Word order and clause structure in Korean Sign Language*

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Abstract

In this paper, we identify the basic word order in Korean Sign Language (KSL) and establish the basic clause structure which generates the basic word order. We first suggest that word order plays a functional role in KSL, and argue from a typological point of view that KSL belongs to the class of languages which have the basic order of SOV. We then claim that words in KSL are organized into constituents by reviewing displacement possibilities, adverb hierarchy, structural ambiguity, and wh-clefting. Building on the conclusions about word order and constituent structure in KSL, we propose a basic clause structure in KSL, adopting the Functional Parametrization Hypothesis proposed by Fukui (1988) and the operation of short scrambling proposed by Takano (1998). In the course of discussion, we also offer an analysis of the puzzling incompatibility between a frequency or manner adverb and a tense auxiliary in certain types of clauses. The current paper not only serves as a base for future research on more complex constructions and syntactic phenomena in KSL, but it also provides an argument for the view that syntactic constituency is one of the defining characteristics of natural languages, regardless of their modality.

Keywords: Korean Sign Language, word order, head directionality, clause structure, constituency, split headedness, Functional Parametrization Hypothesis, short scrambling

1 Introduction

Most, if not all, signed languages that have been studied so far exhibit a great degree of variability in the surface order (Tervoort 1968, Fischer 1974/2008, Liddell 1980, Petronio 1991, Bouchard and Dubuisson 1995, Quadros 1999, S. Kim 2010, Quadros and Lillo-Martin 2010, Leeson and Saeed 2012, among many others). Korean Sign Language (KSL; or HS abbreviated from *Hankwuk Sue* 'Korean sign-language'), for instance, allows the transitive to have variable surface orders as exemplified in (1). In the examples, following the usual conventions in the sign linguistics literature, manual signs are represented by glosses in small capitals, and non-manual markers are indicated by a line above the glosses for manual signs that they co-occur with. As for the abbreviations, 'ht-α' indicates head tilt toward the spatial location associated with α, 'eg-α' indicates eye gaze at the spatial location associated with α, and 't' indicates the bundle of non-manual markers jointly expressing a topic which in KSL includes head nod, brow raise, and eye contact with the addressee (Won et al. 2021, 171). The gloss $\textsc{index}_{\alpha}$ indicates the indexical sign (hand with index finger extended) pointing towards the location associated with α.[1]

(1) a. $\textsc{man}_a\ \textsc{woman}_b\ \overline{\textsc{like}}^{\text{ht-a, eg-b}}$ (SOV)
'The man likes the woman.'

b. $\textsc{woman}_a\ \textsc{man}_b\ \overline{\textsc{index}_a\ \textsc{like}}^{\text{ht-b, eg-a}}$ (OSV)

c. $\overline{\textsc{like}}^{\text{t}},\ \textsc{man}_a\ \textsc{woman}_b\ \overline{\textsc{index}_b}^{\text{ht-a, eg-b}}$ (VSO)

d. $\overline{\textsc{like}}^{\text{t}},\ \textsc{woman}_a\ \textsc{man}_b\ \overline{\textsc{index}_a}^{\text{ht-b, eg-a}}$ (VOS)

(adapted from Won et al. 2020, 65, (4))

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1. See any textbook or handbook on sign linguistics (e.g., Sandler and Lillo-Martin 2006, Pfau, Steinbach, and Woll 2012, Baker et al. 2016, etc.) for the general notation conventions used in the sign linguistics literature. The notations and abbreviations used in this paper will be clarified as we proceed.

The examples in (1) all have basically the same interpretation, namely, 'The man likes the woman', even though their surface orders differ from one another. It seems, at least on the surface, that this is possible because the grammatical relations of the arguments MAN and WOMAN with respect to the predicate LIKE are expressed through some supplementary manual and non-manual components, including head tilt towards the location of the subject, eye gaze at the location of the object, and an INDEX pointing towards the location of the object (see Neidle et al. 2000, 63–85, Sandler and Lillo-Martin 2006, 42–46, Lourenço and Quadros 2020, among others, for relevant discussion).

The flexibility of surface order and the availability of supplementary components marking grammatical relations as such have motivated some researchers to claim that signed languages do not have a basic word order but only have general tendencies or non-structural constraints which may (but not necessarily will) induce certain orders to surface in each sentence (Tervoort 1968, Friedman 1976, Bouchard and Dubuisson 1995, Bouchard 1996, Johnston and Schembri 2007). Bouchard and Dubuisson (1995), for instance, suggest that signed languages do not have to have specific orders to express how elements should be interpreted with respect to each other, since the information can be coded through some other means such as the non-manuals exemplified in (1). Based on this, they conclude "only languages in which word order has a high functional role will exhibit a basic order" (Bouchard and Dubuisson 1995, 132).

Other researchers, however, argue that signed languages, despite their seemingly free surface orders, still have a basic word order at the underlying level and that variable surface orders exhibited by signed languages are due to grammatical processes involving constituent movement such as wh-movement, topicalization, focalization, object raising, etc. (Fischer 1974/2008, Fischer 1975, Kegl et al. 1996, Matsuoka 1997, Neidle et al. 2000, Braze 2004, Sandler and Lillo-Martin 2006, Quadros and Lillo-Martin 2010, Lourenço and Quadros 2020). In this view, if constructions with different surface orders are expressing the same eventuality, it must be the case that they are derivationally related to one another, that is, the construction with a non-basic order is one which is syntactically altered from the construction with a basic order.

The issue of whether or not signed languages have a basic word order is of considerable importance for the study of natural language. As visual-gestural languages, signed languages can be articulated simultaneously with the hands, face, and other body parts. So, unlike spoken languages, words (or 'signs') in the sentence of signed languages do not necessarily have to be linearly ordered, which means that it is impossible to say a priori whether they use word order to express any grammatical meaning at all (Kimmelman 2012). Importantly, if signed languages do not have a basic word order, and a variety of surface orders are simply because words in signed languages can be freely ordered, then syntactic constituency may not be considered a universal feature of natural language (Evans and Levinson 2009) as free word order can be taken to entail absence of constituent structure (Pesetsky 2009). In this case, syntactic constituency (which determines word order on the surface) will be merely one of the strategies that may or may not be adopted by a particular language to code grammatical information in the sentence (Bouchard and Dubuisson 1995, Bouchard 1996, Evans and Levinson 2009, Matthews 2007). On the other hand, if signed languages, despite their simultaneity, still have a basic word order, and the variability of surface orders are due to grammatical processes which alter the structure that would otherwise generate the basic order, then it may be taken to constitute a piece of evidence for the view that syntactic constituency is indeed a central property of natural languages, regardless of the different modalities they might have.

As noted in (1) above, KSL may have variable surface orders as other signed languages do. The variability of surface order in KSL notwithstanding, it has often been noted in the literature that KSL has the basic order of SOV (Seok 1989, Um 1996, Yang 2000, Jhang 2006, Y.-h. Lee 2010, Yoon and Kim 2018, Jeong 2020). But, as far as we are aware, whether KSL in fact has the basic order of SOV, or even whether the language makes use of word order and constituent structure to express any grammatical information in the first place, has not been shown in a systematic way. The purpose of this paper is to identify the basic order of KSL and establish that sentences in KSL are hierarchically structured as those in other more familiar spoken languages are. In doing so, we hope that the paper can serve as a sound base for future research on the diverse constructions and syntactic phenomena in KSL, as well as that it can provide a support for the view that syntactic constituency is one of the necessary features of any natural language.

The paper is organized as follows. In section 2, we contend that word order is part of the grammar in KSL by showing that only certain surface orders are permitted in the transitive regardless of its sentence type or semantic transparency. Then, we claim in the section that KSL belongs to the class of SOV languages based on the observation that it shows most of the characteristics that Dryer (2007) notes as the characteristics of head-final languages. In section 3, we suggest that the linguistic representation in KSL are hierarchically structured. To be specific, we examine the phenomena in KSL involving displacement, adverb hierarchy, structural ambiguity, and wh-clefting, and argue that the phenomena indicate that words in the sentence of KSL are organized into constituents. Based on the conclusions drawn in sections 2 and 3, we propose in section 4 a basic clause structure which generates the basic word order in KSL. To this end, we adopt the Functional Parametrization Hypothesis put forth by Fukui

(1988, 1995/2006) and the short scrambling analysis of variable argument orders suggested by Takano (1998). In that section, we also provide an analysis of the phenomenon in KSL, in which a frequency or manner adverb is not allowed to co-occur with an overt tense auxiliary in certain contexts. Finally, in section 5, we summarize the paper and present brief concluding remarks.

2 Identifying the underlying order

It has been noted in (1) that KSL allows the transitive to have various surface orders with the help of manual or non-manual supplementary components which represent the grammatical relations between elements in the sentence. One might expect then that if the supplementary cues are precluded, the possibilities of surface order in the transitive will become extremely restricted such that only one or even none of the orders is acceptable. This is not quite the case. Without the supplementary cues, two out of six logically possible orders are permitted (under the intended reading) for the transitive in KSL as shown below.[2,3]

(2) a. MAN WOMAN LIKE (SOV)
'The man likes the woman.'
b. MAN LIKE WOMAN (SVO)
c. * WOMAN MAN LIKE (OSV)
d. * WOMAN LIKE MAN (OVS)
e. * LIKE MAN WOMAN (VSO)
f. * LIKE WOMAN MAN (VOS)

None of the examples in (2) involves any intonation break (i.e., pause), and the acceptable examples in (2a) and (2b) can both be used in a pragmatically neutral context, e.g., as an answer to the general question *What happened?* (Sandler and Lillo-Martin 2006, 288), suggesting that neither of the two acceptable orders is more marked than the other. The examples in (2) thus demonstrate that KSL allows the SOV as well as the SVO orders to occur in the transitive without any supplementary cues coding grammatical information. This is in contrast with American Sign Language (ASL), which has been reported to only allow the SVO order for a similar transitive construction as in MARY LOVE JOHN 'Mary loves John' (Fischer 1975, 5; the example is from Neidle et al. 2000, 59, (24)).

The above examples involve the transitive whose arguments are "reversible", i.e., the arguments of the predicate in these examples can be reversed without affecting their semantic acceptability (Fischer 1975, 23, endnote 5). Surface orders may be expected to be restricted one way or another in this case, since different orders can bring about different interpretations ('The man likes the woman' vs. 'The woman likes the man'). Interestingly, KSL exhibits exactly the same ordering pattern when the transitive has "non-reversible" arguments, and so, regardless of its surface order, it can be felicitously interpreted in only one way. The ordering pattern of the transitive with non-reversible arguments in KSL is illustrated in (3). Compare the KSL examples in (3) with the ASL examples presented in (4). In ASL, the order of the transitive is relatively free when non-reversible arguments are involved.[4]

(3) a. MAN BOOK LIKE (SOV)
'The man likes the book.'
b. MAN LIKE BOOK (SVO)
c. * BOOK MAN LIKE (OSV)
d. * BOOK LIKE MAN (OVS)
e. * LIKE MAN BOOK (VSO)
f. * LIKE BOOK MAN (VOS)

(4) a. BOY ICE-CREAM LIKE (SOV)
'The boy likes the ice-cream.'
b. BOY LIKE ICE-CREAM (SVO)

2. The examples in the paper whose source is not indicated have been constructed by the second author, a native signer of KSL who acquired KSL as the first language near the city of Cheonan.

3. It has been reported by Yang (2000) that without the supplementary cues, the SVO order is not allowed for the transitive in KSL. The different judgments reported in the current and the previous studies might reflect some syntactic variation between the varieties of KSL used by different regional or age groups. Since it is beyond the scope of the paper, we will not address the potential syntactic variation here, acknowledging the possibility that there might be varieties of KSL to which the analyses proposed in this paper may not extend in a straightforward manner.

4. The arrangement of the examples presented in Sandler and Lillo-Martin (2006) has been changed in (4) for ease of comparison between KSL and ASL. For the same reason, the example in (4e) is added based on Sandler and Lillo-Martin's (2006, 305) statement "order is not completely free, even with agreement or spatial information ... VSO is not a permitted order in ASL, for example".

c. ICE-CREAM BOY LIKE (OSV)

d. ICE-CREAM LIKE BOY (OVS)

e. * LIKE BOY ICE-CREAM (VSO)

f. LIKE ICE-CREAM BOY (VOS)

(ASL; Sandler and Lillo-Martin 2006, 289, citing Fischer 1975, 14–15)

The fact that the acceptable orders for the transitive with non-reversible arguments are SOV and SVO in KSL, just as those for the transitive with reversible arguments are, suggests that word order is part of the grammar in KSL.[5] From a functional point of view, there is no apparent reason why the transitive with non-reversible arguments should pattern together with the transitive with reversible arguments. The intended meanings of the examples in (3c–f) are just as clear as those of the examples in (3a–b), and yet, the latter are acceptable while the former are not.

The same ordering pattern is observed in a yes-no question in KSL as well. Note first that Liddell (1980, 76–77) points out that SVO is the only order that is allowed in a yes-no question in ASL, based on which Liddell suggests that the underlying order in ASL is SVO. The examples of a yes-no question in ASL are shown below (where 'y/n' indicates the bundle of non-manuals jointly expressing a yes-no question, which in ASL includes upper body forward, brow raise, and chin forward).

(5) a. $\overline{\text{WOMAN FORGET PURSE}}^{\text{y/n}}$
'Did the woman forget the purse?'

b. * $\overline{\text{WOMAN PURSE FORGET}}^{\text{y/n}}$

c. * $\overline{\text{PURSE WOMAN FORGET}}^{\text{y/n}}$

d. * $\overline{\text{FORGET WOMAN PURSE}}^{\text{y/n}}$

e. * $\overline{\text{FORGET PURSE WOMAN}}^{\text{y/n}}$

f. * $\overline{\text{PURSE FORGET WOMAN}}^{\text{y/n}}$

(ASL; Liddell 1980, 77, (10)–(11))

In the case of KSL, on the other hand, the SOV as well as the SVO orders are allowed in a yes-no question as alluded to above. The examples of a yes-no question in KSL are presented below ('y/n' in KSL includes brow raise, eyes wide open, and optional chin slightly pulled to the body; Won et al. 2021, 173–174).

(6) a. $\overline{\text{MAN BOOK LIKE}}^{\text{y/n}}$
'Does the man like the book?'

b. $\overline{\text{MAN LIKE BOOK}}^{\text{y/n}}$

c. * $\overline{\text{BOOK MAN LIKE}}^{\text{y/n}}$

d. * $\overline{\text{BOOK LIKE MAN}}^{\text{y/n}}$

e. * $\overline{\text{LIKE MAN BOOK}}^{\text{y/n}}$

f. * $\overline{\text{LIKE BOOK MAN}}^{\text{y/n}}$

The pattern in (6) suggests that unlike in ASL, different sentence types do not affect the ordering possibilities in KSL.

To sum up so far, the case of the yes-no question in (6), as well as the cases of the transitive with reversible and non-reversible arguments in (2) and (3) show that, regardless of sentence types or semantic conspicuity, KSL consistently permits the SOV and SVO orders and prohibits the OSV, OVS, VSO, and VOS orders when there are no other signals that express the grammatical relations between elements in the sentence. We interpret this to mean that word order of the transitive is constrained by the grammar of KSL at the underlying level such that it is restricted to either SOV or SVO. If this is correct, various surface orders exhibited by KSL would be considered as the results of some grammatical operations applied to the underlying orders, while the non-manual markers which often accompany the derived orders would be consequences of the applications of the order-altering operations.

Although the grammar of KSL appears to allow the underlying orders of both SOV and SVO as illustrated so far, typological considerations point to the conclusion that KSL belongs to the class of languages which have

5. The transitive with reversible and non-reversible arguments may behave differently when the sentence involves elements more than just three elements (subject, object, verb). See footnotes 17 and 19.

Characteristics of head-final languages	KSL
postposition	*yes*
genitive > noun	*yes*
final adverbial subordinator	*yes*
main verb > auxiliary	*yes*
relative clause > noun	*yes*
final question particle	*yes*
standard > marker	*yes*
standard > adjective	*maybe yes*
adpositional phrase > verb	*maybe yes*
subordinate clause > main clause	*maybe yes*
noun > article	*maybe inapplicable*
manner adverb > verb	*maybe no*
predicate > copula	*(inapplicable)*
final complementizer	*(inapplicable)*
noun > plural word	*(inapplicable)*

Table 1: Characteristics of head-final languages and KSL

SOV as the basic order.[6] More specifically, it appears that the ordering patterns of KSL beyond the transitive resemble more like those of head-final languages (i.e., languages with the basic OV order) than those of head-initial languages (i.e., languages with the basic VO order). Since the subject invariably precedes both the object and the verb in (2), (3) and (6), KSL could very well be considered to be an SOV language if it exhibits the properties of OV languages.

Dryer (2007) lists the characteristics of head-initial and head-final languages that are distinctive from each other (see also Greenberg 1966, Hawkins 1983, and Dryer 1992, among others). Of the 15 characteristics that Dryer lists, KSL patterns together with head-final languages with respect to seven in straightforward ways. Of the remaining eight characteristics, three are not applicable in KSL, since KSL, as many other signed languages, simply does not have the relevant elements (i.e., copula, complementizer, and plural word). As for the last five characteristics, three may still be analyzed to follow the patterns of head-final languages, although they are not as straightforward due to some other workings in the grammar of KSL such as extraposition or some extra-grammatical tendencies, e.g., a tendency to reduce processing difficulties. Of the last two characteristics, one may be inapplicable in KSL after all, since currently it seems that KSL does not have the pertinent element (namely, article). This leaves us only one out of 15 characteristics that is deviant from the properties of head-final languages. So, all in all, the ordering patterns of KSL strongly suggest that it is a head-final language, which amounts to saying that KSL actually belongs to the class of SOV languages as previously noted in the KSL literature. The characteristics of KSL as compared to those of head-final languages in Dryer's list are summarized in Table 1 (where 'α > β' indicates 'α precedes β'). Below, we present these characteristics of KSL in turn.

The first characteristic of KSL that we present here concerns the position of adpositions: adpositions in KSL must occur after the noun. The adpositions FROM and TO, for instance, are allowed to follow the noun that they are associated with as in (7a), but they are banned from preceding the noun as in (7b). The examples in (8), where the grammatical one is from an example sentence of the entry for *pwuthe* 'from' in the online dictionary of Korean Sign Language[7], illustrate that the same holds in a full sentence (the subscript '1' indicates the location of the signer, and for that matter, the subscript '2' indicates the location of the addressee).

(7) a. GWANGJU FROM SEOUL TO
'from Gwangju to Seoul'

b. * FROM GWANGJU TO SEOUL

(8) a. INDEX$_1$ BIRTH FROM DEAF
'I am deaf from birth.'

b. * INDEX$_1$ FROM BIRTH DEAF

The examples in (7)–(8) thus show that KSL has postpositions (and not prepositions) as other head-final languages normally do. Note in passing that adpositions in KSL, as in many signed languages, are not frequently used since

6. See section 4 for discussion of the variability between the SOV and SVO orders in the transitive in KSL.
7. https://sldict.korean.go.kr/ (accessed on November 22, 2021)

the relations that they denote are commonly expressed in terms of relative positions of the hands, path movement, etc., in the signing space (see, e.g., Baker et al. 2016, 106–108).

Another characteristic of KSL that patterns with head-final languages and not with head-initial languages involves the genitive construction: the genitive noun must precede the main noun in KSL as it generally does in head-final languages. Consider first the following examples, in which the possessive relation between MAN and BOOK is indicated by the sign glossed as HAVE:

(9) a. MAN HAVE BOOK EXPENSIVE
'The man's book is expensive.' or 'The book that the man has is expensive.'

b. * BOOK HAVE MAN EXPENSIVE

The examples in (9) may initially appear to show that the genitive noun must precede the main noun in KSL, but it is far from conclusive. This is because as indicated in the translation, it is not clear if the examples in (9) actually involve the genitive construction. The expression MAN HAVE BOOK in (9a) might as well be analyzed as involving a relative clause; that is, it could be that the expression was for 'the book that the man has' rather than for 'the man's book'.[8] If this is the case, then the above examples will not really show anything about the relative order between the genitive noun and the main noun. There is, however, another way of coding the possessive relation in KSL, namely, by simply juxtaposing two nominals as illustrated below (see Neidle et al. 2000, 95, and MacLaughlin 1997, 238–239, for similar cases in ASL).

(10) a. MAN_a INDEX_a BOOK EXPENSIVE
'This man's book is expensive.'

b. * BOOK MAN_a INDEX_a EXPENSIVE

In (10), the possessive relation between MAN_a INDEX_a 'this man' (literally, 'man here') and BOOK is expressed by having the two nominals placed immediately next to each other. Importantly, in the context where there is no overt sign which marks possession, the genitive nominal must still precede the main noun as shown in the contrast in grammaticality between (10a) and (10b).

Notice that the possessive relation involved in the above examples is alienable. The same ordering pattern is observed when the possessive relation is inalienable as shown below.

(11) a. MAN HAND PRETTY
'The man's hands are pretty.'

b. * HAND MAN PRETTY

The same is also the case for the genitive construction which does not involve possession but rather involves kinship relations (in which case the sign HAVE cannot be used in the first place). The examples are shown below.

(12) a. MAN DAUGHTER SMART
'The man's daughter is smart.'

b. * DAUGHTER MAN SMART

So, the genitive construction in KSL can be said to have the 'genitive > noun' order, which is what is generally found in head-final, not in head-initial, languages.

Turning to the position of adverbial subordinators, it needs to be noted first that manual subordinators which correspond to expressions like 'because' and 'after' in spoken languages are often not mandatory in KSL. Instead of manual subordinators, adverbial subordinate clauses are usually marked by non-manual markers such as brow raise and head nod accompanied by a "short pause" (i.e., a pause which is longer than a "very short pause" that distinguishes arguments within a clause but shorter than a "long pause" that marks the end of a sentence; Won et al. 2021, 155). For instance, the causal clause in KSL is marked by the mouth gesture for /o/ or head nod ('hn') at the right periphery of the clause; it may alternatively be marked by the manual subordinator BECAUSE, again, at the right periphery of the clause (J.-o. Lee 2012, 38–40; see also Won et al. 2020, 80, and Won et al. 2021, 162). This is demonstrated in (13)–(14) (the subscript '(1+2)' is included in (13a) to indicate that TWO refers to the signer and the addressee in the context (i.e., 'we two'); the hyphen (-) is used in the sign linguistics when two or more words are needed to gloss a single sign, corresponding to the period (.) used to gloss spoken languages).

(13) a. INDIVIDUAL PROBLEM $\overline{\text{EXIST}}^{\text{/o/}}$, $\text{TWO}_{(1+2)}$ COUNSEL WANT
'Because [I] have a personal problem, I want your counsel.'

8. Relative clauses in many sign languages are reported to be marked by non-manual components, most commonly, by brow raise (Tang and Lau 2012, 358). Currently, it is not clear if relative clauses in KSL are accompanied by any non-manual marker(s) in a systematic way.

b. WIFE THAN MORE $\overline{\text{LOVE}}^{\text{hn}}$, WIFE JEALOUS
'Because [I] love [the dog] more than my wife, my wife is jealous.'
(adapted from J.-o. Lee 2012, 39, (1a,e))

(14) INDEX_1 BUSY BECAUSE, MEETING ATTEND CAN-NOT
'Because I am busy, [I] cannot attend the meeting.'
(adapted from Won et al. 2021, 162, (14*ka*))

What is important for the current purpose is that the manual or non-manual components which mark the adverbial subordinate clause occur at the end of the clause. If, for example, the mouth gesture for /o/, head nod, or the manual subordinator BECAUSE comes at the beginning of the clause in (13)–(14), the sentences will become ungrammatical. Some other examples which show the requirement in KSL that adverbial subordinators should occur in the final position of the subordinate clause are presented below, where the subordinators at issue are glossed as AFTER and TIME. The grammatical examples in (15)–(16) are from the media corpus containing natural conversations between two native signers of KSL ("the Corpus", hereafter). A plus symbol (+) in the examples indicates that the component to which it is attached is reduplicated once; and a caret (^) indicates that the signs linked by it form a compound.

(15) a. HIGH-SCHOOL-SENIOR GRADUATE FINISH AFTER, SOCIETY FROM INTERACT ONE NOT-EXIST++
'After [we] graduated high school, [I] have never talked to [the friend].'

b. * AFTER HIGH-SCHOOL-SENIOR GRADUATE FINISH, SOCIETY FROM INTERACT ONE NOT-EXIST++

(16) a. INDEX_1 PAST CHILD TIME, $\overline{\text{WHITE}\text{\^{}}\text{FALL}}^{\text{hn++}}$ COME TIME, ALWAYS LITTLE-BROTHER TOGETHER INDEX_1 2-GO-OUT ...
'In the past when I was a child, when it snowed, I always went outside together with my little brother ...'

b. * TIME INDEX_1 PAST CHILD, TIME $\overline{\text{WHITE}\text{\^{}}\text{FALL}}^{\text{hn++}}$ COME, ALWAYS LITTLE-BROTHER TOGETHER INDEX_1 2-GO-OUT ...

Given that examples in (13)–(16), it may be said that adverbial subordinators, whether they are realized manually or non-manually, must be placed at the end of the subordinate clause in KSL, as they most likely are in head-final languages.

However, there are two cases which seemingly present counterexamples to the generalization about the clause-final adverbial subordinator in KSL. First, J.-o. Lee (2012) and Won et al. (2021) note that the concessive clause in KSL can be marked by the manual sign WHAT with which the non-manual component, furrowed eyebrows ('fb'), co-occurs. Consider the following examples:

(17) $\overline{\text{WHAT}}^{\text{fb}}$ THINK NOT-KNOW
'No matter how hard [I] think, [I] cannot figure [it] out.'
(adapted from J.-o. Lee 2012, 45, (4b))

(18) $\overline{\text{WHAT}}^{\text{fb}}$ EFFORT, BENEFIT NOT-EXIST
'No matter how much effort [I] make, it is of no avail.'
(adapted from Won et al. 2021, 167, (19*ka*))

In the examples above, the concessive clause is introduced by the manual as well as non-manual components at the beginning of the clause, which may lead one to think that not all adverbial subordinate clauses should have a subordinator at the end of the clause. The seemingly deviant pattern in (17)–(18), however, may be put aside as an exceptional case for the moment, for what is marking the adverbial clause here is a wh-sign and a non-manual marker typically associated with a wh-sign in many sign languages. In other words, $\overline{\text{WHAT}}^{\text{fb}}$ in the above examples may not be a genuine subordinator but a wh-element that is used to express concession in some analytic way (analogous to *however*, *whenever*, *whoever*, etc. in English). In fact, the concessive clause does not always have to be marked by $\overline{\text{WHAT}}^{\text{fb}}$ at the beginning of the clause. The following example shows that the concessive clause can also be introduced by the subordinator ALTHOUGH that comes at the end of the clause (where 'ec' indicates eye contact).

(19) INDEX_a BODY ILLNESS $\overline{\text{SICK}}^{\text{ec}}$ ALTHOUGH, COMPETITION PARTICIPATE
'Although he was sick, [he] participated in the competition.'
(adapted from Won et al. 2021, 167, (19*ma*))

If the analysis of $\overset{\text{fb}}{\overline{\text{WHAT}}}$ in the concessive clause presented here is correct, the fact that it occurs at the beginning of the clause does not undermine the generalization that subordinators occur at the end of the clause in KSL. As shown in (19), a true subordinator marking the concessive clause still occupies the clause-final position.

Another potential counterexample to the claim that subordinators in KSL are clause-final concerns the conditional clause. As J.-o. Lee (2012) and Won et al. (2021) point out, the conditional clause may be optionally accompanied by a manual sign like PERHAPS or IN-CASE at the beginning of the clause. Though this seems to be a counterexample, it actually is not, because whether or not the manual sign occurs, the conditional clause must still be marked by the bundle of non-manuals ('cond'), which includes head nod, brow raise, eyes wide open, etc., at the end of the clause as illustrated below (Won et al. 2021, 163–165).

(20) (PERHAPS/IN-CASE) TOMORROW RAIN $\overset{\text{cond}}{\overline{}}$, HIKING CANCEL
'If it rains tomorrow, the hiking will be canceled.'
(adapted from Won et al. 2021, 164, (15*ka–ta*))

If elements like PERHAPS and IN-CASE are supplementary adverbial elements rather than genuine subordinators, then the case of the conditional clause will not constitute a counterexample to the generalization about the clause-final subordinator in KSL, either.[9]

Turning now to auxiliary verbs, they typically follow the verb in head-final languages. In KSL, too, auxiliary verbs follow the verb, suggesting that the language is head-final. For instance, the modal auxiliary glossed as POSSIBLE must appear after a main verb like EAT as demonstrated in (21).

(21) a. INDEX$_1$ APPLE EAT POSSIBLE
'I can eat the apple.'
b. * INDEX$_1$ APPLE POSSIBLE EAT
c. * INDEX$_1$ POSSIBLE APPLE EAT

The examples in (21) show that POSSIBLE should always follow the verb: it can never appear before the verb whether it comes immediately adjacent to the verb intervening between the object and the verb as in (21b) or it comes before the object so that it does not break up the verb phrase as in (21c). The same can be observed for the temporal auxiliary verb glossed as FINISH which marks the past tense as demonstrated below.

(22) a. INDEX$_1$ APPLE EAT FINISH
'I ate the apple.'
b. * INDEX$_1$ APPLE FINISH EAT
c. * INDEX$_1$ FINISH APPLE EAT

The examples in (21)–(22) show that the auxiliary must always follow the verb in KSL. Note, in passing, the fact that POSSIBLE and FINISH are modal and tense auxiliaries can be seen by the ungrammaticality of an example like (23).

(23) * INDEX$_1$ APPLE EAT FINISH POSSIBLE
Intended: 'I can finish up the apple.'

The example in (23), in which both FINISH and POSSIBLE occur in a single clause, is ungrammatical (see Neidle, Kegl, and Bahan 1994 for the case of ASL), even though the sequence of signs in it makes perfect sense from a conceptual perspective as indicated in the intended interpretation. The impossibility of co-occurence of FINISH and POSSIBLE then is most likely due to the grammar of KSL: the two elements belong to the same grammatical category which has only one slot available per clause, analogous to the modal auxiliary and the tense marker in a language like English.[10]

9. It appears that the subordinator IF may also appear at the end of the conditional clause, even though Won et al. (2021, 163–165) have put an asterisk before IF (while stating that it is an "unnecessary element"). See footnote 10 for an example of the conditional clause marked by IF.

10. Three predicational elements can co-occur sequentially in a single clause in KSL unless the sequence includes two (or more) auxiliaries. An example showing this is presented below, which is taken from the Corpus (the subscript 'neu' indicates the neutral position in the signing space; $_{\alpha}$GIVE$_{\beta}$ indicates that the "agreeing verb" GIVE has the path movement from the location associated with α to the location associated with β).

(i) NOT-KNOW EXIST IF, ASK$_1$ $\overset{\text{cond}}{\overline{}}$, FRIENDLY EXPLAIN $_1$GIVE$_{\text{neu}}$ POSSIBLE
'If [one] doesn't know [anything], and if [they] ask me, I can kindly explain [it to them].'

In the grammatical example in (i), the main clause contains three predicational elements EXPLAIN, $_1$GIVE$_{\text{neu}}$, and POSSIBLE in a row, suggesting that the ungrammaticality of (23) in the text does not arise because three predicational elements are used sequentially.

KSL places the relative clause before the head noun, which again indicates that it is a head-final language.[11] The examples of KSL illustrating this are presented below.[12]

(24) a. WOMAN LIKE MAN SMART
'The man that the woman likes is smart.'

b. * MAN WOMAN LIKE SMART

Interestingly, it has been reported that KSL has the internally-headed relative clause in addition to the externally-headed relative clause exemplified in (24) (Yoon and Kim 2018 citing Kang-Suk Byun 2010 – we could not locate the original reference). Examples of an internally-headed relative clause are shown in (25). In the examples, the head noun of the relative clause, ENGLISH, is inside the relative clause and interpreted as the theme argument of the verb, LEARN, in the matrix clause.

(25) a. AMERICA^PERSON ENGLISH TEACH, GRANDFATHER LEARN
'The grandfather is learning English from an American.' (Literal: 'The grandfather is learning English that an American teaches.')

b. GRANDFATHER LEARN, AMERICA^PERSON ENGLISH TEACH

c. GRANDFATHER, AMERICA^PERSON ENGLISH TEACH, LEARN

(adapted from Yoon and Kim 2018, 163–164, (9.39a–c))

Given that internally-headed relative clauses are mostly found in head-final languages (Dryer 2007, 98), examples like (25) may serve as another indication that KSL is a head-final language.[13]

In head-final languages, the question particle which distinguishes between declarative and interrogative sentences most often occur in the sentence-final position. KSL has a question particle glossed as QM (for 'question morpheme'), and it must occur at the end of the sentence as exemplified below (Yang 2000, 109).

(26) a. MAN LIKE WOMAN QM
'Does the man like the woman?'

b. * QM MAN LIKE WOMAN

Though a question particle exists in KSL as shown in (26), a yes-no question is more commonly indicated by the bundle of non-manuals notated as 'y/n' as noted in the text immediately above (6). What is worth noting is that the non-manuals can not only spread over the entire clause as in (6), but they can also occur at the end of the clause as illustrated in (27) (Jhang 1999, 300).

(27) MAN WOMAN $\overline{\text{LIKE}}^{\text{y/n}}$
'Does the man like the woman?'

Importantly, when the non-manuals occur at the beginning of the clause instead, the sentence becomes ungrammatical.[14]

11. If a language places a relative clause before the head noun, it is most likely to be a head-final language; but it is not the case that if a language is head-final, it always has to place a relative clause before the head noun. See Dryer (1992, 86–87) and Dryer (2007, 96–98) for discussion.

12. The example in (24a) is structurally ambiguous such that it may also have the interpretation 'The woman likes the smart man' for the reason noted in footnote 8. See section 3 for some discussion about structural ambiguity.

13. Liddell (1980, 147–170) reports that ASL, an SVO language, also has the internally-headed relative clause as shown below (the example is from Tang and Lau 2012; 'rel' indicates the bundle of non-manuals for relative clauses).

(i) $\overline{\text{RECENTLY DOG CHASE CAT COME HOME}}^{\text{rel}}$
'The dog which recently chased the cat came home.'
(ASL; Tang and Lau 2012, 358, (41a))

An example like (i) may be possible in ASL because the correlation between head-finality and the existence of internally-headed relative clauses is a tendency weaker than the other ordering patterns discussed so far, or because ASL used to be an SOV language (Fischer 1975) and the internally-headed relative clause is a vestige reflecting the former syntactic system of the language. Another possibility is that some modality-specific factors are allowing sign languages to have the internally-headed relative clause more easily regardless of their head directionality. We will not attempt to resolve this issue in this paper. See also Tang and Lau (2012, 357–360) for some examples of the internally-headed relative clause in Italian Sign Language (LIS; an SOV language) and Hong Kong Sign Language (HKSL; an SVO language).

14. Whether or not the element on which the non-manuals occur is verbal does not affect the grammaticality as demonstrated in (i).

(i) * $\overline{\text{LIKE}}^{\text{y/n}}$ MAN WOMAN
Intended: 'Does the man like the woman?'

Note that the example in (i) is given here just for the clarification purpose, and it does not have any theoretical importance at all; the VSO order itself is not permitted in a yes-no question anyway as pointed out in (6).

(28) * $\overline{\text{MAN}}^{\text{y/n}}$ WOMAN LIKE
Intended: 'Does the man like the woman?'

If as Liddell (1980) and Neidle et al. (2000), among others, claim, non-manual components are direct reflections of the syntax, then the fact that the non-manuals marking a yes-no question should occur at the right, not at the left, periphery of the clause as shown in (27)–(28) suggests that the syntactic element containing the question features comes in the clause-final, not in the clause-initial, position in KSL. This is essentially equivalent to saying that the question particle comes in the clause-final position.

The ordering patterns of the comparative construction in KSL present a somewhat obscure picture. In the comparative construction in head-final languages, it is typically the case that the standard of comparison precedes the marker of comparison, which in turn precedes the adjective. If KSL is a head-final language, it is expected to exhibit the same ordering patterns. However, this does not seem to be entirely the case. In KSL, the standard of comparison must be placed before the marker of comparison as in (29a–b), but the standard and marker of comparison do not necessarily have to be placed before the adjective as shown in the grammaticality of (29c). The example in (29d) indicates that the standard of comparison should still precede the marker of comparison when they are placed after the adjective.

(29) a. CAR THAN AIRPLANE FAST
'The airplane is faster than the car.'
b. * THAN CAR AIRPLANE FAST
c. AIRPLANE FAST CAR THAN
d. * AIRPLANE FAST THAN CAR

So, although the order between the standard of comparison and the marker of comparison in KSL follows the order typically observed in head-final languages, the order between the standard and marker of comparison, on one hand, and the adjective, on the other, does not. The deviant pattern in (29c), however, does not constitute a decisive counterexample to the claim that KSL is a head-final language. This is because the language still allows the standard and marker of comparison to precede the adjective as in (29a), meaning that the deviant pattern in (29c) can be analyzed to result from some grammatical process applied to the unmarked order in (29a) which involves displacement of CAR THAN to the end of the sentence. The grammatical process involved in (29c) may be a type of constituent movement such as extraposition of a heavy element or may be a type of discourse-driven displacement induced for the phrase CAR THAN being perceived as new information.[15] We will not attempt to determine the exact nature of the displacement in (29c) in this paper; what matters for the current purpose is that the example is not a real counterexample to the claimed head-finality of KSL. When the examples in (29) are taken into account altogether, KSL still appears to be more like a head-final language than a head-initial language.

In fact, similar conclusions can be made regarding the ordering patterns of adpositional phrases and complement clauses. As for the position of the adpositional phrase relative to the verb, the following examples (where the example in (30a) is from the Corpus) illustrate that the adpositional phrase may precede or follow the verb in KSL.

(30) a. TOUGH EVENT EXPERIENCE ABOUT BRIEF $\overline{\text{EXPLAIN}\ {}_2\text{GIVE}_1}^{\text{ec}}$
'Please tell me briefly about a troubling event you experienced.'
b. BRIEF $\overline{\text{EXPLAIN}\ {}_2\text{GIVE}_1}^{\text{ec}}$ HARD WORK EXPERIENCE ABOUT

As noted earlier, adpositions are not frequently used in KSL, which means that the verb rarely occurs with an adpositional phrase that it is subcategorized for either. Although rare, when the verb and the adpositional phrase occur together, the adpositional phrase may be placed either before or after the verb as illustrated in (30). The order of the verb and the adpositional phrase in KSL thus does not seem to tell us much about the potential head-finality of the language. However, given that KSL clearly follows the patterns of head-final languages in many respects as discussed so far and that the seemingly deviant pattern in (30b) can be given an independent account along the lines of (29c), i.e., as a result of either extraposition or discourse-induced displacement, it can be said that the examples in (30) may still count as a pattern following that of a head-final language.

The positions of complement clauses in KSL can be accounted for in a similar vein. First, consider the examples shown below:

(31) a. INDEX_1 MAN WOMAN LIKE THINK
'I think the man likes the woman.'

15. Sandler and Lillo-Martin (2006, 473) also report that ASL "seems to have operations for displacing ... prominent or heavy elements to the sentence-final position".

b. INDEX$_1$ THINK MAN WOMAN LIKE

If KSL is a head-final language, it is expected that the complement clause precedes the verb as in (31a) given that it is the order which is often found in head-final languages. The complement clause, however, can also follow the verb as in (31b), and in fact, native signers of KSL take the example in (31b) to be more natural than that in (31a). This must not come as a surprise, considering that displacement of the complement clause to the sentence-final position is even obligatory in several head-final sign languages including German Sign Language (DGS) and LIS as well as in many head-final spoken languages (Pfau 2016, 150–152). Tang and Lau (2012, 355-356), citing Branchini et al. (2007), point out that LIS obligatorily extraposes the complement clause to the left or right periphery of the sentence as illustrated in (32) (where 'te' indicates tensed eyes) because by doing so, the processing load of center embedding can be avoided (see also Geraci, Cecchetto, and Zucchi 2008; see Pfau 2016, 151, for the case of the Sign Language of the Netherlands (NGT)).

(32) a. $\overset{\text{te}}{\overline{\text{MARIA HOUSE BUY}}}$ PAOLO WANT
'Paolo wants Maria to buy a house.'

b. PAOLO WANT $\overset{\text{te}}{\overline{\text{MARIA HOUSE BUY}}}$

c. * PAOLO MARIA HOUSE BUY WANT

(LIS; Tang and Lau 2012, 356, (38))

Extraposition of the complement clause to the left periphery is also possible in KSL as the example from the Corpus in (33) shows.

(33) (In a conversation about hearing people playing the role of deaf people in the movie)
DEAF-PERSON BETTER INDEX$_1$ THINK
'I think deaf people are better [at playing the deaf in the movie].'

So, although it is possible to place the complement clause between the subject and the verb generating the order 'subject > complement clause > verb' in KSL, the native signers prefer to extrapose the complement clause to the right periphery as in (31b) or to the left periphery as in (33). These seemingly deviant orders can be accounted for as the tendency to reduce processing difficulties. Therefore, examples like (31b) and (33) must not be taken to indicate non-head-finality of KSL, as they can be attributed to some independent mechanisms in KSL just as the relative orders of adpositional phrases are.

Above, we have discussed the position of the complement clause relative to the verb, but what Dryer's list is concerned about is actually the position of the adverbial subordinate clause relative to the main clause. Dryer (2007) notes that in head-final languages, the adverbial subordinate clause more often precedes than follows the main clause, although just as in the case of the complement clause, the position of the subordinate clause is not strictly fixed in many languages. In fact, the default order of the subordinate clause relative to the main clause in KSL is 'subordinate clause > main clause'. See the examples in (13)–(16) and (19)–(20) above. Given this, it can be said that KSL basically follows the pattern of head-final languages when the order between the adverbial subordinate clause and the main clause is concerned. J.-o. Lee (2012, 39) and Won et al. (2021, 161) also point out that if the positions of the subordinate and main clauses are reversed, the meaning of the sentence will change, which again indicates that the subordinate clause in principle precedes the main clause in KSL. Note, however, that J.-o. Lee and Won et al.'s claim does not seem to be applicable to all types of subordinate clauses, because an example like (34) can be found in natural conversations (the example is from the Corpus).[16]

(34) (In a conversation about natural disasters)
BUT METHOD PREVENT HARD THINK NATURE FORCE OVERCOME CAN-NOT BECAUSE
'But [I] think there is hardly a way to prevent [natural disasters], because [we] are incapable of overcoming the force of nature.'

The example in (34) shows that the adverbial clause with a manual sign like BECAUSE may follow the main clause, even though the adverbial clause precedes the main clause in unmarked cases.

Thus far, we have presented 13 characteristics of KSL which strictly or presumably follow those of head-final languages. In the remainder of this section, we briefly discuss two ordering patterns in KSL which are seemingly deviant from the patterns generally found in head-final languages.

The first pattern in KSL that seems to suggest the language might not be head-final concerns the order of article and noun. Very little is known about the article in sign languages (Baker and van den Bogaerde 2016, 82), but it has been suggested that in a sign language like ASL, the INDEX sign can function as definite and indefinite articles in the

16. See Pfau (2016, 153–159) for some discussion about the order between the adverbial subordinate clause and the main clause in different sign languages.

noun phrase (MacLaughlin 1997, Ch. 3; Neidle et al. 2000, 87–96). More specifically, Neidle et al. (2000, 88) note that the INDEX in ASL can appear either before or after, or both before and after, the noun, and they argue that the INDEX which occurs in the prenominal position functions as an article while that which occurs in the postnominal position functions as a locative adverb. Their argument is based on the observation that the prenominal INDEX necessarily brings about the (in)definite reading of the noun phrase whereas the postnominal INDEX does not. This is exemplified below.

(35) a. INDEX_a BOY LIKE CHOCOLATE
'The boy likes chocolate.'

b. BOY INDEX_a LIKE CHOCOLATE
'{A/The} boy over there likes chocolate.'

c. INDEX_a BOY INDEX_a LIKE CHOCOLATE
'The boy over there likes chocolate.'

(ASL; Neidle et al. 2000, 89, (1), (6), and (7))

The examples in (35a) and (35c) show that when the INDEX occurs before the head noun in a noun phrase, the noun phrase is always interpreted to be definite regardless of whether the postnominal INDEX occurs (35c) or not (35a). The example in (35b) confirms that the postnominal INDEX does not affect the definiteness of a noun phrase.

The INDEX sign in KSL can also occur adjacent to the head of a noun phrase, and when it does, it is also the case that it can appear before or after the noun as shown in (36a) and (36b), respectively, or both before and after the noun as shown in (36c).

(36) a. INDEX_a MAN CRY
'{A/The} man over there is crying.'

b. MAN INDEX_a CRY

c. INDEX_a MAN INDEX_a CRY

If KSL is a head-final language, it may be expected to show the opposite characteristic of ASL (which is a head-initial language): i.e., it might be the case that in KSL, the INDEX that comes after the noun functions as an article, whereas the INDEX that comes before the noun functions as a locative adverb. But the expected ordering pattern does not seem to be applicable in KSL after all. This is because, as indicated in the translation of (36), the INDEX in KSL, either it is prenominal or postnominal, does not code (in)definiteness, which suggests that KSL does not have (definite or indefinite) articles. The view that neither prenominal nor postnominal INDEX is an article in KSL can be supported by the fact that any one of the examples in (36) can be used in either of the following contexts: (i) the context where the signer sees a male stranger crying while walking down the street with a friend; and (ii) the context where the signer and her friend have seen a male stranger laughing while walking down the street, and several minutes later, the signer sees the same man crying this time. So, in KSL, regardless of whether the referent of a noun phrase is definite or not, the INDEX can be used either before or after, or both before and after, the noun, suggesting that both the prenominal and the postnominal INDEX in KSL are like a locative adverb rather than an article. Actually, this is not surprising at all, since a majority of head-final languages are reported not to have articles (Dryer 2007, 96). Note that as the INDEX sign is one of the most widely used form in signed languages (it is found "in all sign languages investigated to date"; Baker 2016, 10), it is not implausible at all that different sign languages use the same sign, INDEX, for different purposes. That is, it is not far-fetched to say that even though the INDEX can be used near a noun in both ASL and KSL, the INDEX in ASL is the realization of an article (when it is prenominal), while that in KSL is not. As for the nature of INDEX in examples like (36) in KSL, we assume for now that it is a locative adverb whether it is prenominal or postnominal. As for an example like (36c), we assume that the adverb INDEX can be repeated before and after the nominal for emphasis (so the example in (36c) might as well be translated as '{A/The} man *right* over there is crying'). We will leave open the exact nature of the INDEX in (36) in this paper.

Finally, the second characteristic of KSL that does not appear to follow the patterns of head-final languages involves the order between the manner adverb and the verb. As Won et al. (2021, 152) point out, manner adverbs (as well as degree or frequency adverbs, for that matter) in KSL typically occur after the verb as illustrated below.

(37) a. INDEX_1 WALK NONCHALANT
'I walked nonchalantly.'

b. SON STUDY HARD
'The son studies hard.'

(adapted from Won et al. 2021, 153, (7*ka–na*))

If the order of manner adverb and verb shown in (37) is the unmarked one in KSL, then KSL may be taken to exhibit an opposite characteristic from the one typically observed in head-final languages. It is worth noting, however, that even though the manner adverb canonically occurs after the verb in KSL, it is not impossible for the adverb to occur before the verb as exemplified in (38).

(38) a. INDEX$_1$ NONCHALANT WALK
'I walked nonchalantly.'

b. SON HARD STUDY
'The son studies hard.'

In the sense that the order of two given expressions is flexible, the case of manner adverb and verb in (37)–(38) is similar to the cases involving the comparative construction, the adpositional phrase, and the complement clause discussed earlier. A difference between the two is that while the latter could be motivated in some way, e.g., through extraposition of a heavy element or discourse-induced displacement of an expression containing new information, the former cannot be done so quite easily because a manner adverb rarely is a heavy element nor is it a sentential element which canonically conveys new information (although it certainly can). It is still a possibility that the manner adverb occurs after the verb in KSL for some grammatical reason, e.g., closer examination might lead to the conclusion that the "adverbs" in (37) are actually not adverbs but predicates. It is also possible that the unmarked position of the manner adverb relative to the verb in (37) is just an idiosyncratic tendency of KSL. Currently, we do not have a systematic analysis to offer. We will simply note in this paper that the position of manner adverbs in KSL may just as well be a counterexample to the head-finality of KSL.

To conclude this section, KSL allows two orders in the transitive without supplementary components coding grammatical information: SOV and SVO. It has been shown that regardless of whether it is declarative or interrogative, or whether it involves reversible or non-reversible arguments, only the two orders are allowed for the transitive in KSL. We have claimed this indicates that word order of the transitive is underlyingly constrained by the grammar of KSL, while the "supplementary components" are byproducts of some order-changing grammatical operations. We, then, have shown that KSL predominantly exhibits the characteristics of head-final languages from a typological perspective, which indicates that KSL can be grouped into the class of SOV languages. Note that the constructions and phenomena presented in this section have not be given any in-depth analysis as the purpose of the section is to simply show that the grammar of KSL adopts linear order to code grammatical information and identify the basic word order in KSL. A comprehensive analysis of each of the constructions and phenomena in this section is left to future research. In the next section, we show that sentences in KSL are hierarchically structured, and in the section that follows, we propose a basic clause structure in KSL, offering an analysis of the flexible order between the object and the verb.

3 Constituency and hierarchical structure

We have contended in the previous section that linear order is part of the grammar in KSL, and KSL belongs to the class of SOV languages. In this section, we demonstrate that words in the sentence of KSL are organized into constituents, and suggest that the linguistic representation in KSL is hierarchically structured as that in other more familiar spoken languages is. The behaviors of KSL that we present to support this view involve displacement possibilities, adverb hierarchy, structural ambiguity, and wh-clefting.

To begin with, it has been pointed out in section 2, while discussing the ordering pattern of the transitive with non-reversible arguments, that scrambling of an element in the sentence is not freely allowed in KSL even if scrambling of the element does not affect the semantic conspicuity of the sentence. So, for instance, a sentence like *BOOK LIKE MAN is ungrammatical in KSL, even though its intended interpretation is obvious given that a book is not an entity that can have a psychological experience. We have claimed that a case like this indicates that word order is constrained by the grammar of KSL at the underlying level. The existence of constituent structure in the sentence of KSL can be demonstrated in a similar way. Consider the following examples, where the object noun in the transitive is modified by the adjective WIDE (39) or HIGH (40):

(39) a. MAN WIDE LAKE LIKE
'The man likes the large lake.'

b. MAN LAKE WIDE LIKE

c. MAN LIKE LAKE WIDE

d. * WIDE MAN LAKE LIKE

e. * MAN LAKE LIKE WIDE

(40) a. WOMAN HIGH SKY LIKE
'The woman likes the high sky.'

b. WOMAN SKY HIGH LIKE

c. WOMAN LIKE SKY HIGH

d. * HIGH WOMAN SKY LIKE

e. * WOMAN SKY LIKE HIGH

The examples in (39a–b) and (40a–b) show that the adjective modifying the object noun in the transitive can be positioned either before or after the noun in KSL. According to Won et al. (2021, 135), the order of modifying adjective and modified noun is flexible when the modification relation between the adjective and the noun is evident in the sentence, and accordingly, no interpretation confusion can be brought about. What can be inferred from this about (39a–b) and (40a–b) is that adjectives like WIDE and HIGH can modify nouns like LAKE and SKY, respectively, but they cannot modify nouns like MAN and WOMAN (there are independent adjectives, OVERWEIGHT and TALL, used to describe analogous properties of a person). Otherwise, the position of the adjective relative to the object noun would not be flexible due to the possibility of the adjective being interpreted to modify the subject noun instead. As for the examples in (39c) and (40c), they demonstrate that the modifying adjective and the modified object noun can be displaced to the right periphery of the sentence.[17] Now, crucially, even though the adjectives WIDE and HIGH can only be associated with the nouns LAKE and SKY in (39)–(40), and so no interpretation confusion is likely to arise, the two elements cannot be separated by some other element in the sentence. This is illustrated in (39d–e) and (40d–e). In (39d) and (40d), the adjective and the object noun are separated by the subject; and in (39e) and (40e), the two elements are separated by the verb. The ungrammaticality of examples like (39d–e) and (40d–e) indicates that the object noun and its adjective modifier constitute a single unit whose members cannot be separated by an element external to that unit. In other words, the adjective and the noun form a constituent noun phrase, which as a single unit functions as the object in the sentence.

Turning to the adverb hierarchy, note first that in KSL, the manner adverb typically occurs after the verb while the temporal adverb typically occurs in the sentence-initial position (Won et al. 2021, 152–154). Examples of manner and temporal adverbs are presented in (41a) and (41b), respectively.

(41) a. INDEX$_1$ WALK NONCHALANT
'I walked nonchalantly.'

b. NOWADAYS, INDEX$_1$ GO-OUT$^+$ NOT-DO STAY-AT-HOME
'Nowadays, I do not go out; [I just] stay at home.'
(Won et al. 2021, 153, (7*ka*) and (8*ka*))

Although the typical positions of manner and temporal adverbs are postverbal and sentence-initial, respectively, they do not always have to be. In addition to the positions in (41), the manner adverb is allowed to occur before the

17. Here, we are assuming rightward displacement for expository purposes without any implication for the application of a movement operation. Many researchers suggest that the adjective in examples like (39c) and (40c) is more like a predicate than a modifier, which if correct could mean that the noun and the adjective in these examples are base-generated in their surface positions (see Lee and Nam 2014, 202–203, Nam 2016, 218–220, Won et al. 2020, 66–68, and Won et al. 2021, 151–152, among others, for some discussion). We will not attempt to give an analysis of the examples in this paper. What is worth noting regarding the discussion in the text is that "rightward displacement" of the kind in (39c) and (40c) is obligatory when the transitive involves reversible arguments as illustrated below.

(i) a. WIFE GIVE-BIRTH DAUGHTER PRETTY
'The wife gave birth to the pretty daughter.'

b. * WIFE PRETTY DAUGHTER GIVE-BIRTH
(adapted from Won et al. 2021, 151, (6*ka–na*))

In (ia), the object noun and the adjective modifying it are displaced to the right periphery of the sentence; whereas in (ib), the two elements stay in the position between the subject and the verb. The ungrammaticality of (ib) can be given an account in terms of the possibility of interpretation confusion noted in the text: the sentence is most likely to be interpreted to mean that the wife was pretty and the daughter gave birth, which is not the intended interpretation. Reversing the positions of PRETTY and DAUGHTER in (ib) as in *WIFE DAUGHTER PRETTY GIVE-BIRTH does not improve the acceptability of the sentence. It appears that the structural possibilities of a sentence can be quite different between when it has reversible arguments and when it has non-reversible arguments (Lourenço and Quadros 2020). Another instance that illustrates this point is the contrast shown in (iia) and (iib).

(ii) a. DAUGHTER PRETTY BIG APPLE EAT
'The pretty daughter ate the big apple.'

b. * WIFE PRETTY CUTE DAUGHTER GIVE-BIRTH
Intended: 'The pretty wife gave birth to the cute daughter.'

The above examples seem to have exactly the same transitive structure in which the subject and object nouns are respectively modified by an adjective. Yet, the sentence with non-reversible arguments in (iia) is grammatical; while that with reversible arguments in (iib) is not. We leave to future research the task of investigating the differences between sentences with reversible and non-reversible arguments.

verb as in (42a) (see also the examples in (37)–(38) in the previous section), and the temporal adverb is allowed to occur after the subject as in (42b).

(42) a. INDEX$_1$ NONCHALANT WALK
'I walked nonchalantly.'

b. INDEX$_1$ NOWADAYS, GO-OUT+ NOT-DO STAY-AT-HOME
'Nowadays, I do not go out but stay at home.'
(Won et al. 2021, 153, (8*na*))

Notice that the temporal adverb describes when, and the manner adverb describes how, the event denoted by the verb takes place. So, from a functional perspective, the positions of the two classes of adverbs relative to each other would not have to be strictly fixed: wherever they occurred in the sentence, the manner adverb might still be interpreted to describe how the event takes place, and the temporal adverb when. That said, consider the following examples, in which a sentence contains both temporal and manner adverbs:

(43) a. YESTERDAY SON STUDY HARD
'The son studied hard yesterday.'

b. SON YESTERDAY STUDY HARD

c. YESTERDAY SON HARD STUDY

d. SON YESTERDAY HARD STUDY

e. * SON HARD YESTERDAY STUDY

In (43a), the temporal adverb YESTERDAY and the manner adverb HARD occur in their canonical positions, and as expected, the sentence is well-formed. The example in (43b) shows that the temporal adverb can appear after the subject instead, and the example in (43c) shows that the manner adverb can appear before the verb instead; these are also expected given the grammaticality of the examples in (42). The example in (43d) demonstrates that both the temporal and manner adverbs can occur in the non-canonical positions at the same time; but importantly, if the positions of the two adverbs in (43d) are reversed as in (43e), the sentence becomes ungrammatical. As pointed out above, the two classes of adverbs describe different aspects of the verbal event. So, the ungrammaticality of the example in (43e) is hardly expected from a purely functional point of view. There does not seem to be any possibility that semantic obscurity might arise; the intended interpretation of (43e) is as transparent as the rest of the examples in (43a–d).

The ungrammaticality of (43e) could well be analyzed in terms of the adverb hierarchy accompanied by the Relativized Minimality effect. It has long been suggested that different classes of adverbs occur in different structural positions, and the hierarchy of adverbs (Jackendoff 1972) is the reflection of the hierarchical positions that different classes of adverbs occupy in the structure (Koster 1978, Cinque 1999, Rizzi 2001, Li, Shields, and Lin 2012, Payne 2018, among others). Payne (2018), for instance, proposes the adverb hierarchy shown below, pointing out that the classes of adverbs that are generally grouped together on semantic grounds exhibit similar syntactic behaviors as well.

(44) Evaluative/speaker-oriented > Epistemic > Temporal & Aspectual > Frequency & Degree > Manner
(Payne 2018, 19)

According to the adverb hierarchy in (44), a temporal adverb like YESTERDAY must occur in a position higher than the position in which a manner adverb like HARD occurs. The ungrammaticality of (43e), then, can be attributed to the fact that the adverbs in the example are not positioned in accordance with the adverb hierarchy. More specifically, the key difference between the well-formed examples in (43a–d) and the ill-formed example in (43e) is that in the former, the temporal adverb precedes the manner adverb, whereas in the latter, the temporal adverb follows the manner adverb. If the precedence relations of elements in the sentence reflect their hierarchical positions in the structure (cf. Kayne 1994, Takano 1998, Abe 1999), it can be said that the temporal adverb occurs in a position higher than the manner adverb in (43a–d), but the temporal adverb occurs in a position lower than the manner adverb in (43e). The latter is in violation of the adverb hierarchy in (44); hence, the ungrammaticality of (43e).

One might think that the example in (43e) can still be taken to conform to the adverb hierarchy under the assumption that the adverbs initially occupied the positions that are dictated by the adverb hierarchy, e.g., as in (43d), but the manner adverb has been displaced to the left of the temporal adverb later in the derivation along the following lines.

(45) [SON [HARD$_i$ [YESTERDAY [t$_i$ STUDY]]]]

Since the adverbs are generated in the relative positions that they are supposed to be, the sentence might be considered by some not to be in violation of the adverb hierarchy. However, in this case too, the sentence must be

ruled-out. This is because this time the displacement operation is in violation of Rizzi's (1990, 2001) Relativized Minimality Condition (see also Chomsky 2015(1995), 285). Rizzi (2001) observes that displacement operations can take place only in a minimal configuration where there is no intervener that has certain characteristics in common with the element undergoing displacement. The Relativized Minimality Condition is summarized below.

(46) In a configuration X ... Z ... Y, where X c-commands Z and Z c-commands Y, Y can be displaced to X only if Z does not have the same type and feature as Y.

In (46), the types of X, Y, and Z can be head, argument (position), or non-argument (position); and the features that X, Y, and Z can have are [quantification], [modifier], [focus], etc. So, basically, what the Relativized Minimality Condition states is that an element (Y) cannot move to a position (X) when there is another element of the same characteristic (Z) that is closer to the position (X). Turning back to (45), it is clear why the displacement operation illustrated in it is not permitted. The temporal adverb YESTERDAY and the manner adverb HARD are both non-arguments, and hence, of the same type; and they are both non-quantificational modifiers, hence, have the feature [modifier] in common. Accordingly, the manner adverb is not allowed to move to a position crossing the temporal adverb according to the Relativized Minimality Condition. Therefore, the derivation shown in (45) is out.

The discussion above reveals that the possibilities of the positions of temporal and manner adverbs in KSL are determined in accordance with the adverb hierarchy and constrained by the Relativized Minimality Condition, the former or which is widely attested to hold true across many different languages and the latter of which is commonly considered as one of the primitives of natural language grammars. Importantly, both of the theoretical appliances that have been proposed on independent grounds resort to hierarchical notions (such as c-command) in their explanation. The fact that the possible positions of adverbs in KSL can be given exactly the same structure-based accounts as those in other languages suggests that KSL may well be hierarchically structured too.

Structural ambiguity is another phenomenon in KSL which shows that strings of words in that language are mapped to constituent structures. There are cases in KSL where a sequence of words has two (or more) meanings as exemplified below.

(47) CHILD PRETTY LAUGH

a. [CHILD PRETTY] LAUGH
'The pretty child laughed.'

b. CHILD [PRETTY LAUGH]
'The child laughed prettily.'

The example in (47) can have two meanings according to how the words in the sentence are grouped together. If CHILD and PRETTY are initially grouped together to the exclusion of LAUGH as in (47a), the sentence is interpreted to mean that the child who is pretty laughed. On the other hand, if PRETTY and LAUGH are initially grouped together to the exclusion of CHILD as in (47b), the sentence is interpreted to mean that the child laughed in a pretty way. An example like (47) is an instance of structural ambiguity, since the meaning of the sentence varies depending on how words are grouped together as constituents. Some more examples of structural ambiguity exhibited in KSL are presented below.

(48) MAN SON DAUGHTER PRETTY LOVE

a. MAN [[SON DAUGHTER] [PRETTY LOVE]]
'The man adores and loves the son and daughter.'

b. MAN [[[SON DAUGHTER] PRETTY] LOVE]
'The man loves the pretty son and daughter.'

(49) NOWADAYS CHILD WELL GREET

a. [NOWADAYS CHILD] WELL GREET
'Children these days greet [their superiors, the elderly, etc.] well.'

b. NOWADAYS [CHILD WELL GREET]
'These days, children greet [their superiors, the elderly, etc.] well.'

The example in (48) can have two different meanings according to which element PRETTY forms a constituent with. If it forms a constituent with the verb LOVE as in (48a), it functions as a verb having the sentence interpreted to mean the man adores and loves the son and daughter; but if it forms a constituent with the conjoined noun phrase SON DAUGHTER as in (48b), then it functions as an adjective having the sentence interpreted to mean the man loves the son and daughter who are pretty.[18] The example in (49) is also structurally ambiguous although the difference

18. It appears that the signers of KSL strongly prefer nominal conjuncts to be structurally parallel. So, the example in (48) can hardly (if possible at all) mean that the man loves the son and the pretty daughter, which would be attained if the example has the structure along the

between the two meanings can be more subtle. On the one hand, the sentence can mean that greeting in a proper way is a property of today's children. This interpretation is obtained if NOWADAYS combines with CHILD to form a noun phrase functioning as the subject of the sentence. On the other hand, the sentence in (49) can also mean that children's greeting in a proper way is happening these days. This interpretation is obtained if NOWADAYS combines with the whole clause CHILD WELL GREET. The two meanings can be distinguished from each other in the context where some children did not use to greet their superior, e.g., their teacher, properly before, but they have changed, and now they greet the teacher in a proper way whenever they run into her. When the example in (49) is signed in such a context, it can have the structure in (49b) but not in (49a), because the latter is not compatible with the given context.

Structural ambiguity is commonly accounted for in terms of multiple underlying structures associated with a single string of words, and generally considered to show that language is not linearly ordered but hierarchically structured. The fact that KSL exhibits structural ambiguity as exemplified in (47)–(49) can thus be taken to be an indication that the language is hierarchically structured.

Finally, many signed languages have a construction which on the surface appears to be a wh-question followed by an answer to that wh-question. The construction is called different names such as wh-clefts, pseudo-clefts, rhetorical questions, or question-answer pairs, among others, according to the analyses given to the construction (Wilbur 1996, 1997; Neidle et al. 2000, 124–126; Johnston and Schembri 2007, 210–211; Branchini 2014, 277–280; Hauser 2019, 131–161; Bross 2020; among many others). Without committing ourselves to any particular analysis, we will refer to the construction as the wh-cleft in this paper. Some examples of the wh-cleft in KSL are presented below ('foc' indicates the bundle of non-manuals including slightly forwarded head, optional brow raise, and eye contact with the addressee; Won et al. 2021, 169–170).

(50) a. COOK HAND $\overset{\text{foc}}{\overline{\text{WHO}}}$, SON
'Who is cooking is the son.'

b. INDEX$_1$ $_1$TELL$_2$ WANT $\overset{\text{foc}}{\overline{\text{WHAT}}}$, INDEX$_2$ ALCOHOL QUIT $\overset{\text{hn}}{\overline{}}$
'What I want to tell you is that you [should] quit drinking.'

c. MOM WORRY $\overset{\text{foc}}{\overline{\text{WHAT}}}$, DAD SMOKE^{++}
'What Mom worries about is Dad's habitual smoking.'

(adapted from Won et al. 2021, 170, (22); slightly modified based on the appendix video clip)

(51) a. DAUGHTER PRETTY EAT $\overset{\text{foc}}{\overline{\text{WHAT}}}$ APPLE BIG
'What the pretty daughter is eating is the big apple.'

b. APPLE BIG EAT $\overset{\text{foc}}{\overline{\text{WHO}}}$ DAUGHTER PRETTY
'Who is eating the big apple is the pretty daughter.'

The examples in (50)–(51) are often considered to correspond to the pseudo-cleft construction in spoken languages such as *What you need is a good meal* in English[19]; and as it is in the pseudo-cleft in a language like English, what

lines of MAN [[SON] [DAUGHTER PRETTY]] LOVE. In order for PRETTY to modify DAUGHTER only, SON needs an adjective of its own as in MAN SON UGLY DAUGHTER PRETTY LOVE 'The man loves the ugly son and the pretty daughter'. The preference (or possibly, grammatical constraint) can also be seen in the contrast between examples like MAN DAUGHTER SON LOVE ('The man loves the daughter and son') and *MAN DAUGHTER PRETTY SON LOVE (Intended: 'The man loves the pretty daughter and the son').

19. It has been noted in footnote 17 that structural possibilities of a sentence with reversible arguments seem to be more restricted than those of a sentence with non-reversible arguments. The same appears to be the case for wh-clefting. The examples in (51) in the text show that in the transitive with non-reversible arguments where each argument is modified by an adjective, either the subject or the object noun phrase can occur in the focus position of a wh-cleft. In contrast, the transitive with reversible arguments in the same condition permits only one of the two options as demonstrated below.

(i) a. WIFE PRETTY GIVE-BIRTH $\overset{\text{foc}}{\overline{\text{WHO}}}$ DAUGHTER CUTE
'Who the pretty wife gave birth to was the cute daughter.'

b. * GIVE-BIRTH DAUGHTER CUTE $\overset{\text{foc}}{\overline{\text{WHO}}}$ WIFE PRETTY
Intended: 'Who gave birth to the cute daughter was the pretty wife.'

In (ia), the object noun phrase DAUGHTER CUTE occurs in the focus position of the wh-cleft, and the sentence is grammatical as its counterpart in (51a) is. In (ib), on the other hand, the subject noun phrase WIFE PRETTY occurs in the focus position of the wh-cleft, and this time, the sentence is degraded as compared with its counterpart in (51b). The contrast between the sentence with reversible arguments and the sentence with non-reversible arguments with respect to wh-clefting again indicates that there might be some (possibly structural) constraints that apply only to the sentence with reversible arguments. Note that the order of the "wh-constituent" (Hauser 2019) in (ib) (Verb > Subject) differs from that in (51b) (Subject > Verb), because the source sentence of wh-clefting in (i) is SVO as in WIFE PRETTY GIVE-BIRTH DAUGHTER CUTE (the SOV order is not available for this type of sentences; see footnote 17). Note also that if the order of the wh-constituent in (ib) followed that in (51b) as in DAUGHTER CUTE GIVE-BIRTH WHO WIFE PRETTY, the sentence would be interpreted to mean 'Who the cute daughter gave birth to was the pretty wife'.

occurs in the focus position of the wh-cleft in KSL must be a constituent. Consider the following examples:

(52) a. NOWADAYS GREET WELL $\overline{\text{WHO}}^{\text{foc}}$ CHELI SWUNI
'Who greet [the superiors, the elderly, etc.] well these days are Cheli and Swuni.'

b. * NOWADAYS GREET $\overline{\text{WHO}}^{\text{foc}}$ CHELI SWUNI WELL

The examples in (52) illustrate that CHELI SWUNI in a sentence like NOWADAYS CHELI SWUNI GREET WELL 'Cheli and Swuni greet [the superiors, the elderly, etc.] well these days' can occur in the focus position of the wh-cleft (52a), but CHELI SWUNI WELL cannot (52b). The former must be a constituent as it is a conjoined noun phrase, but the latter must not as the sequence contains a conjoined noun phrase as well as an element which as an adverb presumably forms a constituent with the verb (phrase). The contrast in (52) thus clearly shows that wh-clefting in KSL (as in many other languages) examines constituency in order to determine what can and what cannot occur in the focus position, which means that the grammar of KSL refers to constituency in its computation.

The wh-cleft in KSL also suggests that displacement operations in KSL may be sensitive to island constraints. Specifically, it appears that what occurs in the focus position of a wh-cleft is restricted such that a string of words, even if it forms a constituent, cannot appear in the position if it leads to the violation of the coordinate structure constraint (Ross 1967). Consider the following:

(53) a. MAN LOVE $\overline{\text{WHO}}^{\text{foc}}$ SON UGLY DAUGHTER PRETTY
'Who the man loves are the ugly son and the pretty daughter.'

b. * MAN SON UGLY LOVE $\overline{\text{WHO}}^{\text{foc}}$ DAUGHTER PRETTY
Intended/Literal: 'Who the man loves the ugly son and _ is the pretty daughter.'

c. * MAN SON UGLY PRETTY LOVE $\overline{\text{WHO}}^{\text{foc}}$ DAUGHTER
Intended/Literal: 'Who the man loves the ugly son and the pretty _ is daughter.'

In (53a), a conjoined noun phrase SON UGLY DAUGHTER PRETTY 'the ugly son and the pretty daughter' occurs in the focus position of the wh-cleft; and as expected since the conjoined noun phrase is a constituent, the sentence is grammatical. The examples in (53b–c), however, show that being a constituent is not a sufficient condition for an expression to occur in the focus position. The noun phrase DAUGHTER PRETTY is a constituent, but it cannot occur in the focus position as shown in (53b); and the noun DAUGHTER is a constituent, but it cannot occur in the focus position as shown in (53c). The ungrammaticality of (53b–c) can be given a straightforward account if having an expression occur in the focus position of a wh-cleft is a type of displacement operation (possibly, focus movement) and is subject to the coordinate structure constraint. The coordinate structure constraint states that in a coordinate structure, no conjunct can be displaced out of the coordinate structure, nor can any element in a conjunct be displaced out of that conjunct. Both the examples in (53b–c) are in violation of this constraint: in (53b), a conjunct is displaced out of the coordinate structure; and in (53c), an element in a conjunct is displaced out of that conjunct. The ungrammaticality of (53b–c) thus indicates that displacement in KSL is regulated by the island constraint applying to a coordinate structure. This would not mean that displacement operations in KSL are subject to all the island constraints identified so far based on the research on spoken languages; but the examples certainly show that the operations are not entirely exempt from the island constraints either.

Note in passing that there is evidence which suggests the construction under consideration is a single sentence involving wh-clefting as assumed so far rather than consisting of two sentences (namely, a wh-question and an answer to the wh-question) put together in a row (although the conclusion about the existence of constituency will still hold if the latter is the case; it is generally considered that only constituents can stand alone as an answer to a wh-question). First, Branchini (2014, 278) points out that the wh-element in a wh-cleft and that in a wh-question involve different non-manual markers in LIS: according to Branchini, the wh-element in a wh-cleft is marked by raised eyebrows, tensed eyes and cheeks, and head leaning forward, but in a wh-question, it is marked by furrowed eyebrows. The wh-elements in the two types of constructions in KSL are reported to exhibit different non-manuals as well: in a wh-cleft, the wh-element is marked by slightly forwarded head, optional brow raise, and eye contact with the addressee (Won et al. 2021, 170), whereas in a wh-question, it is marked by brow raise and eyes wide open (Won et al. 2021, 173). The difference (although it is more subtle than that in LIS) indicates that the wh-constituent in a wh-cleft in KSL is not a wh-question but something different. Second, it is possible in KSL to question a wh-cleft as illustrated in (54).

(54) $\overline{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}^{\text{y/n}}$
NOWADAYS GREET WELL $\overline{\text{WHO}}^{\text{focus}}$ CHELI SWUNI
Literal: 'Are who greet well these days Cheli and Swuni?'

As Hauser (2021, 137) points out (see also Hoza et al. 1997), if the wh-constituent in (54) were a wh-question, it would not be allowed to become part of a yes-no question, since turning an already interrogative sentence into an interrogative is not a derivational possibility in natural language. The possibility of the whole construction being made interrogative in (54) demonstrates that the wh-constituent in a wh-cleft is not a question. Lastly, the view that the wh-cleft is not a question-answer pair can also be supported by the impossibility of applying role shift to a focused clause in the construction (Caponigro and Davidson 2011; Hauser 2021, 135). Role shift is a process very common in signed languages whereby a clause (typically the complement clause of a verb of saying) is expressed from the point of view of the individual whose speech is reported (see Sandler and Lillo-Martin 2006, 379–389, Pfau 2016, 152–153, Steinbach 2021, 351–377, and references therein). Now, consider the following example:

(55) INDEX_a SPEAK WANT $\overset{\text{foc}}{\overline{\text{WHAT}}}$ INDEX_1 ALCOHOL QUIT
'What he wants to talk about is that I/*he [should] quit drinking.'

If role shift applied to the focused clause in the above example, INDEX_1 would be allowed to refer to the same individual as INDEX_a. But this is not the case: INDEX_1 can only refer to the signer herself and it cannot refer to the individual whose speech is being reported, as indicated in the translation. The fact that role shift cannot occur in the focus position indicates that a clause that appears in that position cannot be a speech quotation, which in turn means that the focus position cannot function as an answer to a wh-question.

To summarize the discussion about wh-clefting in KSL, the focus position in the wh-cleft in KSL can be occupied only by a constituent and only if displacing the constituent to that position does not lead to the violation of an island constraint. This shows, along with the behaviors involving displacement possibilities, adverb hierarchy, and structural ambiguity, that sentences in KSL are organized hierarchically rather than simply placed side by side in lines.

4 Basic clause structure

In section 2, we have argued that word order plays a functional role in the grammar of KSL and that KSL belongs to the class of SOV languages. In section 3, we have claimed that sentences in KSL are hierarchically structured as they are in spoken languages. On the assumption that the conclusions drawn in the preceding sections are correct, we establish in this section the clause structure which generates the basic word order in KSL; to this end, we adopt, among others, the Functional Parametrization Hypothesis proposed by Fukui (1988, 1995/2006) and the VP-internal scrambling analysis of argument displacement proposed by Takano (1998).[20]

Modifying the ideas of Borer (1984) and Manzini and Wexler (1987) that values of a parameter are associated with individual lexical items, Fukui (1988, 1995/2006) puts forth the Functional Parametrization Hypothesis shown in (56), which states that lexical categories are invariant across languages and only functional categories are subject to parametric variation. The [+F(unctional)] elements in (56) refer to elements whose category is C, Agr, T, and so on (while the [–F] elements refer to those whose category is N, V, A, etc., for that matter).

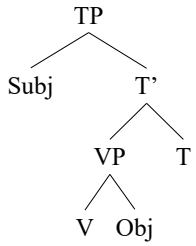
(56) Only [+F] elements in the lexicon are subject to parametric variation.
(Fukui 2006, 108, (15))

What the Functional Parametrization Hypothesis implies in regards to word order and clause structure is that unmarked surface orders of a given language may not directly reflect the head directionality of all phrase structures in that language. That is, the hypothesis allows for the possibility that, e.g., a language exhibits head-final characteristics even if the projections of lexical categories are head-initial, as long as those of functional categories are parameterized to be head-final.

As discussed in section 2, KSL exhibits strong head-final characteristics. A natural way of capturing such an aspect of KSL under the Functional Parametrization Hypothesis would be to assume that at least the projections of functional categories in the language are head-final; otherwise, the theory would require convoluted derivational steps (such as roll-up movement) to produce correct surface orders. As for the head directionality of the projections of lexical categories, which must be universal under the Functional Parametrization Hypothesis, we assume in line with Kayne (1994) and Pesetsky (1995) that it is head-initial across languages (see, e.g., Haider 2013 for the opposing view that phrase structures are universally head-final). The clause structure for the transitive in KSL, then, can be formulated as follows.

20. The analysis presented in this section owes a debt to Abe's (2012) analysis of Japanese Sign Language (JSL).

(57)



In the above structure, the head of the functional projection, TP, is located after its complement (hence, head-final), while the head of the lexical projection, VP, is located before its complement (hence, head-initial) in compliance with the Functional Parametrization Hypothesis.[21] Notice that two further assumptions are made in deriving the structure in (57). First, clauses in KSL are assumed to be TPs, not VPs. This is a reasonable assumption considering that KSL has tense and modal auxiliaries, which are commonly considered to be generated in the head position of TP (see the discussion below (23) in section 2). When there is no tense or modal auxiliary in a clause, we assume that T is occupied by a phonetically null tense element, which we will notate as Tns. The postulation of TP in a clause as such (whether T is overt or null) is related to our second assumption, which is that the subject is generated at Spec,TP. The second assumption can be motivated by the ungrammaticality of examples like (58c) and (59c).

(58) a. INDEX$_1$ APPLE OFTEN EAT
'I often eat an apple.'

b. INDEX$_1$ OFTEN APPLE EAT

c. * OFTEN INDEX$_1$ APPLE EAT

(59) a. MAN MATHEMATICS HARD STUDY
'The man studies mathematics hard.'

b. MAN HARD MATHEMATICS STUDY

c. * HARD MAN MATHEMATICS STUDY

The examples in (58) and (59) contain adverbs of frequency and manner, respectively. In KSL, these adverbs usually appear at the end of the clause, but they are not prohibited from appearing before the verb as shown in (58a–b) and (59a–b) (see the discussion around (38) in section 2). Importantly, although frequency and manner adverbs are allowed to appear before the verb, it is not the case that they can occur anywhere before the verb: they are banned from preceding the subject as the ungrammaticality of (58c) and (59c) indicates.[22] In general, frequency and manner adverbs are considered to mark the edge of verb phrase, which we will take to mean, adopting the view of Cinque (1999), that the functional heads introducing these adverbs occur between TP and VP.[23] The impossibility of these adverbs appearing before the subject, then, suggests that the subject must occur at least as high as TP in the structure whether or not there is an overt tense element. Following the traditional view in the literature, we assume that the position it occurs is Spec,TP.[24]

Recall from section 2 that although it belongs to the class of SOV languages from a typological perspective, KSL permits the transitive to have two equally unmarked orders, namely, SOV and SVO (which is also the case in JSL; Abe 2012). The latter order can be produced by the structure presented in (57). As for the other unmarked order, we claim, following Takano (1998) who argues that VP-internal "short scrambling" is available in all languages, that it is obtained when the derivation involves short scrambling of the object as illustrated below.

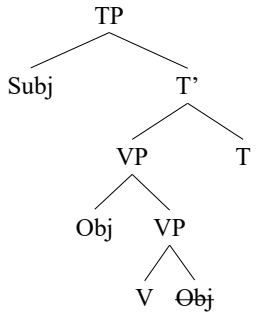
21. Note that the idea of split headedness is not new in the sign linguistics literature. Romano (1991), for instance, has suggested that lexical categories in ASL are head-initial whereas functional categories are head-final. Aarons et al. (1992) and Petronio (1993) have also argued that phrase structures in ASL are basically head-initial but some projections at the CP layer are head-final.

22. Note that since temporal adverbs like NOWADAYS typically appear before the subject (see the discussion around (41) in section 2), it is not that adverbs are categorically prohibited from appearing before the subject.

23. The exact hierarchical positions of frequency and manner adverbs may differ depending on how they are analyzed. The subtle difference between the two types of adverbs is not important for the current purpose as long as they both occur between TP and VP.

24. The VP/vP-internal subject hypothesis, which is now the standard view, would work just as well with the assumption that the subject generated inside VP/vP is forced to move to Spec,TP (for case or EPP reasons); presumably, it might even work better if more data were taken into account. We are assuming that the subject is base-generated at Spec,TP in (57) so that the proposed structure is kept as simple as possible. The VP/vP-internal subject hypothesis is not better nor worse when it comes to the data discussed in this section (although a few more grammatical processes might be needed to incorporate the vP layer into the structure). The structure proposed in this paper may (most likely, should) be expanded considerably to address more data in KSL involving topicalization, focalization, wh-questions, the classifier construction, non-manual agreement markers, and so forth. We are proposing the simplest structure possible as the aim of this section is to provide a basic clause structure on which more elaborate clause structures may be developed.

(60)



If the object undergoes short scrambling and adjoins to VP as in (60), the object will be linearized after the subject but before the verb, resulting in the SOV order. Since VP-internal short scrambling is a free operation that is universally available in any language (that is, it is not a costly operation which takes place only when it has to to serve a certain functional purpose), neither SVO nor SOV must be more marked than the other as desired.

A piece of evidence for the view that the variation between SVO and SOV orders is ascribed to short scrambling of the object comes from the possibility of floating numeral quantifiers. Consider the following:

(61) a. INDEX$_1$ APPLE THREE EAT
'I eat three apples.'

b. INDEX$_1$ EAT APPLE THREE

c. INDEX$_1$ APPLE EAT THREE

d. INDEX$_1$ THREE EAT APPLE

The examples in (61a) and (61b) show that a numeral quantifier like THREE can constitute the object together with a host nominal like APPLE, whether the object is positioned before the verb or after the verb. Notably, the numeral quantifier can be separated from the host nominal as in (61c–d). In (61c), the numeral quantifier is located after the verb while the host nominal is located before the verb; the relative order of the two elements is reversed in (61d). Assuming with Sportiche (1988) and Ko (2005), among others, that a numeral quantifier forms a constituent with a host nominal when it is initially introduced in the structure, the examples in (61c–d) can be given an account along the following lines under the current approach: in (61c), the host nominal undergoes short scrambling stranding the numeral quantifier in the original postverbal position; and in (61d), the numeral quantifier undergoes short scrambling stranding the host nominal in the original postverbal position. The derivations of (61c) and (61d) in this view are illustrated in (62a) and (62b), respectively.

(62) a. [$_{TP}$ INDEX$_1$ [$_{T'}$ [$_{VP}$ APPLE [$_{VP}$ EAT [$_{NP}$ ~~APPLE~~ THREE]]] Tns]]

b. [$_{TP}$ INDEX$_1$ [$_{T'}$ [$_{VP}$ THREE [$_{VP}$ EAT [$_{NP}$ APPLE ~~THREE~~]]] Tns]]

Note that the alternation between SOV and SVO orders itself might be captured in a way that does not involve short object scrambling, through an analysis which allows the complement position relative to the head to be free within VP or through an analysis which allows a verb to optionally raise to (null) T. However, these alternative analyses cannot account for the examples in (61c–d) in any straightforward manner, since in those analyses, the object must stay as a single constituent throughout the derivation. The short object scrambling analysis advocated in this paper, on the other hand, correctly predicts that a numeral quantifier and a host nominal may be separated if short scrambling applies to only one of the two elements. Examples like (61c–d), therefore, can be taken to support the view that short object scrambling, rather than unspecified complement order or optional verb raising, is responsible for the SOV-SVO variation.

We have discussed so far the clause structure in which the head of TP is not occupied by an overt material, i.e., the clause structure where T is phonetically null. As noted earlier, the head of TP may also be occupied by a tense auxiliary like FINISH. When T is phonetically overt as such, V and T cannot be separated from each other as illustrated below.

(63) a. INDEX$_1$ APPLE EAT FINISH
'I ate an apple.'

b. MAN MATHEMATICS STUDY FINISH
'The man studied mathematics.'

(64) a. INDEX$_1$ EAT FINISH APPLE

b. MAN STUDY FINISH MATHEMATICS

(65) a. * INDEX$_1$ EAT APPLE FINISH

b. * MAN STUDY MATHEMATICS FINISH

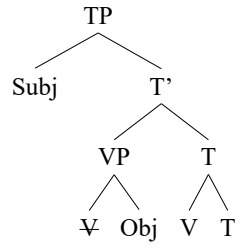
The examples above show that when a clause contains a tense auxiliary, the object may appear either before the verb and the tense auxiliary as in (63) or after the verb and the tense auxiliary as in (64), but it cannot appear between the verb and the tense auxiliary as in (65). Not only is an argument like APPLE or MATHEMATICS not permitted to intervene between the two elements, but an adjunct like OFTEN or HARD is not permitted to do so, either, as shown below.

(66) a. * INDEX$_1$ APPLE EAT OFTEN FINISH
Intended: 'I often ate an apple.'

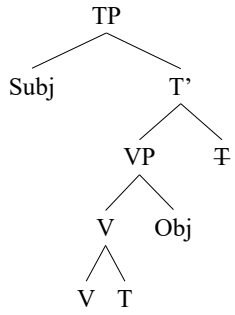
b. * MAN MATHEMATICS STUDY HARD FINISH
Intended: 'The man studied mathematics hard.'

Having observed the same phenomenon in JSL, Abe (2012) suggests that V and T in JSL form a single complex predicate (a single "complex morpheme" in Abe's terms) that cannot be broken up by a non-verbal element. Adopting this view, we propose that the tense auxiliary in KSL is affixal in nature and is required to form a complex head with a verbal host in the syntax. There are basically two ways to achieve this: (i) by raising the verb to T so that the verb adjoins to the tense auxiliary (head movement); and (ii) by having the tense auxiliary hop down to V so that the tense auxiliary adjoins to the verb (affix hopping). The two operations are illustrated below.

(67) a.



b.



We suggest that both options are available in the grammar of KSL. That is, unless it is blocked for some independent reasons, either head movement or affix hopping can be employed to satisfy the morphological requirement of a tense auxiliary to form a complex predicate with a verb.

In this view, an example like (63a) with the SOVT order may be derived in one of two different ways: the verb may raise to adjoin to the tense auxiliary as in (68a), or alternatively, the tense auxiliary may hop down to adjoin to the verb while the object undergoing short scrambling to the edge of VP as in (68b). Either derivation will produce the desired SOVT order in (63a).

(68) a. [$_{TP}$ INDEX$_1$ [$_{T'}$ [$_{VP}$ ~~EAT~~ APPLE] [$_{T}$ EAT FINISH]]]

b. [$_{TP}$ INDEX$_1$ [$_{T'}$ [$_{VP}$ APPLE [$_{VP}$ [$_{V}$ EAT FINISH] ~~APPLE~~]] ~~FINISH~~]]

In the case of an example like (64a) with the SVTO order, on the other hand, only the derivation which employs affix hopping is a viable option. This is because in this example, the complex predicate of verb and tense auxiliary precedes the object, which means that the tense auxiliary must hop down to the verb crossing the object, rather than the verb being raised to the tense auxiliary. The SVTO order might be obtained with head movement of the verb to the tense auxiliary, if the object moved rightward to a position higher than TP; but the rightward movement can hardly be motivated given that the object in an example like (64a) is not a heavy element nor does it alone convey new information while the rest of the sentence conveys old information (the sentence can be signed in a pragmatically neutral context). Given that only affix hopping is a viable option to satisfy the requirement of the tense auxiliary, the example in (64a) must be derived along the following lines.

(69) [$_{TP}$ INDEX$_1$ [$_{T'}$ [$_{VP}$ [$_{V}$ EAT FINISH] APPLE] ~~FINISH~~]]

The considerations so far lead to the generalization that if the object follows the complex predicate of verb and tense auxiliary in a sentence (signed in a pragmatically neutral context), the requirement of the tense auxiliary must always be satisfied through affix hopping; and if the object precedes the complex predicate of verb and tense auxiliary, the requirement of the tense auxiliary may be satisfied through either head movement or affix hopping. With this generalization in mind, consider the contrast between the examples in (70) and (71):

(70) a. INDEX$_1$ OFTEN EAT APPLE
'I often eat an apple.'

b. MAN HARD STUDY MATHEMATICS
'The man studies mathematics hard.'

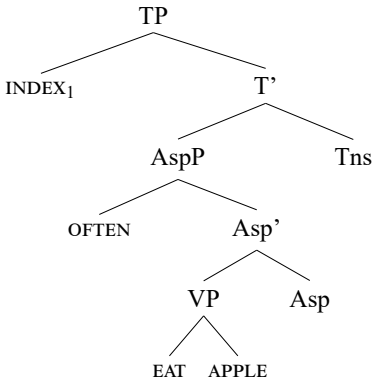
(71) a. * INDEX$_1$ OFTEN EAT FINISH APPLE
Intended: 'I often ate an apple.'

b. * MAN HARD STUDY FINISH MATHEMATICS
Intended: 'The man studied mathematics hard.'

In both sets of examples in (70) and (71), a frequency or manner adverb, which we will call a VP-level adverb for convenience, precedes the verb, and the verb in turn precedes the object. The only difference between the two sets of examples is that the examples in (70) does not involve a tense auxiliary whereas those in (71) does; and apparently, such a difference is significant enough to bring about the difference in grammaticality. This is quite a puzzling phenomenon in that on the surface it appears that the presence of a tense auxiliary somehow prevents a VP-level adverb from occurring in the same clause, or conversely, perhaps the presence of a VP-level adverb somehow blocks the use of a tense auxiliary in the clause. Either way, it is not immediately obvious why an adverb and a tense auxiliary have to interact as such.

The perplexing interaction between a VP-level adverb and a tense auxiliary illustrated in (70)–(71) can be given a principled account under the current approach. Recall from above that we assume, following Cinque (1999), that adverbs are introduced by functional heads and that the functional heads introducing frequency and manner adverbs occur between TP and VP. For expository purposes, we will refer to the head introducing a manner or frequency adverb as Asp (which in Cinque's system will correspond to either Voice, if it introduces a manner adverb, or Asp$_{\text{frequentative}}$, if it introduces a frequency adverb; the difference between the two is not important for the current purpose). Now, notice that the object is placed after the verb in the examples in (70)–(71). In the case of (70), where there is no tense auxiliary, the surface order in which the object follows the verb can be obtained simply by all elements staying in their base-generated position. This is illustrated below for the example in (70a).

(72)



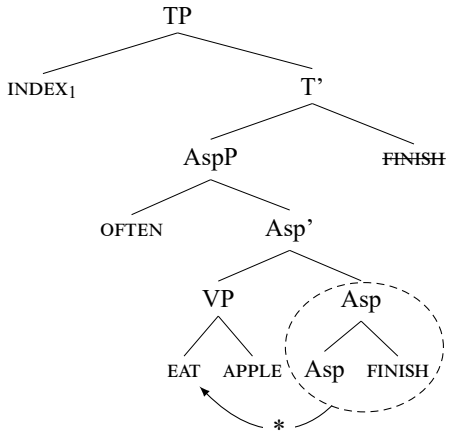
As the sample derivation in (72) shows, the object does not have to undergo short scrambling, nor does null T, which as a phonetically empty element does not require a verbal host, have to undergo head movement or affix hopping, in order to derive the surface order of the examples in (70). So, the examples in (70) can be derived without any problem. In the case of (71), on the other hand, the examples involve a tense auxiliary which needs a verbal host to form a complex head via either head movement or affix hopping. According to the discussion earlier, head movement cannot apply when the object follows the verb and the tense auxiliary, because it will result in the incorrect surface order in which the object precedes the verb rather than following it. Therefore, the examples in (71) must not involve head movement. This means that the tense auxiliary should hop down onto the verb to satisfy its morphological requirement. However, this is not a viable option, either, because of the Strict Cycle Condition in (73).

(73) No rule can apply to a domain dominated by a cyclic node A in such a way as to affect solely a proper subdomain of A dominated by a node B which is also a cyclic node.
(Chomsky 1973, 243)

What the Strict Cycle Condition states is that grammatical operations "cannot return to earlier stages of the cycle after the derivation has moved to larger, more inclusive domains" (Chomsky 1973). In other words, grammatical operations are allowed to apply only between the head of the projection being cycled (or 'being processed') and some element c-commanded by the head (Radford 2009, 140). Returning to the issue at hand, the presence of a frequency or manner adverb in the examples in (71) indicates that there is AspP between TP and VP. In order for the tense auxiliary to adjoin to the verb through affix hopping, then, it must first hops down to Asp and then to the verb. The hopping from T to Asp is permitted as the former is the head of the projection being cycled while

the latter is an element c-commanded by the head. However, the hopping from Asp to V is not permitted since neither the former nor the latter is the head of the projection being cycled. Hence, affix hopping of Asp to the verb is blocked as illustrated in (74) for the example in (71a).

(74)



In short, neither head movement nor affix hopping can satisfy the requirement of the tense auxiliary to form a complex head with the verb in examples like (71). In other words, the surface order of these examples cannot be generated by the grammar of KSL while having the tense auxiliary legitimately form a complex head with the verb. As they cannot be derived in any licit way, the examples in (71) are ungrammatical.

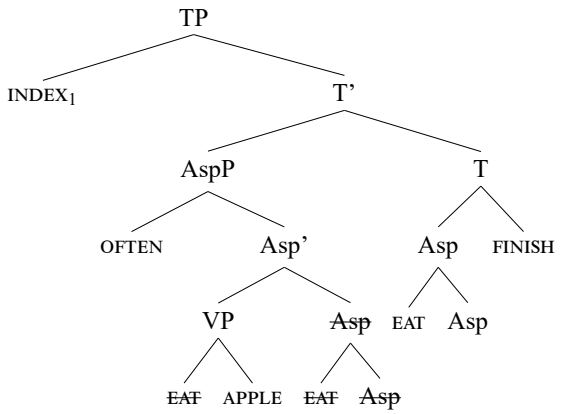
We have argued above that a VP-level adverb and a tense auxiliary cannot co-occur in examples like (71a–b), because neither head movement nor affix hopping can satisfy the morphological requirement of the tense auxiliary. More specifically, it has been argued that in these examples, head movement of the verb to the tense auxiliary is not applicable because it would generate an incorrect word order, and affix hopping of the tense auxiliary to the verb is blocked because the process is anticyclic due to the presence of an intervening functional projection between TP and VP. Such an analysis predicts that a VP-level adverb may co-occur with a tense auxiliary if the object does not follow the complex predicate of verb and tense auxiliary in a clause. This is because in such a context, head movement of the verb to the tense auxiliary can apply to produce the correct surface order while satisfying the requirement of the tense auxiliary. The prediction is borne out as shown below.

(75) a. INDEX$_1$ OFTEN APPLE EAT FINISH
'I often ate an apple.'

b. MAN HARD MATHEMATICS STUDY FINISH
'The man studied mathematics hard.'

The examples in (75) are grammatical, as predicted, even though a VP-level adverb and a tense auxiliary co-occur in the same clause. The examples contain a VP-level adverb, which means that due to the intervening functional projection, the tense auxiliary cannot undergo affix hopping to the verb. However, the object does not occur after the verb in these examples; accordingly, the verb can instead raise to Asp and then to T to serve as a verbal host for the tense auxiliary. Hence, the grammaticality of the examples in (75). A sample derivation for the example in (75a) is presented below.[25]

(76)



25. The correct order for (75a) will be derived whether or not the object undergoes short scrambling in (76). Short object scrambling is not applied in (76) for the sake of simplicity.

Finally, consider the contrast between the examples in (77) and (78):

(77) a. INDEX$_1$ APPLE OFTEN EAT
'I often eat an apple.'

b. MAN MATHEMATICS HARD STUDY
'The man studies mathematics hard.'

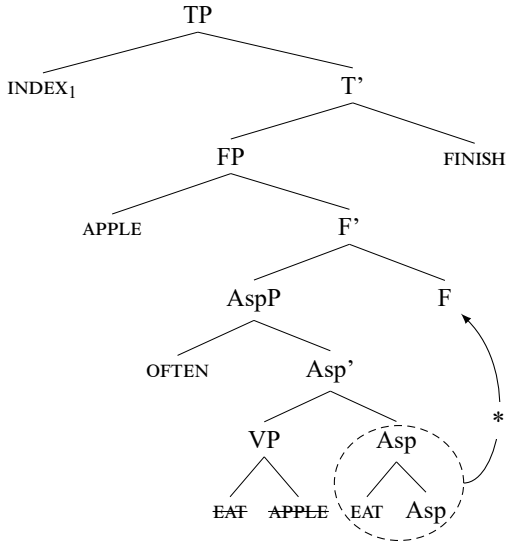
(78) a. ?? INDEX$_1$ APPLE OFTEN EAT FINISH
Intended: 'I often ate an apple.'

b. ?? MAN MATHEMATICS HARD STUDY FINISH
'The man studied mathematics hard.'

The examples in (77) are minimally different from those in (70) in terms of the position of the object: in the former the object precedes, while in the latter it follows, the VP-level adverb and the verb. The examples in (78) are minimally different from those in (71) in a similar vein: in the former the object precedes, while in the latter it follows, the VP-level adverb and the complex predicate of verb and tense auxiliary. According to our discussion above, when the object appears before the verb (and the tense auxiliary) in a clause, head movement of the verb to the tense auxiliary must be able to apply to satisfy the requirement of the tense auxiliary. This means that both sets of examples in (77) and (78) are expected to be well-formed. Surprisingly, however, the judgments of the two sets of examples considerably differ: the former are fully acceptable, while the latter are severely degraded and only marginally acceptable.

Earlier in this section, we have suggested that the order in which the object precedes the verb is obtained when the object undergoes short scrambling to the edge of VP. At a cursory glance, the examples in (77)–(78) might seem to involve short object scrambling as well, for the object after all precedes the verb in these examples. However, this is not the case. Recall from above that we take VP-level adverbs to be hosted by a functional projection, AspP, that appears between TP and VP. Under this view, the order of the object relative to the VP-level adverb in (77)–(78) indicates that the object has moved some place higher than AspP, which means that it is not adjoined to VP. In other words, the object in (77)–(78) must have undergone not short scrambling but what Takano (1998) might call "medial scrambling". Medial scrambling differs from short scrambling in the sense that the latter involves movement within a lexical domain while the former involves movement to a functional domain. Now, suppose in line with Ko (2005) that medial scrambling is triggered by a head with an uninterpretable Σ-feature in the functional domain (cf. Miyagawa 1997).[26] The degraded acceptability in (78), then, may be accounted for if the head of the functional projection triggering medial scrambling, say F, is incapable of hosting a verbal element, and accordingly, prevents the verb from moving all the way to T as illustrated below.

(79)



Since affix hopping is not available in (78) due to the presence of AspP, head movement would be the only way to satisfy the morphological requirement of the tense auxiliary. But as the derivation in (79) illustrates, head movement is also not applicable in these examples due to the presence of FP. Therefore, the examples in (78)

26. Takano (1998) specifically argues against the idea that (short, medial, or "long-distance") scrambling is driven by feature checking. As far as we can tell, the view in the text that medial scrambling involves feature checking, while short scrambling does not, is not incompatible with Takano's claim as long as what the functional head triggering medial scrambling does is strictly limited to displacement of the object, that is, if it is assumed that the functional head does not involve any grammatical function such as focalization or case assignment and the Σ-feature on the functional head merely attracts an element to the specifier position of the head as the familiar EPP- or EDGE-feature does.

cannot be licitly derived, resulting in their degraded acceptability. Lastly, notice the difference in acceptability between (71) and (78). The examples in (71) are completely unacceptable, but those in (78) are severely degraded but still marginally acceptable. Such a difference suggests that the two sets of examples might not be ruled-out for exactly the same reason, and it may be captured by the current analysis as well. The examples in (71) are ruled-out because their derivation is in violation of the Strict Cycle Condition. The Strict Cycle Condition is (presumably) a universal principle which governs how the computational system of human language works; therefore, any example in violation of the Strict Cycle Condition must be completely out. On the other hand, the examples in (78) are degraded due essentially to some property of a particular lexical item in KSL. Properties of a lexical item are not rule-governed and are for the most part arbitrary. This means that there might be some way to ameliorate the unacceptability of examples in which the properties of every lexical item are not all properly reflected. Hence, the marginal acceptability of (78).

5 Conclusion

We have suggested that word order plays a functional role in KSL based on the observation that regardless of whether it is declarative or interrogative, or whether it involves reversible or non-reversible arguments, KSL consistently allows only the SOV and SVO orders to surface in the transitive with no supplementary components coding grammatical information. Then, we have claimed that even though it allows the two unmarked orders in the transitive, KSL must be classified as an SOV language from a typological point of view, because the subject always precedes the object and the verb in pragmatically neutral contexts, and importantly, the ordering patterns of diverse elements in KSL predominantly follow the patterns of OV languages than those of VO languages. Having established that word order is part of the grammar in KSL and that the basic word order of KSL is SOV, we have argued that words in KSL are not linearly ordered but rather are hierarchically structured. We have supported this view by examining the behaviors of KSL involving displacement possibilities, adverb hierarchy, structural ambiguity, and wh-clefting. It has been shown that these behaviors, which may not be easily accounted for in a model of grammar where words are linearly ordered, can be captured straightforwardly if words are organized into constituents. Building on the conclusions about word order and constituent structure, we have proposed a basic clause structure which generates the basic word order in KSL, in which the TP projection is head-final whereas the VP projection is head-initial in line with the Functional Parametrization Hypothesis. We have also offered an analysis of the SOV-SVO variation in KSL claiming that it is attributed to the cost-free, optional operation of short scrambling which moves the object to the edge of VP. Basing on the proposed structure, we have provided an account of the puzzling phenomenon in KSL that a VP-level adverb and a tense auxiliary are not allowed to co-occur in a clause when the object follows the complex predicate of verb and tense auxiliary. We have ascribed the incompatibility of a VP-level adverb and a tense auxiliary in the object-final order to the impossibility of the tense auxiliary satisfying its morphological requirement, neither through head movement nor through affix hopping. The degraded acceptability of the sentence with a VP-level adverb and a tense auxiliary in which the object appears before the VP-level adverb has been attributed to the property of a functional head which triggers medial scrambling of the object, specifically, to the inability of the functional head to combine with a verbal element. We conclude from the discussion in the paper that there is an underlying clause structure which generates the basic word order in KSL, and various surface orders found in the language are derived from the underlying clause structure. The current paper thus may be taken to support the view that syntactic constituency is a central property of natural languages, whether they operate in an auditory-vocal or a visual-gestural modality.

Ever since Stokoe's (1960) discovery that a sign language has a phonemic level of structure just as any spoken language, signed languages have been the topic of active linguistic research, and sign linguistics has become an established branch of linguistics. Since the seminar works of S.-K. Kim (1983) and Seok (1989), KSL has also been given much attention in the literature, and important contributions have been made to the study of KSL over the past decades. Yet, KSL still remains as an understudied language, from a linguistics point of view, compared to other signed languages such as ASL, NGT, LIS, HKSL, Brazilian Sign Language (Libras), etc., and much more work must be done to gain a better understanding of how the grammar of KSL operates and how it is similar to or differs from the grammars of other signed or spoken languages. The present study is aimed to provide a base for the linguistic (syntactic, in particular) investigation of KSL. As noted earlier in the paper, there are many phenomena presented in the paper that are not analyzed in any detail, and the scope of the paper is quite limited such that it offers a clause structure only for the transitive which has a "plain" verb whose arguments are non-reversible without any supplementary components expressing grammatical relations (see Padden 1990, Quadros 1999, or any textbook on sign linguistics for classification of verbs in sign languages). The structure proposed in the paper does not provide positions for negation, focus, topic, wh-operator, etc., either. Despite its limitations, we hope that the current study could serve as a sound base for future research on diverse constructions and syntactic phenomena,

including those just listed, in KSL.

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