is unacceptable since the lexical category \(\text{(V}^0\text{)}\) \(\text{mek-nun-ta}\) in (14a) cannot be fronted.

Either a VP with an AUX as in (16c) or a VP without an AUX as in (16b) can be fronted. The possibility of VP fronting without AUX as in (16b) or with AUX in (16c) follows from a generalization that all \(\text{V}^2\) categories can be fronted in Korean under the VP hypothesis.

   -N rice-A eat-VForm must-Dec
   'Mary must have a meal.'

b. \([\text{pap-ul mek-ki-nun}]\) Mary-ka ha-eya han-ta.
   -A eat-NM-T -N must-Comp do-Dec
   'It is Mary who must have a meal.'

c. \([\text{pap-ul mek-eya ha-ki-nun}]\) Mary-ka han-ta.
   -A eat-Comp must-NM-T -N do-Dec
   'It is Mary who must have a meal.'

But under the compound verb analysis an additional restriction to explain why a compound verb like \(\text{mek-eya han-ta}\) in (16b) can be divided into two parts to be fronted is necessary.

Cho 1988 argues that the compound verb analysis is preferable because of the fact that scrambling of the VP subcategorized for by AUX is impossible and adverbs immediately preceding AUX are impossible. The HPSG analysis of this problem is in section 4.1.

2.2. Evidence against bi-clausal analysis

Once the compound verb hypothesis is found incorrect, it must be determined if the AUX subcategorizes for a S or a VP. Specifically, the problem here is whether the phrase \(\text{chayk-ul ilk-e}\) in (17=1a) is a S or a VP.

\[\text{(17}=1\text{a)}\] Mary-ka \([X \text{ chayk-ul ilk-e}]\) po-ass-ta.
   -N book-A read-Comp try-P-Dec
   'Mary tried to read a book.'

To show that the phrasal category that each AUX subcategorizes for is a S, the bi-clausal analysis provides two arguments. The first is based on negative po-
larity items. The second concerns the occurrences of caki-ka in the X position of (17). However, the VP analysis is more plausible than the bi-clausal analysis because these two arguments actually support the VP analysis rather than the bi-clausal analysis.

2.2.1. Negative polarity items (NPIs)

The VP analysis provides a simpler analysis for the distributional behaviour of NPIs than the bi-clausal analysis. Negative polarity items such as amwukes-to must occur with a negative element (Neg) like anh- within the same clause, as shown in (18) and (19). The sentences in (18a) and (19a) are acceptable because the NPI amwukesto and the Neg anh-ass-ta co-occur in the same clause. But (18b) and (19b) are unacceptable because (18b) has no Neg in the sentence and (19b) has no Neg in the embedded clause with the NPI.

(18) a. [Mary-ka amwukesto mek-ci anh-ass-ta].
   -N anything eat Neg-P-Dec
   'Mary ate nothing.'

   b. *[Mary-ka amwukesto mek-ass-ta].
      -N anything eat-P-Dec
      'Mary ate nothing.'

(19) a. [Mary-ka amwukesto mek-ci anh-ass-ta-ko]
   -N anything eat Neg-P-Dec-Comp
   John-i (Sue-lul) seltukha-ess-ta.
   -N -A persuade-P-Dec
   'John persuaded Sue that Mary ate nothing.'

   b. *[Mary-ka amwukesto mek-ass-ta-ko]
      -N anything eat-P-Dec-Comp
      John-i (Sue-lul) seltukha-ci anh-ass-ta.
      -N tell-P-Comp Neg-P-Dec
      'John persuaded Sue that Mary ate nothing.'

Examples (18) and (19) show that the clause-mate constraint, which specifies that a NPI must occur with a Neg in the same clause, is needed to explain the constructions.

The AUX constructions with a NPI as in (20) are also possible. Under the VP analysis (20a) and (20b) are predicted as grammatical because the phrases amwukesto mek-ci anh-a in (20a) and amwukesto mek-e in (20b) are VPs where the NPI in each VP observes the clause-mate constraint.

    -N anything eat Neg try-P-Dec
    'Mary tried not to eat anything.'

       -N anything eat try Neg-P-Dec
       'Mary didn't try to eat anything.'
Thus, under the VP analysis, the AUX constructions with a NPI follow from the generalization that a NPI must occur with a Neg in the same clause.

On the other hand, the bi-clausal analysis predicts that the italicized words *amwukesto mek-ci anh-ass-ta* in (20a) are a S because the AUX *po-ass-ta* subcategorizes for a S. If the strings are a S and the NPI observes the clause-mate constraint, the grammaticality of (20a) can be accounted for. Still, the analysis wrongly predicts that (20b) is ungrammatical, because the NPI in the S *amwukesto mek-e* violates the clause-mate constraint. There are two possible solutions to this problem. One is that the Tensed S Condition (TSC) is invoked to explain the behaviour of NPIs, instead of the clause-mate constraint. Because the embedded S *amwukesto mek-e* in (20b) has no Tense and TSC restricts the co-occurrence of the NPI and the Neg to a sentence with Tense, TSC can correctly predict that (20b) is grammatical. The other solution is to treat sentences like (20b) as scrambled constructions so that they still seem to observe the clause-mate constraint on NPIs. If the NPI *amwukesto* in (20b) is adjoined to the embedded S by Scrambling, the NPI can occur with the Neg in the same clause. This solution makes the correct prediction for the grammaticality of (20b). However, these alternatives are not preferable.

If the bi-clausal analysis takes Tensed S Condition as the proper constraint to deal with the AUX constructions with a NPI, instead of the clause-mate constraint, the differences in acceptability between (18b & 19b) and (20b) can be accounted for as follows. Even though all three sentences with the NPI *amwukesto* do not have a Neg in the same clause, (20b) is possible because the S *amwukesto mek-e* has no Tense, thereby not violating TSC, whereas (18b) and (19b) are impossible because each clause with a NPI has a Tense and thus violates TSC.

However, examples like (20b) show that although there is a tensed clause with a NPI but no Neg within the same clause, the sentence can be grammatical. The bi-clausal analysis in conjunction with TSC predicts that (21a) is acceptable because the NPI in the embedded S subcategorized for by the AUX *ha*- in (21a) does not violate TSC. But it wrongly predicts that (21b) is unacceptable because the NPI in the embedded S violates TSC.

-N anything eat-Comp Neg-P-Comp must-P-Dec  
'Mary must not have eaten anything.'

-N anything eat-P-Comp must-Comp Neg-P-Dec  
'Mary didn't have to eat something.'

Therefore, this solution is not a good candidate to account for these constructions.

With the second solution of the bi-clausal analysis the clause-mate constraint is regarded as correct, but the structure for (20b) is considered scrambled. The NPI *amwukesto* as the object of the verb *mek-e* in (20b) can be analyzed like (22), where it does not move at all, or it may be treated as a scrambled structure like (23), where the NPI moves to the sister of the embedded S.
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(20b) Mary-ka amwukesto mek-e po-ci anh-ass-ta.
     -N anything eat try Neg-P-Dec
'Mary didn't try to eat anything.'

(22) Mary-ka$_i$ [PRO$_i$ [amwukesto mek-e]$_{vp}$]$_S$ po-ci anh-ass-ta.

(23) Mary-ka$_i$ [amwukesto$_i$ [PRO$_i$ [t$_j$ mek-e]$_{vp}$]$_S$]$_S$ po-ci anh-ass-ta.

If (20b) has a structure like (23), in which the NPI amwukesto is adjoined to the embedded S in terms of scrambling, the NPI belongs to the higher S so that it observes the clause-mate constraint. Thus the bi-clausal analysis does not need any modification for these constructions.

However, there are examples which show that even though we treat some sentences as scrambled to make a NPI occur with a Neg within the same clause, these sentences cannot be grammatical. The sentence in (24) is unacceptable, even if the NPI is scrambled to occur with a Neg within the same clause. Under the bi-clausal analysis, in conjunction with the Scrambling solution, (19b) is unacceptable because the NPI in the embedded sentence violates the clause-mate constraint. On the other hand, (24) should be acceptable because when the NPI in the embedded sentence is adjoined to the S in terms of Scrambling, and it belongs to the higher S which has a Neg, it does not violate the clause-mate constraint. Yet (24) is still unacceptable.

(19b) *[Mary-ka amwukesto mek-ass-ta-ko]
     -N anything eat-P-Dec-Comp
     John-i (Sue-lul) seltukha-ci anh-ass-ta.
     -N tell-P-Comp Neg-P-Dec
'John persuaded Sue that Mary ate nothing.'

(24) *amwukesto$_i$, John-i (Sue-lul) [Mary-ka
     anything -N -A -N
     ø$_i$ mek-ass-ta-ko]$_S$ seltukha-ci anh-ass-ta.\)
     eat-P-Dec-Comp persuade-Comp Neg-P-Dec

The Scrambling solution, thus, is also not a good candidate to account for these constructions.

Again, if the bi-clausal analysis is taken to explain the AUX constructions, NPI restrictions are necessary, but under the VP analysis such restrictions are not necessary.

2.2.2. The occurrence of caki-ka

The VP analysis can correctly predict the occurrence of reflexive caki-ka in Korean while the bi-clausal analysis cannot. For the bi-clausal analysis claims that, as in example (25), the reflexive caki-ka is the subject of the embedded sentence, where only PRO and the reflexive caki-ka can occur in the X position of (17=1a).\) Conversely, the VP analysis claims that the reflexive is not the subject of the embedded sentence [X chayk-ul ilk-e ] but an adjunct to modify the subject Mary-ka in (17=1a).
On the basis of Sells' 1993 claim that the reflexive caki-ka and PRO can occur in the X position as in (25c-d) but a R-expression and Pronominal cannot as in (25a-b), the Bi-clausal analysis can claim that the reflexive caki-ka is the subject of the embedded sentence so that the phrase [X chayk-ul ilk-e] constitutes a S as in (26). If this is true, the occurrence of caki-ka in the subject position can support the Bi-clausal analysis, and the VP analysis, assigning (17) a structure like (27), must explain why the VP [chayk-ul ilk-e] in the AUX constructions can have a reflexive subject.

   -N self-N book-A read-Comp try-P-Dec
   'Mary herself tried to read a book.'

   -N self-N book-A read-Comp try-P-Dec
   'Mary herself tried to read a book.'

However, there are examples showing that the reflexive with a subject case marker caki-ka can freely occur as an adjunct in a sentence. The examples (28a-b), where the reflexive caki-ka occurs as an emphatic expression modifying the subject, show that the reflexive with a subject marker need not always be regarded as a subject. The subject of cohaha-ess-ta (‘liked’) in (28a) is Mary-ka, and in (28b) the subject of the embedded sentence is Mary-ka and that of the higher S is John-i. The reflexive caki-ka in (28) is an adjunct which modifies Mary-ka in (28a) and John-i/un in (28b).

    -N self-N -A like-P-Dec
    'Mary herself liked John.'

    -T/N self-N -N sleep-Dec-Comp tell-P-Dec
    'John himself said that Mary slept.'

To deal with the emphatic reflexive the Bi-clausal analysis must allow both a structure like (29), for (25c) where the reflexive caki-ka is the subject of the embedded clause, and a structure like (30) for (28a). Since the subject of the sentence (30) is not caki-ka but Mary-ka, the structure in (30), where caki-ka is an adjunct, is necessary.

On the other hand, the VP analysis needs only one structure like (27) for (25c) and (28), because this analysis regards the reflexive caki-ka in (25c) and (28) as an adjunct.

The difference in grammaticality between (31a) and (31b) shows that the VP analysis predicts the correct structure for the AUX constructions with the emphatic reflexive caki-ka. The fact that the multiple occurrences of the emphatic reflexive caki-ka in a sentence with AUX are not possible, as in (31a), shows that the string pap-ul mek-e in (31a) cannot be a S. However, the sentences with one emphatic reflexive and one reflexive as the subject of the embedded sentence are grammatical as in (31b).

   -N/-T self-N self-N rice-A eat-Comp try-P-Dec
   'Mary herself tried to have a meal.'

b. Mary-nun/ka caki-ka caki-ka (kacang) yeypputa-ko
   -T/-N self-N self-N the most pretty-Comp
   malha-n-ta.14
   tell-Pres-Dec
   'Mary herself says that she is pretty.'

Under the VP analysis, the structure of (31a) is regarded as (32a) and the structure of (31b) must be (32b). So this analysis correctly predicts that (32a) is unaccept-able but (32b) is acceptable. The sentence (32a) is unaccept-able because both reflexives caki-ka in (32a) are adjuncts modifying the subject Mary, where one of them is redundant. But the sentence (32b) is acceptable because the first caki-ka in the higher S is an adjunct and the second is the subject of the embedded sentences subcategorized by the verb malha- ('say').

   -N/-T self self rice eat-Comp try-P-Dec
   'Mary herself tried to have meal.'

b. [Mary-nun/ka caki-ka [caki-ka (kacang) yeyppu-ta-ko]s
   -T/-N self-N self-N the most pretty-Comp
   malha-n-ta]s.
   say-Pres-Dec
   'Mary herself says that she is pretty.'

The Bi-clausal analysis wrongly predicts that both (31a) and (31b) are acceptable, because this analysis predicts that the first caki-ka in (31a) and (31b) is an adjunct and the second is the subject of the embedded S, as shown in (33). Thus the Bi-clausal analysis must specify additional restrictions to explain why (31a) is ungrammatical and (31b) is grammatical.
The VP analysis needs no such restrictions. Therefore, the VP analysis makes correct predictions and is preferable, whereas the Bi-clausal analysis does not make correct predictions.

3. Morphological Requirements for the VP

When an AUX subcategorizes for a VP, the VP has at least two restrictions on the suffix form: a restriction on the existence of tense, and a restriction on the suffix form for the Comp.

First of all, the fact that only a VP with the correct suffix for the Comp can be grammatical shows that each AUX subcategorizes for the VP with a specific suffix for the Comp. The sentence (34a) is acceptable because the AUX *po-ass-ta* requires a VP with the Comp -e and the verb *ilk* within the VP has the Comp -e.; (34b-d) are excluded because the requirement for the Comp is not satisfied. For example, (34b) is ungrammatical because the verb *ilk* has the wrong Comp -eya. Similarly, the sentence (34’a) is acceptable because the AUX *ha-n-ta* requires a VP with the Comp -eya and the verb *ilk* within the VP has the Comp -eya. But (34’b-d) are unacceptable because the requirement for the Comp is not satisfied.

     -N book-A read-Comp try-P-Dec  
     'Mary tried to read a book.'

(34’) a. Mary-ka chayk-ul ilk-0-eya ha-n-ta.  
     -N book-A read-Pres-Comp must-Pres-Dec  
     'Mary must read the book.'
 b. *Mary-ka chayk-ul ilk-e ha-n-ta.
 c. *Mary-ka chayk-ul ilk-key ha-n-ta.
 d. *Mary-ka chayk-ul ilk-ci ha-n-ta.

Secondly, the fact that some AUXs require a tensed verb while some do not shows that each AUX subcategorizes for a VP but the existence of the tense suffix within the VP depends on the AUX. The sentence (35a) is acceptable because the verb *ilk-e* does not have a Tense suffix, whereas (35b) is unacceptable because the verb *ilk-e* has a tense suffix. On the other hand, if the AUX is *hanta* the verb *mek-eya* in the VP must have a tense suffix as in (36).

     -N book-A read-Comp try-P-Dec  
     'Mary tried to read a book.'
     read-P-Comp
(36) a. Mary-ka pap-ul mek-o-eya ha-n-ia.
   -N rice-A eat-Pres-Comp must-Pres-Dec
   'Mary must have a meal.'

     b. Mary-ka pap-ul mek-ess-eya ha-n-ia.
         eat-P-Comp

To account for these morphological problems there are at least two approaches: the lexical approach and the syntactic approach. The syntactic approach assumes that there are several syntactic nodes, such as INFL Phrase (IP), where the AUX may or may not subcategorize for a IP, instead of a VP or a S, in order to account for the requirement for the tense morpheme. The lexical approach treats the Tense requirement in terms of features in the syntax, where the feature and its value can play an important role in selecting the correct morpheme from the lexicon. The next section argues for the lexical approach to solve the inflectional problem (e.g. tense).  

3.2. Analysis of Tense and Comp in HPSG

If the AUX po-ass-ta subcategorizes for a VP and a NP, we can specify the subcategorization information in the SUBCAT of the lexical representation of AUX in HPSG, as shown in (37).

(37) |SUBCAT <NP[1], [2]VP |HEAD [3] |>
   |MARKING [4] | |
   |SUBCAT<NP[1]> | |

However, we need to indicate that the verb within the VP must have specific suffixes with respect to AUX. One way to ensure the matching of the morphological information between the VP and the verb is to treat tense information as a HEAD feature and to treat the information about Comp as a marker in HPSG. For example, when the AUX po-ass-ta takes a VP as an argument, the base verb form ilk- in the VP must have Comp -e but cannot have tense in grammatical sentences like (38).

(38)

In this case we can specify the information about the tense and the Comp for the VP in the subcategorization (SUBCAT) of (37). Once the morphological information is specified for [1]VP in (38), the information about tense must be identical.
with [2]V in (38). The HEAD Feature Principle (HFP) in HPSG, as shown in (39), specifies this condition.\(^\text{17}\)

(39) The HEAD Feature Principle.
In a headed phrase, the values of HEAD and HEAD-Daughter’s HEAD are token-identical.

The information about Comp is also specified on the VP in the SUBCAT in (37) as the MARKING feature and its value. If the value of MARKING is specified on [1]VP in the tree (38), the value triggers a sort head-marker-structure in terms of schema 4 in (40) and the value (Comp) is realized as a marker daughter.

(40) Schema 4: a phrase with DTRS value of sort head-marker-structure whose marker daughter is a marker whose SPEC value is structure-shared with the SYNSEM value of the head daughter, and whose MARKING value is structure-shared with that of the mother.

The sort hierarchy and feature declarations related to the information about tense and Comp, defined using the HFP and schema 4, as shown in (41-42). If the sort head as a value of the attribute HEAD in (42a) is a sort verb as a subset of substantive, the sort verb must have a tense value like P(ast) for the attribute TENSE as in (42b). Similarly, if the sort marking as a value of the attribute MARKING in (42a) is a sort complementizer as a subset of the sort marked, the sort complementizer must have a subset like -e.

(41) a. partition of head: substantive, functional
b. partition of substantive: noun, verb, adjective, ...
c. partition of tense: \(\emptyset, P(\text{ast}), \text{Pre}(\text{sent})\), ...
d. partition of functional: marker, determiner
e. partition of marking: unmarked, marked
f. partition of marked: complementizer (Comp), conjunction
g. partition of complementizer: -e, -key, -ci, -ko, ...

(42) a. category: 
| HEAD head |
| SUBCAT list(synsem) |
| MARKING marking |
| TENSE tense |

b. verb: [TENSE tense ]

Under the HPSG analysis, including the HFP in (39), Schema 4 in (40), the sort hierarchy in (41) and the feature declarations in (42), the new tree diagram (38') replaces (38). The tree (38') shows that [1]VP in the head-marker structure has a tag [3] as the value of the attribute HEAD, including the tense information which is also the value for [2]VP and [4]V, indicating that the value of HEAD of the three categories is token-identical. Thus, the structure satisfies the HFP, and the morphological requirements for tense can be dealt with in terms of the HFP. The morphological requirement for the Comp can be dealt with in terms of the head-marker schema in (40). If the AUX po-ass-ta subcategorizes for a VP with the Comp -e, the information for the Comp is specified as the MARKING feature and its value as shown in [1]VP of the tree (38') where the value of MARKING is structure-shared with that of mother, [1]VP, by the definition (40).
4. SUBCAT for AUX in HPSG

On the basis of the VP hypothesis and the morphological information for the VP, (43) shows the complete SUBCAT equi (type 1) and raising (type 2) AUXs in HPSG.

(43) AUX: TYPE1 (Equi)
   ex: po- ('try'), ...
   TYPE2 (Raising)
   ex: ci- ('become'), po- ('seem'),18 ha- ('must'), ...

The TYPE1 AUX po- ('try') as an equi-verb has a SUBCAT and a (semantic) CONTENT as shown in (44). The Attribute Value Matrix (AVM) (44a) specifies that the AUX needs a NP and a VP to be saturated and the values of COMP and TENSE for the VP are -e and 0, respectively. In addition, the SUBCAT in the VP indicates that the INDEX of the subject of the AUX and the VP must be identical. The AVM (44b) defines the CONTENT of the AUX po- where its RELATION try has two arguments. One is the COMMITTOR whose INDEX value is [1] and the other is the SOA-ARG whose value is a proposition.

(44) a. |SUBCAT <NP[1], [2]VP |HEAD |TENSE φ | |
     | |MARKING |COMP -e | |
     | |SUBCAT <NP[1]> | |
When the AUX is in a sentence like Mary-ka pap-ul mek-e po-ass-ta, NP[1] represents the NP Mary and the value of SOA-ARG is (45), where the INDEX [1] as a value of the argument role EATER refers to the INDEX of Mary and the INDEX [3] as a value of EATEN refers to that of pap-ul ('rice').

(45) SOA-ARG: | RELATION mek- ('eat') |
               | EATEN [3] |

The TYPE 2 AUX ci- ('become') has SUBCAT and CONTENT as shown in (46). The AVM (46a) specifies that the AUX ci- needs a NP and a AP[+PRD] to be saturated, and that the value of COMP for the AP is -e and that of TENSE must be 0. The SUBCAT of the AP also indicates that the INDEX of the subject of the AUX and that of the AP must be identical. The AVM (46b) defines the CONTENT of the AUX ci- where its RELATION become has only one argument, SOA-ARG.

(46)  a.  |SUBCAT <NP[1], [2]AP |HEAD |TENSE 0 |> |
          |                     |PRD+ | |
          |                     |SUBCAT <NP[1]> | |
          |                     |MARKING|COMP-e |

b.  |CONTENT | RELATION ci- ('become') |
     |        | SOA-ARG [2] |

When the AUX is in a sentence like Mary-ka yeypu-e ci-ass-ta ('Mary became pretty.'), the INDEX value of the subject NP of the AUX in SUBCAT refers to that of the NP Mary and the SOA-ARG in (46b) is as represented in (47). For the SOA-ARG in (47), the INDEX value of the argument role INSTANCE and that of the NP Mary in SUBCAT are identical.

(47) SOA-ARG: [2] | RELATION yeyp- ('pretty') |
               | INSTANCE [1] |

The AUX po- ('seem'), as a member of TYPE2, has a different SUBCAT than other members of TYPE 2 like ci- ('become'). Its SUBCAT takes a VP as one of its arguments while the AUX ci- ('become') needs a AP to be saturated. The lexical representation for the AUX po- ('seem') is as represented in (48). The SUBCAT in (48a) specifies that the AUX needs a NP and a VP to be saturated, the value of COMP for the VP is -na and the value of TENSE can be Pres(ent) or P(ast). Again, the AVM (48b) defines the CONTENT of the AUX po- where its RELATION seem has only one argument, SOA-ARG.

(48)  a.  |SUBCAT <NP[1], [2]VP |HEAD |TENSE Pres V P |> |
          |                     |     | |
          |                     |SUBCAT <NP[1]> |
          |                     |MARKING|COMP -na |
b.  | CONTENT  | RELATION po- ('seem')  |  |
   |          | SOA-ARG [2]            |  |

When the AUX exists in a sentence like *Mary-ka chayk-ul ilk-na po-ta* ('Mary seems to read a book'), the SOA-ARG in (48b) can be represented as in (49).

(49) SOA-ARG:  | RELATION  ilk- ('read')  |  |
             |     | READED [3]          |  |

4.1. Evidence against Phrasal analyses

Cho 1988 proposes an argument against Phrasal analyses on the basis of the impossibility of Scrambling of the VP subcategorized for by AUX and the impossibility of adverbs occurring in front of AUX. The following will show how these phenomena can be accounted for in HPSG.

Cho argues that (50a) can be scrambled in Korean, with the result (50b), whereas (51a) cannot be scrambled as in (51b). According to her explanation, (51b) is unacceptable because *mek-e po-ass-ta* in (51a) is a compound verb and the NP *pap-ul* and the verb *mek-e* cannot be a constituent, so that the string *pap-ul mek-e* cannot undergo Scrambling.

   John-top Suni-N go-P-Dec-Comp think-P-Dec
   'John thought Suni went away.'


   John-top rice-A eat-Comp try-P-Dec
   'John tried to have a meal.'


The evidence that the S *Suni-ka ka-ass-ta-ko* in (50) can be scrambled but the S *pap-ul mek-e* in (51) cannot is a crucial argument against the Bi-clausal analysis, because the difference in acceptability between (50b) and (51b) must be stipulated.

However, the VP analysis predicts that (50b) is possible while (51b) is impossible. The fact that the sentences, where predicative categories such as VP or AP[+PRD] or NP[+PRD] undergo Scrambling, are unacceptable shows that the VP subcategorized for by AUX also cannot undergo Scrambling. The sentence (52), which contains a small clause, is ungrammatical because the NP[+PRD] *papo-lul* is scrambled with the result in (52b). To deal with the scrambling problem in a small clause, Yoo 1993 proposes a Linear Precedence (LP) rule specifying that any predicative category cannot precede its subject, as shown in (53). This LP prevents the NP *Mary-lul* and the NP[+PRD] *papo-lul* in (52a) from Scrambling. The LP rule states that if there is any predicative category, like a VP, which needs only a SUBJECT to be saturated, that predicative category cannot precede the SUBJECT. So the independently motivated LP predicts that (50b) is possible and (51b) is not. In other words, the constituent *Suni-ka ka-ass-ta-ko* in
(50) is a S so that it has no need to observe the LP whereas *pap-ul mek-e is a VP under the VP analysis which must.

(52a) John-i Mary-lul *papo-lul/lo mantul-ess-ta.
    -N -A fool-A/PP -A make-P-Dec
    'John made Mary a fool.'

(52b) *John-i *papo-lul/lo Mary-lul mantul-ess-ta.20
    -N -A/PP -A make-P-Dec
    'John made Mary a fool.'

(53) [1] < [VALENCE|SUBJ|[1]>]

Under the VP analysis, the difference between (50b) and (51b) naturally follows from the LP. Therefore, the evidence in (50-51) is not a counter-example to the VP analysis but, rather, supports the claim that AUX subcategorizes for a VP, not a S, in Korean.

Cho 1988 also claims that adverbs like cacwu ('often') cannot occur in front of the AUX as shown in (54). On the basis of the fact that the adverb cannot intervene between the verb mek-e and the AUX po-ass-ta, she claims that the verb and the AUX form a compound verb so that the adverb cannot modify the AUX and argues that Phrasal analyses are implausible since this problem is difficult to solve under these analyses.

    -N -A eat-Comp often try-P-Dec
    'John often tried to have a meal.'

However, the fact that the adverb can occur between a verb and some AUX shows that her argument against Phrasal analyses is untenable. The sentence with the causative AUX ha-ta ('cause') is acceptable even if an adverb occurs between the two, as shown in (55).

(55) John-i chayk-ul ilk-key cacwu ha-n-ta.
    John-N book-A read often cause-Pres-Dec
    'John often causes someone to read a book.'

If sentence (54) is considered unacceptable but sentence (55) is considered acceptable, even though both sentences have an adverb modifying AUX, the argument for the Compound Verb analysis is not valid.21

Therefore, Cho's argument against Phrasal analyses is not tenable for the VP analysis.

5. Conclusion

The fact that, in spite of the Compound Verb analysts' claims, AUXs are an independent category has been shown through constituency tests such as scope interpretations, kuray + verb constructions and verbal fronting in sec 2.1. Section 2.2 showed that AUX subcategorizes for a VP rather than a S by demonstrating that against the Bi-clausal analysts' claims, sentences with NPI or the reflexive caki-ka can be evidence for the VP analysis. Thus, this supports the claim that the
VP analysis is more plausible than both the Compound Verb analysis and the Bi-clausal analysis in explaining the AUX constructions. Section 3 claimed that the morphological requirements for the VP can be accounted for in terms of the HFP and schema 4 only if tense and Comp are regarded as a value of HEAD feature and a marker, respectively. On the basis of section 2. and 3. section 4 presented the proposal for two types of AUXs, equi- and raising-AUX, under the HPSG framework.

Consequently, AUX constructions can be sufficiently accounted for by the VP analysis. Furthermore, the Compound Verb analysis must not be assumed to be the only hypothesis to explain these constructions in HPSG. Rather, if my analysis is chosen, the restrictions for the AUX constructions can be regarded as a subcase of the restrictions for the VP.

NOTES

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1 Following Choi 1971 I will call an auxiliary verb the last one of the italicized two sequencing verbs in the data. For example, po-ass-ta will be an auxiliary verb in (1a).

2 In this paper I refer to Pollard & Sag 1994 as HPSG 1994 and Pollard & Sag 1987 as HPSG 1987.

3 In describing Korean sentences, I will use the Yale Romanization System.

4 N stands for Nominative, A Accusative, Comp Complementizer, P Past, Pres Present, Dec Declarative, Neg Negation, Q Question, and T Topic.

5 Both VP and S are called V₂ in this paper.

6 Yoo 1993 simply adopts Sells' analysis in studying subcategorization in Korean.

7 My analysis will cover both raising and equi auxiliary verbs, even though in this paper I mainly deal with the AUX in (1a).

8 Sells 1991 proposes a semantic analysis of the scope problem. His analysis is based on the classification of event types of each AUX. However, it is not clear that his analysis can predict the scope problem in coordination.

9 Kule is a variant form for kuray.

10 NM stands for Nominalizing Suffix.

11 For me, (24) is unacceptable. Regardless of bridge verbs like sayngkakha- ('think') or non-bridge verbs like seltukha- in (24), the interpretation where the NPI negates the embedded sentence is almost impossible. However, I think we can get the interpretation where the NPI only negates the higher sentence. For example, (24) can have a interpretation like John didn't persuade Sue anything about the fact that Mary ate (something).
Sells 1993 claims that a Japanese phrase like \([X\ chayk-ul\ ilk-e]\) in (17=1a) is a sub-clause, showing the distributional behaviour of NP for the X position in (25).

The sentence (31a) may improve a little bit with a pause between two caki-ka. Still, it is unacceptable for me. On the other hand, (31b) is better in acceptability.

The verb *malha-* takes a NP, a S and an optional PP as its arguments.

I call my approach the lexical approach in that the information about the required suffixes is specified as features.

This tree is only an abbreviation for Attribute Value Matrix.

The definition of HFP in (39) is a simplified one to enhance the readability. The original definition of the HFP is as follows: The HFP.

In a headed phrase, the values of SYNSEM|LOCAL|CATEGORY|HEAD and DAUGHTER|HEAD-DAUGHTER|SYNSEM|LOCAL|CATEGORY|HEAD are token-identical. cf. HPSG (1994:491)

Even though the raising-AUX po-('seem') has the same phonological base form as the equi-AUX po- ('try'), the two AUXs are different words.

Cho 1988 uses the term *Phrasal analyses* to refer to both the VP analysis and the Bi-clausal analysis.

The PP stands for Postposition.

The question why (55) is good but (54) is bad is open to further study.

REFERENCES


