Early Phrase Structure in Hong Kong Sign Language:

A Case Study

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Abstract

This thesis examines different forms of VERB and functional elements in a set of longitudinal data of a deaf child named CC in order to address the Continuity-Maturation debate. In particular, I explore the development of various forms of VERB, which lays the foundation of the study of early HKSL phrase structure. The Continuity-Maturation debate is addressed on the basis of presence/absence of a light verb phrase (*v*P), Tense Phrase (TP) and Negation Phrase (NegP) and syntactic movements like V-to-*v* movement, object shift and subject raising in early HKSL.

The grammatical category VERB in HKSL can be in various forms: lexical verbs and classifier predicates. Lexical verbs have three subtypes: agreement verbs, spatial verbs and plain verbs. These three types of lexical verbs have different properties. Agreement verbs can be marked overtly for verb agreement. Spatial verbs may encode locations of the entities. Plain verbs contrast with agreement verbs in that they are not marked for any agreement morphology or spatial locations. Classifier predicates usually consist of a verb root and classifier handshapes which may refer to the arguments. Given different properties of these different forms, the HKSL verbs are regrouped as plain verbs and non-plain verbs (i.e. agreement verbs, spatial verbs and verb roots of classifier predicates). A development from morphologically simpler verbs to morphologically complex verbs is observed while other factors like knowledge of signing space and input ambiguity also influence the developmental pattern of various kinds of verbs.

I propose that the HKSL phrase structure has a head-initial *v*P, but a head-final TP and NegP given the word order and syntactic positions of various functional elements, modals, auxiliary-like elements and negators. Previous discussion on Continuity-Maturation debate largely focuses on the presence/absence of functional projections in child phrase structure. The fact that functional projections are available at an early age in HKSL suggests that the early phrase structure is not just VP (as suggested by the Small Clause Hypothesis). The data show further that syntactic movement like V-to-*v* movement, object shift and subject raising in the adult grammar take time to develop. The findings support the Continuity view.

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Abstract

This thesis examines different forms of VERB and functional elements in a set of longitudinal data of a deaf child named CC in order to address the Continuity-Maturation debate. In particular, I explore the development of various forms of VERB, which lays the foundation of the study of early HKSL phrase structure. The Continuity-Maturation debate is addressed on the basis of presence/absence of a light verb phrase (*v*P), Tense Phrase (TP) and Negation Phrase (NegP) and syntactic movements like V-to-*v* movement, object shift and subject raising in early HKSL.

The grammatical category VERB in HKSL can be in various forms: (i) lexical verbs and (ii) classifier predicates. Lexical verbs have three subtypes: (i) agreement verbs, (ii) spatial verbs and (iii) plain verbs. These three types of lexical verbs have different properties. Agreement verbs are verbs which can be marked overtly for verb agreement. Spatial verbs are verbs which encode locations of the entities. Plain verbs contrast with agreement verbs in that they are not marked for any agreement morphology or spatial locations. Classifier predicates usually consist of a verb root and classifier handshapes which may refer to the arguments of the verb root. Given different properties of these different forms, the HKSL verbs are regrouped as plain verbs and non-plain verbs (i.e. agreement verbs, spatial verbs and verb roots of classifier predicates). A development from morphologically simpler verbs to morphologically complex verbs is observed while other factors like knowledge of signing space and input ambiguity also influence the developmental pattern of various kinds of verbs.

HKSL phrase structure is proposed by extending a number of previous works on the adult grammar. It is suggested that HKSL has head-initial *v*P, but head-final TP and NegP given the word order and syntactic positions of various functional elements, modals, auxiliary-like elements (i.e. $HAVE_{exist}$, *NOT-HAVE*) and negators. Previous discussion on Continuity-Maturation debate largely focuses on the presence/absence of functional projections in child phrase structure. The fact that functional projections are available at an early age in HKSL suggests that the early phrase structure is not just VP (as suggested by the Small Clause Hypothesis). The data show further that syntactic movement like V-to-*v* movement, object shift and subject raising in the adult grammar take time to develop. The findings lend further support to Continuity view.

本論文通過一位名叫 CC 的聾童的縱向語料研究各種形態的動詞和功能元素(functional elements)如何回應語言發展連續性假說 (Continuity)跟語言發展成熟性假說(Maturation)之間的辯論。我們會探討作爲研究早期香港手語結構基礎 (early HKSL phrase structure)的各種動詞。我們會從早期香港手語結構中的輕動詞片語 (*v*P)、時態片語 (TP)、否定片語 (NegP) 以及動詞到輕動詞的移動 (V-to-*v* movement) 、賓語移動 (object shift) 、主語上升 (subject raising)等不同的句法變異探討語言發展連續性假說 (Continuity)跟語言發展成熟性假說(Maturation)之間的辯論。

香港手語中的動詞 (VERB) 能以不同的形態出現。這些不同的動詞形態可分爲兩大類: 詞彙動詞 (lexical verbs) 和量詞謂語 (classifier predicates)。詞彙動詞可再分爲三類: 呼應動詞 (agreement verbs)、空間動詞 (spatial verbs) 和簡單動詞 (plain verbs)。這三種詞彙動詞有不同的特性。首先，呼應動詞可以通過顯性的標記表達動詞一致關係(verb agreement)，空間動詞能表達不同個體於位置空間方面的關係。由於簡單動詞不會表達動詞一致關係和位置空間的資料，簡單動詞跟這兩種動詞形成對比。另一方面，量詞謂語多是組合自一個動詞根 (verb roots) 和可表現論元 (arguments) 的量詞手形 (classifier handshapes)。基於不同動詞的特性，我們把香港手語的動詞重新分爲簡單動詞 (plain verbs) 和非簡單動詞 (non-plain verbs)，非簡單動詞即呼應動詞、空間動詞和量詞謂語動詞根。在香港手語的動詞習得中，形態上的複雜性令一些形態較簡單的動詞比形態較複雜的動詞較早出現，同時，空間的掌握和輸入語的歧義均影響著不同種類的動詞的習得。

本論文集合過往對香港手語的語法研究，提出一個香港手語的結構。透過香港手語的語序 (word order) 和情態詞 (modals)、像助動元素 (auxiliary-like elements) 如 $HAVE_{exist}$, *NOT-HAVE* 以及否定詞的語法位置，我們看到香港手語中的輕動詞片語是主要語在首 (head-initial)，時態片語和否定片語則主要語在尾 (head-final)。前人在探討語言發展連續性假說跟語言發展成熟性假說之間的辯論時，往往視兒童語言中的功能投射 (functional projections) 的存在與否爲兩個假說的證據。由於有證據顯示早期香港手語結構包含了不同的功能片語，小句假說 (Small Clause Hypothesis) 並不成立。聾童語料進一步顯示，早期香港手語中的各種句法變異，如輕動詞的移動、賓語移動、主語上升等都需要時間發展。這些結果支持語言發展連續性假說。

Notational Conventions on Sign Language Data

1. ASL and BSL

- Manual signs are glossed with the closest English translation and are represented in English capital letter.
- Index signs are presented by *IND, INDEX* or *IX*
- Pronouns are presented as *PRO-1* or *PRONOUN*
- Nonmanual markings are represented by a line on top of the signs. Labels of the nonmanual markings are given above the line (e.g. *t* = topic, *neg* = negation)
- Subscripts are used to represent
    - location (*0, i, l, a, b, c* and *f*). Different studies used different sets of subscripts to indicate locations.
    - form of movement (*arc* = arc movement, *trace* = trace the size and shape of an object in the space)
    - category of a sign (*loc* = locative)
    - number agreement (*du* = dual, *multi* = multiple)
    - person values (*1* = first person)
    - aspectual marking (*asp*)

2. Slobin's BTS Sign Transcription System

- asp = aspect
- BEND = bending movement
- D = a kind of orientation meaning 'down'
- F = a kind of orientation meaning 'forward'
- ITR = iterative (continuous with clear pauses or stops)
- mvt = movement patterns
- PL_VL = plane showing vertical length
- pm = property marker (i.e. classifiers)
- PNT_1 = point to self
- pth = paths of movement
- src = movement from a place or from contact
- SUP = a kind of location relation meaning 'superior or above'
- TBL = Two bent legs

3. HKSL[1]

a. Signing Space
Signing Space is the spatial area in front of the signer's torso. Most signs are articulated in the signing space. It is represented by a semi-circle.

b. Representation of Utterances:
Most utterances are represented in one line. Two tiers, one for dominant hand (DH) and one for non-dominant hand (NDH) are used for representing the signed

[1] The symbols marking the properties in child language is adapted from the CHAT format in CHILDES (See Tang, Lam and Fung (in prep.)).

utterances when necessary. Similarly, indication of investigator (INV) tier and child (CHI) tier is presented only if they are needed for clearer illustration.

c. Signs

- Manual Signs
  Manual Signs are glossed with English words which are the closest translation of the signs. The glosses of manual signs are represented in capital letters (e.g. *GIVE, WANT*).

  Different signs which can only be translated into one English gloss are distinguished by _1 and _2. Some signs are translated into a number of English words. The glosses are then linked up with hyphen (e.g. *FARE-MORE-THAN*). When two signs form one word, the English glosses are linked up with underscore (e.g. *FEMALE_CHILD* 'girl').

- Index signs
  HKSL has a lot of index signs. They may be pronominal (*IX-1p* = first person pronoun, *IX-2p* = second person pronoun, *IX-3p* = third person pronoun). Or they refer to objects (e.g. *IX-obj*) or locations (e.g. *IX-loc*). When an index precedes a nominal, it is labeled as *IX-det*. Note that previous studies gloss them as $INDEX_{det\ i}$ or $INDEX_{adv\ i}$ or $INDEX_{-1s}$ depending on the focus of study.

- Classifier Predicates
  Classifier predicates are represented by *CL:* followed by a description of the meaning of the classifier predicates (e.g. *CL: GIVE_A_CYLINDRICAL_OBJECT*).

- Family-specific Forms
  The deaf child's family has some forms of signs which deviate from the native signers who participate in the research project. We tentatively call these forms as family-specific forms and they are indicated by '@f'.

- Child-invented Forms
  Child-invented forms are marked with the symbol '@c'.

- Contracted Forms
  Some signs are uttered as if they are one. These signs are marked with '^'.

- Unfinished Signs
  Some examples contain signs which are unfinished and they are marked with the symbol '&'.

d. Gestures
Gestures are common in child language. They are glossed as 'gesture' and a following square bracket and the equality sign indicates the description of the gesture (e.g. gesture [= get someone's attention]).

e. Verb-like tokens
Verb-like tokens are indeterminate between signs and gestures. They are glossed with English small letters (e.g. shoot-with-a-gun).

f. Unintelligible Signs/Gestures
Unintelligible Signs are glossed as XXX while unintelligible gestures are represented as gesture [= xxx].

g. Markers
- Agreement Markers
Agreement verbs can be marked for verb agreement in HKSL. When a verb is marked with subscripts $_{1, 2}$ and $_{3}$, this means that the verb is marked for person agreement. In examples where both the subject and the object are third person, location markers like $_{k, l}$ will be added to the verb (e.g. $_{3k}GIVE_{3l}$).

  Agreement verbs may also be marked with number agreement marker like dual, multiple, etc. Again, they are represented with subscripts (e.g. $GIVE_{multiple}$).

- Location Markers
The current study examines verbal morphology of spatial verbs as well. In order to distinguish agreement markers from location markers, we use subscripts $_{a, b, c, d}$ to represent spatial locations.

h. Nonmanual markings
Nonmanual markings are labeled as *htn* 'head turn', *hl* 'head tilt', *br* 'brow raise' and *eg* 'eye gaze' on a extending line over the manual signs with which the nonmanual markings occur
eg
(e.g. 1X-3p SEE_a).

List of Abbreviations

1	first person
2	second person
3	third person
ABS	absolutive
ACC	accusative
ASP	aspect marker
DAT	dative
DO	direct object
ERG	ergative
INF	infinitive
INTR	intransitive
IMPERF	imperfective
IO	indirect object
M	masculine
N	neuter
NEG	negator
NOMINAL	nominal
NONPAST	non-past tense
OBJ	object
PAST	past tense
PERF	perfective
PRES	present tense
SG	singular
SUBJ	subject
TRANS	transitive
PL	plural
PRN	pronoun
COMP	completive
DIST	distributive

List of Tables

List of Figures

Chapter 1

Introduction

1.1 Introduction

This thesis adopts the nativist approach to child language acquisition. Two major views, Continuity and Maturation, have been put forward in this approach. These views have different assumptions on the phrase structure in child language. I will show that the Continuity view is further evidenced by the findings from a set of longitudinal data of a deaf child named CC. The following section sets up the stage of the present study by giving a review on various versions of the Continuity view and the Maturation view. The skeleton of this thesis is given in Section 1.4.

1.2 The Nativist Approach on Language Acquisition

Children can master their first language rapidly, universally and uniformly. What is astonishing is that children do not generate their first language from the input (i.e. the Poverty of Stimulus Argument).[1] Nativists propose that all human beings are endowed with a biological language organ, called Universal Grammar (UG) in view of these observations. UG consists of a set of principles and parameters. While UG principles stipulate the universal properties of natural languages, UG parameters characterize the differences between them. According to the nativist approach, children are born with UG principles and they need to set the appropriate values of the parameters which matches the properties of the target language in the course of acquisition.

[1] Readers may refer to Crain and Lillo-Martin (1999) and Guasti (2002) for a discussion on the nature of child language acquisition and the Poverty of Stimulus Argument.

Although advocates of the nativist approach generally agree that UG plays a role in the course of acquisition, different researchers have different views on how UG is at work. Two major views, termed Continuity and Maturation (Weissenborn, Goodluck and Roeper 1992, Clahsen 1996, among others), have been widely adopted.[2] Continuity is first introduced by Macnamara (1982). This idea is further developed by Pinker (1984) who claims that "in the absence of compelling evidence to the contrary, the child's grammatical rules should be drawn from the same basic rule types, and be composed of primitive symbols from the same class, as the grammatical rules attributed to adults in standard linguistic investigations" (p.7). Lust (1999) argues that the child grammar, comparing to the adult grammar, is closer to UG (p.118):

> UG (where this term refers to the "principles and parameters" which provide the true content of UG) is a model of the Initial State; it is thus available to the child from the beginning. The "initial state" is taken to refer to the onset of first language acquisition, even "before experience". UG remains continuously available throughout the time course of the first language acquisition. UG does not itself change during this time course.

In essence, proponents of the Continuity view claim that UG principles are available in child grammar as in adult grammar. UG does not change in the course of language acquisition. The Continuity view is strongly supported when children produce utterances that are not in the input (cf. Lust 1999).

By contrast, proponents of the Maturation view suggest that not all UG principles are available at the beginning of language acquisition. UG itself matures according to an innate maturational schedule (cf. Felix 1992). It is suggested that "at each

[2] Different studies have different classifications on the views on the role of UG in the course of acquisition. Weissenborn, Goodluck and Roeper (1992) classify three kinds of views: Strong Continuity Hypothesis, Weak Continuity Hypothesis and Discontinuity. Clahsen (1996), on the other hand, groups the views into Strong Continuity approach, Weak Continuity approach and maturation. We suggest that these different kinds of classification can be grouped under Continuity and Maturation, though there are many different versions under these two views.

developmental stage the child's grammar will be constrained only by those principles that have already emerged, while at the same time it may violate all principles that have not yet matured" (Felix 1992:27). Note that not all maturational accounts follow the view that UG principles may be violated. Wexler (1992, 1994, 1999), for instance, suggests that maturation is UG-constrained in the course of acquisition. Wexler's proposal is treated as a variant of the Continuity view in some studies (cf. de Villiers 2001). Yet he highlights that his view is different from the Continuity view because he assumes that certain linguistic properties grow/mature (cf. Borer and Wexler 1987, Wexler 1999). He points out that "the basic tenet of linguistic theory (generative grammar) is that language is a central part of human biology" (Wexler 1999:69). When language is a kind of biological system or mechanism, it is very natural to assume that language grows and matures.

The two views also differ in how the real change in children's linguistic knowledge in the course of language acquisition is explained. If UG is constantly available during the course of acquisition (i.e. the Continuity view), it is difficult to explain why children speak differently from the adults. Child language looks closer and closer to the adult language as time goes by. The proponents of the Continuity view suggest that the differences between the child and the adult grammars may be due to performance factors or learning delay (Platzack 1992, Valian 1992, Lust 1994, Clahsen 1996, Wexler 1999, among others). Children may have difficulties in language processing or they have limitations on working memory. Learning delay may also explain why children do not speak like the adults. Though children are equipped with the full set of UG principles, they do not know which UG principles are compatible with the target language that involves language-specific properties. Through parameter setting, children would finally master the target language.

The proponents of the Maturation view, on the other hand, claim that the change of children's linguistic knowledge follows from the genetic program in human minds. Mentioned earlier are two variants of the Maturation view. According to Felix (1992), the fact that UG changes over time in the course of acquisition explains why children may initially produce representations that violates the UG principles. Wexler (1992, 1994, 1999), on the other hand, assumes that maturation is UG-constrained such that UG principles would not be violated. Put differently, Felix's account may involve wild grammars while Wexler's account predicts that children always produce possible grammars. Wexler points out that the UG-constrained maturation can capture the learnability problem arisen from the Continuity view (cf. Wexler 1999). That is, why the same set of input data does not trigger learning at an earlier stage but at a later stage? This triggering problem (termed in Borer and Wexler 1987) no longer exists in a maturational account because the late emergence of certain structures is explained by the maturational timetable of the genetic program in human minds.

Within the two broad views, one can find variations on their predictions on child phrase structure. According to Weissenborn, Goodluck and Roeper (1992), the strongest version of Continuity view proposes that all UG principles are available initially and children only produce structures that are possible in the target language. However, they point out that this view is too strong and it is not adopted explicitly. Other proponents of the Continuity view propose a weaker version of the Continuity Hypothesis that states that child structures are possible structures in natural languages, though they may not be in the target language (cf. Weissenborn,

Goodluck and Roeper 1992, Clahsen 1996).[3] This means that a child who acquires language X may produce a structure which does not appear in language X, but in language Y, given that both language X and language Y are natural languages.

At the other end, there are two major versions of the Maturation view.[4] The first one adopts the Gradual Development Hypothesis that assumes that early phrase structure is not identical to adult structure (cf. Borer and Rohrbacher 2002). One example of this approach is Radford's (1990) Small Clause Hypothesis. This hypothesis is built upon an assumption called Minimal Lexical Projection (MLP) that states that syntactic structures are "the minimal syntactic projections of the lexical items they contain" (Radford 1996:44). Another version of the Maturation view, the Full Competence Hypothesis, proposes that children have full competence of the target language. The child phrase structure is the same as the adult one (Poeppel and Wexler 1993). The difference between the child language and adult language is due to underspecification of features. This approach has been grouped under the notion of the Weak Continuity Hypothesis in some studies (cf. Weissenborn, Goodluck and Roeper 1992). Therefore, this account has components of both the Continuity view and the Maturation view. In the following discussion, I will use the name of the hypotheses (e.g. Small Clause Hypothesis and Full Competence Hypothesis) for exposition of the maturational accounts.

Taken together, the difference between the Continuity and Maturation view can be reduced to the question of whether child phrase structures are possible phrase structures. Given the fact that functional categories emerge later than lexical

[3] Different researchers may interpret the notion of Weak Continuity Hypothesis differently. Paradis and Genesee (1997), for instance, describe the Weak Continuity Hypothesis as a claim that suggests "different initial states for child grammar that are not identical to an adult representation" (p.94). Many studies grouped under the Weak Continuity Hypothesis are classified as Discontinuity or maturational accounts elsewhere.

[4] Gleitman (1981) proposes that language acquisition is like maturation from a tadpole to a frog because children only have semantic constraints initially. Since this thesis aims to explore the Child Syntax in HKSL, I will put the semantic accounts aside.

categories like nouns and verbs, the presence/absence of functional categories becomes the testing ground on the two views on early phrase structure.

1.3 Functional Categories

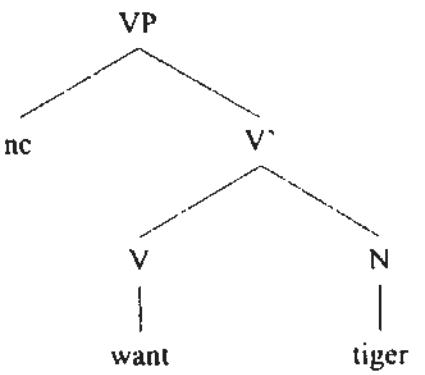
Studies on functional categories are used in the literature to test the validity of the Continuity view or the Maturation view. If functional categories are present when children begin to combine words, the Continuity view is supported. The absence of some or all of the functional categories in the child language, on the other hand, would support the Maturation view. Recall that Full Competence Hypothesis as proposed by Poeppel and Wexler (1993) can be viewed as a weak version of Continuity as well. Under this view, functional projections are also proposed to be present very early, though the features they house may be underspecified. In the following discussion, I will show how empirical data on null arguments, verbal inflections and syntactic positions of verbs reveal the presence/absence of functional projections in child language which in turn lend support to the Continuity view or the Maturation view.

1.3.1 Null Arguments

Null arguments may reveal whether functional projections are present in the early phrase structure. Null subjects have been reported to occur in child's language, regardless of whether the target language is a null-subject language (e.g. Chinese, Italian) or a non-null-subject language (e.g. English, German) (cf. Hyams 1983, 1986, 1992). In English, for instance, children start out with producing utterances like *want tiger, find mommy, taste cereal* and so on (cf. Radford 1996:47). It is suggested that children produce null subjects in these utterances.

Different analyses of the grammatical status of the early null subject lead to different views on the early phrase structure. Radford (1996) proposes that the early null subjects in English are null constant, defined as "a type of null definite description which must be A'-bound by a non-quantificational specifier" (Radford 1996:48). This kind of null subjects occurs in diary style like *(I) Don't know what I can do* in adult grammar. Since early null subjects in English are unbound and discourse-identified, Radford concludes that the null subjects in child English are null constants that occupy the specifier position of the VP, as shown in the following figure (Radford 1996:50):

Figure 1.1 Null Subjects at Spec, VP



This proposal is opposed by the proponents of the Continuity view because such structure is not present in world languages (cf. de Villiers 2001). If the Small Clause Hypothesis is assumed, a number of issues require further explanation. First, one has to posit a different mechanism on Case assignment in child grammar when early null subjects do not suggest the presence of higher functional projections. This also raises the question of how children finally come to know the presence of functional projections. Proponents of the Continuity view propose an alternative account on the same set of data. Hyams (1994), for instance, argues that null arguments are at the specifier position of an Inflectional Phrase (IP) in non-V2 languages and at the

specifier position of Complementizer Phrase (CP) in V2 languages.[5] While it is difficult to argue against both accounts on early null subjects, other empirical evidence shows a clearer picture that the child data conforms to the Continuity view or the Maturation view.

1.3.2 Verbal Inflections

Verbal inflections in child language may reflect whether the child grammar has functional categories and the corresponding projections. Most previous studies which explore the Continuity-Maturation debate assume that verbal inflections are obtained by verb movement from VP to some higher functional projections (e.g. IP or CP, depending on the specific language).[6] The presence of verbal inflections in the child language means that the verb movement is available. Since verb movement is associated with functional projections. The presence of early functional projections is therefore indirectly supported by the presence of verbal inflections.

It is commonly reported that children go through a stage from where no or optional tense/agreement markings are observed (i.e. Optional Infinitive stage) to the emergence of a complete paradigm (cf. Wexler 1994, Ingram, Welti and Priem 2006, among others). The absence of tense/agreement markings in child language is exemplified in (1) below (Radford 1996:44 on English data and Guasti 2002:128 on other language data):

[5] V2 languages are languages where the verbs always occur in the second position.
[6] These studies mainly adopt an earlier version of the Minimalist Program (MP) (i.e. Chomsky 1991, 1993, 1995). In the recent version of MP verbal inflections are not necessarily obtained by overt verb movement (cf. Chomsky 2000, 2001, 2004). See Chapter 3 for more details.

(1) a. ***English***

Bethan *want* one (Bethan 1;8)

baby *eat* cookies (Allison 1;10)

b. ***Danish***

Hun sove (Jens, 2;0)

she sleep-INF

'She sleeps'

c. ***Dutch***

Earst kleine boekje lezen (Hein, 2;6)

first little book read- INF

'First (I/we) read little book.'

d. ***French***

Dormir petit bébé. (Daniel, 1;11)

sleep-INF little baby

'Little baby sleeps.'

Tense/agreement markings for the subject-verb agreement are omitted in (1). While the English verbs are in their bare forms, Danish, Dutch and French verbs are in infinitive form (*sove* in Danish, *lezen* in Dutch, *dormir* in French). It has been assumed that the examples in (1) support the Small Clause Hypotheses because the absence of verbal inflections suggests that the child phrase structure is just a VP.

The Small Clause Hypothesis may also account for a stepwise emergence of different agreement markers in richly-inflected languages. Take Basque as an example. Before venturing the child data, a brief description on the adult grammar is in order. It is pointed out that this language has different agreement markers which appear on auxiliaries and a small set of verbs that frequently occurs (Meisel and

Ezeizabarrena 1996).[7] Totally four types of agreement markings are shown in Basque (Meisel and Ezeizabarrena 1996:202-204):[8]

(2) a. ***Single agreement marking for the subjects of unaccusative verbs (ABS):***

i. Joan naiz.
go:PERF INTR:SUBJ.1SG:PRES
'I have gone.'

ii. noa
SUBJ.1SG:go:PAST
'I went.'

b. ***Bivalent verbs marking subjects (ABS) and dative objects (DAT) of unaccusative verbs***[9]
Gustatzen zait.
please:IMPERF SUBJ.3SG:IO.1SG
'It pleases me.'/ 'I like it.'

c. ***Double marking with bivalent verbs, agreeing with subjects (ERG) and direct object (ABS) of transitive verbs***

i. Ikusi dut.
see:PERF TRANS:DO.3SG:SUBJ.1SG:PRES
'I have seen (it).'

ii. Dakit
know:DO.3SG:SUBJ.1SG:PRES
'I know (it).'

[7] Meisel and Ezeizabarrena suggest that the feature person has a special status. This is because languages which show verb agreement contain person agreement but not necessarily number and gender agreement. Their description on the child data also focuses on person agreement, though they sometimes bring number into the picture.

[8] Basque marks three grammatical Cases: absolutive (ABS), ergative (ERG) and dative (DAT). Since verb agreement is the focus of discussion, I will not examine Case here.

[9] Unaccusative verbs may take more than one argument in some languages. See Radford (2004) for a discussion.

d. ***Triple marking for subject (ERG), direct objects (ABS) and dative objects (DAT)***
Ekarri dizkiot.
bring:PERF TRANS:DO.3PL.IO.3SG:SUBJ.1SG:PRES
'I have brought them to him/her.'

Four types of agreement in Basque are exemplified in example (2). The first type of agreement is found from sentences with subjects but not with objects. Subjects are marked with absolutive case (ABS). Examples in (2ai) and (2aii) show how an auxiliary *naiz* and a frequently-used verb *joan* 'to go' are marked for person (first person) of the subjects ('I') respectively. The second type of agreement refers to instances where the subjects and dative objects are marked. This is exemplified by example (2b) where the auxiliary *zait* is marked for the third person subject and the first person dative object. Auxiliaries or the verbs of frequent use are also marked for direct objects (See example (2c)). This is the third type of agreement where person values of the subjects and direct objects are marked. Finally, when the sentence contains a subject, a direct object and an indirect object, person values of all these arguments will be marked on the auxiliaries or the small set of commonly-used verbs. Example (2d) shows that the auxiliary *dizkiot* is marked for the first person subject ('I'), third person plural direct object ('them') and third person indirect object ('him/her'). In sum, Basque shows a very elaborate agreement system. An immediate question arises is whether children produce these wide range of inflected forms initially.

Meisel and Ezeizabarrena examine the longitudinal data of two children, Mikel

and Jurgi, who acquire Basque as their first language.[10] Like the English, Danish, Dutch and French children (see example (1)), these children first produce nonfinite verb forms (before age 2). This suggests that verb movement does not take place as the functional projections are said to be absent in early phrase structure. Subject agreement markers, direct object agreement markers and indirect agreement markers emerge sequentially for both children:

Table 1.1 Emergence of Agreement Markings in Basque

	Mikel	Jurgi
Subject-Verb Agreement	1;09	2;04
Direct-object-verb agreement	2;04	3;01
Indirect-object-verb agreement	2;07	3;03

At first glance, the child data in Basque seems to support the Small Clause Hypothesis. However, the data is also compatible with the claim that functional projections are available but are not accessible to children (Meisel and Ezeizabarrena 1996). Poeppel and Wexler (1993) point out that "absence of evidence for some category does not constitute evidence for its absence" (p.20). If there is other evidence to the presence of verb movement, the Continuity view can be supported even though verbal inflections seem to be absent in the child language. I will show this point further in the next section.

That not all children produce bare or infinitive verb forms challenges the Small Clause Hypothesis further. Italian children are observed to use subject-verb agreement markings for present tense as early as age 1;10 (Hyams 1983, Schaeffer 1990, Pizzuto and Caselli 1992). German children also produce verbal inflections at

[10] They compare the data of these children with another bilingual child named Peru who acquires Spanish and Basque in a study by Larrañaga (1992). They observe that Basque verbs produced by this child are marked with subject-verb agreement, but not with verb-object agreement. It is proposed that this result is due to the Spanish influence.

around 1;11.0 (Meisel and Müller 1992). The empirical findings from early Italian and German suggest that using bare or infinitive verb forms is not necessarily the first stage of the development of verbal inflections. When children do not universally start out with a stage where verbs are not inflected, the assumption on which Small Clause Hypothesis is built upon does not hold. Hence, the Small Clause Hypothesis does not really capture the early phrase structure.

At this point, it appears that Continuity view gives a correct characterization of the early phrase structure given the fact that some children do produce verbal inflections initially. However, the claim is challenged by the optional infinitive stage (OI stage). The OI stage is a term which describes a stage in which children produce both finite and nonfinite verb forms (Wexler 1994).[11] As noted earlier, the verbal inflections are assumed to be resulted from verb movement to some functional projections. The presence of finite verbs in this stage serves as counterevidence to the Small Clause Hypothesis.

A weaker version of Continuity view has been put forward to capture this phenomenon. Wexler (1998), for instance, proposes an AGR/TNS Omission Model in the framework of an earlier version of MP (See footnote 6). It is assumed in this study that the finite verb forms in adult grammar are arisen from feature checking of the uninterpretable D-feature at Tense Phrase (TP) and Agreement Phrase (AgrP) with the corresponding interpretable D-feature of the subject.[12] Child grammar differs from the adult one as it observes a constraint called Unique Checking Constraint (UCC) which states that "The D-feature of DP can only check against one

[11] Roeper (1999) proposes that the apparent stages/optionality in first language acquisition actually reflect the use of two grammars. The abandonment of the non-target grammar is related to social factors like contexts, social register, etc. Examining child data from this perspective requires a more thorough study on a number of social factors and I will leave this to future research.

[12] The idea of feature checking of uninterpretable features is carried over to the recent version of MP, though the mechanism is slightly different. See Chapter 3 for further discussion.

functional category" (Wexler 1998:59). While the adult may check features against two functional categories, children can only do the feature checking with one functional category. The UCC prohibits children from producing a finite verb form because either tense features or agreement features would be left underspecified.[13] The fact that children also produce finite verb forms suggests that the UCC is not always observed in the child grammar. Wexler proposes one more assumption to account for the optionality:

(3) ***Minimize Violation (MV)***
Given an LF, choose a numeration whose derivation violates as few grammatical properties as possible. If two numerations are both minimal violations, either one may be chosen. (Wexler 1998:64)

A numeration that results in finite verb forms observes the Minimize Violation constraint. Those numerations which derive nonfinite verb forms involve an application of UCC. When children produce finite forms, UCC is violated. There is also violation of the syntactic requirements of tense/agreement (i.e. checking off D-features) when children produce nonfinite verb forms. As a result, the two numerations demonstrate one violation and consequently either one can be chosen. Optionality of tense/agreement marking in child language is therefore observed.

Similar to Wexler, Rizzi (1993/1994) thinks that child grammar differs from adult grammar in that certain principles or properties are not operative at the beginning. Instead of accounting for the OI stage with constraints, Rizzi (1993/1994) proposes that "if children are not sensitive to tense values, there is no substantive

[13] Functional projections have undergone a number of changes in the development of the MP. AgrP, for instance, has been eliminated in the recent version. It follows that Wexler's model requires modifications if AgrP is no longer assumed.

tense variable to speak of at this stage of development" (p.376). He suggests that the OI stage results from the fact that an axiom CP = root in adult grammar does not operate in child grammar.[14] Since CP = root does not hold in child grammar, the child phrase structure may undergo truncation, a process in child grammar which operates at the top level of the phrase structure and it strips away all the projections above a truncation site. AgrP, TP and VP are all possible truncation sites. When truncation occurs at VP, the higher functional projections TP, AgrP and CP are stripped off, thus there is no verb raising and hence no overt realizations of verbal inflections. When truncation takes place at AgrP or TP, the verb raises and the features are realized as verbal inflections. Rizzi highlights that functional projections are not optional, but obligatory. It is the choice of axiom (i.e. CP = root, AgrP = root, TP = root or VP = root) that is optional. Rizzi does not state this explicitly, but his treatment of functional projections has the flavor of the Small Clause Hypothesis. For example, nonfinite verbs result from a VP structure. Then this analysis also faces the challenges associated with the Small Clause Hypothesis listed above.

In sum,.different views are supported by different empirical evidence. The absence of verbal inflections in some languages drives some researchers to propose that early phrase structure is just VP (i.e. the Small Clause Hypothesis). Yet the early emergence of verbal inflections in other languages supports the Continuity view. The presence of OI stage also challenges Small Clause Hypothesis. Assuming that child grammar is different from adult grammar, Wexler (1998) and Rizzi (1993/1994) propose two different accounts to capture the OI stage. One reason for these diverse views is that early verbal inflections may be subject to language-specific properties and they are not uniformly acquired at similar time. Accordingly, determining the

[14] The idea that CP = root stems from the observation that specifier position of CP is the only position that is transparent to "direct discourse identification" (Rizzi 1993/1994:378).

early phrase structure on the basis of verb movement deduced from early verbal inflections, though widely adopted, is on a shaky ground.

1.3.3 Syntactic Positions of Verbs

The syntactic position of verbs in relation to other constituents is a more reliable clue to decide whether verb movement has taken place. If children can displace the verb, verb movement is assumed to exist while tense/agreement markings are underspecified. Negation has been used as a way to test whether a verb has moved or not. Take French as an example. French verbs are finite when they precede the negator *pas* 'not' and they are nonfinite when they follow the negator (Guasti 2002:110):[15]

(4) a. Marie ne *mange pas*. (V_{fin} Neg)
Marie NEG eats not
'Marie does not eat.'

b. pour ne *pas manger* (Neg V_{inf})
in order to NEG not eat-INF
'in order to not to eat'

The verb *mange* 'eat' is finite when it precedes the negator *pas* 'not' in (4a) and the infinitive form *manger* is used when the verb follows the negator *pas* in (4b). This phenomenon suggests that the verb *manger* moves up to a functional category (AgrP for agreement and TP for tense) and becomes *mange*. Children who acquire French as their first language place the finite/nonfinite verb forms in the same way as the adults (Guasti 2002:110):

[15] *Ne* is generally considered as a clitic which moves from the head of the negation phrase (NegP) to a head of a higher functional projection. See Pollock (1989).

(5) a. *Pas manger* la poupée. (Nathalie, 1;9)
not eat- INF the doll
'The doll does not eat.'

b. Elle *roule pas*. (Grégoire, 1;11)
it rolls not
'It does not roll.'

Children's production in example (5) is clearly the same as the adult grammar with respect to the verb position in relation to the negator *pas*. That French children utter the verb *roule* 'rolls' before the negator *pas* 'not' in example (5b) shows that the early French verb moves upward to functional projections AgrP and TP. This lends support to the claim that functional categories are available in early French.

Acquisition of V2 languages provides further evidence to the existence of functional categories in child language. Consider the German example below (Poeppel and Wexler 1993:5-6):

(6) a. Ich *hab* ein doseen Ball. (V_{fin})
I have a big ball

b. Thomsten Caesar *haben*. (V_{infin})
Thomsten C. (= doll) have

Example (6) shows that finite verbs (*hab* 'have') are placed in V2 position and nonfinite verbs (*haben* 'have') occur sentence-finally in German. Since complementizers and finite verbs are in complementary distribution in adult German, it is assumed that finite verbs are realized at C (cf. Poeppel and Wexler 1993).[16]

[16] Whether both CP and IP are present in early German is controversial. The absence of complementizers in early German has been argued to be evidence against the presence of CP in child phrase structure. Since the present study will not touch upon CP, I leave this issue aside. Interested readers may refer to Clahsen (1990), Meisel and Müller (1992), Verrips and Weissenborn (1992) and references cited there.

When children produce the finite verbs in the right position, functional categories are available in the early phrase structure. Poeppel and Wexler (1993) report that the 25-month-old German child in their study, Andreas, tends to produce finite verbs at the second position of a clause (197/203 tokens) and nonfinite verbs clause-finally (37/48 tokens). The findings suggest that CP is present in the early phrase structure as Andreas produces finite verbs at V2 position. The Full Competence Hypothesis is therefore supported.

In sum, functional projections in spoken languages have been studied in order to address the question on whether child phrase structure is a possible adult structure. While the early null subjects do not show clearly whether the Continuity view or the Small Clause Hypothesis is supported, the empirical data from verbal inflections and the syntactic positions of verbs in spoken languages are clear evidence to the Full Competence Hypothesis and the Continuity view. Given the fact that the major evidence examined in the discussion of the Continuity-Maturation debate is associated with the verb, I will examine the grammatical category VERB in Hong Kong Sign Language (HKSL) as a point of departure in the exploration of the early phrase structure. I will show whether the early phrase structure contains functional projections by studying the morphology and syntactic order of the verb in the early HKSL. Further evidence to the presence of functional projections in the early phrase structure is provided by early functional elements like modals/auxiliary-like elements and negators. This study which investigates VERB in child HKSL addresses the issue on how child data in language of a different modality provides further evidence to the Continuity view.

1.4 Thesis Outline

The thesis is organized as follows. In Chapter 2 an introduction of HKSL verbs will be provided. The grammatical category VERB has been classified into three major types in signed languages: agreement verbs, spatial verbs and plain verbs (cf. Padden, 1983, 1988).[17] These different types show different properties as to whether they encode verb agreement, whether they show spatial location of referents or whether they show semantic properties of the arguments. Similar classification may capture HKSL verbs, but if one examines the verbs more carefully, this classification faces some challenges. This observation leads to a new classification of verbs in HKSL, which will be discussed in Chapter 2. This introduction will lay the foundation of the discussion on phrase structure in the following chapters.

Chapter 3 presents my proposal on HKSL phrase structure in adult grammar which will serve as the basis on which the acquisition of early phrase structure is investigated. I will show that light verb phrase (*v*P) is head-initial but other functional projections like TP and Negation Phrase (NegP) are head-final by examining the word order of the verbs and their arguments and the syntactic positions of modals/auxiliary and negators. Syntactic derivations associated with different lexical verbs and classifier predicates will also be examined.

A review of the previous acquisition studies on signed languages is given in Chapter 4. In this chapter I will introduce the general trend of sign language acquisition. Focus will be put on the acquisition of different verb types as this will lay the foundation to a descriptive account of acquisition of verb types in Chapter 6.

Chapter 5 presents hypotheses built on the basis of the literature presented in the previous chapters and the methodology adopted in this study. I will introduce the

[17] Classifier predicates are grouped as a subtype of spatial verbs. More discussion on classifier predicates will be given in Chapter 2.

Deaf community in Hong Kong and the family background of the deaf child CC in this study. A description of the method of data collection, transcription and data analysis is also given in this chapter. Chapters 6 and 7 present the findings on the longitudinal data of CC. Chapter 6 consists of three parts. The first part describes the details on different kinds of verbs and an attempt will be made to outline the developmental pattern of HKSL verbs. The second part examines the relation between the use of space and different kinds of non-plain verbs. The last part discusses the effect of input ambiguity in the acquisition of HKSL verbs. Against the background on early verbs presented in Chapter 6, I will explore the early phrase structure in Chapter 7. In particular, different linguistic phenomena will be explored in order to find out whether the early phrase structure lends further support to the Continuity view. Conclusions will be given in the last chapter. This chapter includes a short summary of this thesis, limitations and directions for future research.

Chapter 2

Forms of VERB in HKSL

2.1 Introduction

Verbs in signed languages have been grouped into agreement verbs, spatial verbs and plain verbs on the basis of different morphological behaviors (see for instance Padden 1983, 1988 on ASL, Meir 1998 on Israeli Sign Language (ISL)).[1] Classifier predicates are grouped as a subtype of spatial verbs in the previous works. The same classification is applicable to the HKSL data (Lam 2003). This chapter consists of two parts. The first part provides a description of different forms of VERB in HKSL on the basis of the verb classification commonly adopted in the field of sign linguistics. The second part proposes a new classification in which agreement verbs, spatial verbs and the verb roots of classifier predicates are grouped under non-plain verbs, as opposed to plain verbs.

2.2 VERB in HKSL

Agreement verbs, spatial verbs and plain verbs are the three types of verbs identified in ASL and spatial verbs include classifier predicates (cf. Padden 1983, 1988). In HKSL I argue that the VERB may be grouped as four types. Plain verbs contrast with all other types of verbs in that they always appear in the same form:[2]

[1] Verbs in spoken languages, on the other hand, are commonly grouped by ways of their argument structure (e.g. transitive, intransitive) or verb meaning (e.g. verbs of transfer, psych-verbs).
[2] See the notational conventions on HKSL data on page v.

(1) a. (IX-3p) DISLIKE STUDY. (Lam 2003: 98)
(He) dislikes studying.'

DISLIKE (Lam 2003:197)

b. *IX-3p$_i$ $_3$$_i$DISLIKE$_{3j}$ IX-3p$_j$. (Lam 2003:99)
'He/she dislikes him/her.'

c. *PIPPEN DISLIKE$_a$ IX-obj$_a$.
'Pippen dislikes this.'

Plain verb cannot be marked for verb agreement or spatial locations. Hence the plain verb *DISLIKE* can only appear in its citation form in (1a). Example (1b) illustrates further that a plain verb cannot be marked for verb agreement. Similarly, the verb cannot be articulated at a locus in the signing space that corresponds to a real referent. That is why the sentence (1c) which contains a spatially-marked plain verb *DISLIKE$_a$* is ungrammatical. Padden (1983, 1988) mentioned that plain verbs can be signed in a location in ASL. Though plain verbs are not marked for spatial locations in HKSL, they may show temporal aspect via reduplication of the verb signs. In sum, they form a group of verbs which generally does not alter their verb forms to express formal properties (e.g. person feature) or semantic properties (e.g. locations or physical properties) of the referents.

Agreement verbs, spatial verbs and classifier predicates are more complex than plain verbs.[3] The complexities shown by these verbs can only be made clear under a

[3] It is the verb root of a classifier predicate that shares the same status with agreement verbs and spatial verbs as V^0. Before I discuss this issue, I will use the term "classifier predicates" for exposition.

closer scrutiny. Hence the following sections are devoted to an examination of these verb forms in HKSL.

2.2.1 Agreement Verbs and Verb Agreement

Verb agreement is defined as a syntactic relation between an agreement verb and its arguments in terms of person, number and gender. In HKSL agreement verbs may show agreement with the subject/object in terms of person, in a way similar to Italian and Spanish:[4]

(2) ***Person Agreement in HKSL***

BUT FRIEND $_{3k}$GIVE$_{3l}$ CAR.

'But a friend gives a car to him.'

$_{3k}$GIVE$_{3l}$ (Lam 2003:93)

Citation Form of GIVE (Tang 2007:521)

Person agreement in HKSL is exemplified in (2). The agreement verb *GIVE* is marked for third person subject *FRIEND* and third person object 'him' when it directs from locus-k to locus-l in the signing space (i.e. sideward movement from right to left). Agreement verbs in other signed languages also express verb agreement in a similar way. ASL verbs, for instance, may be marked for person of the subject and the object:

[4] Agreement verbs may also be marked with number in HKSL. Since CC's agreement verbs only show person agreement, I will put number agreement aside for the sake of clarity.

(3) ***Person agreement in ASL (Padden 1988:59)***

¡INDEX ¡GIVEj BOOK.

'She gave him the book.'

The ASL verb in example (3) echoes the HKSL verb in example (2) as both of them are directed from one third person locus to another third person locus to denote the person values of the subject/object. Person agreement is expressed by alternating the agreement verb forms. Lam (2003) has followed Padden's (1983, 1988) work on ASL in treating the spatial loci in the signing space as agreement affixes.[5] The following figure shows the spatial arrangement in HKSL:

Figure 2.1 Spatial Arrangement in HKSL

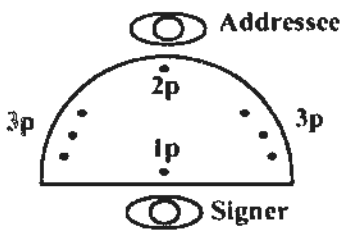
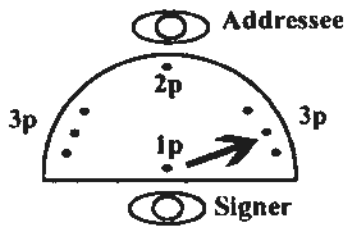


Figure 2.1 illustrates three sets of spatial loci that express person agreement in HKSL. The semi-circle represents the signing space (which is roughly the space in front of a signer's torso). The dots in the signing space refer to the spatial loci that denote agreement values, more specifically, person values. The labels 1p, 2p and 3p mean first, second and third person. When a regular agreement verb begins at a first person

[5] Equating spatial loci with agreement affixes does not capture agreement markings of all agreement verbs. This study will be different from Lam (2003) in that I would follow Meier (2002) to assume that agreement markings are in the form of directionality rather than spatial loci.

locus and ends at a third person locus, the verb, it reflects first person value of the subject and third person value of the object:[6]

Figure 2.2 Articulation of a Marked Verb Form



The arrow head in Figure 2.2 shows the end point of the verb and the other side of the arrow indicates the beginning point of the verb. Person values of the subject and object are expressed by directing the verb sign from a first person locus to a third person locus. The verb may show other person values with different loci:

[6] A small number of verbs acts in the reverse way, the beginning point denotes the person value of object and the end point marks the person value of subject. This kind of verb is known as backward verb.

Table 2.1 Ways of Expressing Different Person Values of Arguments

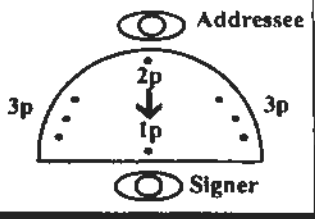
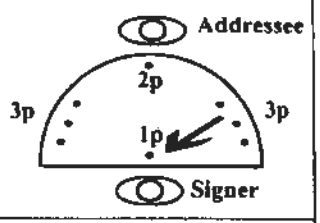
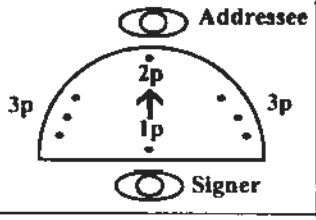
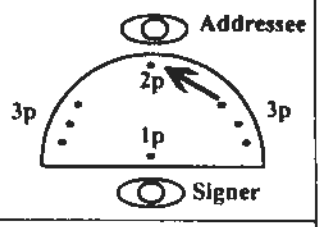
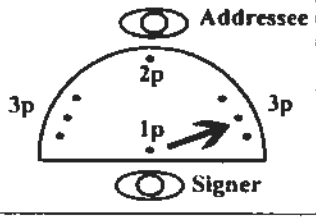
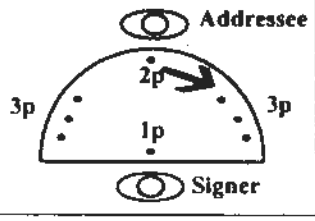
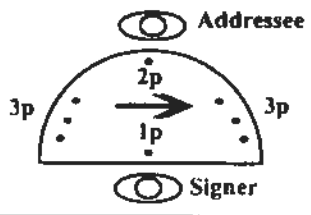
Subject / Object	1	2	3
1			
2			
3			

Table 2.1 shows how the beginning and end points of the verb vary when the person values of the subjects and objects change. Spatial loci where an agreement verb begins and ends can be viewed as agreement affixes. These agreement affixes express three person values: first, second and third.

In the past, I have assumed that agreement affixes in HKSL are spatial loci. However, this may not be an accurate account. In ASL, it is pointed out that not all marked agreement verbs involve path movement (Fischer and Gough 1978). Instead, verb's direction of movement, orientation or location expresses verb agreement in ASL. Meier (2002), for instance, characterizes agreement markings as follows (p.117):

> In signed languages, agreement takes the form of changes in the verb's direction of movement, palm orientation, and/or location such that – when an argument's referent is present in the visible environment of the conversation – the verb *agrees with*, or *indexes*, or *points* to that referent. When a referent is absent, the signer may associate an empty location in the signing space with that referent; verbs may *agree with* or *point to* such locations as well.

Meier characterizes the agreement markings as "verb's direction of movement, palm orientation, and/or location". He further terms the agreement markings in signed languages as directionality. This observation is also true in HKSL given the fact that agreement marking may just involve a change in palm orientation or location, as exemplified by the verbs *HELP* and *DONATE*. The citation forms of these two verbs are given in the following figures:

Figure 2.3 Citation form of *HELP* in HKSL[7]

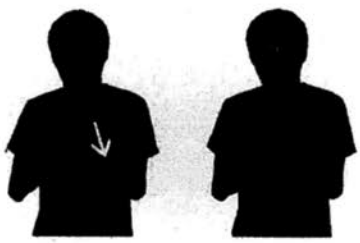


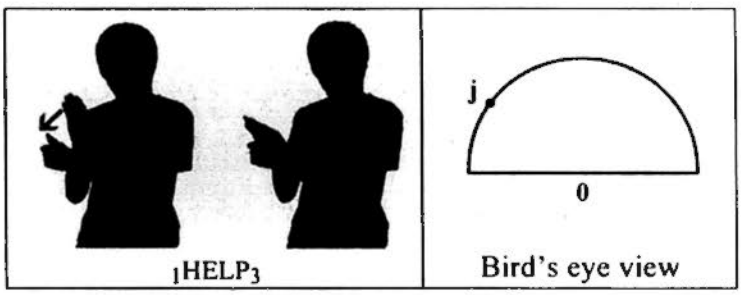
Figure 2.4 Citation form of *DONATE* in HKSL (Tang (2007:581))

The verb *HELP* is articulated at one point in the signing space. It is the palm orientation which indicates the verb agreement. The facing of the palm denotes the object and the other side the subject, as shown in the following example:[8]

[7] Two forms of *HELP* are observed in HKSL. Another form which is less commonly observed from my Deaf informants is a two-handed sign with B-handshape ( ).

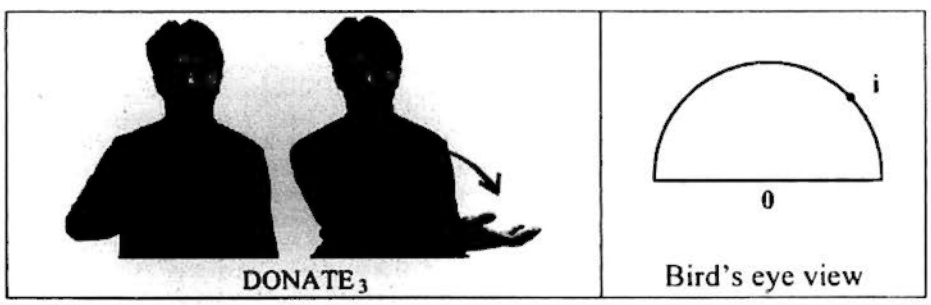
br

(4) IX-3p BUSY? IX-1p $_{1}$HELP$_{3}$.
'He is busy? I help (him).'



In example (4), the verb sign is articulated at one point in the signing space. Verb agreement is expressed by the orientation of the palm. So it is not appropriate to interpret spatial loci as agreement affixes. Similarly, the beginning point of the verb *DONATE* does not show verb agreement because this sign always starts from the signer's chest regardless of the person values of the subject (Lam 2003:109-110):

(5) IX-3p HAVE-TO SIGN-LANGUAGE. DONATE$_{3}$ WON'T. CORRECT?
'If the school uses sign language, (the sponsors) would not donate any money to (the school), right?'



The examples on agreement verbs *HELP* and *DONATE* suggest that agreement markings are not necessarily equal to spatial loci in HKSL. Thus I will adopt Meier's characterization of agreement markings instead in this study.

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[8] The icon indicates that video clips are available. Interested readers can contact the author at scholalam@gmail.com for video clips of examples used in this thesis. See Appendix 9 for a list of video clips.

As noted earlier, a three-way distinction of person agreement is observed in HKSL. However, the fact that agreement verbs may direct to some referential locations complicates the picture of verb agreement. The following example shows that an agreement verb may direct towards a real referent or an imagined referent:

(6) a. ***Real Referent***
BIRD IX-loc. $\textbf{CATCH}_{a}$.
'A bird is there. Catch (it).'

b. ***Imagined Referent (Lam 2003:139)***
STUDENT MEET. STUDENT ANY CL:PERSON_MEET_{m} CHAT.
IX-1p $\textbf{SEE}_{m}$. GOOD.
'A student and (the teacher) meet. Any student comes to (the teacher) and then (the student can) chat with (the teacher) in spoken language. I see that (the teacher and the student chat). (It is so) good.'

In (6a) the verb *CATCH* directs to the actual location of the mosquito (i.e. locus-a). Agreement verbs may also point at a location which is assigned to a particular nominal in the previous context. In example (6b) the locus-m of the verb *SEE* corresponds to the one with the classifier predicates *CL:PERSON_MEET* which serves to establish the nominals 'the teacher' and 'the student' in the signing space. In ASL agreement verbs also behave in a similar way. Researchers who work on ASL have different analyses on this phenomenon. One group of researchers suggests that verb agreement in signed languages is different from that in spoken languages as ASL verbs may direct to the location of the referents to agree with them (cf. Meier 1990, Lillo-Martin 1991). A consequence of this kind of analysis is that ASL has two person distinctions: first and non-first person.[9] Another analysis proposes that what

[9] See Lam (2003) for a detailed discussion on person distinctions in signed languages.

has been called verb agreement in signed languages (at least in ASL) is not truly verb agreement because there is no arbitrary set of spatial loci which functions like agreement affixes in ASL given there are too many points that may refer to the referents in the signing space (Liddell 1994, 1995, 2000). Directing to real referents or imagined referents clearly complicate the picture of verb agreement in signed languages. I suggest that verb agreement should not be viewed as a relation between the verb and the location of the referents, but a syntactic relation between the verb and its arguments. Directing the verb sign towards real or imagined referents, however, is termed as "location marking".[10] Location marking may be deictic or discoursal. Agreement marking, by contrast, expresses a formal relation between the verb and its arguments. Given the different nature of these two kinds of markings, I argue that location marking should not be considered as one kind of agreement markings in HKSL or in signed languages in general. It is the ability of expressing formal agreement relations that defines agreement verbs. Location marking is just a way of constructing a discourse. It may also be associated with other verb types like classifier predicates or other grammatical categories like pronominal, determiner and adjective.

Additional complexities on the properties of agreement verbs come from optionality. Agreement markings in spoken languages, being a kind of inflection, are generally obligatory (Bybee 1985, Spencer 1991, among others). Unmarked verbs would make a sentence ungrammatical in spoken languages which show verb agreement. Agreement verbs in HKSL, by contrast, may be in their bare forms (Lam 2003:115-6):

[10] Spatial verbs also share the same property. See Section 2.2.2 below.

(7) Optional Verb Agreement in HKSL

a. ***Subject-verb and Verb-object agreement***

i. ***Marked Form***

BUT FRIEND $_{3i}$**GIVE**$_{3i}$ CAR.

'But a friend gives a car (to him).'

ii. ***Citation Form***

BUT FRIEND **GIVE** CAR.

'But a friend gives a car (to him).'

b. ***Verb-object agreement***

i. ***Marked Form***

IX-3p HAVE-TO SIGN-LANGUAGE. **DONATE**$_3$ WON'T. CORRECT?

'If the school uses sign language, (the sponsors) would not donate any money to (the school), right?'

ii. ***Citation Form***

IX-3p HAVE-TO SIGN-LANGUAGE. **DONATE** WON'T. CORRECT?

'If the school uses sign language, (the sponsors) would not donate any money to (the school), right?'

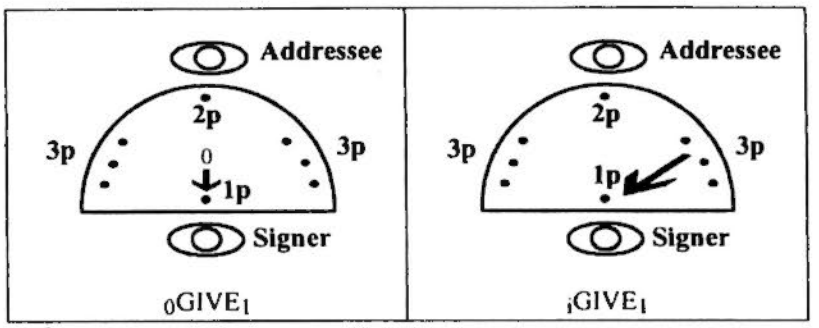
Example (7) shows the optionality of verb agreement in HKSL. Agreement verbs in (7ai) and (7bi) are marked for verb agreement. Yet examples (7aii) and (7bii) show that the absence of morphological marking for verb agreement does not cause the sentence to be ungrammatical as we normally see in spoken languages. Hence verb agreement in HKSL is optional.

The degree of optionality of agreement markings is high in HKSL as both subject-verb agreement and verb-object agreement markings can be omitted.[11] By contrast, only optionality of agreement markings for third person subject has been reported in ASL (Padden 1988:136-7):[12]

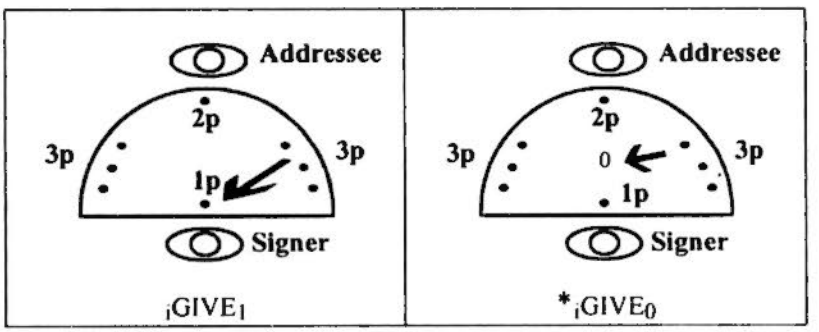
[11] Obligatory agreement markings are also observed in HKSL. I will return to this shortly below.

[12] The author has modified example (8a) (example (15) in Padden (1988:136)) by adding the subscript *i* to denote the possibility of having the verb marked with subject-verb agreement. This is to highlight the optionality of subject agreement marker in ASL.

(8) a. WOMAN $_{0/i}$GIVE$_{1}$ NEWSPAPER.
'The woman gave me a newspaper.'



b. WOMAN $_{i}$GIVE$_{1/*0}$ $_{1}$INDEX BOOK.
'The woman gave me a book.'



Example (8) lists two ASL sentences. The sentence in (8a) shows that the verb sign *GIVE* may begin at a spatial locus (i.e. locus-i, one of the third person loci on the right side of the signing space) that indicates third person value of the subject *WOMAN*. It can also begin at a spatial locus which is neutral to person values (i.e. midpoint of the signing space (the spatial locus-0 in the figure)). Padden (1988) thus concludes that ASL agreement verbs are optionally marked for subject-verb agreement. While subject-verb agreement marking is optional, the marking for verb-object agreement is obligatory. If the verb sign *GIVE* ends at a point in the neutral space, the sentence is ungrammatical.

HKSL also allows an omission of subject-verb agreement markings such that the agreement verb is marked for verb-object agreement only (a case similar to (8a)). Consider the following example (Lam 2003:113):

(9) MOTHER FOLD PLANE GIVE$_3$ COWBOY(= comic book character).
'Mother folds the paper into a plane, (she) gives it to Cowboy.'

As shown earlier, the verb $_{3i}GIVE_{3j}$ expresses subject-verb agreement and verb-object agreement in (2). What example (9) illustrates is another phenomenon where the verb sign only shows the third person value of the object morphologically, leaving the person value of the subject unmarked. This phenomenon is quite common when the subject and the object are both third person. In sum, HKSL allows omission of subject-verb agreement markings or both subject-verb and verb-object agreement markings. It shows a higher degree of optionality than ASL and other spoken languages.

Note that agreement markings cannot always be omitted in HKSL. When the subject is second person or when the object is first person, overt marking for verb agreement is obligatory for agreement verbs, as shown in the following example (Lam 2003:11, 117):[13]

[13] This observation holds with and without role shift.

(10) Obligatory Verb Agreement in HKSL

a. ***First person object***

i. ***Marked Form***

htn$_k$

eg$_k$

IX-3p ANGRY $_3$HIT$_1$.

'He is angry, (he) hits (me).'

ii. ***Citation Form***

htn$_k$

eg$_k$

* IX-3p ANGRY HIT.

b. ***Second person subject***

i. ***Marked Form***

$_2$SEE$_3$ SCHOOL-B.

'(You) see School-B.'

ii. ***Citation Form***

*SEE SCHOOL-B.

Example (10) illustrates the obligatoriness of agreement markings for first person object and second person subject. In example (10a) the sentence is collected from a narrative where the signer assumes the role of a boy bullied by a man on his way home as indicated by the nonmanual markings, head turn and eyegaze, at locus-k. The verb *HIT* must be marked for verb agreement or the sentence would be ungrammatical (as shown in (10aii)). The verb *SEE* in example (10bi) is marked with second person subject and third person object. If the sign is replaced with the citation form, as in example (10bii), the sentence becomes ill-formed. These examples show that optional agreement marking occurs in most cases except when the subject is second person or when the object is first person in HKSL. In other words, second person subject and first person object are the obligatory contexts for agreement markings to occur.

A question arises at this point is why certain person values, specifically second person value of the subject and first person value of the object, induce obligatory agreement markings while other person values don't. Put differently, both first person subject and second/third person object do not require obligatory agreement markings. If the phonological forms of these markings were considered more closely, one would notice that the directionality associated with first person subject and second/third person object conforms to that associated with the citation form. Both citation form and verbs marked with first person subject roughly begin at the space close to the signer's chest. Also, both citation form and verbs marked with second/third person object involve directionality from the signer to the signing space, though different areas of space indicate different kinds of person values. The similarity of phonological forms of the unmarked agreement verbs and the agreement markings for first person subject and second/third person object may be one possible reason for why these agreement markings look optional. More studies on HKSL phonology will allow us to pinpoint the nature of agreement markings.

This section presents a number of properties of agreement verbs in HKSL. Taken together, agreement verbs belong to a group of verbs which express verb agreement via change in directionality of the verb forms.[14] Yet agreement markings are not always obligatory in HKSL. Additionally, person agreement cannot be seen clearly when location markings are involved. The last property of agreement verbs is also shared by spatial verbs, the type of verbs we will now turn.

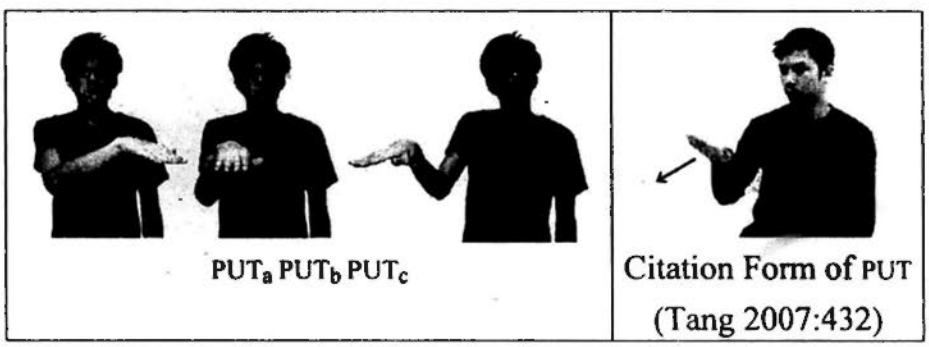
[14] I will discuss verb movement in the following chapter.

2.2.2 *Spatial Verbs and Location Marking*

Spatial verbs are defined as verbs which may show spatial locations of the referents.[15] It has been suggested that changes in the verb form of spatial verbs do not show verb agreement. Consider the following example:

(11) a. TREE CL:TREE_BE_LOCATED_j. MALE **¡WALK$_j$**.
'There is a tree. A man walks towards the tree.' (Lam 2003:100)

b. COMPUTER TEN **PUT$_a$ PUT$_b$ PUT$_c$**.
'Ten computers are put in a row.'



Spatial verbs *WALK* and *PUT* are exemplified in example (11). The locus-i and locus-j of the verb *WALK* in (11a) represent the point where a man starts walking and where the tree is. The direction towards these spatial loci do not indicate person of the subject because the location and movement of the spatial verb forms remain unchanged even with a different subject like 'I'. The verb *PUT*, on the other hand,

[15] This means that spatial verbs are not always spatially-marked.

shows how the computers are placed in (11b). The same pattern has been reported in ASL (Padden 1988:42, 78):

(12) a. ¡INDEX ¡WALK$_j$.
'He walked over there.'

b. ¡INDEX ¡CL:C-SLIDE $_j$.
'I slide a small object to the side.'

At first glance, agreement verbs and spatial verbs look similar as both may alter their forms and both of them may direct to real or imagined referents. Compare the agreement verbs in example (6), repeated as example (13), and spatial verbs in example (14) below:

(13) Agreement Verbs

a. ***Real Referent***
BIRD IX-loc$_a$. **CATCH$_a$**.
'A bird is there. Catch (it).'

b. ***Imagined Referent (Lam 2003:139)***
STUDENT MEET. STUDENT ANY CL:PERSON_MEET$_m$ CHAT.
IX-1p **SEE$_m$**. GOOD.
'A student and (the teacher) meet. Any student comes to (the teacher) and then (the student can) chat with (the teacher) in spoken language. I see that (the teacher and the student chat). (It is so) good.'

(14) Spatial Verbs[16]

a. ***Real Referent***

IX-1p BOOK PUT_{a}.

'I put the book there.'

b. ***Imagined Referent***

GLADYS BOOK HOME PUT_{a}.

'Gladys' book is put at home.'

Examples (13) and (14) illustrate that both agreement verbs and spatial verbs may direct to real or imagined referents. As noted earlier, when referential locations are involved, it is unclear whether agreement verbs are marked for verb agreement. When the location refers to a real referent, agreement verbs look no different from spatial verbs. When the referents are imagined, both spatial verbs and agreement verbs may direct towards a location which is established in the signing space previously.[17] The locus-m of the agreement verb in example (13b) is established to refer to *STUDENT* by the classifier predicate *CL:PERSON_MEET*. Similarly, the locus-j of the spatial verb in example (11a) refers to *TREE* established earlier. But example (14b) shows that a spatial verb may also direct to a spatial locus which is not established to any nominals in the earlier contexts. This shows the difference between agreement verbs and spatial verbs.

The nature of location marking associated with agreement verbs and spatial verbs is the same when the referents are real, but different when the referents are imagined. When the referents are present at the time of signing, signers may direct both

[16] The verb *PUT* has two senses. The verb in example (14a) has an agentive subject while that in example (14b) has a locative subject. A better translation for the verb *PUT* is 'places/exists'. Further investigation on verb meanings will show whether these two senses are two separate lexical items in HKSL. Now I tentatively gloss both senses as *PUT* due to the identical phonetic form of these two senses.

[17] This is known as nominal establishment, a phenomenon where the signers assign certain locus to a nominal in the signing space by pointing to the locus with an index sign or by locating the nominals or classifier predicates at that locus.

agreement verbs and spatial verbs towards the locations of the referents to mean 'an entity here' or 'an entity there'. It follows that location markings for real referents are deictic in nature. But when the location is imagined, the difference between agreement verbs and spatial verbs becomes clear. Location marking is an inherent property of spatial verbs. However, directing an agreement verb towards an imagined location is discoursal as nominal antecedent is required.[18]

2.2.3 Classifier Predicates

The previous subsections have introduced the properties of agreement verbs and spatial verbs. Now I turn to classifier predicates.[19] This form of VERB is more complex than the other verb types. Hence, unlike Padden's (1983, 1988) work on ASL, I would treat the classifier predicates of HKSL as a separate group of VERB.[20] Note that classifier predicates may be verbal, adjectival or nominal. Since the goal of the present study is to explore the phrase structure projected from the grammatical category VERB, the term classifier predicates only refer to the verbal one unless otherwise indicated in the following discussion.

Classifier predicates are compositional in nature as the phonological parameters (i.e. handshape, movement, orientation and location) are largely morphemic in a classifier predicate. While movement may express the action, the handshape is usually coreferential to the arguments involved. Location and orientation both denote the spatial relations among different participants of an event, though location may sometimes correspond to locative arguments/adjuncts. By contrast, phonological

[18] Grammatical relations are also expressed, though it would be less clear than when location marking is absent.

[19] The term classifier predicate rises from the observation that classifier predicates in signed languages look similar to classificatory verbs in Athabaskan languages. However, classifier predicates actually do not really share many properties found in classificatory verbs. See Engberg-Pedersen (1993), Slobin et al. (2001) and Schembri (2003) for further details.

[20] Classifier predicates will be shown to be more complex than a V^0 shortly below.

parameters are generally non-morphemic of a lexical sign. In this thesis I adopt Tang's (2003) view that movement of a classifier predicate is the verb root. Handshape and location, on the other hand, may be coreferential with the arguments of the verb root.

Verb roots in HKSL may or may not have a lexical counterpart which is in the form of a spatial verb and an agreement verb. It has been proposed that spatial verbs are lexicalized from classifier predicates (see Schick 1990 on ASL and Tang 2003 on HKSL). Tang (2003) suggests that the classifier predicates may be lexicalized in HKSL. The fact that lexicalized spatial verbs share the same form of movement with the classifier predicates supports this claim. Compare the spatial verb *PUT* and the classifier predicate *CL:PUT_A_RETANGULAR_OBJECT* below:

Figure 2.5 Two Forms of 'put'

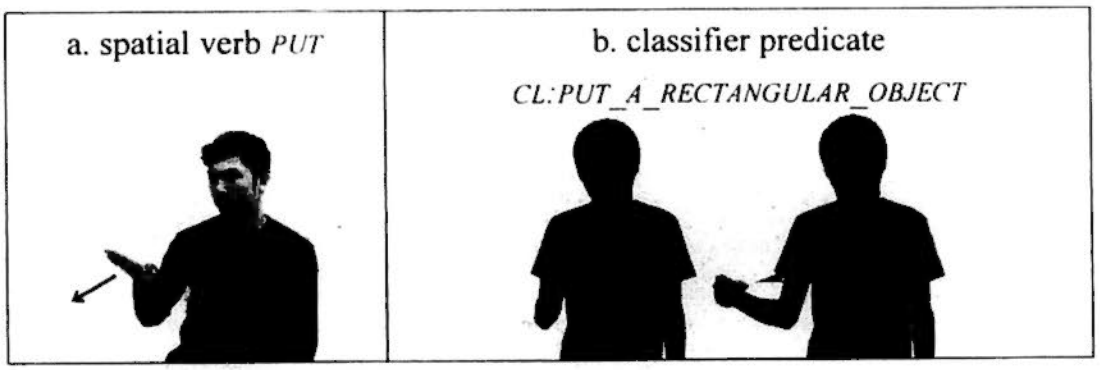
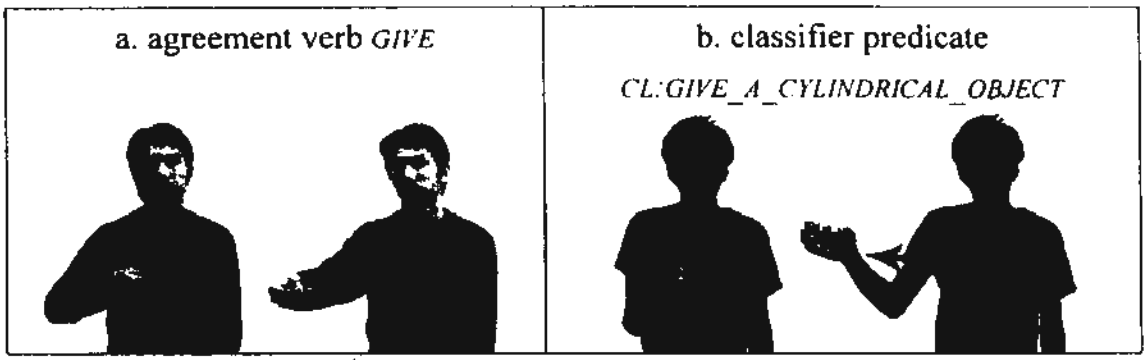


Figure 2.5 illustrates 'put' may be in the form of a spatial verb or a classifier predicate in HKSL. Both forms involve a downward movement in their phonological configuration, though the handshapes are different. While the handshape of the spatial verb is non-morphemic, the one for the classifier predicate indicates the size and shape of a box of drinks.

Similarly, agreement verbs may share the same form of movement with classifier predicates. This can be exemplified by the fact that 'give' may be in the form of an

agreement verb *GIVE* or a classifier predicate *CL:GIVE_A_CYLINDRICAL_OBJECT* in HKSL. Both forms share the same kind of movement (one type of phonological parameter). See Figure 2.6 below:

Figure 2.6 Two Forms of 'give'



The agreement verb *GIVE* contains a path movement when it expresses person agreement (See Section 2.2.1 above). Similarly, the form of movement in the classifier predicate *CL:GIVE_AN_CYLINDRICAL_OBJECT* is also a path movement. The only difference between an agreement verb and a classifier predicate is the handshape. In sum, the same form of movement is shared by spatial verbs, agreement verbs and the corresponding classifier predicates, suggesting that both spatial verbs and agreement verbs are lexicalized from classifier predicates.[21, 22]

Note that not all classifier predicates have a lexicalized counterpart. Classifier predicates which contain the verb roots 'be located' and 'hang' are two examples:

(15) TREE
CL:A_VERTICAL_OBJECT_WITH_EXTENSIONS_ON_TOP_BE_LOCATED_AT.
'A tree is located here.' (Tang 2003:151)

[21] It is possible that classifier predicates which are verbs of motion/location are lexicalized as spatial verbs and those which involve transfer become agreement verbs. Further research will verify this speculation.

[22] Since the same verb meaning may be expressed by lexicalized verb forms or classifier predicates in HKSL, children may avoid using the classifier predicates in the course of acquisition. Or they may be confused by the two forms. The co-occurrence of the two forms is viewed as ambiguous input. I will discuss this issue further in Chapter 6.

(16) WALL FEMALE-CHILD PICTURE
CL:HANG_2D_FLAT_OBJECT_ON_A_VERTICAL_PLANE.
'A girl hangs a picture on the wall.' (Lau 2002:65)

The verb roots 'be located' and 'hang' do not have a lexical verb counterpart in example (15) and (16). To recap, I assume that the verb root of classifier predicates in HKSL may or may not have lexical counterparts.[23]

While the movement refers to the verb root, handshape may be coreferential with the arguments:[24] The argument(s) may be an internal argument, an external argument or both in HKSL:

(17) a. ***Classifier Handshape = Internal Argument (adapted from Lau 2002:58)***
BALL CL:A_ROUND_OBJECT_BOUNCE.
'A ball bounced.'

b. ***Classifier Handshape = External Argument (Tang 2003:156)***
MALE HOUSE CL:A_HUMAN_ENTITY_ENTER_AN_ENCLOSURE.
'A man enters a house.'

c. ***Classifier Handshape = Internal and External Arguments (Lau 2002:59)***
MALE_CHILD PAPER CL:TEAR_FLAT_THIN_OBJECTS.
'A boy tore some pieces of paper.'

Example (17) shows that the classifier handshape may refer to an internal argument (*BALL* in (17a)), an external argument (*MALE* in (17b)) or both internal and external arguments (*MALE_CHILD* = external argument and *PAPER* = internal argument in (17c)).

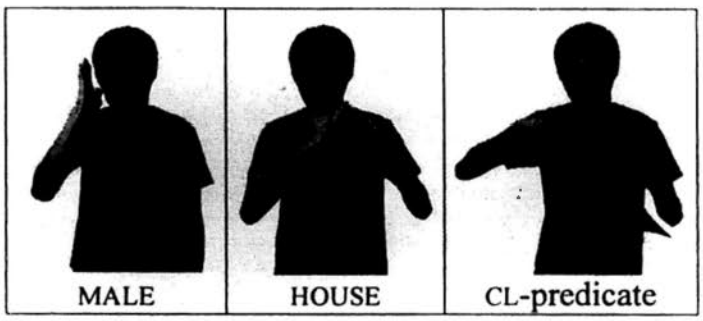
[23] Other studies on classifier predicates have different analyses of verb root. Tang (2003), for instance, describes the verb roots as BE_L-predicates or MOVE predicates. Supalla (1982) also notes three types of predicates (existence, location and motion) in ASL have three types of verb roots (stative, contact, active). Interested readers may refer to these studies for further details.
[24] As mentioned earlier, location may refer to locative argument. I will discuss this shortly below.

The same is true in ASL.[25] These classifier handshapes are grouped into three types: semantic classifier, handle classifier and size-and-shape-specifier (SASS) in HKSL:

(18) a. **Semantic Classifier (Tang 2003:156)**

MALE HOUSE CL:A_HUMAN_ENTITY_ENTER_AN_ENCLOSURE.

'A man enters a house.'

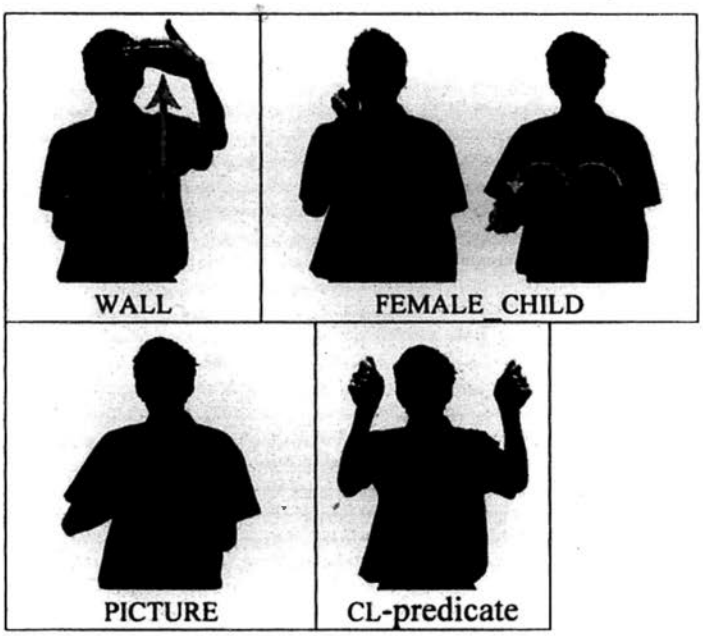


b. **Handle Classifier (Lau 2002:65)**

WALL FEMALE_CHILD PICTURE

CL:HANG_2D_FLAT_OBJECT_ON_A_VERTICAL_PLANE.

'A girl hangs a picture on the wall.'



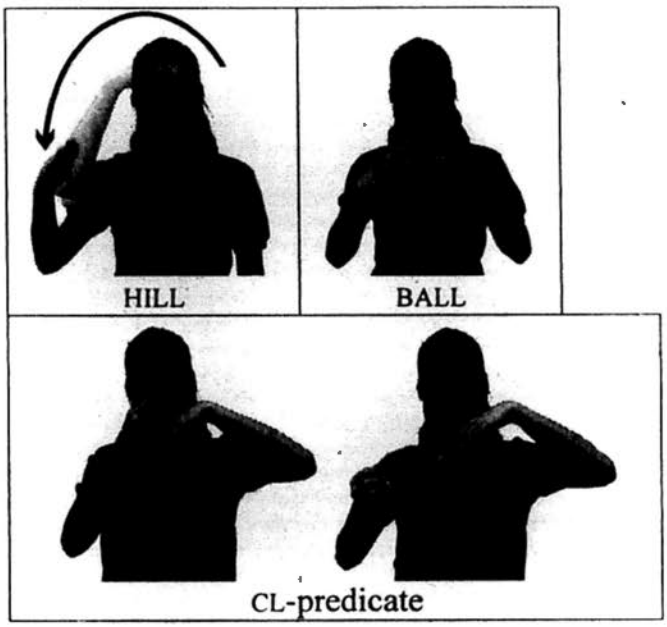
[25] That a classifier handshape may refer to an external argument leads some sign linguists to argue against an incorporation analysis for the formation of classifier predicates. See Glück and Pfau (1998) for a detailed discussion.

c. **SASS**

HILL BALL

CL:A_ROUND_OBJECT_MOVE_DOWN_FROM_THE_TOP_OF_THE_HILL.

'A ball rolls down from the top of the hill.'



Three types of classifier handshapes are listed in (18). Example (18a), repeated from example (17b), shows a semantic classifier handshape ( ) which refers to the class of animate entity with limbs in HKSL. The classifier predicate in (18b) is like an analogue of a real-world activity of hanging a picture. The handshape not only refers to the object, but also the agent who carries out the action and hence it is named as handle classifier.[26] SASS is shown in example (18c). This classifier handshape depicts the physical properties of the real-world objects. This property is also shared by handle classifier, but not by semantic classifier. Yet SASS does not show the handling action of an agent. The differences can be shown by other examples of classifier handshapes in Table 2.2 below:

[26] Alternatively, one may consider the arm and the hand as the agent (Donovan Grose, p.c.).

Table 2.2 Classifier Handshapes in HKSL

Semantic Classifier	SASS	Handle Classifier
 ANIMATE-ENTITIES-WITH-LIMBS	 THIN & STRAIGHT	 handling of a two-dimensional entity (e.g. a piece of paper)
 VEHICLE	 NARROW & STRAIGHT	 handling of a lumplike entity (e.g. rock)
 AIRPLANE	 WIDE & STRAIGHT	
	 FLAT & ROUND (circle)	
	 DEEP & ROUND (cylindrical)	

Table 2.2 shows that different classifier handshapes refer to different entities but they focus on different semantic properties. While semantic classifier always represents a class, handle classifier and SASS depict the physical properties of an object.

As noted, the phonological parameter location is morphemic in a classifier predicate. Specifically, the location of a classifier predicate may be the signer's body, a non-dominant hand or spatial loci, as shown in the following examples:

(19) a. ***Location = Signer's body (Tang 2003:149)***

MOUSE CL:AN_ENTITY_WITH_A_BODY_LONGER_THAN_IT_
IS_WIDE_LIE_FACE_DOWN_ON_MY_SHOULDER.
'A mouse lies on my shoulder.'

b. ***Location = Nondominant hand (adapted from Tang 2003:156)***

TREE CL:TREE_BE_LOCATED. BIRD
CL:A_LEGGED_ENTITY_STAND_ON_THE_TREE.
'A bird perches on the tree.'

c. ***Location = Spatial loci***

COMPUTER TEN-SOMETHING
CL:PUT_A_RECTANGULAR_OBJECT$_{multiple}$.
'About ten computers are placed (in the computer room).'

Example (19) illustrates that location of a classifier predicate is morphemic. In example (19a) the signer's body, specifically 'the shoulder', functions as a morphemic component of the classifier predicate. Example (19b) shows that spatial relation between 'the tree' and 'the bird' is represented by placing the classifier predicate that refers to 'the bird' on the non-dominant hand which expresses a tree classifier. The spatial loci encoded in the classifier predicate *CL:PUT_A_RECTANGULAR_OBJECT*$_{multiple}$ in example (19c) denotes the location where 'the computers' are placed. I preliminarily suggest that location of the classifier predicate in (19c) is coreferential to a discourse-bounded locative argument of the verb root 'put'. The examples (19a) and (19b) show that the location of the classifier predicates may be analyzed as a locative adjunct because the classifier predicates which contain verb roots 'lie' and 'stand' may occur at a neutral location. This claim will be verified with future research on the argument structure of each verb root and lexical verb in HKSL.

The different components of classifier predicates are discussed separately above. Some researchers have attempted to explore the predicate types by looking at different combinations of movement types and classifier handshapes. Schick (1987, 1990), for instance, analyzes the predicates which are formed from different combinations of classifier handshapes (CLASS, SASS and HANDLE) and movement morphemes (MOV, IMIT, DOT) in ASL. CLASS equals to semantic classifiers we have described above. SASS and HANDLE in her work are defined in the same way in other studies. MOV, IMIT and DOT are three movement morphemes that occur with the classifier handshapes. Her categorization of movement morphemes is slightly different from Supalla's. MOV refers to the movement in the signing space. IMIT means the "stylized imitation of real-world action" (Schick 1987:9). Spatial loci in the signing space are characterized by DOT. Different combinations of classifier handshapes and movement morphemes result in different kinds of predicates, as shown in the following table (Schick 1987:13):

Table 2.3 Combinations of Classifier Handshapes and Movement Morphemes[27]

Classifier handshapes / Movement Morphemes	**CLASS**	**SASS**	**HANDLE**
MOV	S-V (-LOC)	V:adj	(S-) V-O (-IO)
IMIT	S-V	S-V	(S-) V-O (-LOC)
DOT	S-V:be (-LOC)	V:adj+LOC	(S-) V-O + LOC

Table 2.3 shows the nature of the predicates which are formed from combining different classifier handshapes and movement morphemes. When CLASS (i.e. semantic classifiers) is combined with MOV, IMIT or DOT, the classifier predicates

[27] The hyphen '-' links up the arguments and the verb of each handshape+movement categories; '+' refers to incorporation of the following element. V:adj+LOC, for instance, means that a locative morpheme is incorporated. The elements in the parenthesis are optional.

refer to the subject and the verb. When the movement morphemes are MOV or DOT, locative arguments are optionally expressed. Note that the predicate that combines CLASS with DOT is existential (i.e. V:be). Predicates which contain handle classifiers, on the other hand, consistently show the verb and the object. When a handle classifier is combined with MOV, indirect object may be expressed as in the case with verbs of transfer. This is the same in HKSL. I have shown two forms of 'give' in Figure 2.6. If the handshape of the verb sign *GIVE* is replaced by a C-handshape (), the verb sign means 'give a deep round object'. The directionality of the classifier predicate denotes the person value of the subject and the indirect object.[28] When the handle classifier is combined with DOT, location is expressed. This kind of predicate mainly involves verb of putting like *DOT + HD:CYLINDRICAL.OBJECT [C] + LOC* 'put a cup somewhere' in ASL (Schick 1990:31). Classifier predicates may be formed from a combination of handle classifier and IMIT. The handle classifier mimics the handling of a real-world object as in *IMIT + HD:THIN.CYLINDRICAL.OBJECTS [S]* 'climb a robe' in ASL. Classifier predicates which combine SASS with MOV or DOT are adjectival.[29] Only SASS + IMIT is verbal. Note that HANDLE + IMIT and SASS + IMIT are sometimes interchangeable in ASL. *BRUSH.TEETH*, for example, can be used with a handle form *HD+THIN.LONG.OBJECT* or with a SASS form *SS:LONG.THIN.OBJECT*. This is probably due to the fact that both handle classifier and SASS describe physical properties of the entities. In HKSL it is observed that classifier predicates which contain handle classifiers are largely agentive while those

[28] Classifier predicates which contain handle classifiers may show verb agreement. Verb agreement with handle classifier is definitely more complex in morphology. To the best of my knowledge, no studies have addressed this issue on whether children have difficulty in acquiring agreement markings of classifier predicate. This may due to the fact that verb agreement and classifier predicates are studied separately. The present study which examines both verb agreement and classifier predicates will allow us to see a fuller picture of the acquisition of the grammatical category VERB.

[29] Adjectival classifier predicates are out of the scope of the present study. Interested readers may refer to Schick (1987, 1990) for details of this type of classifier predicates.

with SASS are nonagentive (Lau 2002). I will discuss this further in the following chapter.

Note that classifier predicates with different kinds of classifier handshapes seem to have different argument structures. While classifier predicates with CLASS and SASS are largely intransitive, those contain HANDLE are always transitive. This observation makes some researchers claim that classifier handshapes are the root of classifier predicates (cf. Frishberg 1975, Kegl and Wilbur 1976, Engberg-Pedersen 1993 and many others). Following Tang (2003), I argue that the transitivity of a predicate is dependent on a verb. If a classifier predicate is verbal, the central component should be the verb rather than the arguments or classifiers which are coreferential with the arguments. This analysis calls for a new verb classification in HKSL.

2.3 Towards a New Verb Classification

The previous section gives us a general background on how verbs are classified in signed languages. VERB is classified into different groups on the basis of the morphological properties they assume. At one end the plain verbs do not express verb agreement via directionality or spatial locations of an entity. They are considered as one group of verbs as opposed to the other three kinds of VERB in HKSL. A similar classification has been put forward in Brazilian Sign Language (Lingua de Sinais Brasileira, LSB) (See Quadros 1999). This new way of classifying verbs is motivated by the fact that agreement verbs, spatial verbs and classifier predicates share some common properties that are not shared by plain verbs. All these verbs make use of the signing space to express grammatical information.

Agreement verbs may express the person values of their arguments. Spatial verbs and classifier predicates may indicate the spatial locations/relations of the referents.

If the phonological parameters of different verb types are considered, the plain-non-plain-verbs distinction becomes clearer. Handshape, movement and location are the three common phonological parameters used to describe a phonological form. While all these parameters are phonological in plain verbs, some or all of them are morphological in agreement verbs, spatial verbs and classifier predicates. See Table 2.4 below:

Table 2.4 Phonological Parameters and Verb Types

Phonological parameters / Verb types	Location	Handshape	Movement	Orientation
Plain Verbs	×	×	×	×
Agreement Verbs	✓	×	✓	✓
Spatial Verbs	✓	×	×	×
Classifier Predicates	✓	✓	✓	✓

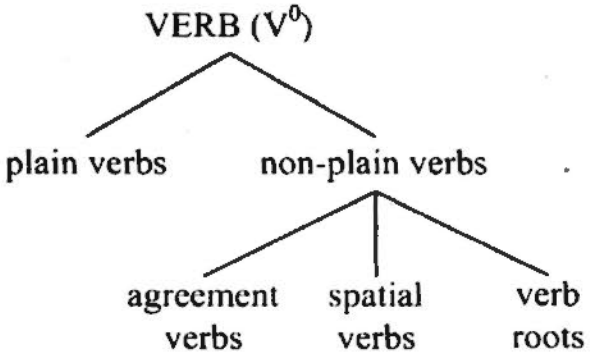
Table 2.4 illustrates which parts of a sign are morphemic and hence function as morphological units. All the phonological parameters (handshape, movement and location) of plain verbs are not morphological (indicated by the symbol '×'). By contrast, the location of agreement verbs, spatial verbs and classifier predicates are morphemic (indicated by the symbol '✓'). While location of an agreement verb indicates syntactic relation between the verb and its argument, the location of a spatial verb may refer to real or imagined referents. Location of a classifier predicate also denotes the spatial relation of the entities being described. It is then useful to group agreement verbs, spatial verbs and classifier predicates as a group of non-plain verbs as opposed to the plain verbs which form another group.

Consider the non-plain verbs more closely. In the last section I have mentioned that classifier predicates are more complex than other forms of verbs. As noted, all phonological parameters of a classifier predicate function as morphological units. Change in movement, location and/or orientation of an agreement verb is dependent on the person values of the arguments. However, the handshape is not morphemic. Similarly, location of a spatial verb expresses the location of a referent. All other parameters of the spatial verbs are non-morphemic. By contrast, all the parameters of classifier predicates represent independent morphemes. While the handshape refers to the arguments of the verb, movement of a classifier predicate is equivalent to a verb. Location may refer to locative arguments or adjuncts and orientation expresses the spatial relation among the participants of an event. The phonological parameters are all morphemic in a classifier predicate but not in an agreement verb or a spatial verb, hence classifier predicates are morphologically more complex than other verb types.

At this point, it is clear that a classifier predicate which contains a verb root and a handshape component is more than just a verb (V^0). Hence treating classifier predicates as one kind of VERB is inaccurate. I propose that the grammatical category VERB is in the form of plain verbs and non-plain verbs in HKSL where non-plain verbs contain agreement verbs, spatial verbs and verb roots which have not been lexicalized yet.[30] This new classification of VERB is given in Figure 2.7 below:

[30] Meir (1999) also noted that the incorporating verb stems (which is probably equivalent to verb roots in this study) in ISL are "general and more abstract motion and location predicates, which do not occur on their own in the language" (p.303).

Figure 2.7 A New Verb Classification in HKSL



It is possible that all non-plain verbs are originated from the same verb type given the fact that agreement verbs and spatial verbs are lexicalized from classifier predicates and verb roots must always be incorporated into classifier predicates. If this line of reasoning is on the right track, the surface verb types are resulted from lexicalization pathways of different classifier predicates.

2.4 Chapter Summary

This chapter gives an introduction of different forms of VERB in HKSL. VERB has been grouped into agreement verbs, spatial verbs, plain verbs and classifier predicates. Plain verbs contrast with other types of verbs as they do not show much morphology. All other types of verbs involve some kinds of alternations of the forms in order to express formal features or semantic properties of the arguments. It is therefore natural to group agreement verbs, spatial verbs and classifier predicates as opposed to plain verbs. Given the morphological complexities of classifier predicates, I further propose that there is yet another group of verbs, called verb roots. This group of verbs is only visible when they merge with classifier handshapes. Classifier predicates are actually larger units which contain these non-plain verbs.

Chapter 3

HKSL Phrase Structure

3.1 Introduction

This chapter provides a proposal of HKSL phrase structure and a discussion on the syntactic derivations associated with the grammatical category VERB in the MP framework.[1] The theoretical background on this framework is given in the next section. Two major issues will then be addressed in this chapter. First, I will present a proposal on the head directionality of HKSL phrase structure which is built upon the basic word order and syntactic positions of functional elements. Second, I will consider the relation between verb types and syntactic structures.

3.2 Theoretical Background

This section introduces the basic assumptions of syntactic derivations couched in the recent MP. The generative approach posits a language faculty (also known as UG) in human mind/brain. The language faculty consists of two systems: a performance system and a cognitive system. The cognitive system is of our concern and it involves I-language which generates linguistic expressions via a computational system and a lexicon.[2] Lexical items are projected as heads in a phrase structure in a way that the computational system can access. The operation which forms phrases of the phrase structure is called Merge. For instance, two lexical items, α and β are

[1] Specifically, the recent version of MP is adopted.

[2] I-language is defined as "'internal', 'individual' and 'intensional'. The concept of language is internal, in that it deals with an inner state of [one's] mind/brain, independent of other elements in the world. It is individual in that it deals with [a person], and with language communities only derivatively, as groups of people with similar I-languages. It is intensional in the technical sense that the I-language is a function specified in intension, not extension: its extension is the set of SDs [i.e. structural descriptions] (what we might call the structure of the I-language)" (Chomsky 1995:15).

selected from the Lexicon. They then form a phrase [$_{\alpha P}$ α β] via Merge. The structure is built further by merging αP with other lexical items from the Lexicon. When the structure is built, it would be sent to a phonological component for phonological representation and a semantic component for semantic representation.

However, some features, specifically uninterpretable features, may make the derivations crash because they cannot be interpreted by the semantic component. In MP, lexical items are bundles of features in the Lexicon. Features may be interpretable or uninterpretable. Interpretable features have semantic content while uninterpretable features do not. Features like [human], [adult] and [female] are interpretable features of a lexical item *woman*. Agreement features (i.e. person, number, gender) of the verbs are unintepretable. While interpretable features may be visible to the semantic component, uninterpretable cannot be visible as they generally have no semantic content. If uninterpretable features are visible to the semantic component, the derivation crashes.

In order to avoid crash, two other operations, Agree and Move, are needed to make unintepretable features invisible to the semantic component. Agree is "a relation (agreement, Case checking) between an LI [i.e. lexical item] α and a feature F in some restricted search space (its domain)" (Chomsky 2000:101). In 2004, Chomsky further formulates Agree as a relation between a probe and a goal. An LI acts as a probe and looks for a goal that carries the matching feature within its c-command domain.[3] There are two preconditions for Agree to occur; first, the probe and the goal have to be active, meaning that both the probe and the goal carry unchecked features. Second, the features have to be complete. The interpretation of

[3] Note that the earlier version of MP requires that a lexical item which carries uninterpretable feature and the head which holds interpretable features to be in a Spec-head relation (i.e. a relation between a head and a specifier in the same phrase) for feature checking to take place. If the feature pair is not in a Spec-head relation, movement is required. With the operation Agree, movement is not necessary.

"complete" is language specific. For instance, an English verb is feature-complete if they have both person and number feature while features are complete in Arabic if the verbs have person, number and gender features (See Radford 2004 and references cited there). When both conditions are fulfilled, Agree takes place so that the uninterpretable features of the probe and the goal are both deleted.

Move, on the other hand, is labeled as a combination of Agree, Pied-Pipe and Merge (Chomsky 2004:13).[4] It is assumed that Move is also motivated by the need of checking EPP feature, an uninterpretable selectional feature of a category that requires the specifier of the category to be filled.[5] EPP feature can be satisfied in two ways. First, an expletive may be merged to a structure such that the probe (the expletive) and the goal (the associate) form an agreement relation.[6] Alternatively, the EPP feature can be filled by moving the closest available category and merge it to the specifier.[7]

In sum, while the phrase structure is built from the bottom through Merge, both Agree and Move are motivated by the need of eliminating features. In MP, a derivation crashes if it contains uninterpretable features or EPP features. These features are like viruses which have to be erased via Agree or Move. In the following sections I will show how HKSL sentences are derived in this framework.

---

[4] Chomsky (2004) proposes that Merge is of two types: External Merge and Internal Merge. External Merge is of the same sense as noted in our earlier description. Internal Merge, on the other hand, is considered as an operation which involves displacement of a lexical item. A copy would be left in the position where a lexical item moves out. It is further assumed that scopal and discourse-related properties motivate Internal Merge (e.g. wh-movement). Merge in the operation Move refers to Internal Merge.

[5] EPP feature is assumed to provide extra specifier positions which are not required by the Projection Principle as in the case of object shift for *v*P and expletives for TP (Chomsky 2000). In 2004, Chomsky points out that a head has EPP feature "only if that yields new scopal or discourse-related properties" (p.11). Note that EPP feature is relabeled as OCC in Chomsky (2004) to mean "I must be an occurrence of some β" (p.11). An occurrence of β is equivalent to a sister of β. Since EPP is a widely-used terminology, I will continue to use it in the sense stated in Chomsky (2004) in the following discussion.

[6] The present study will not touch upon expletives. Interested readers may see Chomsky (1995) for a more thorough discussion on relation between an expletive and its associate.

[7] See Appendix 1 for an illustration of syntactic derivation in this framework.

3.3 HKSL Phrase Structure

Armed with the theoretical background in the previous section, I will now discuss the adult phrase structure in HKSL. Though HKSL is encoded in a different modality, I assume that the mechanisms in deriving sentences in the previous section are also applicable to HKSL because HKSL is also one kind of natural languages. This section consists of two parts. The first section presents a proposal of HKSL phrase structure. The second section shows the syntactic derivations associated with different types of verbs.

3.3.1 Head Directionality[8]

This section discusses head directionality of HKSL phrase structure which is a pre-requisite to our discussion of syntactic derivations associated with different kinds of verbs. The head directionality is determined by the order of different kinds of heads (verb, complementizer, determiner, preposition, etc) and their complements.[9] Based on the basic word order and syntactic positions of functional elements like negators and modals in HKSL, I assume the following structure:[10]

---

[8] Head directionality may be head-initial and head-final. These two values are subsumed under the head parameter. Head-initial refers to the ordering in which the head precedes its complement; head-final, on the other hand, states that the head follows its complement (Fukui 1993:401):

a. [x' X^0 Y^{max}] (head-initial)
b. [x' Y^{max} X^0] (head-final)

Given the head parameter, the form of the phrase structure of a language can be determined by looking at the ordering between the head and its complement in the language (Fukui 1993:401):

c. English VP (head-initial)
[v' [V^0 eat] [Y^{max} an apple]]
d. Japanese VP (head-final)
[v' [Y^{max} ringo-o] [V^0 tabe-ru]]
apple-ACC eat-NONPAST
'eat an apple'

Although the linear order of the head and its complement reflects the head directionality of a language, the reality is not as neat as what head parameter predicts. German phrase structure, for instance, contains head-final VP and head-initial functional phrases like IP and CP. Chinese shows an even more complex picture. Huang (1994) points out that heads are generally final except when the head is a [+V].

[9] The head directionality of a number of heads (preposition, determiner and complementizer) remains unclear in HKSL. Though some signs like *INSIDE* in HKSL may be equivalent to a preposition in spoken languages, this kind of signs is rarely used. When they are used, they may occur before or after a DP. Signers also tend to use a classifier predicate instead to express a locative adjunct/argument. Similarly, determiners (in the form of an index signs) in HKSL may precede or follow a noun (N). Tang and Sze (2002) suggest that the prenominal index signs are determiners and postnominal one is ambiguous between a determiner and an adverbial. Overt complementizer is not observed so far, though question markers like *YES-NO-YES* and *HAVE-NOT-HAVE* may occupy C. The following discussion will therefore focus on the heads V and *v*.

[10] Lam (2008) assumes a head-initial TP in HKSL. This study shows a different view on the head directionality of phrase structure given the clause-final modals/auxiliaries in HKSL.

Figure 3.1 HKSL Phrase Structure

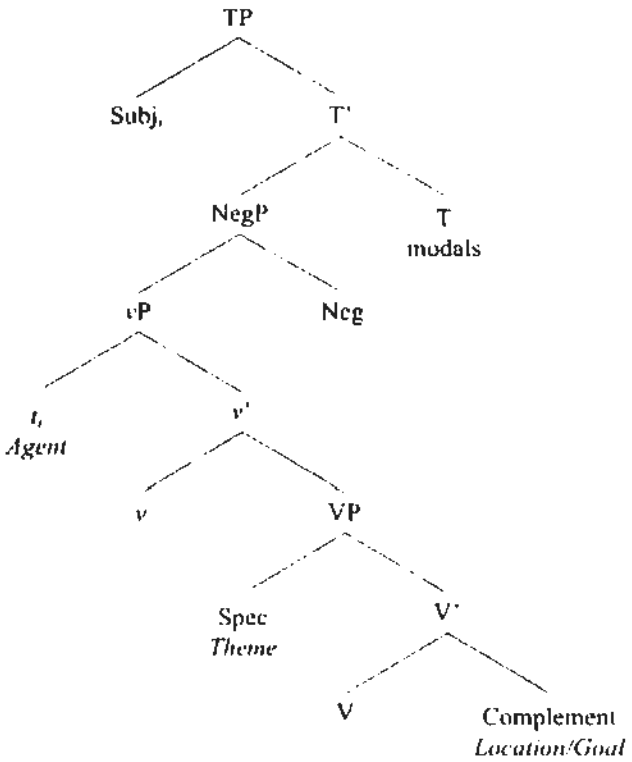


Figure 3.1 shows the proposed HKSL phrase structure.[11] I assume that the basic word order can be seen when no morphology or syntactic movement like topicalization occurs. Sentences with a plain verb and a neutral face do not show morphology.[12] When these sentences have a broad focus, it is assumed that these sentences reflect the basic word order. Consider the following example (Sze 2000a:46):

(1) a. FATHER LIKE COMPUTER.
'Father likes computer.'

b. *FATHER COMPUTER LIKE.

[11] According to Chomsky (2004), "T functions in the Case-agreement system only if it is selected by C, in which case it is also complete" (p.15). Since the head directionality of CP requires further research, I leave out the CP for expository purpose. The assumption that TP is selected by C holds until contrary evidence is found.

[12] When a HKSL sentence is signed with a neutral face, no nonmanual markings are indicated. When nonmanual markings are not uniform over the sentence, freer word order is observed, as I will show shortly below.

(2) a. FATHER UNDERSTAND SIGN-LANGUAGE.
'Father understands sign language.'

b. *FATHER SIGN-LANGUAGE UNDERSTAND.

When the sentences that contain a plain verb have a broad focus and they are uttered with a neutral face, the word order is SVO, as shown in examples (1a) and (2a). In both cases, SOV order is considered as ungrammatical (i.e. (1b) and (2b)). SVO order is also strictly followed in sentences with an unmarked agreement verb:

(3) a. CHILD HELP GRANDMOTHER.
'A child helps his/her grandmother.'

b. * CHILD GRANDMOTHER HELP.

The agreement verb *HELP* in example (3) is in its citation form. When the agreement verbs are unmarked, SVO order is strictly followed.[13] Based on the available data, SVO is the basic word order in HKSL. Sze (2008) also agrees with this claim as she observes utterances showing SVO order outnumber those showing SOV order in the adult data obtained from a two-hour dialogue, twenty short narratives and some questions-and-answers sessions in her study. In addition, around 90% of the word order in embedded clause is SVO in her study.[14] The order in embedded clauses is assumed to be the underlying word order of a language (cf. Poeppel and Wexler 1993, Chen 2001). Plainly, at least VP in HKSL is head-initial.

[13] Not many spatial verbs are transitive. To the best of my knowledge, the verb *PUT* is the only verb that selects two arguments. This verb may occur with agentive subject where SOV order is observed or with locative subject where both SVO and SOV orders are allowed. I will discuss this further below.
[14] It appears that SVO and SOV orders co-occur in HKSL. Such co-occurrence may be associated with grammaticalization. Alternatively, the SVO order may be a result from the Cantonese influence. However, a closer examination at the word orders associated with plain verbs shows that SOV order is related to the types of objects (proper names, common nouns and pronouns). I will show that SOV order is derived from object shift, a syntactic derivation where object moves out from the VP to some higher specifier positions. A closer scrutiny of object shift will be given below.

In addition to the evidence given above, sentences which contain ditransitive verbs in HKSL show further the ordering of head and complement in VP. Sze (2000a, b) reports that indirect object must follow the verb in HKSL, as shown in the following example (Sze 2000a:73):

(4) a. FATHER BORROW MOTHER MONEY (S V IDO DO)
'Father borrows some money from mother.'

b. *FATHER BORROW MONEY MOTHER (S V DO IDO)
'Father borrows some money from mother.'

The ditransitive verb *BORROW* in example (4) is an unmarked agreement verb.[15] When all arguments are overt, indirect objects *MOTHER* must precede the direct object *MONEY*.[16, 17] The same pattern is observed with *GIVE* from a grammaticality judgment task:[18]

(5) a. FELIX GIVE BRENDA CANDY (S V IDO DO)
'Felix gives a candy to Brenda.'

b. ?/*FELIX GIVE CANDY BRENDA (S V DO IDO)
'Felix gives a candy to Brenda.'

---

[15] The order is not sensitive to whether the verb is marked or unmarked as the same order is observed when the verb is marked.

[16] It is possible that *MOTHER MONEY* is a possessive phrase. Tang and Sze (2002) report that possessive phrase is head-initial and therefore the ungrammaticality in example (7b) may be due to the ordering of the possessive phrase. So this example does not really illustrate the word order of ditransitive verbs. The phrase *MOTHER MONEY* is the direct object instead. I will show shortly below that the S-V-DO-IDO is marginal when DO and IDO do not form a possessive phrase.

[17] Null arguments are common in HKSL. I will focus on sentences which have overt arguments below as the presence of null arguments do not show the word order clearly.

[18] Three native signers were invited to judge 55 videotaped HKSL sentences generated by alternating word orders of the verbs *GIVE*, *DONATE*, *HAVE* and *PUT*. After judging each set of sentences, the signers were also asked to rank the set of sentences such that the preferred word order was obtained. It is observed that agreement verb *DONATE* and spatial verb *PUT* are considered as two-place predicate. In *FOUNDATION MONEY DONATE$_3$ CENTER* 'The foundation's money is donated to the center', the *MONEY* and *FOUNDATION* are viewed as parts of a possessive phrase, similar to *GLADYS* and *BOOK* in *GLADYS BOOK PUT$_a$ HOME* 'Gladys' book is put at home.'. So the agreement verb *GIVE* is the only ditransitive verb observed so far.

The ditransitive agreement verb *GIVE*, being unmarked in example (5), behave in the same way as *BORROW* in example (4). Note that S-V-IDO-DO, though acceptable, is not most preferred. According to our results of the judgment task, the order S-DO-V-IDO is, in fact, ranked as the most natural order. Consider example (6) below where the sentences in each group were varied according to (i) unmarked for verb agreement, (ii) marked for verb-object agreement only and (iii) marked for both subject-verb agreement and verb-object agreement:[19]

(6)	a.	i.	FELIX GIVE BRENDA CANDY	(S V IDO DO)
		ii.	?FELIX GIVE$_3$ BRENDA CANDY	
		iii.	FELIX $_3$GIVE$_3$ BRENDA CANDY	
	b.	i.	?/*FELIX GIVE CANDY BRENDA	(S V DO IDO)
		ii.	?/*FELIX GIVE$_3$ CANDY BRENDA	
		iii.	?FELIX $_3$GIVE$_3$ CANDY BRENDA	
	c.	i.	FELIX CANDY GIVE BRENDA	(S DO V IDO)
		ii.	FELIX CANDY GIVE$_3$ BRENDA	
		iii.	FELIX CANDY $_3$GIVE$_3$ BRENDA	
	d.	i.	*FELIX BRENDA GIVE CANDY	(S IDO V DO)
		ii.	*FELIX BRENDA GIVE$_3$ CANDY	
		iii.	*FELIX BRENDA $_3$GIVE$_3$ CANDY	
	e.	i.	*FELIX CANDY BRENDA GIVE	(S DO IDO V)
		ii.	*FELIX CANDY BRENDA GIVE$_3$	
		iii.	*FELIX CANDY BRENDA $_3$GIVE$_3$	
	f.	i.	?/* FELIX BRENDA CANDY GIVE	(S IDO DO V)
		ii.	*FELIX BRENDA CANDY GIVE$_3$	
		iii.	*FELIX BRENDA CANDY $_3$GIVE$_3$	

[19] Individual variation is observed with non-manual markings in this example. One deaf signer thinks that nonmanual markings for the arguments are required when the verb is marked for agreement. Hence she thinks that S-DO-V-IDO and S-V-IDO-DO are marginal when nonmanual markings are absent. But other signers accept these orders even though the sentences are signed with a neutral face.

When the verb *GIVE* is unmarked, both S-V-IDO-DO (i.e. (6ai)) and S-DO-V-IDO (i.e. (6ci)) are considered grammatical, though the former is considered as an order influenced by Cantonese. When the verb is marked for verb-object agreement (as in (ii) sentences) or for both subject-verb agreement and verb-object agreement (as in (iii) sentences), S-DO-V-IDO is the only word order which is considered grammatical by all deaf informants. S-V-IDO-DO is viewed as marginal or even ungrammatical when the verb is marked. Note that the verb can never occur in the clause-final position (i.e. (6e) and (6f)).

In Chapter 2 I have mentioned that nominals in signed languages may be assigned to certain spatial loci in a discourse and this phenomenon is known as nominal establishment. When the arguments are established in the signing space via nonmanual markings like head tilt and eye gaze, the degree of acceptance of various word orders is higher:[20]

[20] When nominals are established in the signing space, agreement verbs must direct towards the space which represents the nominals. So the sentences in example (7) all contain marked agreement verbs.

(7) a. $\underline{\quad ht_i \quad}$ $\underline{\quad ht_j \quad}$ (S V IDO DO)
$\underline{\quad eg_i \quad}$ $\underline{\quad eg_j \quad}$
?FELIX $_3$GIVE$_3$ BRENDA CANDY

b. $\underline{\quad ht_i \quad}$ $\underline{\quad ht_j \quad}$ (S V DO IDO)
$\underline{\quad eg_i \quad}$ $\underline{\quad eg_j \quad}$
?/*FELIX $_3$GIVE$_3$ CANDY BRENDA

c. $\underline{\quad ht_i \quad}$ $\underline{\quad ht_j \quad}$ (S DO V IDO)
$\underline{\quad eg_i \quad}$ $\underline{\quad eg_j \quad}$
FELIX CANDY $_3$GIVE$_3$ BRENDA

d. $\underline{\quad ht_i \quad}$ $\underline{\quad ht_j \quad}$ (S IDO V DO)
$\underline{\quad eg_i \quad}$ $\underline{\quad eg_j \quad}$
?FELIX BRENDA $_3$GIVE$_3$ CANDY

e. $\underline{\quad ht_i \quad}$ $\underline{\quad ht_j \quad}$ (S DO IDO V)
$\underline{\quad eg_i \quad}$ $\underline{\quad eg_j \quad}$
*FELIX BRENDA $_3$GIVE$_3$ CANDY

f. $\underline{\quad ht_i \quad}$ $\underline{\quad ht_j \quad}$ (S IDO DO V)
$\underline{\quad eg_i \quad}$ $\underline{\quad eg_j \quad}$
?FELIX BRENDA CANDY $_3$GIVE$_3$

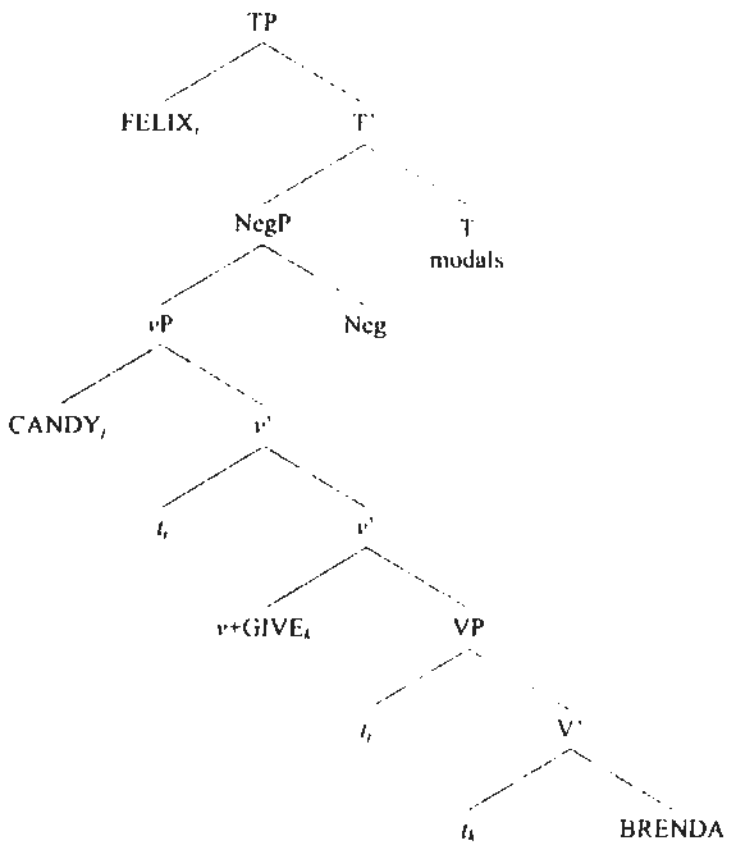
Word orders which have been judged as ungrammatical are viewed as marginal (S-IDO-V-DO and S-IDO-DO-V) when nominal establishment is involved. Yet S-DO-V-IDO is still most preferred. The following table summarizes the judgment on sentences in (6) and (7) above:

Table 3.1 Summary of Grammaticality Judgment on sentences in (6) and (7)

	Unmarked	VO Agreement	SV and VO Agreement	Nominal Establishment + Agreement Markings
S V IDO DO	✓	?	✓	?
S V DO IDO	?/*	?/*	?	?/*
S DO V IDO	✓	✓	✓	✓
S IDO V DO	*	*	*	?
S DO IDO V	*	*	*	*
S IDO DO V	?/*	*	*	?

A question at this point is how the judgments shown above reveal the head directionality in HKSL. When the head V follows its complement, it is head-final. Note that the head-final orders S-DO-IDO-V and S-IDO-DO-V are consistently ungrammatical in HKSL whether the verbs are marked for agreement, or whether they occur with nonmanual markings for nominal establishment. Though S-IDO-DO-V is marginally accepted when nominal establishment is present, it could not serve as a piece of evidence for head-final structure because nominal establishment may be associated with word order variations. The head-initial structure is further supported by the fact that S-DO-V-IDO order is accepted regardless of the forms of the agreement verb *GIVE* in this test. A head-initial *v*P captures this order naturally:[21]

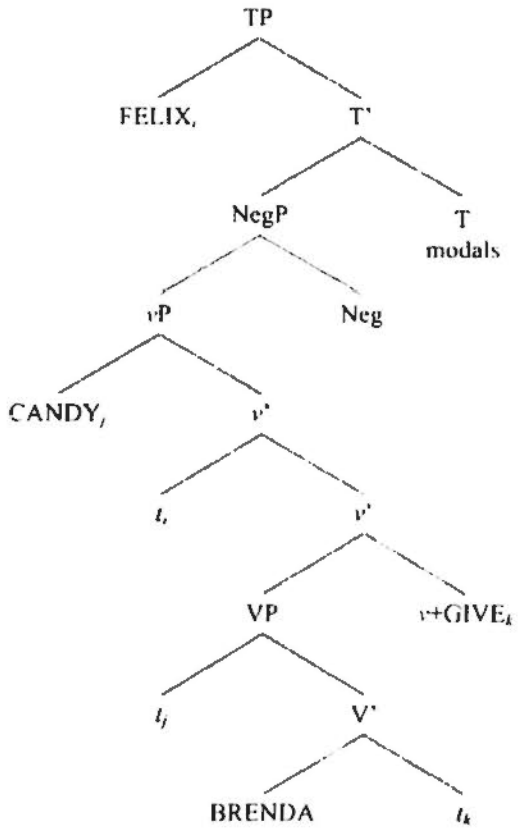
Figure 3.2 Derivation with a Head-initial *v*P



[21] I assume that the verb moves only from V to *v* in HKSL. In addition, the direct object is shifted to Outer Spec, *v*P due to object shift. Further discussion on verb movement and object shift will be given in Section 3.3.2 below.

When the *v*P is head-initial, the indirect object *BRENDA* always follows the verb. But if the *v*P is head final, an unacceptable word order S-DO-IDO-V will be resulted:

Figure 3.3 Derivation with a Head-final *v*P



Note that I assume that the verb does not move up to T since raising to a head-final T will yield an unacceptable S-DO-IDO-V order. One may alternatively posit a head-initial TP. Yet a head-initial TP is not compatible with the adult data.

I assume that both TP and NegP are head-final. The head directionality of TP and NegP can be seen from the syntactic positions of T-elements (e.g. tense markers and modals) and negators. In ASL the syntactic position of a lexical tense marker *FINISH* is considered as an indicator of whether the functional projection is head-initial or head-final. The fact that it may occur in preverbal position and sentence-final position (See example (8) below) causes a debate on whether IP is head-initial or head-final.

(8) Lexical Tense Marker in ASL (Romano 1991:245, cited from Sandler and Lillo-Martin 2006:310):

a. ME SEE MOVIE FINISH

b. ME FINISH SEE MOVIE

While Fischer (1990) proposes a head-initial phrase structure for ASL, Romano (1991) argues that IP should be head-final given (8a).[22] Yet it is not entirely clear how (8b) is derived with a head-final structure. In HKSL, no lexical tense markers are found. I will therefore focus on modals. HKSL modals like *CAN*, *WILL*, *HAVE-TO*, etc. are observed to occur clause-finally (Lee 2006:76, 77, 79):[23]

(9) a. BRING_ALONG_SHOULDER_BAG **HAVE_TO**. (pro) STEAL **WILL**.[24]
'You have to bring along your shoulder bag. It is possible (for) it to be stolen.'

b. INDEX.$_{1s}$ GO_HOME TELEVISION **WILL**.
'I will go home and watch the television broadcast.'

c. INDEX.$_{1s}$ ACCOMPANY (pro) **NEED_TO**.
'I have to accompany (my father).'

Example (9) shows that the modals *WILL* and *HAVE_TO* are clause-final with both plain verbs (e.g. *BRING_ALONG_SHOULDER_BAG* in (9a), *TELEVISION* in (9b)[25]) and unmarked agreement verb (e.g. *STEAL* in (9a)). The examples (9a) and (9b) both show S-V-mod

[22] ASL is shown to have SVO order in a number of studies (Fischer 1974, Liddell 1980, Padden 1983, 1988). Fischer (1990) points out that ASL has a head-initial structure, supported by the fact that verbs generally precede their objects, modals precede their complements, etc. Fischer admits that heads sometimes follow complements in ASL. She points out that the complement-head order is associated with definiteness and hence the apparent SOV structure is actually derived by moving complements upward like mini-topics.

[23] Signers may also use nonmanual markings like pursed lips meaning 'must' to replace the manual modals. The full paradigm of nonmanual markings which express modality requires further research. Since the constituent order with nonmanual modals is unclear, I will focus on manual modals below.

[24] The modal *HAVE-TO* may appear in preverbal position to some signers.

[25] The verb sign *BRING_ALONG_SHOULDER_BAG* may be a lexicalized form of handle classifier predicate. The verb sign *TELEVISION* may be a verb which has incorporated a noun like Cantonese VO compound. Both signs are classified as plain verbs as they show neither agreement nor spatial morphology.

order. When an object *pro* is involved, as exemplified by example (9c), S-V-O-mod order is observed. Since modals shown here scope over the entire event, it is assumed that they are at some higher functional projections. In this study I posit that modals are located at T. As modals are clause-final, the TP is head-final in HKSL. One consequence of the head-final TP is that verbs at V cannot raise as T is occupied by the modal:

Figure 3.4 Movement from *v* to T[26]

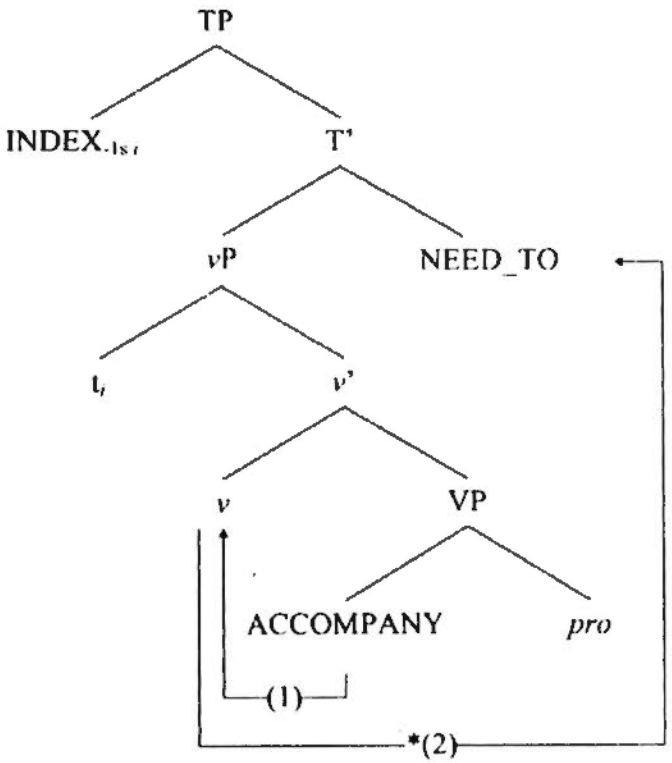


Figure 3.4 shows that the verb *ACCOMPANY* cannot move into T since it is occupied by the modal *NEED_TO*. The movement (2) is not possible. One may suggest the modals may be placed at a higher functional projection in such a way that T is empty for *v*-to-T movement. If T is head-final, overt verb raising would give the word order like

[26] Features are not represented in tree structures for the sake of clearer illustration unless otherwise indicated.

S-DO-IDO-V which is not acceptable in the adult grammar. I will discuss this in more detail in the next section.

Further evidence for a head-final T comes from the auxiliary-like elements *HAVE$_{exist}$* and *NOT-HAVE*.[27] While *HAVE$_{exist}$* indicates emphatic affirmation and existence of a proposition, *NOT-HAVE* expresses emphatic negation and non-existence of a proposition:

(10) MOTHER BUY APPLE **HAVE$_{exist}$/NOT-HAVE**.
'It is/isn't the case that Mother bought some apples.'

The signs *HAVE$_{exist}$* and *NOT-HAVE* also occur with past events only, evidenced by the fact that they cannot occur with temporal adverbials for non-past events like *TOMORROW*:

(11) a. **YESTERDAY/TODAY** FELIX BUY CANDY **HAVE$_{exist}$ NOT-HAVE.**
'It is/isn't the case that Felix bought some candies yesterday/today.'

b. ***TOMORROW** FELIX BUY CANDY **HAVE$_{exist}$/NOT-HAVE**
'It is/isn't the case that Felix bought some candies tomorrow.'

These properties make them look similar to the Chinese *you* 'have' and *meiyou* 'not have' or Cantonese *jau5* 'have' and *mou5* 'not have'. The Chinese *you* and *meiyou* have been analyzed as auxiliaries which are placed at I (cf. Huang 1988). Auxiliaries usually express tense, aspect and agreement. Since *HAVE$_{exist}$* and *NOT-HAVE* only express past events, I term these signs as auxiliary-like elements. The clause-final position of these signs further supports the claim that TP is head-final in HKSL.

[27] In HKSL the signs *HAVE* and *NOT-HAVE* can be further grouped into three types: possessive, locative/existential and existential. This observation is also noted in Lee (2006). I will focus on the existential *HAVE* and *NOT-HAVE* below.

NegP is also head-final in HKSL. I assume that NegP dominates *v*P because negators have scope over the event expressed by the elements within *v*P. The fact that negators are clause-final suggests that NegP is head-final. Examples of negative sentences in HKSL are given below (Lee 2006:87, 93):[28]

(12) a. INDEX$_{1s}$ TELL$_3$ JAFI NOT
'I am not telling Jafi this.'

b. JAFI GO_HOME NOT
'Jafi didn't go home.'

In (12) the negator *NOT* always occurs at clause-final position regardless of verb types: agreement verb *TELL* (i.e. (12a)) or plain verb *GO_HOME* (i.e. (12b)).

At the beginning of this section, I have proposed that TP dominates NegP in HKSL, as illustrated in Figure 3.1. It follows that one would see S-V-O-neg-mod order in HKSL. Yet no such order has been observed in HKSL. More importantly, negators and modals do not co-occur:

(13) a. *FELIX TAKE_CARE SON HAVE-TO NOT.
'It is not the case that Felix has to take care of her son.'

b. *FELIX TAKE_CARE SON NOT HAVE-TO.
'It is not the case that Felix has to take care of her son.'

Example (13) illustrate that both S-V-O-mod-neg and S-V-O-neg-mod orders are not accepted. When either the negator or the modal are taken away, the sentences would be well-formed. This suggests that negators and modals do not co-occur. One

[28] Lee has reported some sentences where the object precedes the verb (i.e. S-O-V-neg). This order can be derived by having the object moved to Outer Spec, *v*P. Since this does not affect our discussion on head-directionality of NegP, I leave this issue aside.

possibility is that both negators and modals are from the same syntactic node (presumably T). The preliminary analysis presented in this section focuses largely on the negator *NOT* which appears in the child data studied in this thesis. Lee (2006) also reports other negators like *NEVER, NOT-YET* and so on. The relation between modals and negators requires a more thorough study. I will therefore assume that NegP is present to house various kinds of negators until further evidence against this view is found. Further research on negators and modals will shed light on this preliminary analysis of NegP and TP.

SVO is shown to be the basic word order in HKSL above. However, sentences which are not influenced by morphology and syntactic movement can also be signed in SOV order:

(14) CHILDREN SNOW-WHITE LIKE.
'Children like *Snow White*.'

The sentence in example (14) contains a plain verb. SOV is accepted, though SVO order is preferred. In her study, Fischer (1975) proposes that the word order variations are related to the reversibility between the subject and the object in ASL. The higher the degree of reversibility, the lower the chance of having a wide range of word order variations, as shown in the following examples:

(15) Reversible subjects and objects (Fischer 1975:5)

a. MAN NOTICE CHILD (SVO)
'The man noticed the child.'

b. CHILD, MAN NOTICE (OSV)
'As for the child, the man noticed it.'

c. NOTICE CHILD, MAN (VOS)
'He noticed the child, the man did.'

(16) Non-reversible subjects and objects (Fischer 1975:14)

a. BOY LIKE ICE-CREAM (SVO)

b. BOY ICE-CREAM LIKE (SOV)

c. ICE-CREAM LIKE BOY (OVS)

d. LIKE ICE-CREAM BOY (VOS)

e. ICE-CREAM BOY LIKE (OSV)

Examples (15) and (16) illustrate that when a sentence contains reversible subjects and objects, word order variations are limited when compared to those which have non-reversible subjects and objects.[29] In example (14) the subject *CHILDREN* is animate while the object *SNOW-WHITE* '*Snow White* (=fairy tale)' is inanimate. One may account for the SOV order with reversibility. Since the subject and object are

[29] The notion of reversibility is a possible explanation to why word order variations are observed in ASL. Yet Liddell (1980:90) shows that SOV order is not allowed for some verbs which selects non-reversible subjects and objects:

a. *MAN MOVIE SEE

b. *MAN NUMBER FORGET

These sentences serve as counterexamples to Fischer's claim on the relationship between word order variations and reversibility. The word order is not as free as one expects. The word order variations can actually be captured by a formal account in which one word order is the basic word order and other word orders are all derived from this basic word order in ASL (cf. Sandler and Lillo-Martin 2006). I will also adopt a formal view on SOV order in HKSL. See Section 3.3.2.

non-reversible, word order variations are allowed. However, the picture is more complicated when the following examples reported in Sze (2000a) are considered:

(17) Reversible Sentences (Sze 2000a:52-53)[30]

a. CAT CHASE RABBIT.
'A cat is chasing a rabbit.'

b. *CAT RABBIT CHASE.
'A cat is chasing a rabbit.'

(18) Non-reversible Sentences (Sze 2000a:46)

a. FATHER LIKE COMPUTER.
'Father likes computer.'

b. ??/* FATHER COMPUTER LIKE.
'Father likes computer.'

Examples (17) and (18) show that reversibility does not introduce word order variations, but leads to ungrammaticality in HKSL. This contrasts with Fischer's (1975) observation presented in examples (15) and (16) in ASL above. While non-reversible sentence like *BOY LIKE ICE-CREAM* in ASL allows a wide range of word order variations, the same non-reversible sentence *FATHER LIKE COMPUTER* in HKSL has to be signed with SVO order.

A question arises here is why SOV order is allowed with example (14) but not with examples (17) and (18). I suppose that SOV order is related to the types of objects. Consider the following sets of sentences:

[30] The plain verb *CHASE* in Sze's example is articulated in the same way as *RUN* glossed in this study.

(19) a. %FION **DORAEMON**(=Japanese cartoon character) LIKE.
'Fion likes Doraemon.'

b. ?FION **DOG** LIKE.
'Fion likes dogs'

c. *FION **IX-3p** LIKE.
'Fion likes him/her.'

(20) a. CHILDREN **OCEAN-PARK** LIKE.
'Children like Ocean Park.'

b. ?CHILDREN **PLAYGROUND** LIKE.
'Children like playgrounds'

c. *CHILDREN **IX-det** LIKE.
'Children like that.'

(21) a. CHILDREN **SNOW-WHITE** LIKE.
'Children like *Snow White*.'

b. ?CHILDREN **BOOK** LIKE.
'Children like books.'

c. *CHILDREN **IX-det** LIKE.
'Children like that.'

Examples (19) to (21) illustrate native signers' judgment on SOV sentences with different types of objects (proper names in (a) sentences, common nouns in (b) sentences and pronominal/determiners in (c) sentences). Note that the symbol % shows that the acceptance of the sentence is subjected to individual differences. The degree of acceptance of SOV order is highest with objects that are proper names and least with objects that are pronominal/determiners. The acceptance of SOV order with common noun objects is in the middle. In addition, reversibility accounts for

word order variations when the subject and the object are proper names. The sentence *FION DORAEMON LIKE* is allowed, but the sentence *KENNY BRENDA LIKE* 'Kenny likes Brenda' is ungrammatical. The subject *FION* and the object *DORAEMON* in the first sentence is non-reversible. But the subject *KENNY* and the object *BRENDA* in the second sentence are reversible. So the reversibility explains why the second sentence must follow a SVO order.[31]

SOV order is also observed with spatial verbs and classifier predicates. Consider the examples below:

(22) a. IX-1p BOOK PUT_a.
'I put the book there.'

b. MALE_CHILD PAPER CL:TEAR_FLAT_THIN_OBJECTS.
'A boy tore some pieces of paper.'

Example (22) shows that the word order associated with a spatial verb (i.e. *PUT*) and a classifier predicate (i.e. *CL:TEAR_FLAT_THIN_OBJECTS*) is SOV. The spatial verb and the classifier predicate in (22) cannot have SVO order:

(23) a. *IX-1p PUT_a BOOK.

b. *MALE_CHILD CL:TEAR_FLAT_THIN_OBJECTS PAPER.

Given the fact that both spatial verbs and classifier predicates largely express spatial locations/relations of the entities involved in an event, it is possible that the SOV order is related to such property. While it may be true for classifier predicate, the

[31] The derivation of SOV order will be discussed in detail in Section 3.3.2.

following example serves as a counterexample to the relation of spatial verb and SOV order:

(24) a. GLADYS BOOK PUT_a HOME
'Gladys' book is placed at home.'

b. GLADYS BOOK HOME PUT_a
'Gladys' book is placed at home.'

The verb *PUT* may occur with SVO order and SOV order in example (24). Note that this verb takes a theme subject while the one in example (22a) selects an agentive subject. The contrast between example (22a) and example (24) may follow from the type of subjects rather than the property of expressing spatial locations. In sum, while classifier predicates always occur with SOV order, spatial verbs do not.

3.3.2 Lexical Verbs and Syntactic Derivations

Now I will proceed to illustrate the syntactic derivations of different verb types given the background presented in the previous section. This section discusses the syntactic derivations associated with agreement verbs, spatial verbs and plain verbs in HKSL. First, I review the previous syntactic analyses in other signed languages. Then I will show how I modify my syntactic analysis presented in Lam (2003) to keep up to the current theory. Derivations of SOV order will also be discussed.

Not many syntactic analyses on verbs are found in the literature. Chen (2001) puts forth an idea that SOV order in ASL is derived by a verb movement towards a Manner Phrase (ManP) because verbs which show morphology on aspect, location and instrument are associated with SOV order. The details about the syntactic derivations are not mentioned. Rathmann (2000, 2003) also attempts to explore

whether AgrP is present in German Sign Language (DGS) by examining an auxiliary-like element labeled as Person Agreement Marker (PAM) in their study. PAM is inserted when there are phonetic constraints (e.g. body-anchored) that block full agreement (i.e. subject-verb agreement and verb-object agreement) or when the episodic reading of the sentence is forced.[32] He further proposes that PAM is at head, AgrP because it shows different syntactic behaviors with agreement verbs (Rathmann 2003:186):[33]

(25) a. ***Underlying structure***

HANS$_i$ [$_{AgrP}$ PAM$_j$ [$_{VP}$ [MAG [MARIE$_j$]]]]
Hans PAM like Marie
'Hans likes Marie.'

b. ***Object shift***

HANS$_i$ [$_{AgrP}$ MARIE$_j$ PAM$_j$ [$_{VP}$ [MAG [*t*]]]]
Hans Marie PAM like

c. ***Object cliticization***

HANS$_i$ [$_{AgrP}$ PAM$_j$+MARIE$_j$ [$_{VP}$ [MAG [*t*]]]]
Hans PAM Marie like

[32] In DGS, sentences may have generic reading or episodic reading. Compare the sentences below (Rathmann 2003:184):

a. *SOHN$_j$ MUTTER$_i$ 5-JAHRE LEHREN$_i$*
son mother 5-years teach
'A mother used to teach her son for 5 years.' (generic reading)
'A mother has been teaching her son for 5 years.' (episodic reading)

b. *SOHN$_j$ MUTTER$_i$ 5-JAHRE PAM$_i$ LEHREN$_i$*
son mother 5-years PAM teach
??'A mother used to teach her son for 5 years.' (generic reading)
'A mother has been teaching her son for 5 years.' (episodic reading)

When PAM is absent (in (a)), the sentence is ambiguous between generic and episodic reading. Ambiguity is eliminated when PAM is added (as in (b)) and the sentence only has episodic reading.

[33] The subscripts *i* and *j* in the following examples are agreement markers rather than coindices.

(26) a. ***Underlying structure***

HANS$_i$ [$_{AgrP}$ [$_{VP}$ [$_i$FRAGEN$_j$ [MARIE$_j$]]]]

Hans ask Marie

'Hans asks Marie.'

b. ***Object shift***

*HANS$_i$ [$_{AgrP}$ MARIE$_j$ [$_{VP}$ [$_i$FRAGEN$_j$ [*t*]]]]

Hans Marie ask

c. ***Object cliticization***

*HANS$_i$ [$_{AgrP}$ $_i$FRAGEN$_j$+MARIE$_j$ [$_{VP}$ [*t*]]]

Hans ask Marie

In example (25) object shift or object cliticization at AgrP are induced by the presence of PAM. When the PAM is not present in example (26), object shift and object cliticization are not allowed. PAM and agreement verbs are also shown to behave differently when functional elements like negators, aspect markers and modals are present (Rathmann 2003:187):

(27) a. ***Negators***

HANS$_i$ [$_{NegP}$ [NOCH^NICHT] [$_{AgrP}$ [$_i$PAM$_j$+MARIE$_j$] [$_{VP}$ [MAG]]]]

HANS$_i$ [$_{NegP}$ [$_i$PAM$_j$+MARIE$_j$] [NOCH^NICHT] [$_{AgrP}$ t [$_{VP}$ [MAG]]]]

'Hans does not yet like Marie.'

b. ***Aspect Markers***

HANS$_i$ [$_{AspP}$ [GESEWEN] [$_{AgrP}$ [$_i$PAM$_j$+MARIE$_j$] [$_{VP}$ [MAG]]]]

HANS$_i$ [$_{AspP}$ [$_i$PAM$_j$+MARIE$_j$] [GESEWEN] [$_{AgrP}$ t [$_{VP}$ [MAG]]]]

'Hans already like Marie.'

c. ***Modals***

HANS$_i$ [$_{TP}$ [KANN] [$_{AgrP}$ [$_i$PAM$_j$+MARIE$_j$] [$_{VP}$ [SCHWINDELN]]]]

HANS$_i$ [$_{TP}$ [$_i$PAM$_j$+MARIE$_j$] [KANN] [$_{AgrP}$ t [$_{VP}$ [SCHWINDELN]]]]

'Hans can lie to Marie.'

(28) a. ***Negators***

HANS$_i$ [$_{NegP}$ [NOCH^NICHT] [$_{VP}$ MARIE$_j$ $_i$FRAGEN$_j$]]

'Hans has not yet asked Marie.'

b. ***Aspect Markers***

HANS$_i$ [$_{AspP}$ [GESEWEN] [$_{VP}$ MARIE$_j$ $_i$FRAGEN$_j$]]

'Hans has already asked Marie.'

c. ***Modals***

HANS$_i$ [$_{TP}$ [KANN] [$_{VP}$ MARIE$_j$ $_i$FRAGEN$_j$]]

'Hans can ask Marie.'

While PAM+object may precede or follow the functional elements (i.e. (27)), agreement verbs always have to follow the functional elements (i.e. (28)). This empirical evidence drives Rathmann to conclude that PAM and agreement verbs are located at different positions in the phrase structure. While PAM is inserted at AgrP, agreement verbs locate within VP. Note that AgrP is also absent with agreement

verbs. Chen's work on ASL and Rathmann's work are similar in that both explore verbs which show overt morphology. The structure of verbs which do not show overt morphology is not mentioned.

The most thorough study in attempting to explore the relation between verb types and phrase structure is perhaps Quadros' (1999) work on LSB (i.e. Brazilian Sign Language). She divides LSB verbs into two types: plain and non-plan verbs (i.e. agreement verbs and spatial verbs) and she observes that the two kinds of verbs have different behaviors when they co-occur with a negator, an auxiliary (which is marked for verb agreement)[34] or a tense marker. Consider negative sentences in LSB first:[35]

(29) Negation with non-plain verbs (Quadros 1999:116)

neg

IX<the> JOHNa NO <a>GIVE<b> BOOK (SNVO)

'John does not give the book to (her).'

(30) Negation with plain verbs (Quadros 1999:116, 117, 124)

neg

a. *JOHN NO DESIRE CAR (SNVO)

neg

b. *IX<the> JOHN DESIRE NO CAR (SVNO)

neg

c. JOHN DESIRE CAR NO (SVON)

'John does not like the car.'

Plain verbs contrasts with non-plain verb in that the negator precedes the non-plain verb *GIVE*, but follow the plain verb and its object (hence clause-final). Plain verbs

[34] This auxiliary sign is similar to those in Taiwan Sign Language (TSL) (Smith 1990), Japanese Sign Language (JSL/NS) (Fischer 1996) and PAM in German Sign Language (DGS) (Rathmann 2000, 2003).

[35] Quadros (1999) uses the angle brackets < > to indicate the types of IX as well as locations of agreement verbs and alphabets a, b for locations of nominals (e.g. *JOHNa*). The line marked with *neg* indicates the nonmanual marking for neg. The markers *eg*, *hn* and *bs* in the following examples of LSB refer to eyegaze, headnod and bodyshift respectively. S, N, V and O refer to subject, negator, verb and object.

and non-plain verbs clearly show different behaviors with respect to negative sentences. Similarly, the presence of an auxiliary with plain verbs shows that plain verbs belong to a different group which is distinct from the group of non-plain verbs:

(31) Auxiliary sign with non-plain verbs (Quadros 1999:134)

eg

*JOHNa MARYb <a>AUX<b> <a>MEET<b> (SOAuxV)

'John meets Mary.'

(32) Auxiliary sign with plain verbs (Quadros 1999:54, 63)

eg eg hn

a. IX<the> JOHNa IX<the> MARYb <a>AUX<b> LIKE (SOAuxV)

'John likes Mary.'

hn

b. IX<the> JOHNa LIKE IX<the> MARYb (SVO)

'John likes Mary.'

Examples (31) and (32) illustrate that an auxiliary optionally occurs with plain verbs, but not with non-plain verbs. The presence of an auxiliary with the non-plain verb like *MEET* gives rise to an ungrammatical sentence.

Lastly, the observation that tense markers can occur with non-plain verbs, but not with plain verbs (even in the presence of the auxiliary sign) serves as another piece of evidence to Quadros' proposal of different structures for different kinds of verbs. Consider the following examples (Sandler and Lillo-Martin 2006:330-1):

eg eg hn

(33) a. *IX<the> JOHNa IX<the> MARYb FUTURE-TNS <a>AUX<b> LIKE
'John will like Mary.'

eg/bs

b. IX<the> JOHNa FUTURE-TNS <a>GIVE<b> BOOK
'John will give (her) the book.'

While the tense marker *FUTURE-TNS* can occur with the non-plain verb *GIVE* in example (33b), the same tense marker is not allowed with the plain verb *LIKE*. Quadros hence proposes that the structure for plain verbs only consists of IP while that of non-plain verbs contain a split-IP, that is, AgrSP, TP and AgrOP (See the two structures below):

Figure 3.5 LSB Phrase Structure for Plain Verbs (Quadros 1999:161)

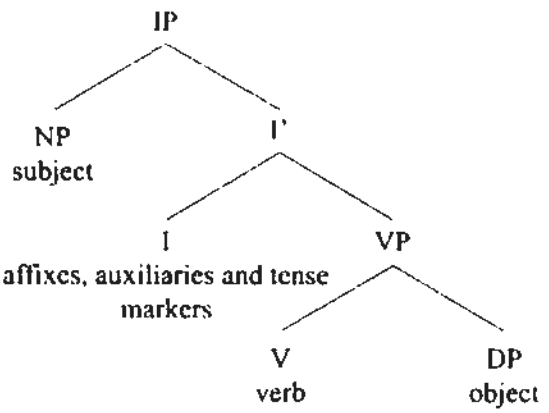
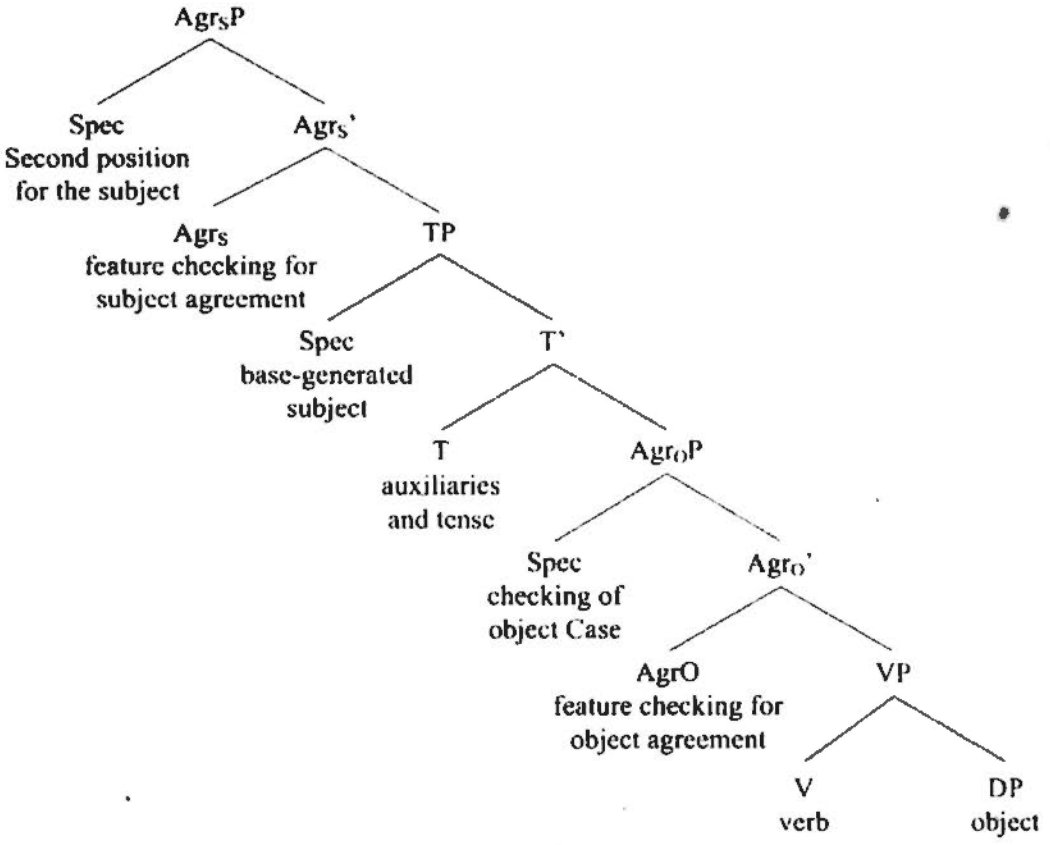


Figure 3.6 LSB Phrase Structure for Non-plain Verbs (Quadros 1999:162)

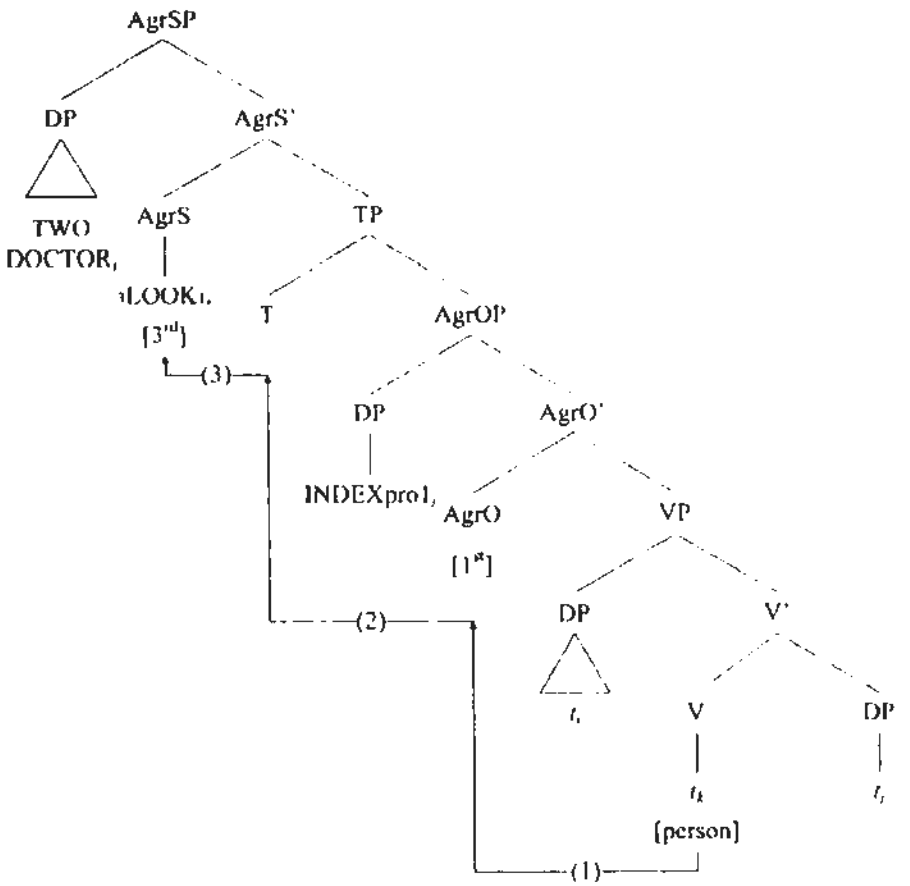


Quadros assumes different structures given the different behaviors of plain and non-plain verbs in LSB.

While two structures are proposed in Quadro's analysis in LSB, I assume that the different behaviors in HKSL can be captured by one structure. In Lam (2003) I have proposed a unified account for syntactic derivations of agreement verbs, spatial verbs and plain verbs. The AgrPs, AgrSP (for subject-verb agreement) and AgrOP (for verb-object agreement) are available for all these verbs. The reason is that all these verbs carry uninterpretable [person] feature. The [person] feature is realized as overt agreement markings for agreement verbs, but zero morphemes for plain and spatial

verbs after feature checking.[36] The derivations of these three types of verbs are demonstrated in the following figure:

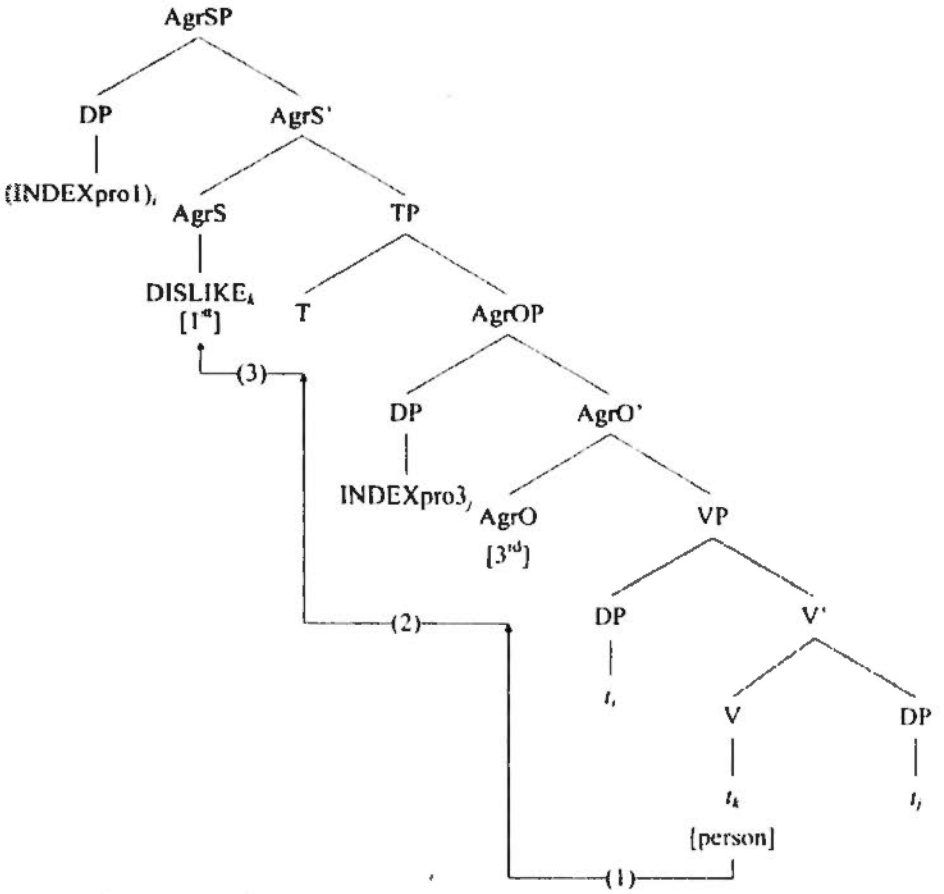
Figure 3.7 Agreement Verb and Phrase Structure in HKSL (Lam 2003:177)



TWO DOCTOR $_3$LOOK$_1$ INDEX$_{pro1}$
'Two doctors look at me.'

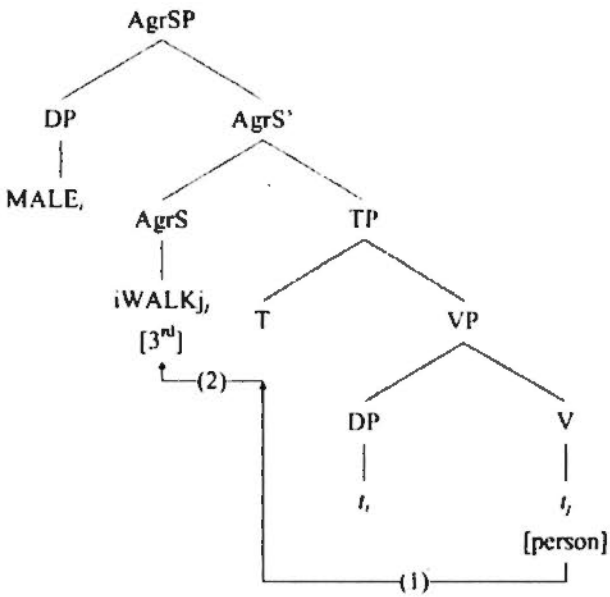
[36] One may question on how location marking are realized in the syntactic derivations. I have noted in Chapter 2 that location marking is an inherent property of spatial verbs and hence they are not realizations of features in the syntactic derivations. Location marking is also associated with nominal establishment. I assume that this kind of marking is a discoursal device and hence it is not realized at Syntax.

Figure 3.8 Plain Verb and Phrase Structure in HKSL (Lam 2003:178)



(INDEX$_{pro\ 1}$) DISLIKE NDEX$_{pro\ 3}$
'(I) dislike them.'

Figure 3.9 Spatial Verb and Phrase Structure in HKSL (Lam 2003:179)



MALE $_i$WALK$_j$
'A man walks (towards the tree).'

In the past I follow the earlier version of MP in assuming that agreement markings are realized by feature checking in a Spec-head relation. Such derivations may capture the SVO order in HKSL. Yet it is not entirely clear how SOV and S-DO-V-IDO order are derived. In this thesis I will show how various word orders are derived in the framework of the recent version of MP.

Consider basic word order first. I propose that all lexical verbs are associated with the same structure because they all show SVO order in general. The derivations with an agreement verb, a plain verb and a spatial verb are given in Figures 3.10, 3.11 and 3.12 respectively:

Figure 3.10 Derivation of *CHILD HELP GRANDMOTHER*

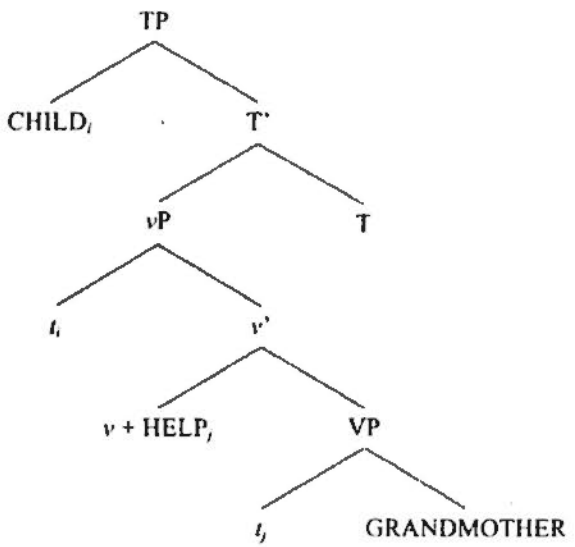


Figure 3.11 Derivation of *FION LIKE DORAEMON*

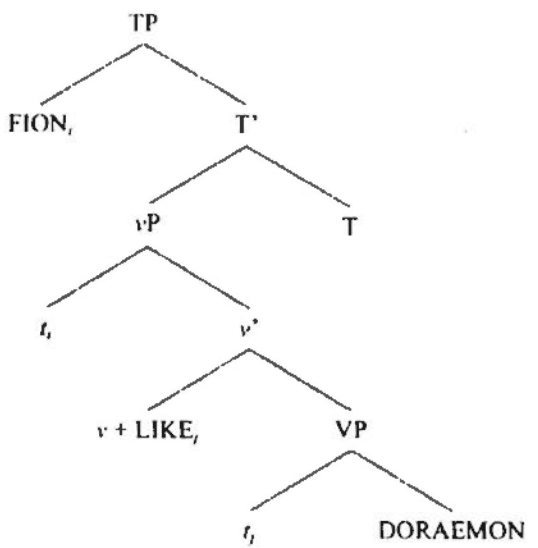
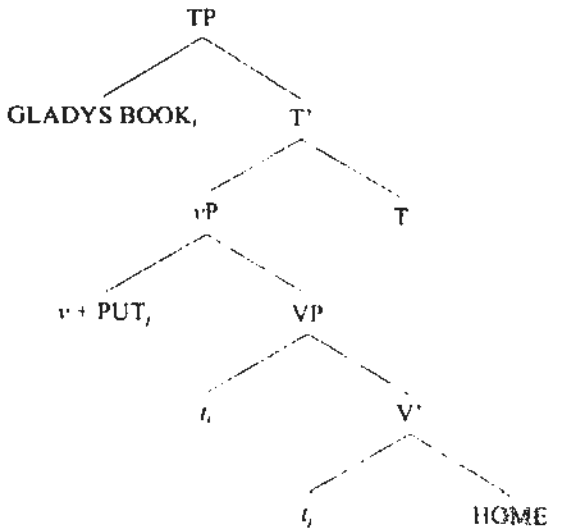


Figure 3.12 Derivation of *GLADYS BOOK PUT$_a$ HOME*



The agreement verb *HELP* and the plain verb *LIKE* both select an agentive subject (*CHILD* and *FION*) in Figures 3.10 and 3.11. By contrast, the spatial verb *PUT* selects a theme argument *GLADYS BOOK* in Figure 3.12. Given Spec, vP is associated with agentivity, I assume that Spec, vP is only available in Figures 3.10 and 3.11 where the verb selects an agentive subject (cf. Radford 2004). Similar to what I have proposed in Lam (2003), I assume that plain verbs and spatial verbs also have uninterpretable agreement features and these features are realized as zero morphemes. The heads T and *v* are assumed to act as the probes while the goal is the verb.[37] Uninterpretable agreement features of the verb will get valued via Agree as long as the probe c-commands the verb. Note that Case assignment is a by-product of Agree in the recent version of MP. Therefore, the DP arguments have Case when Agree takes place.

[37] An alternative account is that agreement features are checked and valued by matching features of the probe at C and the goal at V because the presence or absence of overt agreement markings on the agreement verbs are related to the discourse (i.e. whether the referents are established in earlier contexts or not). This calls for a question of why T does not function as the probe and why T seems to be invisible in the probe-goal matching between C and V. Further research is required to address this issue.

The subject raising to Spec, TP, however, is due to the EPP feature of T.[38] Similarly, V-to-*v* movement is assumed to be triggered by the affixal nature of *v* rather than the need for feature checking. The affixal nature of *v* is further supported by the formation of classifier predicates. Yet I assume that the verb does not move out from *v*P to TP because modals would occupy the T.

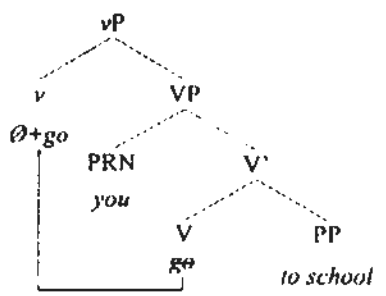
The verbs in Figures 3.10, 3.11 and 3.12 all have two arguments. While agreement verbs are always transitive or ditransitive, spatial verbs and plain verbs may be intransitive. Intransitive verbs may be unergative or unaccusative. Unergative verbs (e.g. *run, walk*) requires an external argument and unaccusative verbs (e.g. *break, melt*) an internal argument.[39] Both types of intransitive verbs are observed in HKSL. I posit that the structures of the intransitive verbs are as follows:[40]

---

[38] The EPP feature is one way to account for why English has expletives. In HKSL, no expletive is observed so far. Then one may question why HKSL subjects move upward to Spec, TP. Though negators and adverbs are not observed in HKSL, a shifted object in SOV order can be a piece of evidence showing that HKSL subjects move. I assume that subjects universally move to Spec, TP in HKSL until contrary evidence is found.

[39] Unaccusative verbs in English can be altered to a transitive structure. This phenomenon is known as transitive/unaccusative alternations. Due to space limit, I will not discuss this issue in this study.

[40] The question of whether unaccusative verbs have a *v*P structure is addressed in a number of studies. Legate (1998) argues that unaccusative verbs should be projected into *v*P because they share similar behaviors with other kinds of verbs in a number of syntactic diagnostic tests (pseudoclefting, isolation, verb phrase fronting, "though" movement, Nuclear Stress Rule, quantifier raising and wh-phrases). Similarly, Bowers (1993, 2000, 2002) suggests that unaccusative verbs are projected into a Predication Phrase (PrP) which selects a VP as its complement. He proposes that PrP is a generalization of the light *v* and his proposal is supported by crosslinguistic evidence (See Bowers 2000). Radford (2004) also suggests that unaccusative verbs have *v*P structure because the unaccusative imperative structures like *Go you to school* in Belfast English involve a V-to-*v* movement:



In my analysis I follow these studies in assuming that both transitive verbs and intransitive verbs have *v*P structure.

Figure 3.13 Derivations of Sentences which contain Unergative Verbs

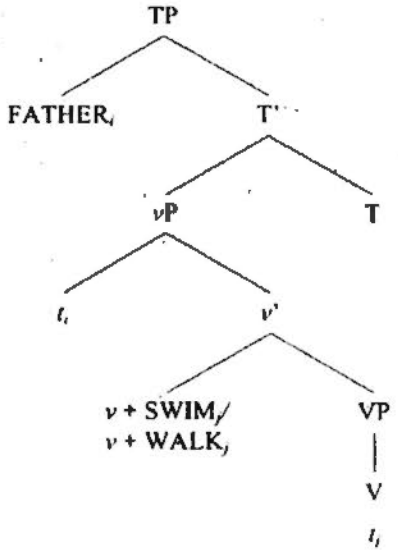
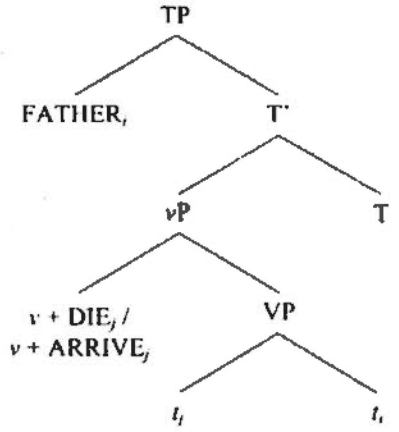


Figure 3.14 Derivations of Sentences which contain Unaccusative Verbs



The spatial verb *WALK* and the plain verb *SWIM* in Figure 3.13 are unergative verbs. The spatial verb *ARRIVE* and the plain verb *DIE* in Figure 3.14 are unaccusative verbs. Unlike transitive verbs, only Case/agreement features for the subjects needed to be checked off. The unergative verbs have *v*P structure because the subject is agentive. The subjects of the unaccusative verbs are experiencers and hence no Spec, *v*P is available. Turning to ditransitive verbs, I have shown above that ditransitive verb has an S-DO-V-IDO order and this order is captured naturally with the structure which contain a head-initial *v*P and a head-final TP. Consider Figure 3.2, repeated as Figure 3.15 below:

Figure 3.15 Derivation of *FELIX CANDY GIVE/GIVE$_3$/$_3$GIVE$_3$ BRENDA*

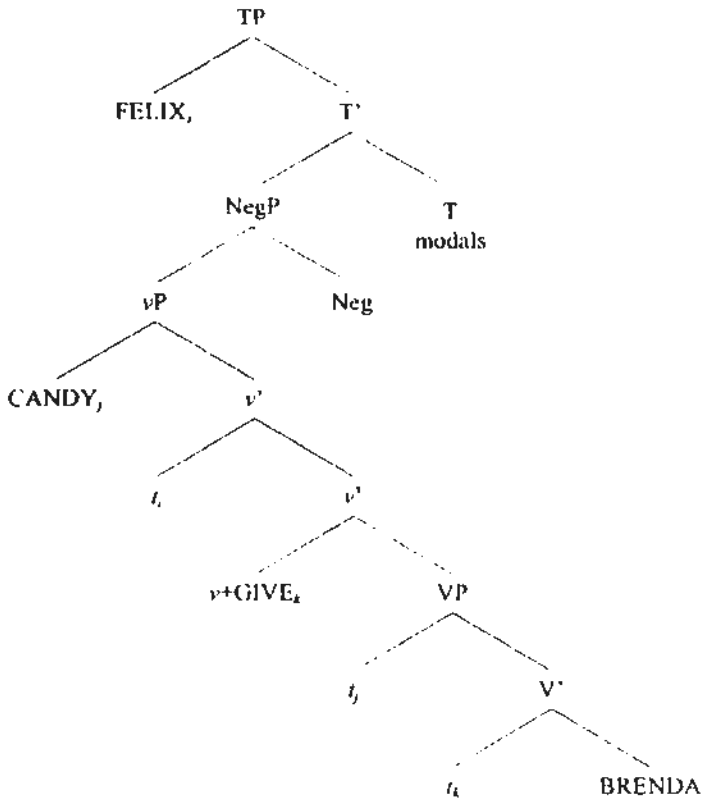


Figure 3.15 illustrates the derivation of S-DO-V-IDO order with ditransitive verb *GIVE*. The verb *GIVE* first merges with the goal argument *BRENDA*.[41] Then the V+D further merges with a theme argument *CANDY*. The structure is further developed by adding the *v*P through Merge. The small *v* which acts as the probe looks for the matching features in its minimal search domain (i.e. closest c-command). Notice that both *CANDY* and *BRENDA* are third person. Agree should take place between the verb and *CANDY* which is closer. However, overt agreement markings of agreement verbs

[41] I assume that a phrase structure has its basis on the Thematic Hierarchy (Agent > Theme > Location/Goal) (cf. Larson 1988). The verb first merges with the argument which has the theta-role at the lowest position of the Thematic Hierarchy (i.e. the operation Merge takes place). When Agent, Theme and Location/Goal are available, the verb takes the Location/Goal argument first, followed by Theme and Agent. When only Agent and Theme are available, the Theme is merged first and hence it would be in the complement position of V. It follows that the theme argument of a ditransitive verb is located at Spec, VP while that of a transitive verb is located at the complement position of V. One may argue that it is more consistent to put the theme argument at Spec, VP for both transitive verb and ditransitive verb. Yet this move will result in an empty complement position for transitive verbs. It is assumed in MP that a head first merges with its complement, followed by its specifier(s), if any (cf. Chomsky 2004:7). The theme argument, being a complement of a transitive verb, is first merged and hence it would not be in the specifier position.

always reflect the person values of the indirect object, rather than direct object (cf. Lam 2003). This suggests that the verb does not see the direct object *CANDY* in Agree. I assume that the ditransitive verbs only agree with animate arguments and hence the indirect object *BRENDA* is the only eligible candidate to be the goal of the *v* (a probe) in Agree.[42] Verb-object agreement and Case are valued then.[43] The subject, base-generated at *v*P gets Case with the head T via Agree. Given the EPP feature at T, the subject moves up to Spec, TP such that the EPP feature is satisfied.

I have noted earlier that SOV order is observed in HKSL. While in ASL Chen (2001) assumes that SOV order is resulted from verb movement to a head-final Manner Phrase (ManP), I suppose that the SOV order is a result of a syntactic movement called object shift. Object shift is a language phenomenon commonly observed in Scandinavian languages.[44] The types of object that may shift vary from languages to languages. While both pronominal and DP objects may move across negators in Icelandic, only weak pronoun may move in other Scandinavian languages like Swedish (Thráinsson 2000:150):

(34) a. Nemandinn las ekki ***hana/bókina**.
student-the read not it/book
'The student didn't read it/the book.'

b. Nemandinn las **hana/bókina** ekki.
student-the read it/book not
'The student didn't read it/the book.'

[42] Other languages also demonstrate similar phenomenon (cf. Baker 1996, Woolford 2000, among others).
[43] I assume that the Case of the indirect object is dative. The direct object, on the other hand, has an inherent Case and hence it does not enter Agree. Anagnostopoulou (2003), for instance, points out that it is not always the case that the theme argument has structural Case in a study of Japanese passives.
[44] Object shift is usually discussed along with another kind of object movement called scrambling in German and Dutch (cf. Vikner 1994, Holmberg 1999, Thráinsson 2000). I assume that the SOV order in HKSL is a result of object shift rather than scrambling because object shift is usually related to the types of objects (e.g. full NPs and pronominal NPs) while scrambling is not. This will become clear in the following discussion.

(35) a. Studenten läste inte ***den/boken**.
student-the read not it/book
'The student didn't read it/the book.'

b. Studenten läste **den/*boken** inte.
student-the read it/book not
'The student didn't read it/the book.'

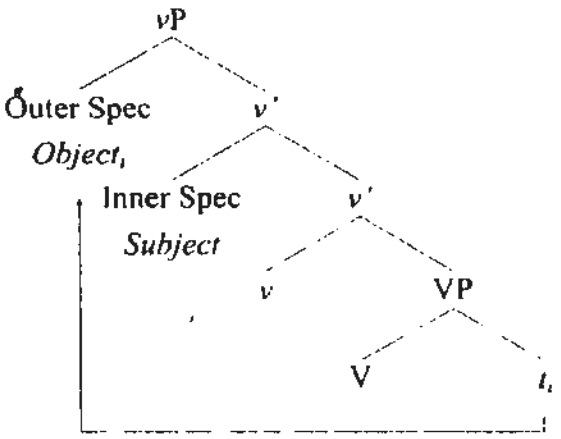
Examples (34) and (35) illustrate object shift in Icelandic and Swedish respectively. The pronominal objects (*hana* in Icelandic and *den* in Swedish) must move to precede the negators (*ekki* in Icelandic and *inte* in Swedish), hence object shift of pronominal DP objects are obligatory in both languages. The difference between the two languages is that Icelandic allows optional object shift with full DPs while Swedish does not have such option. The types of objects which may be shifted and whether the shift is obligatory is therefore language-specific.[45]

Object shift is viewed as a DP movement driven by an EPP feature of *v* in the recent version of MP. Chomsky (2001) notes that EPP feature is present for a new interpretation. Given the fact that shifted objects are associated with interpretation (e.g. focus (Holmberg 1999) or presupposition (Josefsson 1999)), it is assumed that *v* has an EPP feature which causes the object to move from VP to Outer Spec, *v*P, as shown in the following figure:[46]

[45] Due to space limit, I do not attempt to give a detailed overview on object shift. See Richards (2006) and references cited there for a fuller picture on object shift and different accounts associated with this language phenomenon.

[46] In Gungbe, one of the Gbe languages, the object shift is associated with imperfective verbs, but not with perfective verbs. See Aboh (2004) for details.

Figure 3.16 Object Shift



In Figure 3.16 the object which is originated from the complement position of V moves up to Outer Spec, *v*P. It is assumed that the two specifier positions (Outer Spec and Inner Spec) of *v*P are of equidistance with the *v* and hence no violation of minimality is resulted (See Hornstein, Nunes and Grohmann 2005 for details).[47] Since negators in Scandinavian languages shown above are analyzed as adverbs within VP, objects which precede the negators are the result of object shift (cf. Thráinsson 2000).

Going back to HKSL, I assume that the SOV order is derived from object shift in the same manner as that in Scandinavian languages. As noted earlier, only Icelandic allows full object DP to move up to Outer Spec. Other Scandinavian languages only allow the weak pronoun to move. I have noted above that SOV order with plain verb is related to the types of objects. The acceptance of preceding a proper name object is higher than that of preceding a common noun object and a pronominal/determiner object. Given the fact that SOV order is sensitive to the types of objects (at least with plain verbs), I assume that sentences with SOV order involve object shift, as shown in the following figure:

[47] Richards (2006) list two other proposals on object shift. Due to space limit, interested reader may refer to his paper and references cited there.

Figure 3.17 Derivation of *FION DORAEMON LIKE*

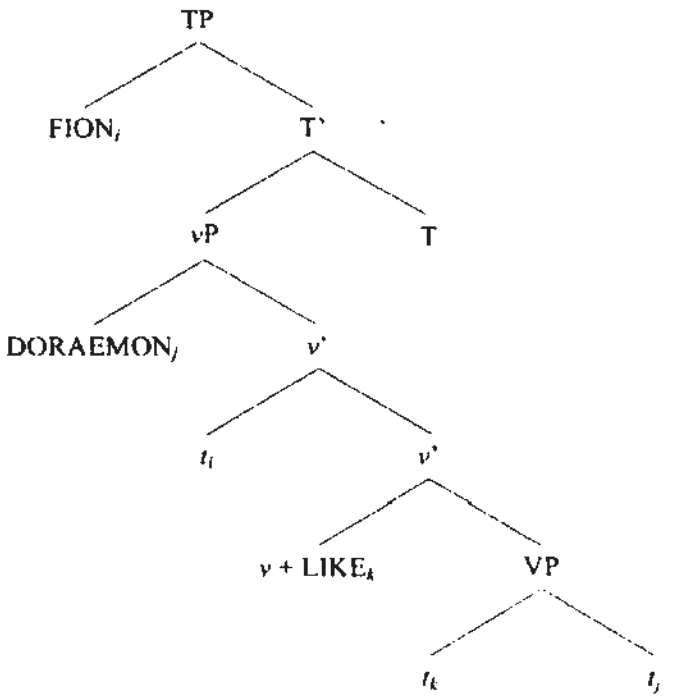


Figure 3.17 illustrates how a SOV order is derived. The subject base-generated from Inner Spec, *v*P moves up to TP due to EPP feature. The verb also moves from V to *v* in the same way I have shown in the derivation with transitive verbs above. If the object stays in VP, the surface word order is SVO. The order is SOV when the object moves up to Outer Spec, *v*P. I further assume that object shift is optional in HKSL such that SVO and SOV orders are observed with proper name objects which are not reversible with the subjects.

In sum, Case/agreement features are checked off via Agree. I suppose that subjects always raise to Spec, TP due to the EPP feature. Object shift to Spec, *v*P is related to the types of verbs and objects.

3.3.3 Derivations of Classifier Predicates

Classifier predicates are relatively more complex than other types of verbs and hence it is worth considering the syntactic derivations associated with classifier

predicates separately. The analyses on the formation of classifier predicates can be grouped into two types, lexical and syntactic analyses. Meir (1999) proposes a lexical noun incorporation analysis for the classifier predicates in ISL. Other analyses are syntactic (Glück and Pfau 1998 on DGS, Lau 2002 on HKSL and Benedicto and Brentari 2004 and Benedicto 2008 on ASL). Since my analysis is a syntactic one, I will only review syntactic analyses in other signed languages in this section. My analysis on classifier predicates in HKSL will follow the review.

Both DGS and ASL classifier predicates are analyzed with syntactic analyses. Consider DGS first. Glück and Pfau (1998) propose that classifiers are inflection because classifiers show the same behavior with agreement verbs.[48] It is observed that arguments in an embedded clause may move out to the sentence-initial position in both ASL and DGS.[49] This phenomenon is termed as left dislocation in Glück and Pfau's study.[50] The position from which the argument has moved may be occupied by a null argument *pro* or resumptive pronoun when the verb is an agreement verb in both signed languages. See the examples below (Glück and Pfau 1998:68-70):

(36) Left Dislocation with Agreement Verbs in ASL

a. ***pro/resumptive pronoun at subject position***

t

BROTHER$_1$, JULIE$_2$ THINK ***pro***/**PRONOUN**$_1$ $_1$LOOK-OVER$_3$ CAR$_3$ FINISH

'My brother$_i$, Julie thinks (he$_i$) already looked over the car.'

b. ***pro/resumptive pronoun at object position***

t

MAN$_1$, STEVE$_2$ SAY JULIE$_3$ FINISH $_3$GIVE$_1$ ***pro***/**PRONOUN**$_1$ BOOK

'That man$_i$, Steve said Julie already gave a book to (him$_i$).'

[48] Glück and Pfau use the term 'classification'. In Sandler and Lillo-Martin (2006) they use classifiers instead.

[49] Glück and Pfau get ASL data from Lillo-Martin's (1991) work.

[50] From the nonmanual marking *t*, the left dislocation can be viewed as a kind of topicalization.

(37) Left Dislocation with Agreement Verbs in DGS

a. ***pro/resumptive pronoun at subject position***

t

MAN-IND$_1$, CHILD THINK ***pro/HE***$_1$ WOMAN-IND$_2$ BOOK $_1$SHOW$_2$

'This man$_i$, the child thinks (he$_i$) shows the book to the woman.'

b. ***pro/resumptive pronoun at object position***

t

WOMAN-IND$_1$, CHILD THINK, MAN-IND$_2$ ***pro/HER***$_1$ BOOK $_1$SHOW$_2$

'This woman$_i$, the child thinks, the man shows (her$_i$) the book.'

Examples (36) and (37) illustrate the left dislocation with agreement verbs *LOOK-OVER, GIVE* in ASL and *SHOW* in DGS respectively. The positions from which the embedded subjects or objects moved out are occupied either by a null argument *pro* or by a resumptive pronoun in ASL and DGS. Hence agreement markings in both ASL and DGS serve as the licensor of *pro* if a resumptive pronoun is not used. Now compare classifier predicates in DGS left dislocation with examples (36) and (37) (Glück and Pfau 1998:70-71):

(38) Left Dislocation with Classifier Predicates in DGS

a. ***pro/resumptive pronoun at subject position***

t

PENCIL$_a$-IND$_1$, CHILD THINK, ***pro/IT***$_1$ HILL$_2$ $_2$ROLL-CL$_a$

'This pencil$_i$, the child thinks, (it$_i$) is rolling down the hill.'

b. ***pro/resumptive pronoun at object position***

t

GLASS$_a$-IND$_1$, CHILD THINK, MAN ***pro/IT***$_1$ TABLE$_2$ $_2$TAKE-CL$_a$

'This glass$_i$, the child thinks, the man take (it$_i$) off the table.'

Classifier predicates in DGS can occur with *pro*, as shown in example (38) above. This echoes with examples (36) and (37) presented above. Classifier predicates share

the same status with agreement verbs when arguments move out from embedded clauses. It is then natural to analyze classifiers as some kinds of inflections. If classifiers were inflections, one would expect that the classifier predicates be formed via syntactic derivations. How classifier predicates are derived syntactically in DGS is not mentioned in Glück and Pfau's study.

Benedicto and Brentari (2004), on the other hand, work out the syntactic derivations associated with classifier predicates in ASL. They propose that classifier predicates are subsumed under the notion of agreement which is defined as "choosing a point in space associated with an argument and expressing it at the beginning or end of the agreement predicate" (p.797). They argue that classifier handshapes are functional heads of two functional phrases, f_1P and f_2P which undergo Spec-head agreement with the nominals from VP.[51]

Before showing how syntactic derivations are associated with classifier handshapes, there is a need to introduce Benedicto and Brentari's classification of classifier handshapes in ASL on which their syntactic analysis is built upon. Benedicto and Brentari relabeled Engberg-Pedersen's classification of classifier types in Danish Sign Language into Body Part Classifier (BPCL), Semantic Classifier (SCL), Descriptive Classifier (DCL) and Handling Classifier (HCL).[52] dICL and hICL are subtypes of DCL and HCL respectively, both involve description of instruments. BPCL depicts the body parts (e.g. a head, a foot, etc.). SCL describes classes of objects (e.g. vehicles, human, etc.). DCL outlines the size and shape of the whole object (e.g. bed, paper). If the handshape of a DCL refers to an instrument, it

[51] Benedicto and Brentari do not label the f_1P and f_2P as clP explicitly except on p.752 where they show the Spec-head agreement between the DP moved out from the VP and the classifier. By contrast, Lau (2002) proposes a VCLP to capture the realization of handle classifiers and SASSes. We will go to her analysis shortly below.

[52] Engberg-Pedersen divides classifier types as (i) limb, (ii) whole entity, (iii) extension and (iv) handling. BPCL in Benedicto and Brentari's work equals to (i). SCL, dICL and some DCL are equivalent to (ii). Other DCLs are viewed as (iii). HCL and hICL are the same as (iv). Note that DCL may be labeled as SASS.

is glossed as dICL. Finally, HCL shows the manipulation of an object. If the object is an instrument, the classifier is called hICL. Interestingly, different classifier handshapes are associated with different kinds of argument structures in ASL as evidenced by a number of diagnostic tests:

Table 3.2 Argument Structures and Classifier Handshapes in ASL[53]

Classifier handshapes	Transitivity	External Argument (f_1)	Internal Argument (f_2)	Diagnostic Tests[54]			
				± FINISH	± WILLING	±[distr]	± NOTHING
BPCL	Unergative	+	-	+	+	-	-
SCL, DCL, dICL	Unaccusative	-	+	-		+	+
HCL, hICL	Transitive	+	+	+	+	+	+

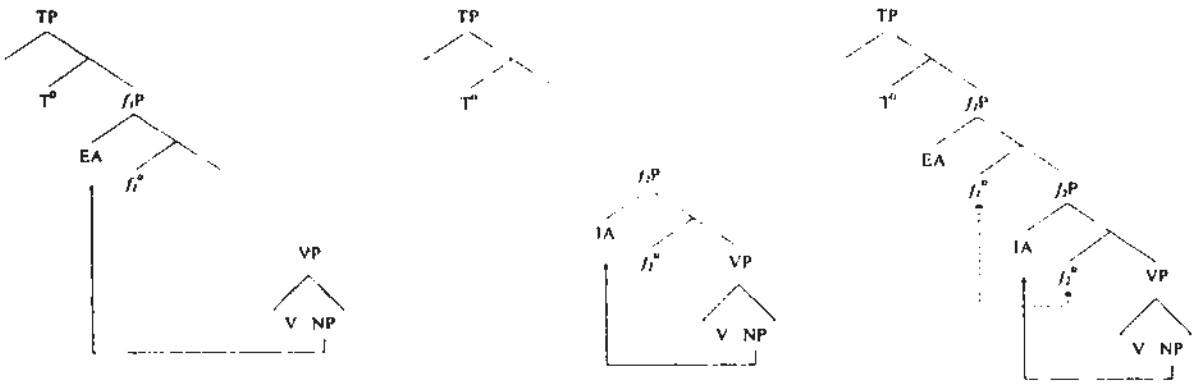
As shown in Table 3.2, different groups of classifier handshapes are associated with different argument structures. BPCL is unergative; SCL, DCL and dICL are unaccusative and HCL and hICL are transitive. In other words, while internal arguments are present with classifier predicates which contain SCL, DCL or dICL, external arguments occur with classifier predicates which contain BPCL. HCL and hICL are those classifier handshapes which are associated with both external and internal arguments. This observation is supported by a series of diagnostic tests for internal arguments (i.e. [distr] and *NOTHING*) and for agentive external arguments (i.e. *FINISH* and *WILLING*).

Benedicto and Brentari therefore propose different structures for different kinds of classifier handshapes:

[53] Benedicto and Brentari report unergative/unaccusative and transitive/intransitive alternations in ASL. Since the present study does not touch upon verb alternations, I leave these issues behind.
[54] *FINISH* is a sign for negative imperative in ASL. *WILLING*, on the other hand, requires agentive external argument. Hence the compatibility of these two signs suggests the presence of agentive external arguments. The distributive marker [distr] and negator *NOTHING* are used to mark object and hence they are used for testing whether the predicates contain internal arguments.

Figure 3.18 Phrase Structure and Classifier Handshapes (Benedicto and Brentari 2004:767, 769)

a. f_1 = *BPCL* b. f_2 = SCL, DCL, dICL c. f_1+f_2 = HCL



The phrase structures of different types of classifier predicates in Figure 3.18 are built in the framework of Borer (1994, 1998, 2005). Her framework is slightly different from what I have described in Section 3.2. According to Borer, the DPs within VP are not specified as internal or external arguments because the interpretation of DPs is not determined by the verb. It is through movement to some functional phrases (f_1P for external argument EA and f_2P for internal argument IA) that the DPs obtain their syntactic status as external or internal arguments of the verb.

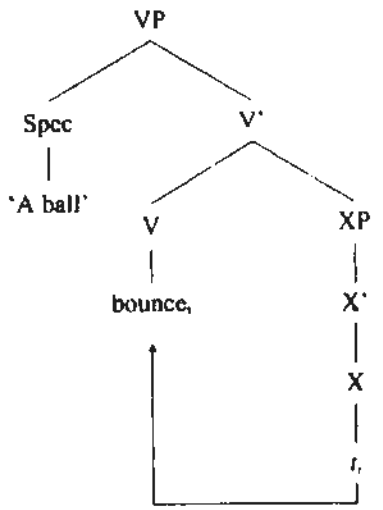
It is proposed that f_1P is present for classifier predicates which consist of BPCL (unergative), HCL or hICL (transitive) and f_2P to exist for classifier predicates which contain SCL, DCL, dICL (unaccusative), HCL and hICL (transitive) (See Figure 3.18 above). These functional phrases are headed by classifier handshapes. When the predicate is one-place, the DP may move either into Spec, f_1P or into Spec, f_2P. But if the predicate is two-place, it is proposed that a constituent is merged and the agent role is introduced by the head of f_1P.[55] Benedicto (2008) extends the syntactic analysis in Benedicto and Brentari (2004) further by claiming that a D_{class}-feature

[55] Note that the f_1P and f_2P can be viewed as some version of *v*P in the Chomskyan MP framework (Elena Benedicto, p.c.). Placing external argument at f_1P then follows the standard assumption that *v*P houses agent argument.

forms a complex head with *v* because it, being uninterpretable in the verbal domain, cannot project into an independent projection.[56] This complex head has an EPP feature that attracts the associate DP to move up to Spec, *v*P. It is assumed that different kinds of *v* (e.g. transitive, unaccusative) are associated with different structures and different classifier handshapes. In sum, classifiers are considered either as inflection (Glück and Pfau 1998 for DGS, Benedicto and Brentari 2004 for ASL) or as realizations of D_{class}-feature (Benedicto 2008).

Now consider HKSL. Lau (2002) proposes a syntactic account in which classifier predicates are formed by two operations: (i) an incorporation of an X-element into V and (ii) feature checking of an agentivity feature at a functional projection called Verbal Classifier Phrase (VCLP). Following Hale and Keyser's (1993) analysis on English denominal and deadjectival verbs, Lau assumes that the verb root of classifier predicates involve incorporation:

Figure 3.19 Incorporation of X and V (Lau 2002:131)

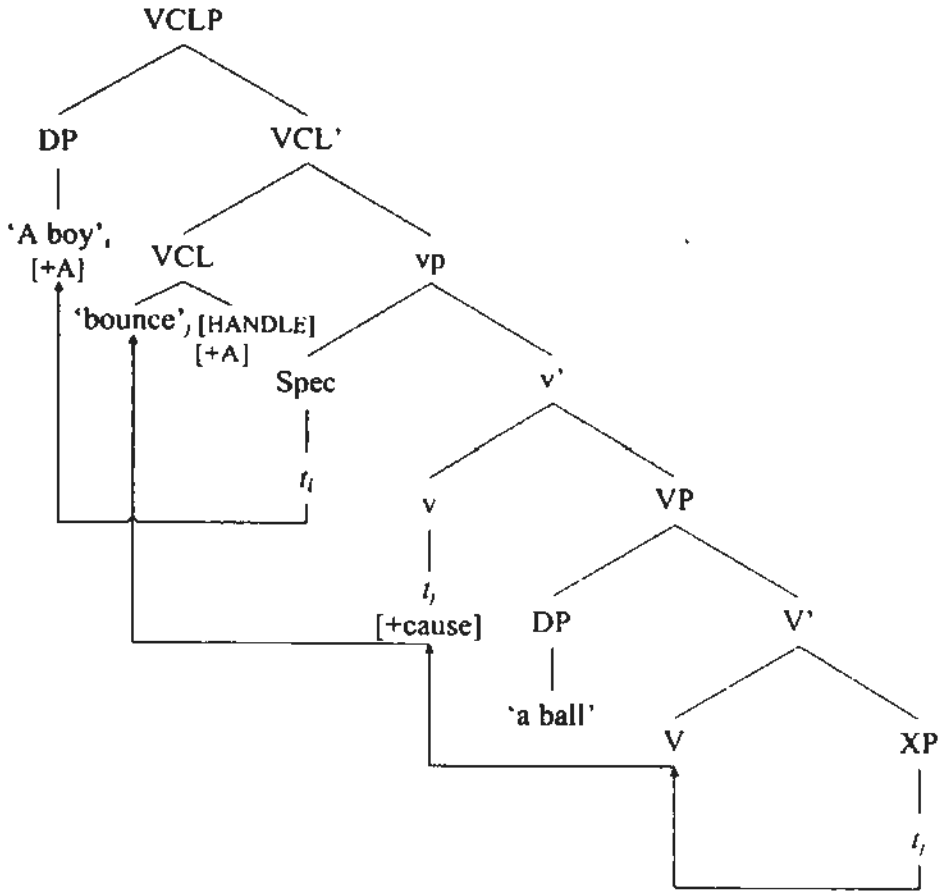


[56] The idea of D-feature stems from Benedicto's (2002) works on Mayangna, a language used in the Atlantic Coast of Nicaragua and Honduras. Benedicto (2008) points out that D-feature may appear at functional heads (i.e. *v*, Asp, T, Neg) in order to capture a wider range of natural languages. Since our focus is on classifier predicates, I will put her analysis on other languages aside.

The tree structure in Figure 3.19 shows that an indeterminate category X is moved into the head V via conflation. This is the first operation that derives classifier predicates.

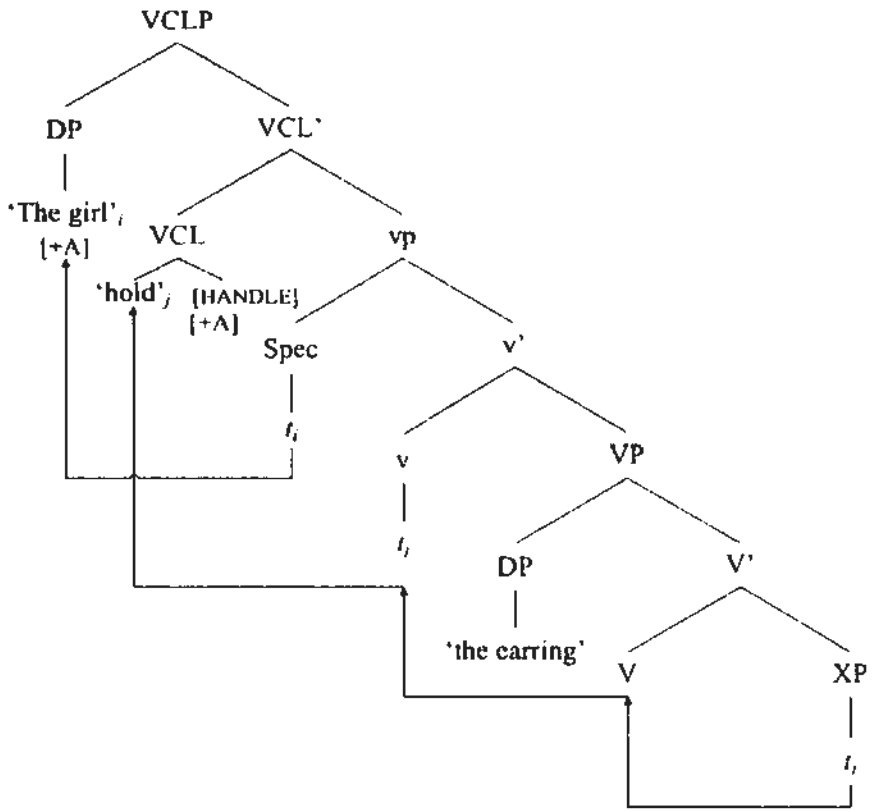
The second operation is the movement to VCLP. Lau proposes that classifier handshapes are realized by movement to the head of VCLP. The movement is triggered by an agentivity feature at VCL. This proposal is motivated by the observation that handle classifiers always require an agentive subject while SASSes can only take non-agentive subjects. She further characterizes this fact by suggesting that Handle classifiers contain an uninterpretable [+agentive] feature while SASSes have [−agentive] feature. The [±agentive] feature must be eliminated via feature checking at a functional projection named VCLP. Under this analysis, the V first moves up to light *v* to assign Case and theta-role and then it raises to the head of VCLP. At the same time, the subject which contains interpretable [± agentive] moves into the Spec, VCLP. The uninterpretable feature [± agentive] is checked off between the DP and the incorporated element at VCL. [HANDLE] is realized if the subject is [+agentive] (See Figures 3.20 and 3.21). [SASS], on the other hand, occur with [−agentive] feature (See Figure 3.22). Since classifier predicates may or may not be causative, it is assumed that *v* may be [cause] or [performative].

Figure 3.20 Realization of Handle Classifiers in Causative Construction (Lau 2002:153)



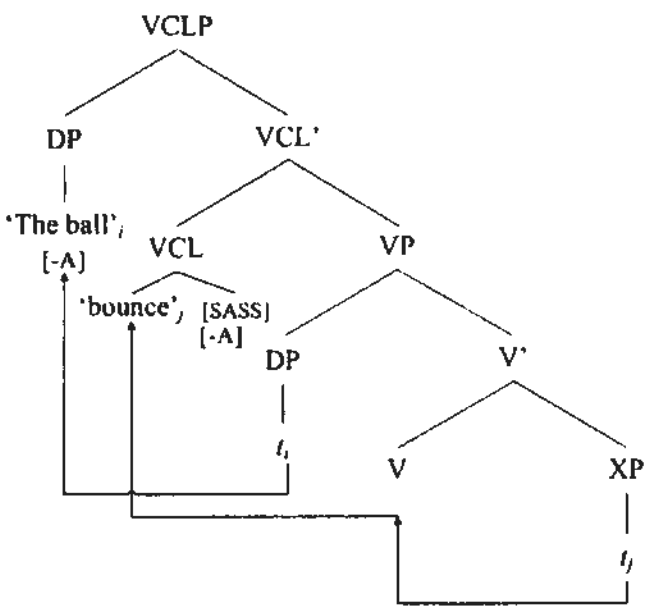
MALE-CHILD BALL CL:BOUNCE_A_ROUND_OBJECT [HANDLE]
'A boy bounced a ball.'

Figure 3.21 Realization of Handle Classifiers in Transitive Construction (Lau 2002:154)



INDEX$_{det}$ FEMALE-CHILD EARRING CL:HOLD_A_SMALL_OBJECT [HANDLE]
'The girl held the earring.'

Figure 3.22 Realization of SASS (Lau 2002:156)



BALL CL:BOUNCE_A_ROUND_OBJECT [SASS]
'A BALL BOUNCED.'

Figures 3.20, 3.21 and 3.22 illustrate feature checking of [± agentive] of both transitive and intransitive classifier predicates.[57] Figures 3.20 and 3.21 also show that the difference between the derivations of handle classifiers in causative predicates and in transitive predicates lies in the presence versus absence of the [+cause] feature at the light *v*. Note that agentive subject can only go with classifier predicates which contain handle classifier. If a transitive sentence has a nonvolitional agent like *WIND*, the classifier predicates would contain a SASS, but not a handle classifier.

Lau's analysis is similar to other syntactic accounts on classifier predicates in that classifiers are viewed as verbal affixes. These verbal affixes contain uninterpretable feature, though the label of this feature (being [± agentive]) is different from what others propose. While Benedicto and Brentari assume that classifier handshapes are head of functional projections, Lau proposes that the argument structure is reflected by the *v*P (transitives) or VP (intransitives). So VCLP is a phrase which does not determine the argument structure. Lau's analysis also highlights that the choice of a classifier handshape depends on whether the subject is a volitional agent.

Lau's analysis on handle classifiers and SASSes lays the groundwork for analysis on classifier predicates in HKSL. A number of issues require further exploration. First, the status of X is unclear. It has been assumed that the elements which form the phrase structure are from the Lexicon. One consequence of proposing an indeterminate category X is that an unknown category resides in the Lexicon. Lau can, in fact, assume that this category is [+N] given that classifier handshapes generally refer to nominals. Second, the function of VCLP actually overlaps with that of *v*P. It is assumed that Spec, *v*P is occupied by Agent given the fact that *v*P is

[57] Lau's analysis focuses on the derivations of classifier predicates but not the derivations of sentences which contain classifier predicates. Hence the word order is not touched upon in her study.

formed according to the Thematic Hierarchy (cf. Larson 1988, Hale and Keyser 1993). It appears that the [agentive] feature is redundant if this proposal is assumed. One may argue that Spec, *v*P is also assumed to be associated with agentivity (cf. Radford 2004). Lau's [± agentive] feature is more specific as she uses the binary value of [± agentive] to capture volitional and nonvolitional agents. Even if the [agentive] feature of classifier predicates is more specific (e.g. the agent has to be volitional), such feature resides more naturally at Spec, *v*P. When *v*P has the function of introducing agentivity, VCLP can be eliminated.[58]

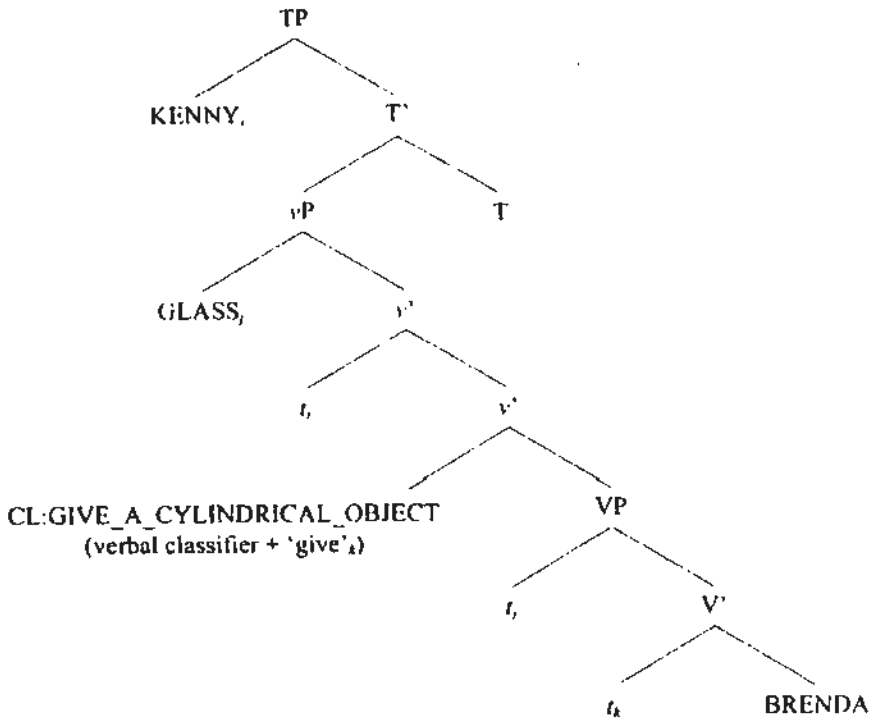
In the following paragraphs, I will modify Lau's analysis by considering different classifier predicates and their word orders. Following Lau, I assume that HKSL classifier predicates are formed at Syntax. The reasons are as follows. The morphemes which form a word at the Lexicon (and l-syntax) are assumed to be relatively idiosyncratic while that at Syntax (or s-syntax) are productive (cf. Travis 2000). Classifier predicates involve mainly the verbs of motion/location and a restricted set of classifier handshapes in HKSL. The components of classifier predicates are therefore considered as productive rather than idiosyncratic. It follows that the classifier predicates are formed at Syntax. The second piece of evidence showing that classifier predicates are formed at Syntax is the opacity of the classifier predicates. Since a word formed in the Lexicon is X^0 at Syntax, the internal structure of this word is opaque to Syntax (cf. Di Sciullo and Williams 1987). The choice of classifier handshapes is dependent on the meaning of the arguments. For instance, when the argument is an animate entity, the classifier predicate has to contain a semantic classifier for an animate entity (). The fact that classifier handshapes reflect the meaning of the verb's arguments suggests that classifier predicates are not

[58] A more detailed discussion on why VCLP is eliminated is given in Appendix 2.

opaque at Syntax. Otherwise, no coreferentiality should be seen between the classifier handshapes and the verb's arguments. Consequently, I propose that classifier predicates are formed at Syntax rather than at Lexicon. I assume that the classifier handshapes are realized at *v* rather than VCL. Similar to lexical verbs, the verb root originated at V moves up to *v*. I assume further that the light *v* is in the form of bound verbal classifier.[59] So classifier predicates are V+*v* complex. Take *CL:GIVE_A_CYLINDRICAL_OBJECT* as an example:

[59] Different analyses have different proposals on what triggers the realization of verbal classifiers. Lau assumes that agentivity (or more specifically ±volitional agent) determines the choice between handle classifier and SASS in HKSL. Benedicto (2008) posits a D_{class}-feature at *v* which gives rise to different classifier handshapes. Though agentivity may account for the choice between handle and SASS in HKSL, it could not explain why semantic classifier is chosen. The uninterpretable D_{class}-feature, however, calls for a number of questions. Uninterpretable features must be eliminated in MP. Assuming that D_{class}-feature is checked off with the DP arguments which c-command the *v*, a question follows is why certain nouns have interpretable D_{class}-feature (in the derivations with classifier predicates) while others don't (in the derivations with lexical verbs). Benedicto notes that the N in the DP does not have the inherent specification of the features of the classifier and it is possible that the D_{class}-feature is copied to the head D. She leaves this option for further exploration. By positing that verbal classifiers as overt light *v*, the question on feature checking of D_{class}-feature is avoided. The nominal nature of classifier handshape, however, may be considered as the result of denominalization of classifiers at the morphological level, an option that requires further investigation.

Figure 3.23 Derivation of HKSL Classifier Predicates

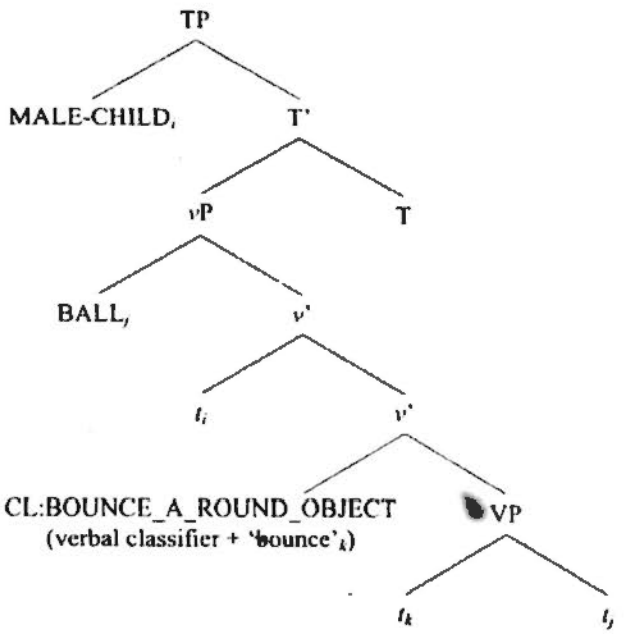


KENNY GLASS CL:GIVE_A_CYLINDRICAL_OBJECT BRENDA
'Kenny gives a cup to Brenda.'

The verb root 'give' is ditransitive and therefore it takes three arguments, an agent, a theme and a goal. Like the lexical verb *GIVE* shown above, the verb root first merges with the goal argument *BRENDA* and then the theme argument *GLASS* to form a VP. The VP is merged with a *v*P further where Inner Spec, *v*P houses the agent argument. The verb root 'give' has to move up to adjoin to the *v*, the verbal classifier is then attached to the verb root and a classifier predicate is formed. Note that the subject moves out to TP for EPP feature and the direct object *GLASS* also undergoes object shift to Outer Spec, *v*P such that the S-DO-V-IDO order is resulted.

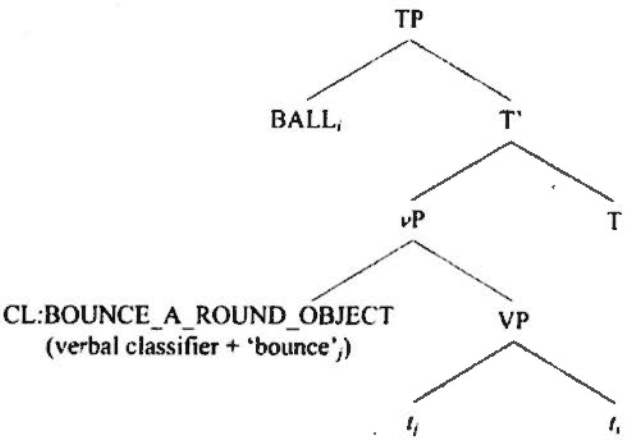
Transitive and intransitive classifier predicates are also formed by attaching verbal classifier at *v* to the verb root, as illustrated below:

Figure 3.24 Derivation of Transitive Classifier Predicates



MALE-CHILD BALL CL:BOUNCE_A_ROUND_OBJECT (HANDLE).
'A boy bounced a ball.'

Figure 3.25 Derivation of Intransitive Classifier Predicates



BALL CL:BOUNCE_A_ROUND_OBJECT (SASS).
'A ball bounced.'

Figures 3.24 and 3.25 illustrate the formation of transitive and intransitive classifier predicates. The transitivity is determined by the verb root and the formation of classifier predicates *CL:BOUNCE_A_ROUND_OBJECT* are realized by moving the verb root 'bounce' to attach to a verbal classifier at *v*. While a handle classifier is realized in Figure 3.24, an SASS is realized in Figure 3.25 due to the argument structure of

the verb root. Recall that there is a debate over whether unaccusative verbs are projected into *v*P (See footnote 40). The classifier predicates in HKSL provide further evidence to a *v*P structure for an unaccusative predicate. The verb root in Figure 3.25 is unaccusative. This verb root has to move up to *v* to form an unaccusative classifier predicate, showing that *v*P is required even though the verb root at V is unaccusative. Assuming that the verb root is of equal status with other unaccusative lexical verbs, both verb root of a classifier predicate and lexical verb undergo the same kind of verb movement. Hence I posit that V-to-*v* movement occurs to all lexical verbs and verb roots of classifier predicates. Note that the derivations shown in Figures 3.23, 3.24 and 3.25 all involve object shift of the direct object to Outer Spec, *v*P. I assume that object shift is obligatory with classifier predicates, as evidenced by the SOV order with transitive verb roots and S-DO-V-IDO order with ditransitive verb roots.

I have mentioned earlier that different studies have different proposals on what determines the choice of classifier handshapes. Benedicto and Brentari propose that the functional projections f_1P and f_2P are related to which classifier handshapes show up. Similarly, Lau suggests the [±agentive] feature determines whether the classifier handshape is a handle classifier or SASS. In ASL the unaccusative classifier predicates may contain a semantic classifier or SASS. Similarly, transitive classifier predicates in HKSL not only involve handle classifiers as in *CL:BOUNCE_A_ROUND_OBJECT*, but also semantic classifiers:

(39) DOG CL:ANIMATE_ENTITY_BE-LOCATED-AT$_a$.
CAT CL:ANIMATE_ENTITY_BE-LOCATED-AT$_b$.
CL:ONE_ANIMATE_ENTITY_KICK_ANOTHER_ANIMATE_ENTITY.
'A dog is here. A cat is there. (The dog) kicks (the cat).'

The classifier predicate *CL:ONE_ANIMATE_ENTITY_KICK_ANOTHER_ANIMATE_ENTITY* is transitive. If the functional phrases like f_1P and f_2P determine the choice of classifier handshapes, the question of how the structures choose between semantic and handle classifiers in transitive classifier predicates in HKSL or between semantic classifiers and SASSes in unaccusative classifier predicates ASL needs to be answered. Alternatively, one may posit an [±agentive] feature to account for the choice of classifier handshapes as Lau does. However, classifier predicates in HKSL which require agentive subject may contain either a handle or a semantic classifier, so positing such feature does not account for the choice of classifier handshapes in HKSL. The choice on the types of classifier handshapes (i.e. semantic, handle and SASSes) and the specific classifier handshape(s) (i.e. semantic classifier for animate entity) largely depends on the semantic properties of the subjects and/or objects. If the subject is an animate entity, a semantic classifier for animate entity is selected. Hence I argue that whether the verb attaches to a handle classifier, a semantic classifier or SASS reflects only the selectional requirement on the verb argument structure.[60]

3.4 Chapter Summary

This chapter presents a syntactic account on the phrase structure projected from various kinds of verbs. HKSL has a head-initial *v*P, but head-final NegP and TP. The basic word order shown by the plain verbs and the V-IDO sequence suggests that *v*P is head-initial. Clause-final functional elements like negators and modals which have

[60] The derivations on classifier predicates discussed so far involve classifiers which are coreferential with the arguments. In Chapter 2 I have noted that classifier predicate may contain a component which corresponds to a locative adjunct. One possible analysis is that the classifier handshape for 'tree' is *v*'-adjunct and it is fused with the *v* because this *v*'-adjunct is bound. A more thorough analysis on classifier handshapes that corresponds to the locative adjuncts will verify this tentative analysis.

scope over the entire proposition reflect head-final NegP and TP. I also assume lexical verbs do not move out of the VP and the SOV order is derived by object shift to Outer Spec, *v*P. Classifier predicates, on the other hand, are formed by moving the verb root to *v*. It follows that classifier predicates are structurally more complex than lexical verb. Since SOV order always occurs with classifier predicates, I suppose that object shift to Outer Spec, *v*P is obligatory for classifier predicates, but that for lexical verbs is related to the types of verbs and objects.

Chapter 4

Acquisition Studies in Signed Languages

4.1 Introduction

Acquisition studies in signed languages are few when compared with those in spoken languages. Being exploratory in nature, none of these studies have touched upon the theory of phrase structure noted in Chapter 1. The following section will give a general overview on sign language acquisition. Acquisition studies on verb agreement and on classifier predicates will be examined in Sections 4.3 and 4.4 respectively. The question of whether functional projections are available in early signed languages is addressed in Section 4.5. The final section describes the previous acquisition studies on HKSL.

4.2 Sign Language Acquisition: A General Overview

Previous studies on sign language acquisition are largely about how deaf children acquire ASL. While acquisition of verb agreement and classifier predicates are most widely-studied, other topics include acquisition of null arguments, pronouns, negation, wh-questions, word order and so on (See Emmorey 2002 for a review). Most of these topics share one common theme: the effect of modality properties in the course of child acquisition of signed languages.[1]

In ASL the pronouns are gesture-like as they resemble the forms of pointing gestures commonly produced by children. Gestures are regarded as a reflection of cognition but pronouns could well be analyzed as linguistic units. It is assumed that

[1] Not all acquisition studies focus on modality-specific properties. Lillo-Martin's (1991) work on null arguments and Chen's (2001) work on word order in early ASL explore theoretical issues like parameter setting.

language is a component of the cognition if the transition from gestures to signs is continuous (Bates, Camaioni and Volterra 1975, Bruner 1975, Bates 1976, Clark 1978, Bates et al. 1979, among others). By studying longitudinal data on 2 deaf girls and experimental data of one of the two deaf girls, Petitto (1986) observes that gestures do not function as placeholders of signs in ASL. This is evidenced by the fact that both children demonstrate an avoidance period between ages of 12 and 18 months when they use proper nouns to refer to people and avoid the use of personal pronouns in this period. This shows that the acquisition of ASL pronoun is associated with linguistic properties rather than modality-specific properties.

Similarly, Reilly and Anderson (2002) explore the relation between affective facial expressions and grammatical nonmanual behaviors by considering acquisition of negation, adverbials, wh-questions and conditional clauses in ASL.[2, 3] All these language phenomena involve grammatical nonmanual behaviors: a headshake for negation, *mm* for adverbial meaning "regular, easily, or pleasurably", *th* for adverbial meaning "awkwardly or carelessly"[4]; furrowed brow and a slight head tilt for wh-questions and raised brows and a head tilt for conditional clauses. While the nonmanual behaviors for negation and wh-questions are the same as the nonlinguistic communicative correlate, those for adverbials and conditionals are specific to ASL. Surprisingly, all grammatical nonmanual behaviors emerge after children's use of respective manual signs. This shows that children acquire manual signs before the corresponding nonmanual behaviors regardless of whether the nonmanual behaviors

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[2] Reilly and Anderson also mention that children begin with using manual signs and nonmanual behaviors as unanalyzed amalgams. After this stage, children then use the signs and the nonmanual behaviors sequentially, marking the stage where children identify nonmanual behaviors are from a different channel with the manual signs.

[3] Reilly and Anderson put the findings of their previous works together to examine this issue. Due to space limit, I will not discuss each of their previous works in detail. Interested readers may refer to the references cited there.

[4] *mm* refers to "lips pressed together; the bottom lip may protrude in a slight pout" and *th* is articulated by "relaxing the jaw, parting the lips slightly and showing the tongue" (Reilly and Anderson 2002:180).

look identical with the nonlinguistic communicative gestures. Additionally, the fact that children stop using nonlinguistic communicative gestures like headshake when manual signs appear suggests that grammatical nonmanual behaviors are not developed continuously from nonlinguistic communicative gestures. This result echoes with Petitto's work on pronouns noted earlier.

Verb agreement in signed languages looks gestural especially when an agreement verb is directed towards an actual location of a referent. The gestural nature of verb agreement drives Meier (1982) to explore whether iconicity accelerates the acquisition of verb agreement in ASL. As in the findings shown from pronouns and nonmanual markings, the acquisition of verb agreement is dependent on the development of a linguistic system rather than iconicity. Recently Casey (2003) and Quadros and Lillo-Martin (2007) explore further on the relation between gesture and verb agreement. While Casey proposes that children who acquire ASL as their first language transfer the knowledge of directionality from gestures to signs, Quadros and Lillo-Martin, drawing on the data from early ASL and LSB, claim that early gestures function as supplement to both hearing and deaf children.

Classifier predicates are also widely studied in sign language acquisition. Though classifier predicates are also gestural, researchers tend to account for the acquisition of classifier predicates with linguistic factors like morphological complexities. Since both verb agreement and classifier predicates fall in the scope of the present study, I will discuss these two phenomena in detail in the following two sections. In sum, children acquiring ASL as their first language do not resort to modality-specific properties in the acquisition of different language phenomena.

4.3 Acquisition of Verb Agreement

In Chapter 1 I have shown that children may omit tense/agreement markings in spoken languages. The same phenomenon is also observed in sign language acquisition of agreement markings:

(1) a. ***American Sign Language (ASL) (Meier 1982:119)***[5]
Context: Corinne (2;1) has just poured the contents of her cereal bowl into Mother's bowl:

Mother: FINISH MOTHER GIVE [I: 2 to 1], GIVE [I: 2 to 1].
'You already gave (it) to Mother, you gave to Mother.'

Corinne: FOOD *GIVE[CF] MOTHER FINISH
'Gave Mother food already.'

b. ***British Sign Language (BSL) (Morgan, Barriere and Woll 2006:33)***
Adult: $_1$BITE$_3$
'(I) bite (it).'

Mark: BITE $_1$IX$_3$ (2;2)
'Bite me on it.'

Example (1) illustrates that deaf children at around age 2 omit agreement marking even though the context requires the verbs to be marked for verb agreement. This phenomenon is also observed from child data of hearing children (See Chapter 1). Deaf children behave like hearing children as both of them omit morphological markings. Note that the absence of agreement markings does not necessarily mean the absence of such knowledge. The index sign *$_1IX_3$* that follows the verb sign *BITE* in

[5] [I: 2 to 1] refers to agreement markings for second person subject and first person object; [CF] means citation form.

example (1b) suggests that the child has some knowledge of agreement markings (See Tang et al. 2006 for the same point).

Though deaf children omit agreement markings, the first use of agreement markings appear at an early age. While Meier (1982) and Casey (2003) both report that the first use of marked agreement verbs appears at around age 2 in early ASL, Quadro and Lillo-Marin (2007) observe that correctly-marked agreement verbs appear before age 2 when they study three children who acquire ASL as their first language and a child who acquires LSB as his first language. When agreement markings in signed languages appear, children seldom use them wrongly. Though agreement markings are observed only with a restricted set of verbs (i.e. agreement verbs) in signed languages, overgeneralization is not commonly observed. Fischer (1973) and Casey (2000) report few tokens in which deaf children overgeneralize the agreement inflection to non-agreeing verbs (e.g. *EAT, DRINK,* etc.), implying that deaf children may not really have difficulty in acquiring agreement markings. Other errors have been reported are mismatch of agreement markings and the arguments being agreed with. Meier (1982) observes that American deaf children direct the ditransitive agreement verb to the direct object instead of indirect object in adult grammar. The verb agrees with the wrong argument. Casey (2000) also reports that deaf children acquiring ASL direct the verb to the location of the subject when the location of the object is the target direction between the ages of 2;7 and 2;11. This may be due to a lack of knowledge on the linguistic space or argument types.

As noted, the agreement verbs may be directed towards real or imagined referents in the signing space. Casey (2003), based on longitudinal data of six children

acquiring ASL, reports that children tend to use directional signs with real referents.[6] Related to this, there is a question of whether space plays a role in the acquisition of verb agreement. Meier (1982) addresses this issue by examining whether iconicity affects the acquisition of verb agreement. The directionality shown by agreement verbs is highly iconic in the adult signing. It is possible that iconicity will accelerate the acquisition of verb agreement. Meier sets up two models which assume that iconicity would play a role in acquisition of verb agreement: mimetic model and spatial analogy. These two models have different predictions on the acquisition of verb agreement:

[6] In her study, Casey (2003) defines directionality as "the use of movement, spatial displacement, and/or palm orientation in the production of a manual action gesture or sign to indicate an additional referent involved in the action" (p.349). Directional signs include both spatial verbs and agreement verbs in her study.

(2) a. ***Mimetic Model***

i. Verb agreement appears earlier with verbs that are mimetic (e.g. *GIVE*) than with verbs which are not mimetic (e.g. *ASK*).

ii. Children's use of verb agreement with mimetic verbs results in early acquisition of verb-object agreement involving second and third person objects.

iii. Children only produce both subject-verb agreement marking and verb-object agreement marking when the subject is first person.

iv. Children would replace the marked form with the unmarked citation verb form when the object is first person.

b. ***Spatial Analogy***

i. Agreement with verbs of motion will emerge early.

ii. Children prefer doubly-agreement forms (i.e. both subject-verb agreement and verb-object agreement are marked on verbs) as these forms are "better diagrams" than singly-agreement forms (i.e. only verb-object agreement is marked on verbs).

iii. Children would not replace the marked form with unmarked citation verb form.

In addition to these two models of iconicity, Meier also makes two predictions from a morphological model. First, this model predicts that children would acquire verb agreement late. Children would also begin with singly-agreeing forms (verbs which agree with one argument, specifically object) because these forms are morphologically less complex than doubly-agreeing forms (verbs which agree with two arguments). This prediction contrasts with those made by mimetic model and spatial analogy model because both models predict an early emergence of verb agreement. In addition, the prediction on the developmental sequence of singly agreement forms and doubly agreement verbs made by the morphological model is the opposite of the one made by the spatial analogy model. By examining

longitudinal data of three American deaf children who acquire ASL as their first language, Meier observes that predictions of both models of iconicity are not borne out. Rather, the child data conforms to the predictions of the morphological model:

Table 4.1 Predictions made by Mimetic Model and Counter-evidence from ASL Child Data

Predications made by Mimetic Model	Counter-evidence
1. Verb agreement appears with verbs that are mime-like (e.g. *GIVE*) earlier than that occurs with verbs which are not mime-like (e.g. *ASK*).	Children use both mimetic form and non-mimetic form of potentially mimetic verb (e.g. *GIVE*). At around age 2, children use various kinds of verbs, many of them are not mimetic (e.g. *LOOK-AT*).[7]
2. Children's use of verb agreement with mime-like verbs results in early acquisition of verb-object agreement with second and third person objects.	Children use the citation forms instead of marked forms when the objects are second or third person.
3. Children only produce both subject-verb agreement marking and verb-object agreement marking when the subject is first person.	Children generally produce fewer doubly-agreement forms than singly-agreement forms.[8]
4. Children would replace the marked form with the unmarked citation verb form when the object is first person.	Children are able to use marked form (i.e. *GIVE* [I: to 1]) when the object is first person.

[7] Meier calls verbs like *LOOK-AT* figurative directional verb "in which directional movement is not an image of motion in the referent world" (p.106). This kind of verbs is classified as non-mimetic in his study.

[8] Meier notes that this finding may be resulted from the fact that many agreement verbs do not allow double agreement (i.e. subject-verb agreement and verb-object agreement).

Table 4.2 Predictions made by Spatial Analogy and Counter-evidence from ASL Child Data

Predications made by Spatial Analogy	Counter-evidence
1. Agreement with verbs of motion will emerge early.	Early verbs are not verbs of motion and transference.
2. Children prefer doubly-agreement forms (i.e. both subject-verb agreement and verb-object agreement are marked on verbs) as these forms are "better diagrams" than singly-agreement forms (i.e. only verb-object agreement is marked on verbs).	Children generally produce fewer doubly-agreement forms than singly-agreement forms.
3. Children would not use the citation verb form of verbs of motion and transference as the movements of these forms are analogues of the real-world events.	Children use citation form even though the verbs are potentially mimetic.

Tables 4.1 and 4.2 illustrate that Meier's research findings are incompatible with all the predictions of the models of iconicity (mimetic model and spatial analogy). The emergence of agreement marking is rather late (at around age 3;0, more or less the same time when agreement morphemes emerge in children who acquire spoken languages). This suggests that children do not attend to iconicity in the course of acquisition. If iconicity plays a role in the acquisition of verb agreement, agreement verb forms should appear much earlier. That agreement verb forms do not emerge earlier suggests that iconicity does not accelerate child acquisition of verb agreement in ASL.

The optionality of agreement markings is also specific to signed languages. This property drives researchers to examine whether children make more errors with obligatory agreement markers than optional agreement markers, or vice versa. Meier (1982) conducts an elicited imitation task to explore this question. What he has found is that children do better with obligatory agreement markers than optional agreement markers. Casey (2003) and Quadros and Lillo-Martin (2007) further examine verb agreement under the obligatory contexts. Casey reports that Deaf children acquiring ASL produce more marked agreement verbs under obligatory contexts during the period from age 0;8 to 2;11. Marked agreement verbs outnumber unmarked ones since children reach age 2;5. Quadros and Lillo-Martin (2007), however, have contrary findings due to a different treatment on obligatory contexts. Obligatory contexts are defined as cases when verbs of transfer agree with [+human] objects in verb-object agreement. After an extensive study on the directionality of the verbs and the sentence/discourse contexts, they observe that children are able to produce obligatory agreement before age 2. HKSL allows a higher degree of optionality because both subject-verb agreement and verb-object agreement can be omitted except when the subject is second person or the object is first person. The effect of optionality is addressed in Tang et al. (2006). I will discuss this study in Section 4.6.

In addition to iconicity and optionality of agreement markings, some researchers also explore whether early gestures play a role in the acquisition of verb agreement. I have noted in Section 4.2 that discontinuity between gestures and acquisition pronouns is observed in child ASL. Casey (2003) and Quadros and Lillo-Martin (2007), on the other hand, attempt to explore the relation between directional gestures and acquisition of verb agreement. Casey (2003) examines directional gestures like *give-me, pick-me-up* which are commonly produced by both hearing

and deaf children and compares these directional gestures with the double agreement verbs (i.e. verbs marked for both subject and object agreement). She concludes that early directional gestures and marked agreement verbs demonstrate continuity from gestures to signs. Quadros and Lillo-Martin (2007) also study the relation between gesture and verb agreement. Their findings show that gestures are complementary to language and they are not used as placeholders of unknown or difficult verbs.

In sum, deaf children who acquire signed languages start out with unmarked verbs in the same way as hearing children drop the tense/agreement markings. While acquisition studies in spoken languages largely explore how agreement markings reveal the functional projections in early phrase structure, the studies on signed languages show that deaf children attend to linguistic properties rather than modality-specific properties in language acquisition.

4.4 Acquisition of Classifier Predicates

Classifier predicates are also widely studied in signed languages. In Chapter 2 I have shown that classifier predicates are more complex than lexical verbs due to their compositional nature. Previous studies have examined deaf children at different ages, ranging from age 2;0 to 9;0. This age range suggests that the period of acquisition of classifier predicates is very long. Studies on the acquisition of classifier predicates either focus on the developmental sequence of different kinds of classifier handshapes or how children combine different components of classifier predicates simultaneously. Let us examine these two issues one at a time.

Most previous acquisition studies explore how deaf children come to know classifier predicates. Earlier studies mainly attempt to outline the developmental sequence by looking at the classifier handshapes (i.e. semantic, handle or SASS) (cf.

Kantor 1980, Supalla 1982, Hamilton and Lillo-Martin 1986). Supalla (1982), for instance, examines the development of semantic classifiers and SASSes by three American deaf children aged from 3;6 to 5;11 using an elicitation task. He explores how children produce semantic classifiers (e.g. vehicle classifier, tree classifier) and SASSes (round versus straight morpheme) after watching video clips of moved objects. He finds that there is a variation in the acquisition of different semantic classifiers (e.g. tree classifier is learned late). On the contrary, children's performance on the SASSes (round versus straight morphemes) is the same across age.

Schick (1987), on the other hand, reports a developmental sequence of classifier predicates in ASL. She looks at the development of classifier handshapes on the basis of four different criteria (Schick 1987:70):

Table 4.3 Morphological Coding in Schick's Study

a.	The Handshape Morpheme	The handshape used for the predicates was identified for both the dominant hand and the non-dominant hand. Whether this handshape was correct or incorrect was recorded.
b.	The Movement Morpheme	Whether the child used an appropriate verb root (MOV, IMIT, DOT) was recorded.
c.	The Grid Morpheme	Correct use of space in the predicate was recorded.
d.	Adult-like Production	A child was given credit for forms that were completely acceptable by adult standards.

Based on these four criteria, Schick explores the developmental sequence of three kinds of classifier handshapes: HANDLE (i.e. handle classifiers), SASS and CLASS (i.e. semantic classifiers). A summary of the result is given below (Schick 1987:73):

Table 4.4 Schick's Findings on Acquisition of Classifier Predicates in ASL

a.	The Handshape Morpheme	CLASS > SASS > HANDLE
b.	The Movement Morpheme	CLASS > HANDLE, SASS
c.	The Grid Morpheme	HANDLE > SASS > CLASS
d.	Adult-like Production	HANDLE, SASS > CLASS

Different developmental sequences are observed in Schick's study when different criteria are concerned. CLASS emerges earlier than other classifier handshapes, when handshape and movement morpheme are concerned. HANDLE is observed earlier when the grid morpheme and adult-like production are considered. Different handshapes are acquired at different times. Schick shows that a fuller picture on the acquisition of classifier predicates can be seen when the handshape morpheme, movement morpheme, the grid morpheme and adult-like production are considered.

Different components of classifier predicates are expressed simultaneously in adult grammar. How children acquire this property of simultaneity expressed by classifier predicates is another common research question. It has been argued that the long period of acquisition of classifier predicates is due to the simultaneity of classifier predicates (Newport and Meier 1985). Supalla (1982) explores how children develop from expressing various components of a classifier predicate sequentially to using them simultaneously. He predicts that children begin with learning different components of classifier predicates one after another. After this, children put these different components of a classifier predicate together, but expressing them sequentially. Then children will combine different components of a classifier predicate simultaneously. The result of Supalla's work conforms to his predictions. First, children tend to omit some of the components of a classifier predicate. In many cases, the classifier being omitted refers to GROUND in a motion event in Talmy's (1985, 2000a, b) framework. Slobin et al. (2003) also report similar

findings from their longitudinal study of deaf children who acquire ASL and deaf children who acquire Sign Language of the Netherlands (SLN). Supalla also finds sequential production of classifier predicates. Children tend to use the index finger to trace the path in a motion event instead of adopting a classifier handshape over the path as native signers would do. Clearly, his prediction that sequentiality precedes simultaneity is borne out.

Sign language researchers also look into the errors made by deaf children in the course of acquisition of classifier predicates. Handshape, locative placement of classifiers representing figure, ground and path, omission of morphemes and omission of nominal referents are some errors reported in the literature (Supalla 1982, Schick 1987, Slobin et al. 2003, among others). Handshape errors include substitution of a less marked handshape for the target one. Children may also substitute a handshape of a frozen sign for a classifier handshape. For instance, it is observed in Supalla's study that the H-handshape () of the noun *EGG* is borrowed to mean a disk-shaped object in early ASL.

Omission error is also observed. Children may omit the classifier morpheme like movement (e.g. path movement) of the classifier predicates (See Emmorey 2002 for a review). They may also omit the nominal referents of the classifiers in the classifier predicates even though the nominal referents have not been mentioned in the earlier context (Slobin et al. 2003:288):

(3) Establishing Reference [DD, ASL, C: 5;0]

Situation: Child describes going swimming and sliding down into the water (as part of a longer narrative).

Utterance: Nondominant hand in B-handshape with palm facing the signer and fingertips pointing right. The dominant hand, in a bent V-handshape, starts above the nondominant hand and moves away from the signer with a downward slope, bending and unbending the fingers.

Transcription: PNT_1 HAVE BIG (slide)-pm'PL_VL-pm'TBL-src'SUP_PL_VL-pth'DF-mvt'BEND*-asp'ITR* [*]

%err: referent of pm'PL-VL (noun slide) is absent; mvt'BEND-asp'ITR $mvt=mvt'0-asp'0

Example (3) illustrates an omission of the nominal referents which serve as the antecedents of the classifier predicates, specifically the nominal antecedents for both figure and ground. The child utters a classifier predicate 'slide down into water' (B-handshape of nondominat hand serves as ground and V-handshape of the dominant hand functions as the figure. The movement of the dominant hand represents the action of sliding down right at the beginning. Since this kind of error is associated with constructing the entire clause in which classifier predicates are used, we will consider this kind of error as an error of constructing a classifier construction rather than an error on the form of classifier predicates.

This section gives a general overview of the previous research on the acquisition of classifier predicates. Most studies report the child's production of different types of classifiers (e.g. semantic classifiers, handle classifiers and SASS). These studies mainly examine the developmental sequence of different types of classifiers. Some of them touch upon how children come to know the complexity of classifier

predicates, and how to utter various components simultaneously. Some common errors reported in the literature are also presented. These findings will lay the background in my exploration on the acquisition of classifier predicates, especially on classifier handshapes and errors, in early HKSL.

4.5 Are there Functional Projections in Early Signed Languages?

In Section 4.2 I have mentioned that the interaction between modality-specific properties and sign language acquisition constitute one common goal of some previous studies. In the literature very few studies like Lillo-Martin's (1991) work on acquisition of null arguments and Chen's (2001) study on word order variation in ASL address theoretical issues like parameter setting. Though the present study does not address parameter setting, I will review Chen's work as a background to my exploration on word order which will ultimately help me to address the question on whether functional projections are available in early phrase structure in HKSL.

Chen (2001) studies word order variations in adult and child ASL in order to find out if word order parameter is set early and to explore the relation exists between the setting of word order parameter and regularity of verbal inflections. According to Chen, ASL allows various word orders like Turkish, Russian, and so on. The SVO order is reported to be canonical while other word orders (e.g. SVS, OSV) are noncanonical.

In her longitudinal data of four deaf children aged from 21.75 months to 29.75 months, Chen observes that children produce both canonical and noncanonical word orders. This phenomenon is also reported from early Turkish (Slobin 1982, Ekmekçi 1986). Interestingly, the occurrences of noncanonical word order are more consistent than those involving a canonical word order. The children produce OV order for

verbs marked for aspect, location or instrument. Subject-pronoun copy and topicalization are observed. With respect to topicalization, Chen focuses on the OV utterances produced by one of the four children.[9] This child does not produce topic markers in the adult ASL. But the child uses a prosodic break like that in ISL topicalization as early as 24 months (See Nespor and Sandler 1999, Rosenstein 2001 for a description on ISL topicalization). Since word order variations are observed from the children, Chen concludes that ASL children set their word order parameter early.

Chen attempts to study early ASL in the framework of Principles and Parameters Model. The focus is placed on the word order parameter, but there are a number of issues that are not addressed. As noted earlier, Chen assumes that certain verbal inflections are projected into ManP in adult grammar. But the exact position of the ManP in the ASL phrase structure is not mentioned. It is unclear where ManP is and how the ASL verbs move up to ManP. One may speculate that it may be right above VP as one of the verbal inflections that trigger ManP is aspect and it is common for AspP to appear above VP. The derivations of these verbal inflections wait for further research. Another issue is about subject-pronoun copy and object topicalization. It is unclear whether Chen assumes that subject-pronoun copy and object topicalization involves movement. Whether the subject-pronoun copy is cliticized to C (Petronio 1991, 1993) or to VP (Wilbur 1994, 1999) remains to be resolved.

[9] Chen identifies topics using the nonmanual marker brow raise. Since the other three children do not produce OV utterances with brow raise, their OV utterances are not considered as instances of early topicalization.

4.6 Acquisition Studies in HKSL

Few acquisition studies have been done in HKSL.[10] Like other studies in signed languages, these studies examine a well-defined area like verb agreement on agreement verbs and classifier predicates. First, consider verb agreement. Tang et al. (2006) examine both longitudinal data and experimental data from CC, the same child studied in the current analysis. This work investigates CC's production of a ditransitive agreement verb *GIVE* on the basis of 38 video sessions (from age 2;6.17 to 5;7.20). The forms of *GIVE* are mostly uninflected, some of them are directed to the real referents in the same way as the adults do. Few tokens are overtly inflected for subject-verb agreement and/or verb-object agreement. The first clear use of agreement marking only appears at the age of 3;5.23, a time much later than what has been reported in other languages (See Chapter 1). When the data is studied more closely, it is also observed that CC produces more inflected forms than uninflected forms of *GIVE* in obligatory contexts than in optional contexts. In this study, optional contexts refer to (i) subject is first person and object is second person, (ii) subject is first person and object is third person and (iii) both subject and object are third person. Obligatory contexts are (i) subject is second person, (ii) subject is second person and object is third person, (iii) subject is third person and object is first person and (iv) subject is third person and object is second person.[11] Tang et al. (2006) account for this fact by resorting to the optionality of verb agreement in adult grammar. When agreement marking is optional, it may look ambiguous to the child, resulting in late emergence of verb agreement.

[10] Recently, Wong (2008) has completed a study on acquisition of handshapes in HKSL. Since the present study focuses on acquisition on morphosyntax, I will not review her work here.

[11] I do not consider (iv) as an obligatory context in my previous research. Further studies are needed to verify whether this context is truly an obligatory context.

The experimental data is obtained from a real referent task, a story-retelling task and a truth-value judgment task. The real referent task shows that CC is able to direct the verb sign *GIVE* to different locations, suggesting that he has acquired the directionality of agreement verbs. In the story retelling task, CC is asked to retell a story previously told to him by an adult native signer. The story consists of 9 tokens of *GIVE* in different contexts ((i) first person subject and third person object, (ii) second person subject and first person object, (iii) first person subject and second person object, (iv) third person subject and third person object, (v) second person subject and third person object and (vi) third person subject and first person object)). Generally speaking, CC's production of the story is not adult-like, even though he is asked to retell a story. He produces more tokens of verb-object agreement (e.g. $GIVE_3$) than subject-verb and verb-object agreement (e.g. ${}_1GIVE_3$). In many of the optional contexts, he uses the citation form.

Finally, a truth-value judgment task in the form of a computer game is used to elicit CC's knowledge on verb agreement when CC is around age 6. CC shows sensitivity towards ungrammatical sentences as he correctly judges the ungrammatical sentences as wrong in most instances. Yet, he does not seem to be aware of the optional/obligatory contexts. For two optional contexts (third person subject and third person object; first person subject and third person object), CC does well in the condition where the subject is first person and the object is third person, but not in the condition where both the subject and the object is third person. CC also does poorly for the obligatory context (where the subject is third person and the object is first person). So he is not sensitive to the optional and obligatory contexts with respect to the truth-value judgment task. Taken together, it is concluded that CC's knowledge of person agreement shows great variability in both longitudinal

and experimental data. No clear evidence supports that CC has mastered verb agreement in HKSL even at around age 6.

Classifier predicates in early HKSL are examined more widely. All previous studies investigate experimental data from deaf students at a local deaf school. Earlier studies (Tang, Chu and Sze 2003 and Tang, Sze and Lam 2004), following the tradition in sign language acquisition research, mainly examine the form of classifier predicates in terms of Talmy's characterization of motion events. Focus has been put on children's knowledge on the spatial relations among referents represented by the classifier handshapes. Like the findings reported in Supalla (1982), it is observed that many children omit the ground classifiers (e.g. dropping the ground classifier for 'canopy of tree' in the classifier predicate *CL:CAR_PLUNGE_DOWN_INTO_A_TREE_CANOPY*) or uses a lexical sign which would otherwise be a classifier in adult grammar (e.g. substituting the classifier for animate entity with the lexical sign *BIRD* in a classifier predicate *CL:BIRDS_BE_LOCATED_ON_A_PLANE*).

Recently, Tang, Sze and Lam (2007) look into simultaneity associated with classifier constructions. Similar to the previous studies in other signed languages, this study reports on a number of errors made by the deaf students with respect to classifier handshapes: (i) whether deaf students produce the target form of classifier handshapes and (ii) whether deaf students are able to make use of different classifier handshapes to represent the figure and ground in a motion event. On top of these findings, the use of gestures by deaf students in place of classifier predicates in adult grammar is also examined. In essence, all these studies focus on whether deaf children master the knowledge of building up a classifier predicate and a classifier construction in early HKSL.

4.7 Chapter Summary

This chapter introduces the research focus on sign language acquisition. Though signed languages are of visual-gestural modality, the acquisition of signed languages shows that children do not rely on nonlinguistic gestures in acquiring linguistic signs. This is evidenced by a wide range of research on verb agreement, pronouns, negation, wh-questions and so on. Acquisition of verb agreement and classifier predicates in ASL and HKSL are examined more closely as the findings reported in these studies lay the background to the present study. Chen's study on word order which attempts to address language acquisition from a theoretical perspective is also given.

Chapter 5

Hypotheses and Methodology

5.1 Introduction

Armed with the background presented in the previous chapters, I will now proceed to examine the early phrase structure in HKSL. In Chapter 1 I mentioned that this thesis aims at addressing the Continuity-Maturation debate on the basis of HKSL child data. The first part of this chapter lists a number of hypotheses with respect to this research question. I will see to what extent these hypotheses are borne out in the following chapters. The second part is a description of the methodology I use in this study.

5.2 Hypotheses

This thesis addresses the early phrase structure of HKSL built up from V^0 to a VP and all the way up to TP through Merge. I assume that the V^0 is present in the phrase structure when different verb types emerge in child language. A number of hypotheses are formulated with respect to the acquisition of verb types and early phrase structure. Consider the acquisition of verb types first. HKSL VERB has different forms: agreement verbs, spatial verbs, plain verbs and verb roots of classifier predicates (See Chapter 2). Different developmental patterns are predicted under different hypotheses that built upon different factors: morphological complexity, the use of space and input ambiguity. If morphological complexity plays a role in the acquisition of V^0, it is assumed that plain verbs emerge earlier than other types of verbs. It is also hypothesized that agreement verbs and spatial verbs would appear earlier than classifier predicates because classifier predicates are more

complex in the sense that classifier predicates are multimorphemic. The same prediction can be made if the linguistic use of space associated with non-plain verbs takes time to develop. If the acquisition of non-plain verbs relies on space, it is predicted that these non-plain verbs emerge early if the linguistic use of space is mastered early and vice versa. If such reliance does not hold, a child may not use non-plain verbs even though the use of space is present in the child language.

The third hypothesis assumes input ambiguity plays a role in language acquisition and predicts marked agreement verbs and classifier predicates both emerge late. Ambiguous input may delay the emergence of certain language phenomena or cause transfer from one language to another language.[1] The optionality of agreement markings in adult grammar and the presence of plain verbs may confuse the child on finding whether an agreement verb should be marked or not. Similarly, the fact that classifier predicates are lexicalized into agreement verbs and spatial verbs blurs the boundary between (i) classifier predicates and agreement verbs and (ii) classifier predicates and spatial verbs. It follows that different verb types in the adult grammar may not be the same in the child language.

In Chapter 1 I have noted that the Continuity view and the Maturation view hold different views on whether functional projections are present initially in the child phrase structure. I propose that HKSL phrase structure has a head-initial *v*P and head-final TP and NegP in Chapter 3. I suppose that the Maturation view is supported if the child data in HKSL only shows the presence of VP. The presence of functional projections like *v*P, TP and NegP, on the other hand, gives evidence to the Continuity view.

[1] I will discuss the notion of input ambiguity in detail in Chapter 6.

5.3 Methodology

5.3.1 The Child

The deaf community is a diverse group.[2] First, different deaf people have different levels of hearing losses. According to the statistics in US, most deaf children were born to hearing parents. Only a very small portion (about 10%) of deaf children was born to deaf parents (Hoffmeister and Wilbur 1980:61). In other words, few deaf children are exposed to sign language input. To the best of my knowledge, Hong Kong has very few native signers. Under the strong oralist approach in Hong Kong, most deaf children have to learn speech and lip-reading at a very early age. Only one deaf school is left now. There used to be 4 deaf schools in Hong Kong and all of them used oral approach and sign language was not encouraged. These deaf schools are closing because of the mainstreaming. In some schools, sign language has become a secret language. In addition, even deaf parents may not sign to their deaf children because sign language is viewed as an inferior language.

The child studied here is named CC. He was born to deaf parents who are both non-native signers. CC's father is a driver and his mother is a clerk. The father went to a local deaf school while the mother a hearing school. Speech was the medium of instruction in both schools. But since deaf students tend to communicate among themselves via sign language at deaf schools, the father had more sign language exposure than the mother did. As both parents were brought up in an oral environment, sign language was not the major means of communication at home. Before the research team visited the family, speech, simultaneous communication[3] and some gestures were the primary means of communication among the deaf

[2] The word *deaf* which starts with a small d refers to the group of people who has hearing loss. When the word starts with a capital D, it refers to a group of people who observes the Deaf culture.
[3] Simultaneous communication refers to the communication mode in which a signer speaks and signs at the same time. Usually the signing follows the grammar of the speech.

parents, the hearing grandmother and the child.[4] When the parents went to work during weekdays, the hearing grandmother and a hearing caretaker looked after the child. Speech became the major means of communication. In sum, CC was not exposed to any native sign language before he joined the research project at age 1;9.6.

CC began to receive input of HKSL when the parents agreed to join the research project. Since then, the child is exposed to non-native HKSL input from parents and native HKSL input from the Deaf researchers. Totally three Deaf researchers took the role of an investigator in the video-taping sessions studied in this thesis. A summary of their bio-data is given below:

Table 5.1 Bio-data of Native Deaf Researchers Participated in the Video-taping Sessions

Signers	Gender	Age	Degree of Deafness	Deaf Family Members	Schools attended
Signer A	M	29	Profound	Parents and an elder sister	Local deaf school
Signer B	F	25	Profound	Parents and an elder sister (i.e. Signer C)	Local deaf school, hearing school
Signer C	F	29	Profound	Parents and a younger sister (i.e. Signer B)	Local deaf school

All the Deaf researchers were born to Deaf parents and they are all profoundly deaf. All of them studied in the same local deaf school. But Signer B began to attend a hearing school when she was age 15. All Deaf researchers were roughly at early 20s when they interacted with CC in the video-taping sessions. Since HKSL input is generally limited, Signer B or Signer C visited CC twice or three times a month in

[4] Since both parents are not native signers, some of their signs deviate from those of the native signers. These signs are labeled as family-specific forms.

addition to the weekly video-taping sessions. Signer B and Signer C also visited CC daily for around one month during the summer in 2002 and 2003.

5.3.2 Data Collection

CC was filmed regularly from age 1;9.6. Deaf researchers of HKSL played with him, told him stories and conversed with him during the video-taping sessions. HKSL was the medium of communication in all sessions. The native Deaf researchers who interacted with CC transcribed the data using the software ELAN developed by Max Planck Institute of Psycholinguistics, Nijmegen (See Appendix 3 for sample files). All signs were transcribed except for those exchanges among the Deaf researchers, hearing researchers and the parents which were out of sight of the child. The notation conventions in the transcription were largely adapted from those reported in ASL studies: manual signs are glossed with the nearest English translations and represented with English capital letters.[5] Symbols adapted from the CHAT format used by Child Language Data Exchange System (CHILDES) provide additional information on the nature of different signs (cf. MacWhinney 2000). See notational conventions of HKSL data on page v.

5.3.3 Methods on Data Analysis

The present study examine CC from the age of 1;9.6 to 4;6.21 on a monthly basis (i.e. 34 sessions). It is common to report longitudinal data on a weekly or bi-weekly basis. However, a pilot study shows that CC's development was slow and hence I study his data on a monthly basis with a longer time span. A longer time interval will

[5] The transcription of the longitudinal data is still in progress and only manual signs are glossed.

provide us with a clearer picture of the developmental pattern. Each video session usually lasts for one hour (See Appendix 4).

Excluding repetition and blind copy, totally 8092 utterances are observed from the 34-session longitudinal data of CC.[6] 2095 utterances of the total utterances CC produced contain verb-like elements: (i) verb signs, (ii) gestures which function like verb signs (hereafter verbal gestures) or (iii) verb-like tokens which are indeterminate between signs and gestures, as shown in the following example:[7, 8]

(1) a. ***Verb Sign***
IX-3p **CRY**.
'She cries.' (2;9.29)

b. ***Verbal Gesture***
YOUNGER_SISTER **gesture [= sleep]**
gesture [= sleep].
'Younger sister is sleeping, sleeping.' (2;2.0)

c. ***Verb-like Token***
Tear-open IX-obj.
'Tear open that [i.e. a bag of biscuits]' (2;3.25)

These verb-containing utterances form the basis of our discussion in the following chapters. These verb-containing utterances are further grouped into (i) complete utterances, (ii) unfinished utterances and (iii) utterances which show partial imitation

[6] Utterances are divided on the basis of native signers' intuition and contextual cues.
[7] Gestures which involve real objects (e.g. toys, biscuits) are not coded in the transcripts. Gestures examined in this study are of two main types: iconic gestures which are more or less pantomimes of real-world activities and conventional ones like *give-me, all-gone* which have been reported from data of hearing children (cf. Bates, Camaioni and Volterra 1975, Caselli and Volterra 1990, Morford 1996, among others).
[8] Verbal gestures and verb-like tokens are not verb signs in the conventional HKSL. These items are identified and categorized by native signers. Since both of them employ the same modality as verb signs, it is possible that CC does not distinguish them from verb signs. An inclusion of these verb-like elements therefore shows a fuller picture of the acquisition of VERB in HKSL.

from the adults' utterances. Examples of these three types of utterances are given below:

(2) a. ***Complete Utterance***

EAT CL:BISCUIT_STICK.

'(I) eat biscuit stick.' (2;6.17)

b. ***Unfinished Utterance***

CHI: MOTHER &BUY GO@f BUY +/.

'Mother goes to buy…'

INV: gesture [= get someone's attention] SHEEP.

'Hey, sheep'

CHI: SHEEP.

'Sheep.' (2;7.19)

c. ***Utterance which shows partial imitation***

INV: IX-obj MATCH IX-obj.

'This is the matches.'

CHI: MATCH ["] PLAY.

'Matches, play (matches)' (2;10.9)

Unfinished utterance (marked with the symbol '+/.') in example (2b) is due to the interruption from the Deaf researcher. Example (2c), on the other hand, exemplifies an utterance where the sign *MATCH* is a copy of the adult sign (indicated by the symbol '["]') and the verb sign *PLAY* is spontaneous. Note that all instances in (2) are verb signs. Verbal gestures and verb-like tokens are also observed in different kinds of utterances:

(3) a. ***Complete Utterance***

FOOD gesture [= give me].

'Food, give me.' (1;11.8)

b. ***Unfinished Utterance***

gesture [= give me] &PHONE +/.

'Give me the phone.' (2;9.29)

c. ***Utterance which shows partial imitation***

INV: IX-1p NIGHT ULTRAMAN(= Japanese fictional character) gesture [= transform oneself]
CL:ULTRAMAN'S_BUG_EYES
CL:ULTRAMAN'S_EARS.
'I transform into Ultraman who has bug eyes and special ears at night.'

CHI: ULTRAMAN ["] IX-1p ["] NIGHT ["] CL:BODY gesture [= do Ultraman's energy attack]
CL:THE_WOUND_HEALED_IMMEDIATELY
'I become Ultraman at night and I do the energy attack and my wound healed immediately." (4;0.23)

(4) a. ***Complete Utterance***

POLICEMAN shoot-with-a-gun.

'Policeman shoots with a gun.' (3;2.24)

b. ***Unfinished Utterance***

CHI: support-with-the-hands +/.
'(Monkey mother) helps (little monkey) to get up'

INV: support-with-the-hands WHAT?
'What is 'support-with-the-hands'?' (3;2.24)

Examples (3) and (4) list the instances of verbal gestures and verb-like tokens in different kinds of utterances. Note that some utterances contain verbal gestures, verb signs and/or verb-like tokens:

(5) a. POLICEMAN CATCH ELDER-SISTER **shoot-with-a-gun** GOOD.
'It is good that the policeman catches elder sister [i.e. the Deaf researcher] and shoots at her with a gun.' (3;5.23)

b. CL:BISCUIT_STICK **GIVE@f gesture [= give me]**.
'Give (me) the biscuit stick.' (2;6.17)

All these utterances form the data pool for the present study. A summary of different kinds of verb-containing utterances are given in the table below:

Table 5.2 Verb-containing Utterances Produced by CC

Utterance Types	Verb Signs		Verbal Gestures		Verb-like tokens		Co-occurrence[a]		Total
Complete	1617	(82.08%)	223	(11.32%)	74	(3.76%)	56	(2.84%)	**1970**
Unfinished	84	(94.38%)	3	(3.37%)	2	(2.25%)	0	(0.00%)	**89**
With Partial Imitation	32	(88.89%)	4	(11.11%)	0	(0.00%)	0	(0.00%)	**36**

[a]Co-occurrence refers to utterances where a verb sign and a verbal gesture or a verb-like token co-occur.

The discussion on the emergence of VERB is built upon the tokens of spontaneous verbs and verbal gestures in complete utterances, unfinished utterances as well as utterances with partial imitation.

In the study of early phrase structure, unfinished utterances and utterances with partial imitation are excluded because it would be unclear whether the arguments are present or absent in these utterances (See Sandler et al. 2005 for a similar methodology). Negators, modals and auxiliary-like elements (e.g. $HAVE_{exist}$) are also examined to find out whether early phrase structure contains functional projections.

A summary of the utterances which contain these functional elements are given below:

Table 5.3 Utterances which contain Functional Elements

Functional Elements	Number of Utterances
Negators	321/471 (68.15%)
Modals	28/471 (5.94%)
Auxiliary-like elements	122/471 (25.90%)

In examining the developmental pattern of the emergence of VERB and other functional elements, some measures of acquisition are necessary. Stromswold (1996) lists three kinds of measures which determine the age of acquisition: (i) age of first use, (ii) age of repeated use and (iii) age of regular use. The definitions of these three kinds of measures are given below (Stromswold 1996:45):

(6) a. ***Age of first use***
the age at which a child first used a clear, novel example of a construction

b. ***Age of repeated use***
the age by which a construction either had appeared five times or had appeared twice in one month

c. ***Age of regular use***
the age at which a child began to use a construction regularly. This was determined by graphing the number of occurrences of a construction and visually inspecting the graph for points of inflection

Among the three measures, the definition of the age of regular use is a bit vague. So I will focus on age of first use and age of repeated use. Age of first use will be useful

in tracking the availability of functional projections in early HKSL. Note that the use of verbs/negators which are unanalyzed chunks or routines are excluded. Thus the first use reported in the following chapters genuinely reflects the child language. Age of repeated use is also considered as an additional measure to balance the shortcomings of age of first use.

Input data is included when necessary. It is obtained from the adults' utterances in the corpus. Both hearing and Deaf researchers participate in the project and therefore the adults' utterances include both native and non-native HKSL. As our purpose of examining input data is to see how CC's HKSL deviates from the adult grammar, only utterances produced by native signers are included in the discussion in the following chapters.

Chapter 6

Emergence of VERB

6.1 Introduction

This chapter presents the early verbs produced by CC. In particular, the use of space and the effect of input ambiguity will be considered. As noted in Chapter 2, VERB in HKSL can be grouped into plain and non-plain verbs (agreement verbs, spatial verbs and verb roots of classifier predicates).[1] Non-plain verbs make use of the signing space to express deictic meaning, syntactic relations like verb agreement or spatial relations of different entities of an event (or events). A related question is whether CC is aware of the use of space of non-plain verbs. The second focus of this chapter is to examine the effect of input ambiguity. The boundary among different verb types in the adult grammar is not clear-cut. I have mentioned in Chapter 2 agreement verbs, for instance, may be unmarked and this makes agreement verbs look like plain verbs to the child. I will examine whether ambiguous input plays a role in the acquisition of VERB in HKSL.

6.2 Verb-like Elements Produced by CC

Totally 2095 utterances produced by CC constitute the data set of the current study. Out of the 2095 utterances, 2769 tokens of verb-like elements are identified. The following graph shows the distribution of these tokens from age 1;9.6 to 4;6.21:

[1] Classifier predicates are in the form of verb root + classifier handshape(s) and classifier handshapes cannot be separated from the verb root. The verb root is a kind of VERB and hence classifier predicates are included in our discussion on the emergence of VERB. In the following section I will continue to use the term "classifier predicates" for exposition.

Figure 6.1 Verb-like Elements Produced by CC

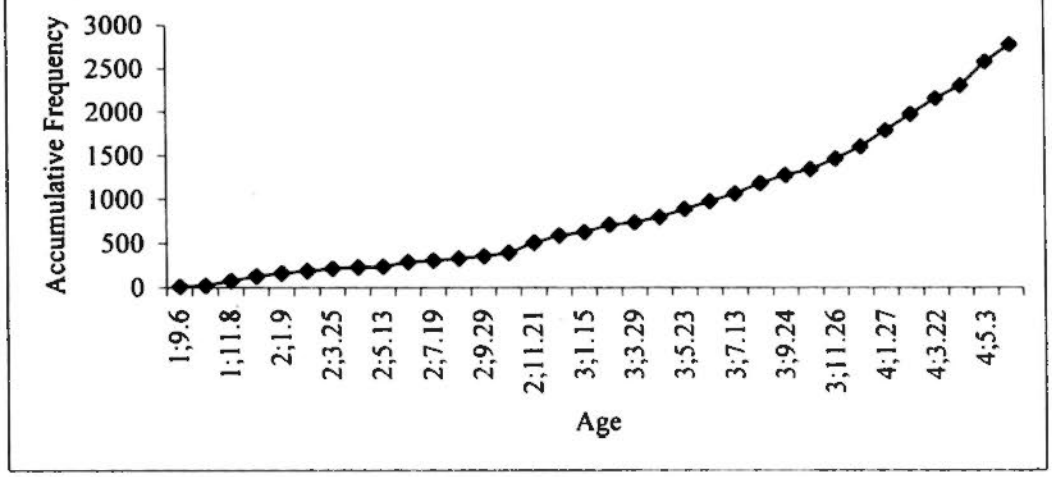


Figure 6.1 shows that the number of verb-like elements increases in a steady manner. In Chapter 5 I have shown that verb-like elements include verb signs, verbal gestures and verb-like tokens. The distribution of these three kinds of verb-like elements is given in the following table:

Table 6.1 Distribution of CC's Verb-like Elements

Verb-like Elements	Number of Tokens
Verb Signs	2399/2769 (86.64%)
Verbal Gestures	283/2769 (10.22%)
Verb-like tokens	87/2769 (3.14%)

Recall that verb signs can be subdivided into different groups in adult grammar (i.e. agreement verbs, spatial verbs, plain verbs and classifier predicates). In the next section, I will discuss CC's verb signs. Verbal gestures and indeterminate verb-like tokens will also be considered further in Sections 6.2.2 and 6.2.3.

6.2.1 Verb Signs

Totally 2399 tokens of verb signs are identified in CC's utterances. The verb signs produced by CC and verb roots of CC's classifier predicates are listed in Table 6.2 and Table 6.3 respectively. [2] The number next to each entry is the number of tokens observed.[3]

[2] Some verb signs are used by CC's parents but not by native signers of HKSL. These signs are labeled with the symbol *@f*. Few signs are created by CC and they are marked with *@c*. The grouping of these signs is based on whether they denote verb agreement or spatial locations of referents.

[3] Most agreement verbs and spatial verbs listed in Table 6.2 have a classifier origin. The verbs *ASK, FARE-MORE-THAN, HELP_1, PUNISH, TEACH, BUMP, CUT-WITH-A-KNIFE, CUT-WITH-SCISSORS, DRAW, DROP* and *WIPE* are verbs which do not show clearly whether they are lexicalized from classifier predicates.

Table 6.2 List of Lexical Verbs Produced by CC

Agreement Verbs		Plain Verbs						Spatial Verbs	
ASK	3	BE-RESPONSIBLE-FOR	1	EXPLODE	7	REPLACE-ONE-PERSON-FOR-ANOTHER	15	ARRIVE	1
BITE	28	BLEED@c	5	FALL	2	RIDE-A-HORSE	1	BUMP	12
CATCH	10	BREAK	2	FIGHT_2	3	RIDE-BICYCLE	5	CLEAN	1
FARE-MORE-THAN	1	BREATHE	1	FLY_1	7	RUN	6	CLIMB	9
GIVE	29	BUY	9	FORGET	10	SEEM	2	COMB	5
HELP_1	12	BUY@f	29	GIVE@f	27	SIGN	1	CUT-WITH-A-KNIFE	1
HELP_2	17	CALL	1	GO	39	SING_2	3	CUT-WITH-SCISSORS	6
HIT	29	CANNOT-SEE	3	GO@f	47	SLEEP	38	DRAW	1
IGNORE_2	1	CHANGE_1	7	GO-SHOPPING	1	SMELL	1	DRAW@f	46
KISS	4	CHANGE_2	44	GO-TO-SCHOOL@f	11	SNEEZE	12	DROP	14
PUNISH	3	CHOOSE	1	GO-TO-WASHROOM@c	4	STICK	4	FLY_2	8
SAY	76	CLOSE-A-DOOR	1	GROW-UP	4	STOP	3	JUMP	1
SCOLD	2	CLOSE-THE-MOUTH	4	HAVE-A-MEAL	1	STUDY	1	KNOCK	3
SEE	140	COME	15	HAVE-A-MEAL@f	10	SWALLOW	1	POUR_1	3
TAKE	61	COME@f	19	$HAVE_{loc/exist}$	156	SWIM_2	9	POUR_2	1
TEACH	6	CONTINUE	1	$HAVE_{poss}$	85	TAKE-PILL	4	PRESS	3
TELL	6	COOK@f	4	HEAR	2	TALK	3	PUT	27
THANK	32	COOK_2	6	HOLD	3	TEAR	3	SIT	10
		CRAWL	2	KNIT	1	THINK_1	3	SLIP	12
		CRY	45	KNOW	17	UNDERSTAND	1	SPLASH	1
		DANCE	1	LAUGH	8	WAIT	29	STAND	4
		DIE	36	LIE	14	WAKE-UP	2	THROW	9
		DISAPPEAR	1	LIKE	93	WANT_1	5	THROW-AWAY	4
		DISLIKE	16	LOOK-FOR	11	WASH	1	TOUCH	2
		DO	13	LOVE	1	WASH-HAIR	9	WALK	7
		DON'T-KNOW	18	MAKE	2	WASH-HANDS	13	WIPE	9
		DON'T-UNDERSTAND	6	MARRY	11	WASH-ONESELF_1	1	WRITE	4
		DREAM	3	MELT	5	WASH-ONESELF_2	12		
		DRINK	32	OPEN-A-DOOR	1	WATCH-TV	1		
		DRINK-SOUP	1	PASS-GAS	1	WEAR-BRACLET	2		
		DRINK-THROUGH-A-STRAW	19	PLAY	100	WEAR-CAP	1		
		DRIVE	3	PLUS	1	WEAR-HEARING-AIDS	2		
		EAT	97	PUT-ON-SHOES	2	WEAR-MAKE-UP	2		
		EAT@f	2	PUT-ON-CLOTHES	2	WORK	39		
		EXCHANGE	2	REMEMBER	7				

Table 6.3 Verb roots of Classifier Predicates Produced by CC[4,5]

(bandage)	7	(hack)	2	**(slip)**	3
(be located)	1	(hatch)	1	(speak)	2
(bite)	2	(hide)	5	(spill)	2
(blow)	7	**(hit)**	25	(splash)	1
(break)	4	**(hold)**	10	(squirt)	1
(brush)	2	(hold_put)	1	**(stab)**	12
(burn)	3	(inflate)	1	**(stand)**	8
(climb)	6	(lift)	4	**(swim)**	3
(close)	2	(light)	7	**(take)**	9
(collapse)	7	(melt)	4	(take off)	2
(comb)	1	(move)	7	(take_eat)	3
(come)	2	(open-bag)	3	(take_stab)	1
(crash)	1	(open-book)	1	**(tear)**	1
(cut)	2	(open-can)	2	**(throw)**	4
(disappear)	3	(open-door)	9	(tie)	3
(draw)	2	(open-eye)	3	(tighten)	1
(drink)	1	(perform magic)	9	**(touch)**	1
(eat)	5	(pierce)	1	(turn)	3
(enlarge)	1	(produce music)	1	(turn on)	3
(examine)	3	(plough)	5	(turn over)	1
(extinguish)	2	(pull)	6	(unplug)	1
(fall)	19	**(put)**	16	**(walk)**	38
(fight)	5	(put on)	5	(wear)	7
(flow)	1	**(read)**	1	**(wipe)**	5
(fly)	4	(ride)	5		
(give)	11	(screw)	1		

Note that the bolded verb roots listed in Table 6.3 share the same meaning and similar phonetic forms with some lexical verbs listed in Table 6.2. At first glance, one may suggest that certain classifier predicates are formed from some lexical verbs

[4] Verb roots are identified on the basis of the verb meaning of the classifier predicates. The brackets are used to indicate that the following words are not independent signs but verb roots of classifier predicates.

[5] The verb roots 'hold_put', 'open_close', 'take_eat' and 'take_stab' may be combined from two verb roots. However, no clear evidence supports this claim. Since it is possible that HKSL has a verb root which contains the meaning of both 'hold' and 'put', 'open' and 'close, 'take' and 'eat' or 'take' and 'stab', I will treat them as separate verb roots here.

and classifier handshapes. Classifier predicates which contain verb roots like 'give', 'take' share similar movements with their lexical verb counterparts. One may suggest that a classifier predicate like *CL:TAKE_THE_BABY* is formed from a lexical verb *TAKE* and a handle classifier. In Chapter 2 I have argued that agreement verbs and spatial verbs are lexicalized from classifier predicates. So it is not the case that *TAKE* is part of *CL:TAKE_THE_BABY*. Since it is not clear whether children know the relation between classifier predicates and lexical verbs, I will keep the classifier predicates and the lexical verbs separate in the following discussion. The distribution of early verb signs is summarized in Table 6.4 below:

Table 6.4 Distribution of CC's Verb Signs

Types of Verb Signs	Number of Tokens
Agreement Verbs	460/2399 (19.17%)
Spatial Verbs	204/2399 (8.50%)
Plain Verbs	1381/2399 (57.57%)
Classifier Predicates	354/2399 (14.76%)

Plain verbs take up the greatest portion of CC's verb signs (as shown in the number of tokens shown in Table 6.2 and the list of lexical verbs in Table 6.3). The same pattern has also been observed in other studies on children acquiring signed languages from birth (cf. Meier 2002, Lillo-Martin, Mathur and Berk 2005, Quadros and Lillo-Martin 2007, among others). However, CC was not exposed to HKSL from birth. It would be more appropriate to compare him with other late learners. Berk (2003) and Berk and Lillo-Martin (in prep) report that both native-signing children and late learners who are exposed to ASL at around age 3 and at age 6 produce

spatial verbs more often than agreement verbs.[6] The results shown in Table 6.4 therefore conform to the pattern observed from both native-signing children and late learners.

Another explanation to this pattern is that plain verbs are morphologically simpler. Or the emergence of early verbs may be associated with verb meaning. It happens that early verbs like 'eat', 'drink' and 'sleep' are all plain verbs in HKSL. This is probably why most CC's verb signs are plain verbs.[7] Agreement verbs, spatial verbs and classifier predicates, on the other hand, are all morphologically more complex. A closer examination of each of them is given below.

6.2.1.1 Agreement Verbs

Totally 460 tokens of agreement verbs are identified in CC's data. In Chapter 2 I have mentioned that agreement verbs may be marked or unmarked for verb agreement except when the subject is second person or when the object is first person in the adult grammar. Additionally, agreement verbs may behave like spatial verbs as they may be directed to the actual or imagined location of the referents. All these forms of agreement verbs are observed in CC's utterances:

(1) Context: CC asked the investigator to give a biscuit stick to him.

GIVE CL:BISCUIT_STICK.
'Give (me) a biscuit stick.' (2;6.17)

[6] But late learners have specific difficulty on agreement verbs as their error rates on agreement verbs are higher than that of native-signing children. I will return to this point in a discussion on early agreement verbs below.

[7] See Quadros and Lillo-Martin (2007) for a similar point in their explanation of low frequency of agreement verbs in child ASL.

(2) Context: CC told a story.

GIVE$_{3j}$ ELDER_BROTHER EAT CANDY.
'(Mother) gives elder-brother a candy to eat.' (3;5.23)

(3) Context: CC asked the investigator to take an umbrella which was hung at the top of a cupboard.

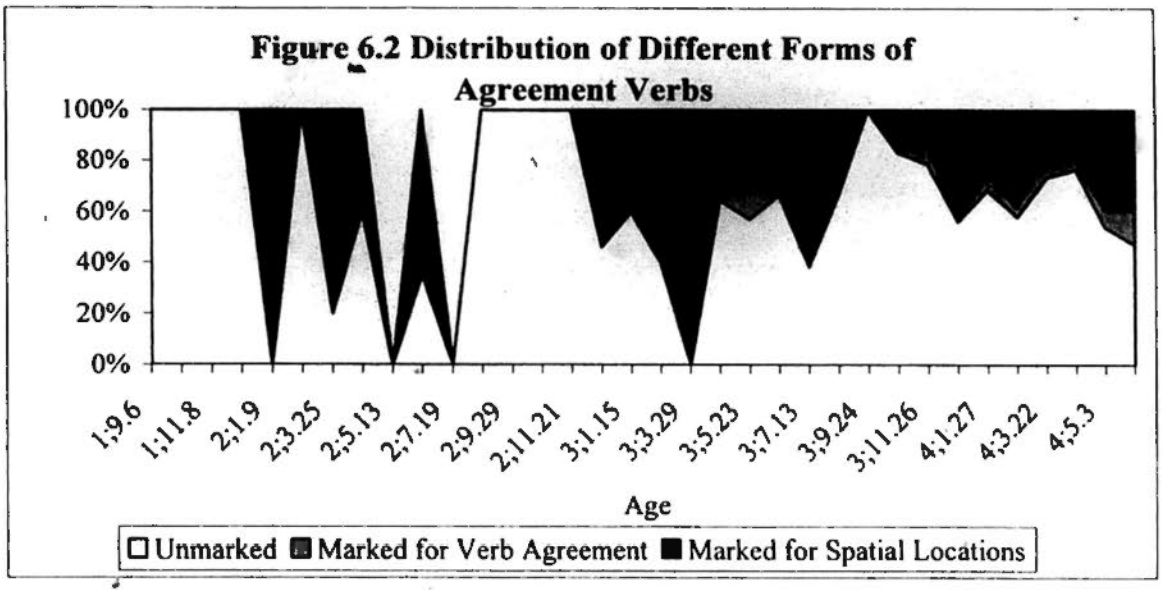
IX-obj [i.e. umbrella] UMBRELLA TAKE$_a$ UMBRELLA.
'That umbrella, take the umbrella.' (2;1.9)

Examples (1) to (3) are instances where the agreement verbs are unmarked (*GIVE*), marked for verb agreement (*GIVE$_{3j}$*) and marked for location of the object referent *UMBRELLA* (*TAKE$_a$*) respectively. Most agreement verbs are unmarked. A small portion of agreement verbs are spatially-marked. Agreement markings are rare. The distribution of the three forms of agreement verbs is summarized in the following table:

Table 6.5 Forms of Agreement Verbs Produced by CC

Forms of Agreement Verbs	Number of Tokens
Unmarked	284/460 (61.74%)
Marked for Verb Agreement	23/460 (5.00%)
Marked for spatial locations	153/460 (33.26%)

A related question is whether there is a developmental sequence of the three forms of agreement verbs. It is common for children to produce bare or infinitive forms before they try to use marked forms (See Chapter 1). Similarly, CC's use of unmarked agreement verbs precedes the verb forms which are marked for spatial locations and for verb agreement, as shown in the following figure:



A developmental sequence from unmarked agreement verbs to spatially-marked agreement verbs and finally to marked agreement verbs can be seen from Figure 6.2. Agreement verbs remain bare until age 2;1.9 where the first spatially-marked verb is observed. This type of verbs occurs more often since age 3. The first clear use of marked agreement verbs is observed at age 3;4.13. Agreement markings are produced more since age 4, however they remain rare.[8] Recall that HKSL agreement verbs may be marked for subject-verb agreement or both subject-verb and verb-object agreement. Meisel and Ezeizabarrena (1996) observe a developmental sequence from subject-verb agreement, to verb-direct-object agreement and finally to verb-indirect-object agreement in acquisition of verb agreement in Basque (See Chapter 1). Meier (1982), on the other hand, reports that children tend to agree more often with one argument than two in the acquisition of verb agreement in ASL (See

[8] Further discussion on the late emergence on agreement markings will be given in Section 6.4.

Chapter 4).[9] While HKSL data conforms to Meier's observation, Meisel and Ezeizabarrena's findings are not observed in HKSL:

Table 6.6 Emergence of Agreement Markings with Subjects, Direct Objects and Indirect Objects

With Subject and Object		With Direct Object		With Indirect Object	
3;11.26	1	3;4.13	1	3;5.23	1
4;5.3	5	3;11.26	1	4;2.25	2
4;6.21	4	4;1.27	2	4;3.22	1
		4;3.22	3		
		4;4.13	1		
		4;6.21	1		
Total	**10**	**Total**	**9**	**Total**	**4**

Table 6.6 lists all tokens of verb agreement in CC's utterances. Unlike Basque children, CC produces agreement markings first with direct object, followed by indirect object. Agreement markings with both subject and object only appear few months later (i.e. age 3;11.26). Meisel and Ezeizabarrena's generalization therefore does not hold in HKSL. Deen (2004) observes that Swahili object agreement is acquired extremely early (at age 1;10) while subject agreement is omitted more often. He explains that this phenomenon is related to omission of subject agreement in certain contexts in the non-standard dialect of Swahili. Similarly, agreement verbs are largely marked for verb-object agreement in adult HKSL. The child data in HKSL demonstrates optionality of verb agreement, a property which is also present in the adult grammar.

Consider agreement verbs which are marked for spatial locations more closely. Whether the referents are present or assigned to spatial loci in previous signing

[9] Since the major goal of Meier is to test whether iconicity plays a role in acquisition of verb agreement in ASL, he does not list the developmental sequence on singly agreement and doubly agreement explicitly. From the figures shown in his work, both types of agreement are observed from age 2;8.

determines whether agreement verbs are spatially-marked in adult grammar (See Chapter 2). The data from CC shows that directing to real referents is also optional in child language. Consider the following table:

Table 6.7 Forms of Agreement Verbs and ±Real Referents[10]

	Unmarked		Marked for Spatial Locations		Marked for Verb Agreement	
+Real Referents	221/378	(58.47%)	143/378	(37.83%)	14/378	(3.70%)
–Real Referents	58/77	(75.32%)	10/77	(12.99%)	9/77	(11.69%)

Table 6.7 illustrates the distribution of the three forms of agreement verbs when the referents are present or absent at the time of signing. Note that I take a broader sense of +Real Referents. Not only actual object/person is counted as +Real Referents, the presence of story books is also noted +Real Referents as CC often refers to book characters. With +Real Referents, unmarked agreement verbs constitute the majority of agreement verbs CC produced. A handful of them are marked for spatial locations and very few of them are marked for verb agreement. One may question why the verbs are marked for verb agreement but not for spatial locations under the context with +Real Referents. Role shift may occur with +Real Referents where the referents are the books. It is assumed that the directionality associated with agreement verbs under such context is viewed as an example of genuine verb agreement, as shown in the following example:

[10] The data presented in this table excludes 5 tokens of agreement verbs as the referents of these agreement verbs cannot be identified from the videos.

(4) Context: CC was asked to tell a story about how a group of rabbits prepared a birthday party for a wolf.

ht$_i$
eg$_i$
RABBIT SEE$_{3i}$.
'The rabbit sees (the wolf).' (3;4.13)

When CC produces example (4), the researcher holds a story book which CC refers to (i.e. +Real Referents). CC first gazes at the book when he signs *RABBIT*, then he assumes the role of *RABBIT* (marked by head tilt (ht) and eye gaze (eg) towards the locus-i) and signs the verb SEE$_{3i}$. Since the object 'wolf' is not established at locus-i earlier, this example is counted as an instance of marked agreement verbs.

−Real Referents, on the other hand, refer to the referents that are present at the time of signing. Many instances of −Real Referents are imagined referents which may or may not established in the previous contexts. Similar to the results with +Real Referents, most agreement verbs are unmarked, some are spatially-marked and few are marked under the context with −Real Referents. Note that spatially-marked agreement verbs are directed to an imagined location:

(5) INV: gesture [= get someone's attention] IX-2p
$_{2m}$**TELL$_{3i}$** MOTHER IX-2p WANT_1 SIT
PLANE. IX-2p $_{2m}$**TELL$_{3i}$** MOTHER CAN.
'hey, (you) tell your mother that you want to take the plane. You can tell your mother.'

CHI: **TELL$_a$** IX-1p^LIKE **TELL$_a$** PLANE.
'Tell her that I like plane.' (3;3.29)

In example (5) the adult $_{2m}$*TELL$_{3i}$* and CC's *TELL$_a$* share the same direction (locus-3i = locus-a). CC's use of *TELL$_a$* echoes the directionality for a third person object in the

adult form. This instance is viewed as an example of a spatially-marked agreement because the verb directs towards a previously-established locus.

Comparing the results with +Real Referents (58.47%) and −Real Referents (75.32%), the percentage of unmarked agreement verbs is higher with −Real Referents. More spatially-marked agreement verbs occur with +Real Referents (37.83%) than with −Real Referents (12.99%). Marked agreement verbs, however, do not seem to correlate with the presence/absence of real referents. What Table 6.7 shows is CC has some sense on the correlation between real referents and spatially-marked agreement verbs.

Consider CC's marked agreement verbs more closely, they are rarely produced. I have mentioned in earlier chapters that agreement verbs are optionally marked in HKSL except when the subject is second person or when the object is first person. In Chapter 4 I have mentioned that children acquiring ASL do better under obligatory contexts in an experiment. Tang et al. (2006) also report that more instances of marked form of *GIVE* are observed under obligatory contexts. If CC produces marked agreement verbs under obligatory contexts, it can be concluded that he has acquired verb agreement in HKSL, even though few tokens of marked agreement verbs are observed. Totally 40 tokens of agreement verbs occur in the obligatory contexts. The distribution of the different forms of agreement verbs is given below:

Table 6.8 Forms of CC's Agreement Verbs in Obligatory Contexts[11]

Obligatory Contexts	Unmarked		Marked for Spatial Locations		Marked for Verb Agreement	
S (2^{nd}) V O (1^{st})	10/16	(62.50%)	5/16	(31.25%)	1/16	(6.25%)
S (2^{nd}) V O (3^{rd})	4/18	(22.22%)	14/18	(77.78%)	0/18	(0.00%)
S (3^{rd}) V O (1^{st})	5/6	(83.33%)	1/6	(16.67%)	0/6	(0.00%)
Total	**19/40**	**(47.50%)**	**20/40**	**(50.00%)**	**1/40**	**(2.50%)**

The rate of unmarked and spatially-marked agreement verbs is as high as 97.5% (39/40).[12] This rate is much higher than that observed from both signed and spoken languages. Children acquiring ASL as their first language from birth rarely produce unmarked agreement verbs when the contexts require obligatory agreement (Berk 2003, Quadros and Lillo-Martin 2007).[13] The rate in child Italian, Spanish, Catalan and Japanese is less than 5% (See Pizzuto and Caselli 1992 for Italian, Torrens 1995 for Catalan and Spanish and Sugisaki 2007 for Japanese). In child English the rate of inappropriately inflected verb forms is around 40-60% (Brown 1973). Though the rate is a bit higher in child language, it is still much lower than what we have observed in child HKSL. The only correct instance of marked agreement verb occurs with second person subject and first person object:

[11] The person values of the subject S and the object O are expressed as (1^{st}), (2^{nd}) and (3^{rd}) (i.e. first person, second person and third person).
[12] The rate is still as high as 47.5% (19/40) if one follows Meier (1982) to include agreement verbs which are marked for spatial locations as a kind of verb agreement.
[13] Different studies report different ages at which verb agreement is acquired. Meier (1982) reports that children acquiring ASL master verb agreement around age 3;0. Quadros and Lillo-Martin (2007) report an earlier age (before age 2) when a different definition of obligatory agreement is used.

(6) Context: CC told a story in which a monkey asked his mother for a box of matches.

IX-obj MONKEY IX-obj,
(assume the role of the monkey)
CAN MATCHES **GIVE$_{1o}$**,
(assume the role of the monkey's mother)
CANNOT, NOT, FIRE.
'This (picture), monkey, this (picture), can you give me the matches, no, no, (it would cause) fire.' (4;2.25)

The verb *GIVE* in example (6) is marked for verb-object agreement. This is the only instance where CC uses a marked form of agreement verbs in obligatory context. The other 38 verbs are either unmarked or spatially-marked:

(7) a. Context: CC wanted to open the door of a room. But he was not tall enough to use the key to open the door. He asked Gladys for help.

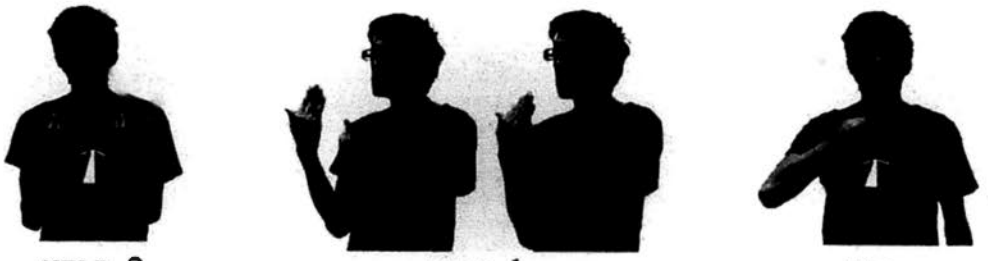
IX-2p GLADYS **HELP_2** GLADYS KEY **HELP_1**.
'You, Gladys help (me), Gladys helps (me to open the door) with the key.' (3;9.24)

b. CC lay on the Deaf researchers' laps.

NOT HIT$_a$.
'(You) do not hit (me).' (3;1.15)

When the subject is second person and the object is first person, adult verb forms must be marked for verb agreement (See Figure 6.3).

Figure 6.3 Marked Forms of *HELP_2*, *HELP_1* and *HIT* in Adult HKSL



$_2$HELP_2$_1$ $_2$HELP_1$_1$ $_2$HIT$_1$

Example (7) shows that CC uses either unmarked verb form (i.e. *HELP_1* and *HELP_2* (7a)) or a spatially-marked form (*HIT*$_a$ in (7b)) under the obligatory context (i.e. second person subject and first person object). The high error rate shown above echoes with the results on late learners acquiring ASL. Berk (2003) and Berk and Lillo-Martin (in prep) point out that native-signing children rarely make omission or commission errors while late learners produce many errors with person agreeing verbs. Berk also reports that the verb agreement errors with all verb types range from 2% to 11.1%. When only agreement verbs are considered, the correct rate ranges from 13.33 to 47.37% for one late learner and from 0 to 40% for another late learner in Berk's study.[14] Notice that Berk has used a different method in counting the number of agreement verbs. The number of agreement verbs marked for spatial locations in the current study may be treated as tokens of spatial verbs in her study. If I follow her method, the 20 instances of spatially-marked agreement verbs may be treated as spatial verbs. If we put aside these instances, we can say the 20 agreement verbs are either marked or unmarked. 95% (19/20) of them are not correctly used. The rate is close to one of the late learner reported in Berk's work. This seems to suggest that CC's production of agreement verbs is affected by delayed input, though the input is available at a much earlier age than children studied by Berk. The fact

[14] Berk has given the raw score on the number of correct use and total number of agreement verbs in Appendix B in her work. I have counted the correct rate by dividing the number of correct use by the total number of agreement verbs in order to compare her results with the results I have got from CC.

that HKSL shows a higher degree of optionality may also explain the higher error rate on verb agreement in the early HKSL. As noted in Chapter 2, ASL allows omission of subject-verb agreement when the subject is third person. HKSL, however, allows greater degree of omission as agreement markings can be omitted unless the subject is second person or when the object is first person. So optionality in the adult grammar may be an alternative explanation to the results. I will illustrate this point further under the context of input ambiguity in Section 6.4.

Marked, unmarked and spatially-marked agreement verbs are exemplified by different verbs in examples (6) and (7) above. A question arises is whether certain verbs are always marked for verb agreement while others are always unmarked or spatially-marked under the obligatory contexts. Consider the following table:

Table 6.9 List of CC's Agreement Verbs observed under Obligatory Contexts

Verbs	Unmarked	Marked for Spatial Locations	Marked for Verb Agreement
BITE	100.00% (1/1)	0.00% (0/1)	0.00% (0/1)
CATCH	0.00% (0/1)	100.00% (1/1)	0.00% (0/1)
GIVE	33.33% (3/9)	55.56% (5/9)	11.11% (1/9)
HELP_1	100.00% (3/3)	0.00% (0/3)	0.00% (0/3)
HELP_2	100.00% (1/1)	0.00% (0/1)	0.00% (0/1)
HIT	0.00% (0/1)	100.00% (1/1)	0.00% (0/1)
SAY	100.00% (3/3)	0.00% (0/3)	0.00% (0/3)
SEE	42.86% (3/7)	57.14% (4/7)	0.00% (0/7)
TAKE	27.27% (3/11)	72.73% (8/11)	0.00% (0/11)
TEACH	100.00% (2/2)	0.00% (0/2)	0.00% (0/2)
TELL	0.00% (0/1)	100.00% (1/1)	0.00% (0/1)

Table 6.9 gives a list of agreement verbs produced by CC under the obligatory contexts. Totally 11 agreement verbs are observed when the subject is second person and/or when the object is first person. While the verbs *BITE*, *HELP_1*, *HELP_2*, *SAY* and

TEACH are unmarked in all instances under the obligatory contexts, the verbs *CATCH, HIT* and *TELL* are always spatially-marked. This seems to suggest that CC treats these verbs as plain verbs or spatial verbs instead of agreement verbs. When utterances that occur under optional contexts are considered, only few of these verbs (*HELP, SAY* and *TEACH*) are unmarked in all instances. The remaining verbs may be unmarked, marked for spatial locations or verb agreement. The verbs *HELP, SAY* and *TEACH* may be treated differently in child HKSL. The fact that other verbs may appear in different forms under both obligatory and optional contexts shows that CC has the concept of different verb types in HKSL. He just cannot distinguish obligatory and optional contexts.

One may question whether the unmarked verb forms are associated with ±Real Referents. Unmarked agreement verbs may also occur with −Real Referents:

(8) Context: The investigator asked if CC would cry when his mother took him to a shower.

IX-det MOTHER HELP_1 (IX-1p).
'Mother helps (me)' (3;8.19)

Example (8) is an instance with -Real Referents and obligatory context (i.e. third person subject and first person object). When the referent of the subject *IX-det MOTHER* in example (8) is absent at the time of signing, CC still uses an unmarked agreement verb *HELP_1*. The absence of real referents is not related to overt agreement markings in child language. The result is different from Tang et al. (2006). Given the fact that Tang et al. (2006) examines the verb *GIVE* till 5;7.20, it is possible that agreement markings are acquired between the period from age 4;7 to 5;7.

In sum, different forms of agreement verbs are observed. Very few marked agreement verbs are produced regardless of whether the referents are present or imagined. Only one marked agreement verb is observed in the obligatory context. This suggests that the child language may not distinguish obligatory and optional contexts for verb agreement.

6.2.1.2 Spatial Verbs

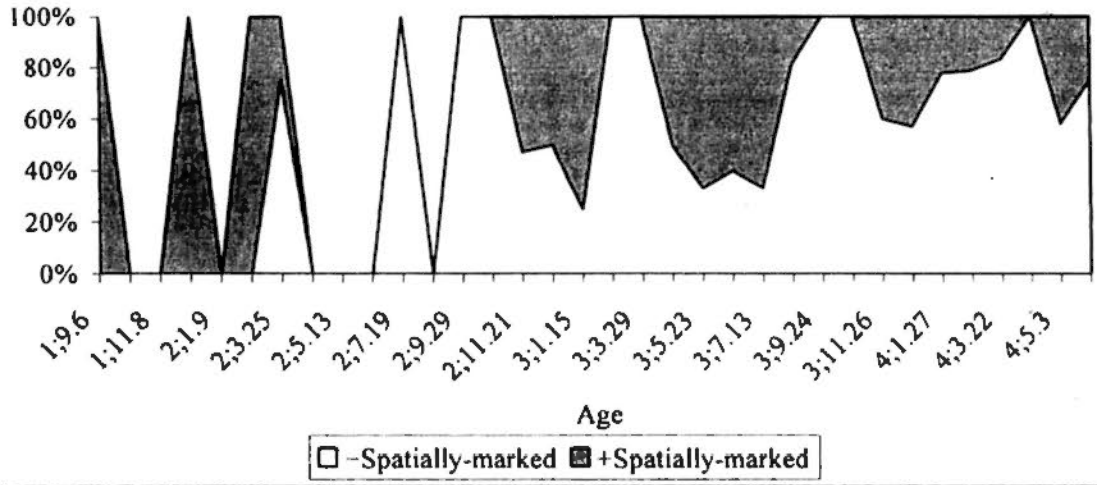
204 tokens of spatial verbs are observed. Similar to what is observed from agreement verbs, bare spatial verbs outnumber those which are marked for spatial locations:

Table 6.10 Forms of Spatial Verbs Produced by CC

Forms of Spatial Verbs	Number of Tokens
+Spatially-marked	68/204 (33.33%)
−Spatially-marked	136/204 (66.67%)

Bare spatial verbs (i.e. −spatially-marked) take up a greater proportion of the total number of spatial verbs produced by CC. In adult grammar spatial verbs may or may not express spatial locations of the referents via the signing space. It follows that the absence of marking spatial locations by spatial verbs does not necessarily reflect the absence of spatial property of spatial verbs in child language. On the contrary, the presence of spatial markings reveals the presence of such property. In addition, if the spatial property of spatial verbs is present in the child language, the verb types in child language may be similar to the adult one. Consider the following figure:

Figure 6.4 Distribution of Different Forms of Spatial Verbs



Two stages can be identified from the development of spatial verbs. From age 1;9.6 to age 2;2;0, all the spatial verbs CC produced are spatially-marked. So spatial verbs that are −spatially-marked do not appear before those what are +spatially-marked.[15] Starting from age 2;3.25, spatial verbs which are not spatially-marked are observed. After a gap where no spatial verbs are identified (from age 2;4.23 to age 2;6.17), CC uses −spatially-marked spatial verbs more often than +spatially-marked spatial verbs. The following examples exemplify spatial verbs observed in these two stages:

(9) Context: CC turned to face the TV.

PRESS$_a$.
'Press (the button of the TV).' (2;2.0)

[15] This result may be surprising when one expects that spatial verbs that are -spatially-marked appear earlier. The fact that they do not may be due to the fact that location marking is an inherent property of spatial verbs.

(10) a. Context: CC saw that a researcher ducked to avoid the DV-camcorder in the video-taping session.

gesture [= get someone's attention]
gesture [= get someone's attention] IX-2p
WASH-HANDS IX-2p **CLIMB$_a$** STINK.
'Hey, hey, you should wash your hands. You crawl on the floor. (Your hands) stink.' (2;11.21)

b. Context: The investigator asked CC to look at her new camera.

HOME IX-obj HAVE$_{exist}$ **PUT** IX-loc IX-loc HAVE$_{loc/exist}$
BIG.
'Home, that, has placed there, there is a big (camera).' (4;0.23)

Example (9) shows a spatial verb directed to the actual location of the referent in the first stage. Example (10), on the other hand, lists two examples of spatial verbs in the second stage. Spatial verb *CLIMB* in example (10a) is directed towards the location where the researcher ducks. In example (10b) the spatial verb *PUT* is not spatially-marked. This verb occurs with index signs which point at the actual location of the camcorder (i.e. *IX-loc*). One may suggest that CC uses locative index signs as an avoidance strategy for using spatially-marked spatial verbs. However, only 4 tokens of spatial verbs occur with locative index signs and 3 of them show spatial locations. See the following example:

(11) Context: CC saw that Gladys ducked to avoid blocking the DV-camcorder in the video-taping session.

DH: IX-loc CLIMB$_a$ NOT.
NDH: IX-loc
'Don't climb there.' (2;11.21)

Example (11) illustrates that there is no direct relation between the presence of locative index signs and spatial verbs which show spatial locations.

Recall that the presence/absence of real referents correlates with spatial markings of agreement verbs. I have noted that previous studies in classifier predicates explore the developmental sequence of different classifier handshapes. A consideration of classifier handshapes in CC's classifier predicates allows one to compare the findings in other studies. Consider Table 6.11 below:

Table 6.11 Forms of Spatial Verbs and ±Real Referents[16]

	+Spatially-marked	−Spatially-marked
+Real Referents	66/172 (38.37%)	106/172 (61.63%)
−Real Referents	2/22 (9.09%)	20/22 (90.91%)

Table 6.11 shows the distribution of +spatially-marked spatial verbs and –spatially-marked spatial verbs under the contexts with +Real Referents and with –Real Referents. Most spatial verbs are not spatially-marked in both contexts. Considering the two groups of spatial verbs that are +spatially-marked, the percentage of the group with real referents (38.37%) is much higher than that of the group without real referents (9.09%), suggesting a tendency of expressing spatial locations with +Real Referents than with −Real Referents. This finding is similar to that on agreement verbs. I will consider the results on spatial verbs and agreement verbs further in Section 6.3 below.

6.2.1.3 Classifier Predicates

Table 6.4 shows 354 tokens of classifier predicates are observed. Most of these (88.70%) involve one classifier handshape. Other classifier predicates are formed

[16] 10 tokens are excluded because the referents cannot be identified.

from (i) two classifier handshapes (3.97%) or (ii) one classifier handshape and CC's body (7.34%). Examples of these three groups of classifier predicates are listed in (12) below:

(12) a. ***One Classifier Handshape***
Context: CC told the investigator how he was punished by his grandmother.

IX-1p **CL:HIT_WITH_A_HANGER** TAKE$_a$ HANGER 
TAKE$_a$ **CL:HIT_WITH_A_HANGER.**
'I, (grandma) hits with a hanger, (she) takes a
hanger, she takes (it) and hits (me) with a hanger.' (3;2.24)

b. ***Two Classifier Handshapes***
Context: CC was asked to describe an episode in a story.

IX-obj MOTHER WALK 
CL:PUT_A_BOX_OF_CANDIES_INTO_A_CUPBOARD
IX-obj CANDY SECRET.
'This [i.e. picture], Mother walks and (she) puts
a box of candies into the cupboard secretly.' (3;2.24)

c. ***One Classifier Handshape and Body***
Context: CC told a story about how a prince two book characters.

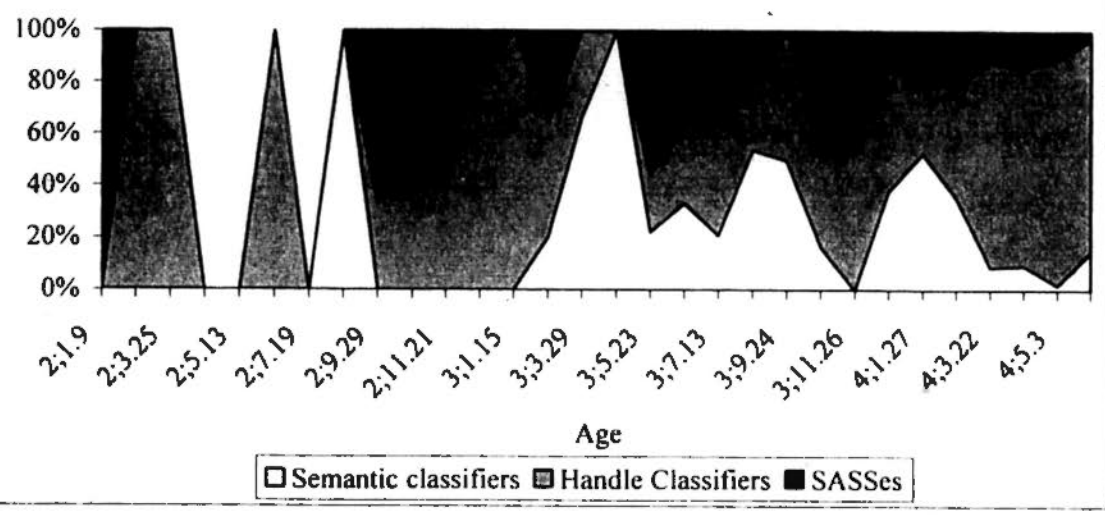
PRINCE, CL:SWORD, gesture [= hit with a sword]. 
IX-obj IX-obj TWO DIE.
CL:STAB_THE_BODY_WITH_A_SWORD DIE
BLEED@c.
'The Prince, a sword, (the Prince) hits with a sword,
this and this, two of them die, the sword hits into the
body, it bleeds.' (4;6.21)

Example (12) illustrates three possible combinations of the verb root and classifier handshapes in CC's classifier predicates. The verb root 'hit' in example (12a) is

combined with a handle classifier (i.e. handling a cylindrical object) to form a classifier predicate which means 'hit with a hanger'. This type of classifier predicates is the commonest type observed. On the other hand, a verb root may be combined with two classifier handshapes, each denoting an argument. The verb root in example (12b), for instance, is combined with two classifier handshapes, a handle classifier handshape which denotes the handle of a cupboard and a SASS for a box of candies.[17] CC also uses his body as part of the classifier predicates. In (12c), a handle classifier for cylindrical object means holding a sword. The body shows the goal of the action of 'stab'.

Recall that classifier handshapes are classified into three groups in this study: semantic classifiers, handle classifiers and SASSes. CC produces all kinds of classifier handshapes. Consider the following figure:

Figure 6.5 Distribution of Different Classifier Handshapes



[17] This example shows an error on the choice of classifier handshape here. Instead of using SASS for 3D object, he uses SASS for flat object in this example. I will return to the errors observed in CC classifier predicates shortly below.

Figure 6.5 shows the proportion of the three types of classifier handshapes in each session. Generally speaking, handle classifiers and SASSes occur much more frequently than semantic classifiers. Handle classifiers and SASSes are also observed much earlier than semantic classifiers. Consider the following example:

(13) a. ***Semantic Classifier***
Context: CC told a story about a monkey.

IX-obj **CL:AN_ANIMATE_ENTITY_WALK**
gesture [= walk like a monkey]
CL:AN_ANIMATE_ENTITY_WALK.
'This (picture), (the monkey) walks, walks.' (3:2.24)

b. ***Handle Classifier***
Context: CC was shown a picture in which a child blew bubbles with a bubble blower.

IX-obj **CL:BLOW_BUBBLES.**
'This, blow bubbles.' (2;2.0)

c. ***SASS***
Context: CC saw that the investigator closed an umbrella.

CL:CLOSE_AN_UMBRELLA@c.
'Close the umbrella.' (2;1.9)

Example (13) shows three kinds of classifier handshapes produced by CC. At age 2;1.9, CC produces a child-invented classifier predicate *CL:CLOSE_AN_UMBRELLA@c* which consists of a SASS which would otherwise be a two-handed sign with S-handshape () in adult grammar (i.e. (13c)).[18] The first target-like classifier predicate which contains SASS is exemplified by *CL:FLIP_OPEN_THE_GATEFOLD* at

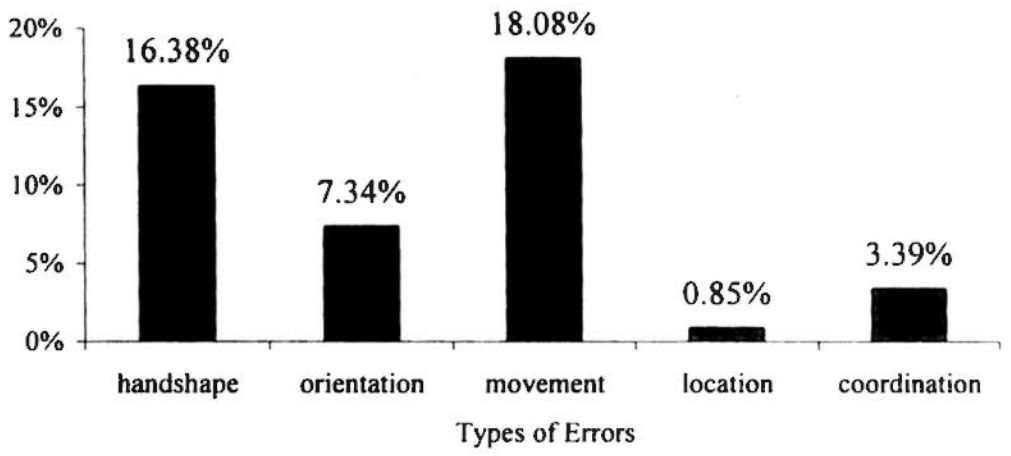
[18] Video clips are available upon request. See the video clip ad_umbrella.mpg for an illustration of an adult utterance *UMBRELLA CLOSE_AN_UMBRELLA* 'close an umbrella'.

age 2;9.29. The first handle classifier is observed at age 2;2.0, as shown in example (13b). CC produces a handle classifier for handling a long and flat object to represent the holding of a bubble blower, though the handshape is slightly deviant from the adult one. The first semantic classifier emerges much later at age 2;8.18 where CC produces a classifier predicate *CL:A PLANE_FLIES* when the researcher teaches him to sign the noun *PLANE*.[19] Another example of early use of semantic classifier is exemplified by example (13a) where CC correctly uses the classifier handshape for legged animate entity. Taken together, both handle classifiers and SASSes emerge earlier than semantic classifiers. This finding conforms to Schick's results with respect to adult-like production (See Chapter 4). But it is slightly different from the experimental study on late learners of HKSL in which semantic classifiers are mastered earlier than SASSes (Tang, Sze and Lam 2007). The age when the deaf children are exposed to HKSL may explain the discrepancy in results from the longitudinal and experimental data. 13/14 deaf students in the experimental study were born to hearing parents. The mean age of first contact of HKSL is 6. This is an age much later than CC's age of first contact of HKSL (which is at age 1;9). So the different developmental patterns in the two studies may be resulted from the different times when the children are exposed to HKSL. Note that semantic classifiers emerge later than other classifier handshapes. One possible explanation to this question is that many semantic classifiers share the same handshape with lexical signs in adult grammar. CC may be confused by the input data. I will discuss this issue further in Section 6.4.

[19] One may question why *CL:A_PLANE_FLIES* is not a lexical noun given the fact that CC produces it under a noun context. CC displaces the handshape in space such that a prolonged path movement is involved in articulating *CL:A_PLANE_FLIES*.. The orientation is also sideward rather than forward as in the lexical sign *PLANE*. All native Deaf researchers consider these properties as those of a classifier predicate instead of a lexical sign. See the video clip ad_plane.mpg for an illustration of adult form of *PLANE*.

In Chapter 4 I have reviewed the findings on classifier predicates in other signed languages. A number of errors on the form of classifier predicates are reported. Overall few errors are observed from CC's classifier predicates, as illustrated in the following figure:[20]

Figure 6.6 Errors on CC's Classifier Predicates



Handshape and movement are the most common errors. Given the fact that few classifier predicates contain two classifier handshapes, the coordination error is low. Substitution errors are also observed in CC's classifier predicates. Totally 5 instances of misuse of the types of classifier handshapes are found, as shown in the following table:

[20] Handshape, orientation, movement and location are phonological parameters which characterize the formation of a sign. Coordination refers to the locative placement on classifier predicates with two classifier handshapes.

Table 6.12 CC's Substitution of Types of Classifier Handshapes

no.	CC's utterances	Age	Child Classifier Handshapes	Adult Classifier Handshapes
(1)	CL:PULL_DOWN_THE_VISOR, MOTORCYCYLE. '(I) pull down the visor (of a helmet), (I) ride the motorcycle.'	3:7.13	*Handle* S-handshape 	*SASS* Whs-handshape 
(2a)	IX-3p KENNY PUT$_a$ CL:PHONE_FALL, OUT-OF-ORDER [*] gesture [= reprimand]. 'He Kenny puts the phone there, the phone falls and becomes out of order.'	3;7.13	*SASS* Whs-handshape	*Semantic* F̂-handshape
(2b)	CL:PHONE_DROPS, TELEPHONE CL:PHONE_DROPS, IX-obj DROP CL:PHONE_DROPS IX-loc. 'A telephone drops, telephone drops, it drop, the telephone drops there.'	3;7.13	*SASS* Whs-handshape 	*Semantic* F̂-handshape 
(2c)	CHANGE [*] CL:TORTOISE_FALL_DOWN. 'The tortoise falls down.'	3:11.26	*SASS* C-handshape 	*Semantic* F̂-handshape
(3)	&HOME CL:LEGGED_PERSON_STAND gesture [= stand]. '(the books) stands.'	4;2.25	Semantic V-handshape 	SASS B̂-handshape 

Table 6.12 lists the 5 tokens where CC uses a different type of classifier handshape. CC may substitute a SASS with a handle classifier (i.e. (1)), or a semantic classifier with a SASS (i.e. (2a), (2b), (2c)), or a SASS with a semantic classifier (i.e. (3)). No other tokens of similar substitution are observed. Given the small number of tokens of this kind of substitution error, I have no reason to claim that CC has difficulty in choosing the right classifier handshape to form a classifier predicate with the verb root. It has been reported that different classifier handshapes are associated with different argument structures in ASL (See Chapter 3). An immediate question is whether the substitution errors listed in Table 6.12 reflect the argument structures of

classifier predicates in child language. In Chapter 3 I have mentioned that SASSes and handle classifiers differ in that the latter requires a volitional agent. The substitution errors shown in (1) of Table 6.12 may suggest what is intransitive in adult grammar is transitive in child language. It has been reported that children use intransitive verbs as if they are transitive (cf. Bowerman 1974, 1983). Alternating the classifier handshape may be related to acquisition of verb argument structure. However, since the classifier predicate in (1) of Table 6.12 only shows up for once, it is not entirely clear whether CC assumes a different argument structure by using a handle classifier. The substitution of a semantic classifier with a SASS and a SASS with a semantic classifier in (2) and (3) of Table 6.12, however, is not related to alternation of argument structures as the change in classifier handshapes does not necessarily lead to a change in the verb's transitivity.

Recall that the semantic classifiers, handle classifiers and SASSes have a number of different handshapes which correspond to the semantic properties of the referents. Semantic classifiers for vehicles and for animate entities, for instance, are represented by different handshapes (ĥ-handshape () for animate entities and Wc-handshape () for vehicles) respectively. CC does not seem to have any difficulty in choosing the right classifier handshape on the whole, except in the following example:

(14) Context: CC was asked to describe an episode in a story.

IX-obj MOTHER WALK
CL:PUT_A_BOX_OF_CANDIES_INTO_A_CUPBOARD
IX-obj CANDY SECRET.
'This [i.e. picture], Mother walks and (she) puts the box of candies into the cupboard secretly.' (3;2.24)

Example (14), repeated from example (12b) above, shows that CC may be confused with the dimensional properties of SASS for 'the box of candies'. Instead of using a handshape of a 3D object, CC has used a classifier handshape for a flat object here, showing that he may not be familiar with the class of SASS handshapes. On the whole, CC produces few errors on classifier predicates with respect to the phonological configuration of classifier predicates and cross-type and within-type classifier handshapes.

In Chapter 2 I have mentioned that all the phonological parameters of a classifier predicate are morphemic. Recall that the location of agreement verbs and spatial verbs is also morphemic in the sense that the location reflects agreement markings or location markings. Location of a classifier predicate may refer to a goal argument or a locative adjunct, depending on the verb argument structure of the verb root. A question arises at this point is whether CC's classifier predicates reflect his knowledge of the morphemic nature of location. Most CC's classifier predicates (217/276) do not have morphemic location and they are articulated in the neutral space. Few of them (59/276) involve either actual location or imagined location.[21] Consider the following example:

(15) Context: Some soya milk was split on the floor.

IX-loc CL:WIPE_WITH_A_CLOTH IX-loc.
'There, clean there.' (3;0.13)

[21] The major goal of discussing morphemic location of classifier predicates in this section is to lay the foundation of our discussion on the use of space in Section 6.3. In Chapter 2 I have mentioned that morphemic locations of classifier predicates may be signer's body, nondominant hand or spatial loci. The first two kinds of morphemic locations involve physical objects (the body and the hand). These two kinds of morphemic locations are different from those associated with agreement verbs and spatial verbs. Hence, classifier predicates which involve body (43/354) and non-dominant hand (35/354) are excluded in the discussion on morphemic location in order to ensure that the same kind of use of space shown by different verb types is studied.

(16) a. Context: CC read a book with a researcher.

CL:FLIP_OPEN_THE_GATEFOLD$_{\text{on the book}}$.
'Flip open the gatefold here.' (2;9.29)

b. Context: CC told a story in which a monkey mother taught a little monkey not to draw on the wall.

CL:DRAW_ON_WALL NOT.
'Do not draw on the wall.' (2;11.21)

Examples (15) and (16) illustrate non-morphemic location and morphemic location of classifier predicates respectively. In example (15) the location of the classifier predicate is neutral *CL:WIPE_WITH_A_CLOTH*. The presence of a locative index (i.e. *IX-loc*) suggests that the linguistic use of space is also present in child language. Only that the space is not expressed by the classifier predicates. However, example (16) shows that space is linked up with the early classifier predicates. In example (16a) CC articulates a SASS classifier predicate *CL:FLIP_OPEN_THE_GATEFOLD* at an actual location (i.e. a book). The location of a classifier predicate *CL_DRAW_ON_WALL*, on the other hand, refers to 'the wall' in example (16b). Note that early handle classifier predicates are highly gestural. Tang, Sze and Lam(2007) argue that semantic classifiers function as triggers for children to reanalyze the handshape component from a phonological unit to a morphological one because semantic classifiers refer to generic classes. If only semantic classifier predicates are genuine early classifier predicates in the child grammar, a question follows is whether semantic classifier predicates contain morphemic location. The following example shows the morphemic location of CC's semantic classifier predicates:

(17) a. Context: CC was playing some toys.

CL:CLIMB_UP_A_LADDER.
'(A minifigure) climbs up a ladder.' (3;3.29)

b. Context: CC told a story about how a group of rabbits prepared a birthday party for a wolf.

CL:A_WOLF_SLIP_DOWN_ON_THE_FLOOR.
'(A wolf) slips down on the floor.' (3;4.13)

While example (17a) involves an actual location, the classifier predicate in example (17b) contains an imagined location for the place where a wolf slips down. This shows that CC has some sense of using space with classifier predicates.

In the discussion of agreement and spatial verbs, I have explored the relation between ±Real Referents and agreement markings/location markings. A related question is whether ±Real Referents is related to CC's use of morphemic location of a classifier predicate. See Table 6.13 below:

Table 6.13 ±Real Referents and ±Morphemic Location of Early Classifier Predicates[22]

	+Real Referents				**−Real Referents**			
	+Morphemic Loc		−Morphemic Loc		+Morphemic Loc		−Morphemic Loc	
Semantic	13/64	(20.31%)	51/64	(79.69%)	5/19	(26.32%)	14/19	(73.68%)
Handle	18/123	(14.63%)	105/123	(85.37%)	11/30	(36.67%)	19/30	(63.33%)
SASS	8/32	(25.00%)	24/32	(75.00%)	2/6	(33.33%)	4/6	(66.67%)
Total	**39/219**	**(17.81%)**	**180/219**	**(82.19%)**	**18/55**	**(32.73%)**	**37/55**	**(67.27%)**

Table 6.13 shows the use of morphemic location in different classifier predicates under the contexts with +Real Referents and with −Real Referents. In both contexts,

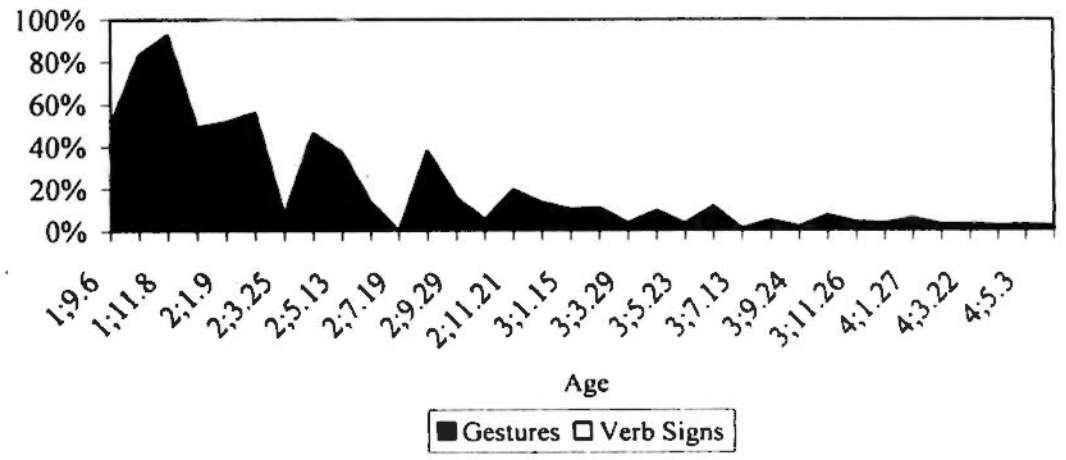
[22] Two tokens which do not show the use of space are excluded in this table because they have unknown referents.

classifier predicates which contain a neutral location (i.e. –morphemic location) outnumber those which show a morphemic use of location. This contrasts with the results from agreement verbs and spatial verbs.

6.2.2 Verbal Gestures

Unlike spoken languages, gestures and signs share the same modality. It is possible that CC could not distinguish the differences between gestures and signs initially. Hence it is worth considering his use of gestures. Figure 6.7 shows the distribution of verbal gestures and verb signs produced by CC.

Figure 6.7 Distribution of Verbal Gestures and Verb Signs



Totally 283 tokens of verbal gestures are observed from age 1;9.6 to 4;6.21. The number of verbal gestures is small in most sessions. The use of gestures increases over time, as shown in the following figure:

Figure 6.8 Verbal Gestures Produced by CC

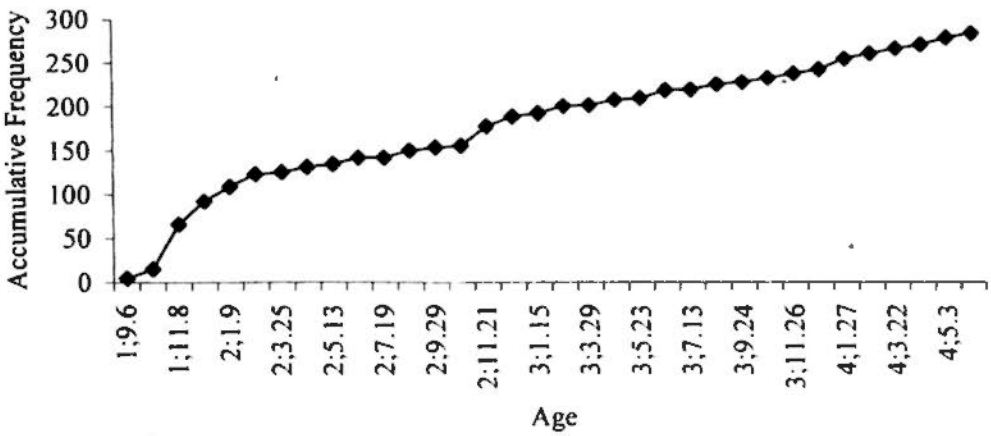


Figure 6.8 shows that a spurt of verbal gestures occurs at age 1;11.8 and then verbal gestures increase steadily over time. Most verbal gestures occur as main verbs in CC's utterances (80.65%). They may occur alone or with other arguments, as shown in the following examples:

(18) Context: CC wanted to get a toy from the Deaf researcher.

gesture [= give me].
'Give me (the toy).' (1;10.21)

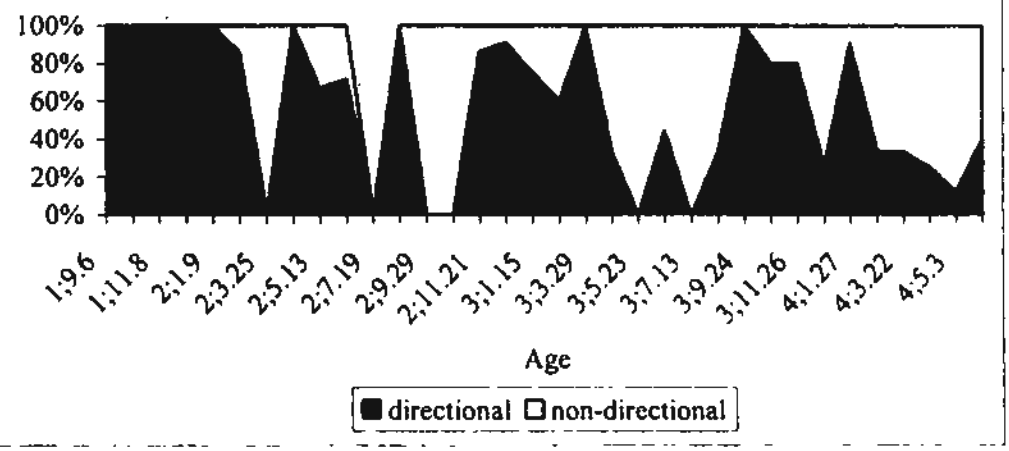
(19) a. FOOD gesture [= give me].
'Food, give me.' (1;11.8)

b. YOUNGER-SISTER gesture [= sleep]
gesture [= sleep].
'Younger-sister is sleeping, sleeping.' (2;2.0)

c. SELF IX-1p gesture [= put here].
'I put it here myself.' (4;1.27)

In example (18) the verbal gesture *gesture [= give me]* is similar to the conventional gesture *give-me* commonly produced by hearing children. 176 utterances which contain verbal gestures are like the one shown in example (18). A handful of utterances (46 tokens) contain verbal gestures and overt arguments. Example (19) provides few instances of this type of utterances. Note that example (19b), repeated from example (1b) in Chapter 5, demonstrates CC's use of a body-anchored verbal gesture while other examples show verbal gestures which involve use of space. In example (19a) CC direct the verbal gesture towards the addressee. In example (19b) he indicates the location by tapping on the sofa. In her study, Casey (2003) observes that deaf children acquiring ASL produce more directional gestures than non-directional gestures. If the unclear cases are put aside, totally 277 tokens of verbal gestures are divided into directional and non-directional gestures. 77.26% (214/277) are directional verbal gestures and 22.74% (63/277) are non-directional ones. The distribution of these two types of gestures is given below:

Figure 6.9 Distribution of Directional and Non-directional Verbal Gestures



Verbal gestures are always directional from age 1;9.6 to age 2;1.9. Non-directional verbal gestures emerge at age 2;2.0. The non-directional gestures are more frequently

observed then. The results given in Figure 6.9 are different from what Casey observes from children acquiring ASL. The mean percentage of directional gestures produced by deaf children acquiring ASL at each age ranges from 86.88 to 100%. The percentage of directional gestures produced by CC acquiring HKSL in each session ranges from 0% to 100%. A different pattern on the distribution of directional and non-directional gestures is observed in the current study.

Verbal gestures produced by CC may also occur with other verb signs which have the same meaning. Totally 9 utterances contain both verbal gestures and verb signs of the same meaning. See the example below:

(20) a. IX-1p IX-1p GIVE@f gesture [= give me].
'Me, me, give, give me.' (2;0.12)

b. BITE gesture [= bite] AFRAID PAINFUL, BLOOD.
'(The dog) bites, bites(the cat). (The cat) is afraid and painful. There's blood.' (4;6.21)

In example (20) CC produces both a verbal gesture and a verb sign for the same verb meaning (i.e. 'give' in (20a) and 'bite' in (20b)). 58 tokens of utterances involve co-occurrence of verb signs and verbal gestures. This type of utterances is observed from age 2;0.12. At age 4;6.21, the verbal gestures still occur. It is not surprising to see this result because native signers also insert gestures in their signing. What is more interesting is whether CC goes through a stage from using verbal gestures to verb signs.

In Chapter 4 I have introduced Petitto's (1986) acquisition study on gestures and pronouns in ASL. She observes that there is a discontinuity in the transition from gestures to signs because both children demonstrate an avoidance period between

ages of 12 and 18 months when they use proper nouns to refer to people and avoid the use of personal pronouns in this period. The relation between gestures and verb signs is another testing ground on whether signs are developed from gestures in the course of acquisition of signed languages. Casey suggests that directionality in verb signs emerges from directionality in gestures. But Quadros and Lillo-Martin (2007) claim that gestures are complementary to signs.

The verbal gestures and verb signs in early HKSL are also examined in order to find out whether verbal gestures may also function as placeholders of verb signs. 24 tokens of verbal gestures share the same meanings with the verb signs. The following table lists the verb meanings shared by CC's verbal gestures and verb signs:

Table 6.14 Verb Meanings shared by CC's Verbal Gestures and Verb Signs

'bite'	'fly'	'ride bicycle'	'swim'
'climb'	'give'	'run'	'take-eat'
'cry'	'hit'	'scold'	'think'
'die'	'jump'	'sit'	'turn over'
'drive'	'laugh'	'sleep'	'wait'
'eat'	'look for'	'stand'	'wash'

The distribution of the verbal gestures and verb signs listed in Table 6.14 is given below:

Figure 6.10 Verbal Gestures and Verb Signs with the Same Meaning

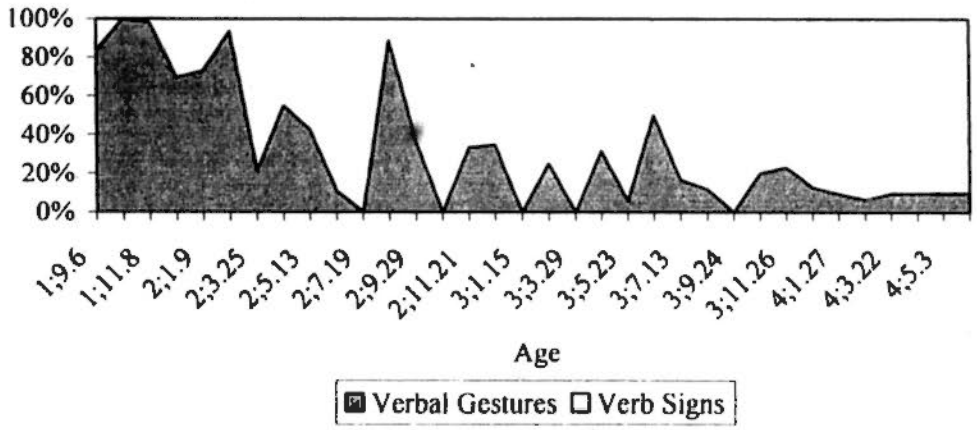


Figure 6.10 shows that verbal gestures cluster at the earlier ages while more and more verb signs are observed at later ages. When the 24 pairs of verbal gestures and verb signs are examined more closely, most verbal gestures (66.67%) appear after CC's first clear use of the corresponding verb signs. Only 8 verbal gestures (33.33%) appear before the respective verb signs (*cry, give, jump, look for, run, sit, take-eat, wash*). One can only conclude that a small set of gestures may function as the placeholders of the corresponding signs. The transition from gestures to signs seems to be an arbitrary process as the corresponding signs of the 8 verbal gestures listed above include both plain and non-plain verbs, transitive and intransitive verbs. Neither morphological properties nor verb semantics can explain why certain gestures serve as placeholders of certain signs while other gestures do not.

The distribution of directional and non-directional gestures and that of marked and unmarked non-plain verbs lend further support to the claim that gestures do not develop into signs. If the knowledge of directionality in gestures is transferred to that in verb signs, a higher percentage of marked non-plain verbs would be expected. The fact that the non-plain verbs are unmarked in most instances suggests that there is no

transition from gestures to signs. Note that Petitto's work examines data of younger children. It is possible that CC has already reached a stage when verbal gestures and verb signs co-occur and therefore the developmental sequence of the verbal gestures and verb signs cannot be seen clearly. Further research on younger children may shed light on this issue.

6.2.3 Verb-like Tokens

While the data shown above are grouped into different types according to the adult grammar, 87 verb-like tokens are indeterminate between gestures and signs. These tokens have the verb meanings below:

Table 6.15 Verb-like Tokens Produced by CC

'clean the hand'	1	'jump'	1	'support with the hands'	4
'close the door'	4	'put'	1	'tear'	5
'comfort'	1	'shoot'	67	'tie'	3

Table 6.15 lists the frequency of each verb-like tokens. Most verb-like tokens (83/87) are indeterminate between gestures and classifier predicates and few of them (4/87) are either imitation of the action shown on the story books ('clean the hand' and 'comfort') or mimes of real-world activities ('put' and 'jump'). The indeterminacy between classifier predicates and gestures in these tokens is due to the fact that classifier predicates and the corresponding gestures sometimes look the same. It follows that it is difficult to determine whether CC mimes or signs. Further research on phonological configuration may help to identify the difference between gestures and classifier predicates in HKSL.

6.2.4 Developmental Pattern of VERB

An overview on the early verbs produced by CC is given above. When the findings presented in the previous sections are put together, one can see different verb types appear at different times. The following table shows the age of the first clear use and age of repeated use of CC's early verbs counted on the basis of token frequency.

Table 6.16 First Clear Use and Repeated Use of Verb Signs and Verbal Gestures[23]

		Repeated Use	
	First Clear Use	Appeared 5 times	Appeared twice in one month
Verbal Gestures	1;9.6	1;9.6	1;9.6
Plain Verbs	1;9.6	2;0.12	2;0.12
Agreement Verbs			
Unmarked	1;9.6	1;11.8	1;9.6
Marked for spatial locations	2;1.9	2;3.25	2;1.9
Marked for verb agreement	3;4.13	4;1.27	3;11.26
Spatial Verbs			
+Spatially-marked	1;9.6	2;0.12	1;9.6
−Spatially-marked	2;3.25	2;7.19	2;3.25
Classifier Predicates			
Semantic	2;8.18	3;2.24	3;2.24
Handle	2;2.0	2;10.9	2;10.9
SASS	2;1.9	2;10.9	2;9.29

If only first clear use is concerned, unmarked agreement verbs, spatial verbs which are spatially-marked, plain verbs and verbal gestures emerge at the same time (age 1;9.6). This is followed by the emergence of spatially-marked agreement verbs and classifier predicates which contain SASSes. Classifier predicates with handle

[23] See Chapter 5 for the definition of repeated use.

classifiers appear soon after the emergence of SASS. Spatial verbs which are not spatially-marked are then observed.[24] Semantic classifiers appear next and finally marked agreement verbs are found. Semantic classifiers are viewed as triggers for reanalyzing a classifier handshape as a morphological unit (cf. Tang, Sze and Lam 2007). If this proposal is true, CC's classifier predicates which contain semantic classifiers are therefore genuine emergence of classifier predicates.[25] When the developmental sequence is determined on the basis of repeated use, the pattern is more or less the same except that –spatially-marked spatial verbs appear earlier than handle classifiers and SASSes. The developmental sequences defined by the two different measures are summarized below:

[24] I have shown that spatial verbs that are +spatially-marked appear earlier than those which are –spatially-marked. Assuming this phenomenon is due to the fact that location marking is an inherent property of spatial verbs, CC begins to produce spatial verbs as early as age 1;9.6.

[25] Though the acquisition of classifier predicates may be identified by the emergence of semantic classifiers, classifier construction where the arguments are involved takes times to develop, as evidenced by non-adult like word order associated with classifier predicates that will be presented in the next chapter.

(21) a. ***First Clear Use***

Verbal gestures, Agreement verbs (unmarked), spatial verbs, plain verbs

> SASS, agreement verbs (show locations)

> Handle

> Semantic

> agreement verbs (marked)

b. ***Repeated Use***

i. ***Appeared 5 times***

Verbal gestures

> Agreement verbs (unmarked)

> spatial verbs, plain verbs

> agreement verbs (show locations)

> SASS, Handle

> Semantic

> agreement verbs (marked)

ii. ***Appeared twice in one month***

Verbal gestures, Agreement verbs (unmarked), spatial verbs

> plain verbs

> agreement verbs (show locations)

> SASS

> Handle

> Semantic

> agreement verbs (marked)

The similar pattern is observed when type frequency of CC's early verbs is considered (See Appendix 7). Verbal gestures are observed before age 2. Unmarked agreement verbs, spatially-marked agreement verbs, spatial verbs, and plain verbs all appear at or before age 3. Various types of classifier predicates emerge from age 2;9 to 3;4. Marked agreement verbs appear after age 4. Classifier predicates which are morphologically more complex emerge later than unmarked or spatially-marked verbs when the age of repeated use is considered. Yet marked agreement verbs

appear even after classifier predicates. It appears that CC first uses the space to encode spatial information before he uses marked agreement verbs. This claim is further supported by the fact that the use of morphemic location with classifier predicates generally appears earlier than marked agreement verbs:

Table 6.17 First Clear Use and Repeated Use of ±Morphemeic Location of Classifier Predicates and Marked Agreement Verbs

		Repeated Use	
	First Clear Use	Appeared 5 times	Appeared twice in one month
Semantic			
+morphemic location	**3;3.29**	**3;4.13**	**3;3.29**
−morphemic location	2;8.18	3;4.13	3;2.24
Handle			
+morphemic location	**2;3.25**	**3;2.24**	**3;2.24**
−morphemic location	2;10.9	3;0.13	2;10.9
SASS			
+morphemic location	**2;9.29**	**3;7.13**	**2;9.29**
−morphemic location	2;1.9	3;2.24	3;2.24
Marked Agreement Verbs	3;4.13	4;1.27	3;11.26

Table 6.17 shows that almost all classifier predicates begin to show +morphemic location before the emergence of marked agreement verbs. Given the fact that classifier predicates do not always express morphemic location and that agreement verbs remain unmarked in obligatory contexts, it can be concluded that, both classifier predicates and verb agreement in child language are not the same as those in adult grammar.

I have listed a number of hypotheses on the developmental pattern in Chapter 5. The hypothesis that morphologically simpler verbs emerge earlier than morphologically complex verbs is borne out. Plain verbs and unmarked agreement

verbs appear quite early while morphologically more complex verbs like marked agreement verbs and classifier predicates emerge much later. There are two more hypotheses which predict a reliance of the emergence of non-plain verbs on the use of space and on input ambiguity. I will discuss these two factors in detail in the following sections.

6.3 Use of Space

Signed languages make use of the signing space to express a number of grammatical information. Chapter 2 shows that different forms of verbs employ space to express spatial locations of the referents, verb agreement and spatial relations among different participants of an event. This section explores the use of space in child language by studying the non-plain verbs and verbal gestures that potentially involve the use of space.[26] In particular, three issues will be considered. First, I will examine whether a development of the use of space is present in CC's data. In the last section, the use of space is shown to be related to the presence of real referents for agreement verbs, spatial verbs and classifier predicates. This section extends the analysis to verbal gestures in order to get a fuller picture of the relation between real referents and space in child language. The third issue is about the development of different types of space. Space can be divided into real space, surrogate space and token space (cf. Liddell 1994, 1995, 2000). I will examine whether the developmental pattern of different forms of verbs presented in the previous section is related to a development of different types of space.

[26] Not all verbal gestures may show use of space. Some verbal gestures produced by CC are body-anchored. This kind of gestures will be excluded in the following discussion.

6.3.1 Development of the Use of Space

I have mentioned in the previous section that non-plain verbs and verbal gestures may involve the use of space in CC's utterances. The following figure summarizes whether CC directs these non-plain verbs/verbal gestures to convey spatial information or verb agreement throughout the period studied in this thesis.

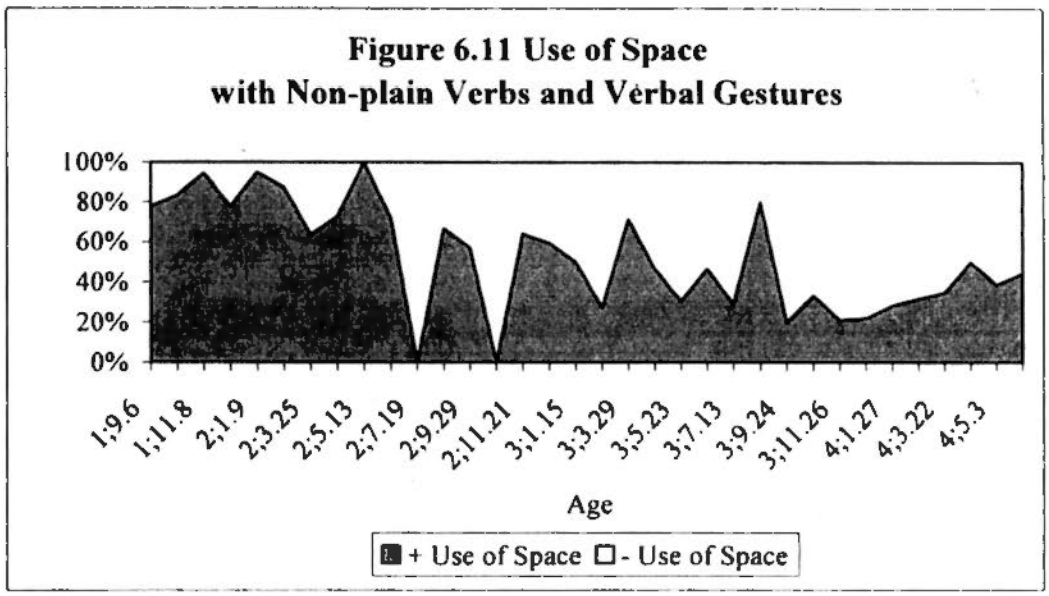


Figure 6.11 shows a higher proportion of non-plain verbs/verbal gestures that demonstrate the use of space before age 2;7.19. Lower percentage of non-plain verbs/verbal gestures that employ the signing space is observed after age 3. Note that the great number of spatially-marked verbal gestures at the early stage inflates the proportion which shows the use of space. When verbal gestures are excluded, a different picture can be seen:

Figure 6.12 Use of Space with Non-plain Verbs

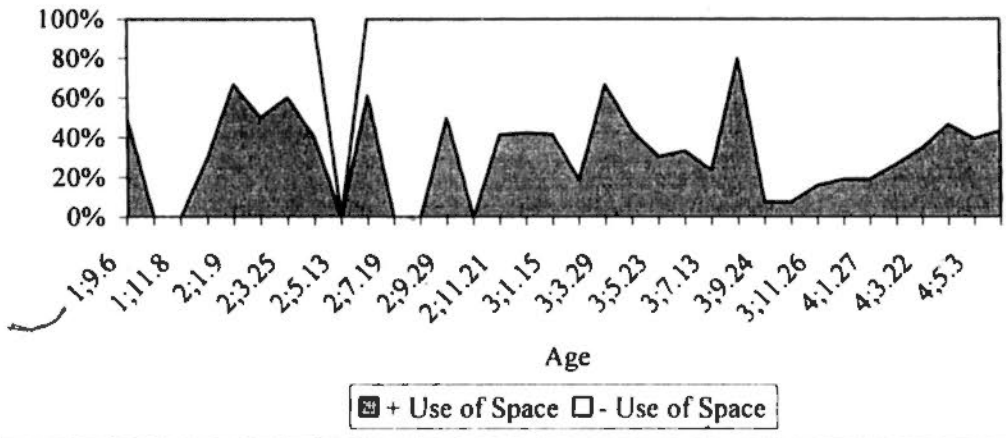


Figure 6.12 shows that the proportion of non-plain verbs which demonstrate the use of space is below 60% in almost all sessions (except for the session at age 2;5.13 where no tokens of non-plain verbs are observed). Though the use of space is seen from verbal gestures, this property is not always observed from non-plain verbs (See Section 6.2). The difference in the use of space with verbal gestures and non-plain verbs may also suggest that verbal gestures and non-plain verbs are viewed as two separate categories in the child language.

6.3.2 ±Real Referents and the Use of Space

Turning to real referents, I have mentioned that the use of space in adult grammar is associated with real referents or imagined referents in Chapter 2. A question follows is whether CC uses space with non-plain verbs/verbal gestures only when real referents are present. Consider the findings below:

Table 6.18 Use of Space and ± Real Referents

	+Real Referents		−Real Referents	
	+Use of Space	−Use of Space	+Use of Space	−Use of Space
Verbal gestures	234/242 (96.69%)	8/242 (3.31%)	1/15 (6.67%)	14/15 (93.33%)
Agreement Verbs	157/378 (41.53%)	221/378 (58.47%)	19/77 (24.68%)	58/77 (75.32%)
Spatial Verbs	66/172 (38.37%)	106/172 (61.63%)	2/22 (9.09%)	20/22 (90.91%)
Classifier Predicates	39/219 (17.81%)	180/219 (82.19%)	18/55 (32.73%)	37/55 (67.27%)
Total	**496/1011 (49.06%)**	**515/1011 (50.94%)**	**40/169 (23.67%)**	**129/169 (76.33%)**

Table 6.18 shows the number of tokens of different kinds of non-plain verbs and verbal gestures under the contexts with +Real Referents or –Real Referents. Whether verbal gestures involve +Use of Space is directly related to the +Real Referents. Almost all verbal gestures (96.69%) show directionality with +Real Referents, but not with –Real Referents. The relation of ±Real Referents and ±Use of Space is less direct with agreement verbs and spatial verbs.[27] The percentage of +Use of Space is not higher than that of –Use of Space under the contexts of +Real Referents and –Real Referents. But the fact that the percentage of agreement/spatial verbs which involves +Use of Space and +Real Referents is higher than those with +Use of Space and –Real Referents suggests that +Use of space by these verbs is sensitive to +Real Referents.

[27] Since both agreement markings and location markings involve the use of space, I sum up the tokens of these two types of markings of agreement verbs to get a more general result on the use of space.

Turning to classifier predicates, +Use of space can be identified by the use of morphemic location. CC's classifier predicates are mainly articulated in the neutral space where location is not morphemic. Note also that the percentage of classifier predicates which involves +Use of Space and +Real Referents is not higher than the group with +Use of Space and –Real Referents. It shows that +Real Referents may not be related to the +Use of Space for classifier predicates. Generally speaking, CC tends to use the space when the real referents are present given that the percentage on the tokens which demonstrate the use of space with +Real Referents (49.06%) is higher than the tokens which show the use of space with –Real Referents (23.67%).[28]

6.3.3 Real Space, Surrogate Space and Token Space

In the previous discussion, I have treated space as one unit. Yet space can actually be divided into different types. As noted at the beginning of this section, real space, surrogate space and token space are three kinds of space (cf. Liddell 1994, 1995, 2000). To recap, the referents are of the actual size in real space and surrogate space. The only difference between real space and surrogate space is that the former involves real referents and the latter imagined referents. Token space differs from real space and surrogate space as referents in the token space is compressed. Signing in token space is like manipulating puppets on a stage. Only that these puppets are largely classifiers.

The use of three types of space is observed at different ages. Consider real space first. At age 1;9.6 CC is able to direct verbal gesture like *gesture [= give me]* towards the Deaf researcher who has the toy ball he wants. He can also indicate the location of the verbal gestures *gesture [= sit here]* by tapping his hands on a chair. In

[28] See Hoffmeister (1978) for a similar claim with respect to development of demonstrative pronouns, locatives and personal pronouns in ASL.

the same session CC uses the spatial verb *BUMP* to mean 'bump one's head'. Agreement verbs which show spatial locations of the real referents appear 3 months later (age 2;1.9).

The use of surrogate space and token space appears later. This may be related to the fact that these two types of space are associated with imagined referents. Consider the use of surrogate space first:

(22) a. ***Agreement Verbs***

INV: gesture [= get someone's attention] IX-2p
$_{2m}$TELL$_{3i}$ MOTHER IX-2p WANT_1 SIT PLANE.
IX-2p $_{2m}$TELL$_{3i}$ MOTHER CAN.
'hey, (you) tell your mother that you want to take the plane. You can tell your mother.'

CHI: **TELL$_a$** IX-1p^LIKE **TELL$_a$** PLANE.
'Tell her that I like plane.' (3;3.29)

b. ***Spatial Verbs***

IX-obj DROP$_a$ DROP$_a$.
'This (picture), (the witch's teeth) drops.' (4;5.3)

c. ***Handle Classifier Predicate***

CL:GIVE_A_BOX_OF_CANDIES CANDY EAT MANY CANDY.
'(Mother) gives (me) many candies to eat. (4;1.27)

d. ***SASS Classifier Predicate***

CL:BUBBLES_IN_THE_SOUP IX-obj DRINK-SOUP
CL:LOSE_A_TOOTH CL:LOSE_A_TOOTH.
'(There are) bubbles in the soup. This [the picture], (the Queen) drinks (the potion) and (she) loses her tooth.' (4;5.3)

Example (22) illustrates CC's use of verbs in surrogate space. The use of surrogate space appears much later than the use of real space. In example (22a) (repeated from

example (5)) the Deaf signer directs the agreement verb *TELL* on her right to express verb agreement for a third person singular object. CC responded by turning his head towards the spatial locus (i.e. locus-3i) previously established by adult's agreement verb. Then he signs the verb *TELL* towards the same spatial locus. This is considered as an example of CC's use of surrogate space with –Real Referents. The spatial verb in example (22b) involves imagined referent 'the witch's teeth'. By placing the spatial verb at his own teeth, CC wants to express the meaning of 'witch's teeth' drops'. The handle classifier predicate *CL:GIVE_A_BOX_OF_CANDIES* in (22c) and the SASS classifier predicate *CL:LOSE_A_TOOTH* in (22d) are also used in the surrogate space where the referents are of the same size as the one in real space.[29]

The agreement verb in example (22a) above is spatially-marked. One month later, the first agreement marking is observed at age 3;4.13 where CC directs the verb sign *GIVE* on his right to refer to a third person object. Consider example (4), repeated as example (23) below:

(23) Context: CC was asked to tell a story about how a group of rabbits prepared a birthday party for a wolf.

ht$_i$
eg$_i$
RABBIT SEE$_{3i}$.
'The rabbit sees (the wolf).' (3;4.13)

Example (23) is an example of genuine agreement markings under the context with +Real Referents. The Deaf researcher is holding a book which shows an episode where a rabbit sees a wolf. The fact that CC does not direct the verb sign towards the book, but to an abstract locus-3i suggests that CC has knowledge of verb agreement

[29] One may suggest that examples (22b) and (22c) involve role shift and therefore surrogate space is used. Whether a correlation holds between role shift and surrogate space requires further research.

at age 3;4.13. But if repeated use is used as the measure of age of acquisition, verb agreement only appears around 4:

(24) Context: CC was asked to tell a story.

SEE... gesture [= xxx]... SEE_{3j} FOX NOT.
'(A bear) sees the fox.' (4;1.27)

In example (24) CC directs the second agreement verb *SEE* towards locus-3j to refer to a third person object. The use of surrogate space to express syntactic relation like verb agreement only appears after age 4, a time much later than when CC begins to use surrogate space to express spatial locations of the referents. Though the type of space is the same, the complexity of agreement markings make it emerge much later.

Token space, on the other hand, is observed few months after the first example of the use of surrogate space (i.e. example (22a)). The use of token space is associated with semantic classifiers under the context of +Real Referents, as illustrated in the following example:

(25) Context: CC described the job of a traffic police.

VISOR CL:RIDE_THE_MOTORCYCLE
CL:SPEAK_IN_THE_MICROPHONE
CL:RIDE_THE_MOTORCYCLE
CL:MOTORCYCLE_MOVES_IN_A_ZIG_ZAG_MANNER.
'(The police pulls down) the visor (of the helmet), (the police) rides the motorcycle, speaks into the microphone, rides the motorcycle. The motorcycle moves away in a zig-zag manner. (3;7.13)

In example (25) the first three classifier predicates use the surrogate space. The last classifier *CL:MOTORCYCLE_MOVES_IN_A_ZIG_ZAG_MANNER* contains a semantic classifier for vehicle. CC is able to displace the classifier predicates in the signing space to express the meaning of 'a zig-zag movement' in token space.

In sum, CC begins to use space very early. Yet the patterns on verbal gestures and non-plain verbs are different. The use of space is closely related to the presence of real referents. Most non-plain verbs (except classifier predicates) tend to employ the use of space when the referents are real. Finally, I have shown that the early verbs also reflect a developmental sequence from real space, to surrogate space and finally to token space.

6.4 Input Ambiguity

6.4.1 The notion of Input Ambiguity

A number of works attempt to explore the role of ambiguous input in the course of acquisition (Gibson and Wexler 1994, Fodor 1998, 2001, Müller 1998, Fodor and Crowther 2002, among others). While many of these works attempt to examine the relation between input ambiguity and parameter setting (e.g. Gibson and Wexler 1994, Fodor 1998, 2001, Fodor and Crowther 2002), others treat ambiguous input as the cause of transfer in bilingual acquisition (e.g. Müller 1998, Yip and Matthews 2000). It follows that the notion of input ambiguity has at least two interpretations. The first interpretation is that input is ambiguous between different parameters which characterize different languages (Gibson and Wexler 1994). For instance, the English sentence like *John kisses Mary* may be captured by both V2 parameter and head parameter, hence parametric ambiguity (or cross-grammar ambiguity in Fodor's (2001) terms).

The second interpretation of the notion of ambiguity is also known as within-grammar ambiguity (cf. Fodor 2001). The ambiguity is arisen within a particular language. For instance, it is well-known that the verb is placed in the second position (i.e. Verb Second (V2)) in a matrix clause, but at a final position in a subordinate clause in German. Müller (1998) points out that the positions of finite and nonfinite verbs in German are not as neat as what has been described. Consider the following example (Müller 1998:151):

(26) a. Ich **mag** Nebensätze, weil sie so kompliziert **sind**.
I like subordinate clauses because they that complicated are.
'I like subordinate clauses because they are so complicated.'

b. Ich **mag** Nebensätze, weil sie **sind** so kompliziert.
I like subordinate clauses because they are that complicated.
'I like subordinate clauses because they are so complicated.'

Example (26) shows that the verb in the subordinate clause can be placed in verb-final position as well as V2 position when the subordinate clause is introduced by *weil* 'because'. Additional complexities come from the fact that verbs in subordinate clauses introduced by conjunctions like *denn* 'since' and *sondern* 'but' have non-verb-final word order. The input then looks ambiguous to children. If children are able to detect the differences, it may serve as a piece of evidence showing that input ambiguity does not affect the acquisition of word order in German. What Müller observes is that ambiguous input results in transfer when bilingual children are faced with ambiguous input in language A, they would use the rules from language B where input is not ambiguous.

6.4.2 Ambiguous Input and Acquisition of Verb Agreement

I have noted in Section 6.2 that productive use of agreement markings is observed only after age 4. The age of acquisition of agreement markings is much later than what has been reported in both spoken and signed languages (See Chapters 1 and 4). The late emergence of verb agreement may be resulted from the effect of input ambiguity.[30]

In HKSL agreement verbs may appear in different forms in the adult grammar: (i) unmarked, (ii) marked for spatial locations and (iii) marked for verb agreement. The first form looks like plain verbs and the second form shares similar characteristics (i.e. location markings) with spatial verbs. The phenomenon is termed as optionality of agreement markings in Tang et al. (2006). This optionality can be viewed as ambiguous input. Ambiguous input causes transfer from language A to language B when input from language A is unambiguous and that from language B is ambiguous (See Section 6.4.1). The input on plain verbs and spatial verbs may be viewed as unambiguous input while that on agreement verbs is ambiguous. Given the fact that the input on agreement verbs is ambiguous, CC may miscategorize agreement verbs as either plain verbs or spatial verbs. As a result, agreement markings emerge late.

Miscategorizing agreement verbs is viewed as a stage in the course of acquisition. An immediate question is at what point CC comes to realize that agreement verbs belong to a separate group of verbs. CC may rely on input on personal pronouns to obtain the knowledge of using directionality to express person values in HKSL. Personal pronouns also express first, second and third person values in adult grammar (cf. Lam 2003). Directionality in personal pronouns cannot be omitted. This could be a possible trigger for CC to reanalyze miscatergorized agreement verbs.

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[30] An alternative explanation is that the acquisition of verb agreement is affected by delayed input. See Section 6.2.1.1 for details.

In Lam (2003), I have mentioned that the verb *FARE-MORE-THAN* is the only agreement verb which is always marked for person agreement. If my observation is correct, this verb can also be a trigger in acquisition of verb agreement. Further research will verify whether this explanation can capture the regularization of irregular input.

6.4.3 Ambiguous Input and Acquisition of Classifier Predicates

In Chapter 2 I have mentioned that classifier predicates may be lexicalized as agreement verbs and spatial verbs in HKSL. The lexicalized forms usually share the same handshape or similar movement with the classifier predicates. The only difference between the lexicalized forms and classifier predicates is that the latter usually show a more elaborated description on the action and spatial relations between entities (e.g. *WALK* and *CL:AN_ANIMATE_ENTITY_WALK*).

If CC's classifier predicates resemble lexical verbs, it can be concluded that ambiguous input plays a role in the acquisition of classifier predicates in HKSL. Though classifier predicates are observed early (before age 3), CC's classifier predicates are different from the adult ones. Classifier predicates are initially occur with discourse-bound antecedents (first clear use = age 2;1.9). At age 2;6.17, CC begins to produce overt nominal antecedents occasionally. Unknown referents are also observed from age 2;9.29. Consider the distribution of these three types of nominal antecedents more closely:

Table 6.19 Nominal Antecedents and Early Classifier Predicates

	+ Overt Nominal Antecedent		−Overt Nominal Antecedent			
			Discourse-bound		Unknown	
Semantic	18/84	(21.43%)	60/84	(71.43%)	6/84	(7.14%)
Handle	31/182	(17.03%)	146/182	(80.22%)	5/182	(2.75%)
SASS	7/46	(15.22%)	37/46	(80.43%)	2/46	(4.35%)
Two-handed	7/42	(16.67%)	35/42	(83.33%)	0/42	(0.00%)
Total	**63/354**	**(17.80%)**	**278/354**	**(78.53%)**	**13/354**	**(3.67%)**

Table 6.19 shows that only a very small portion of classifier predicates (17.80%) occur with overt nominal antecedents. Most of them are not overt, but could be identified from the discourse, as shown in the following example:

(27) a. Context: CC told the researcher what mother did after he finished his homework assignments.

CL:GIVE_A_BOX_OF_CANDIES CANDY@f EAT MANY CANDY.
'(Mother) gives (me) a box of candies, candy, eat many candies.' (4;1.27)

b. Context: CC talked about how the Queen turned into a witch in *Snow White*.

IX-1p WITCH_PERSON CL:WEAR_RING GLASS CL:GIVE_AN_APPLE.
'I, the witch, wear a ring, (drink) a glass of magic potion, give an apple (to Snow White).' (4;3.22)

At first glance, these classifier predicates may be treated as lexical verbs in the child language because overt nominal antecedents are not present.[31] Though overt nominal antecedents are not mentioned in these examples, the classifier handshapes of the

[31] In Chapter 7 I will show that CC's classifier predicates are not just lexical verbs.

classifier predicates can be recovered from the discourse. Example (27a), repeated from example (22c), shows that CC produces the handle classifier predicate *CL:GIVE_A_BOX_OF_CANDIES* which is coreferential with the subject 'mother' established earlier.[32] Similarly, the two classifier predicates *CL:WEAR_RING* and *CL:GIVE_AN_APPLE* in example (27b) are coreferential with discourse-bound antecedents, though the overt objects *RING* and *APPLE* are not mentioned earlier.

A small number of utterances (3.67%) demonstrate classifier predicates which do not occur with any recoverable arguments (i.e. unknown antecedents):

(28) Contexts: CC told the researcher about riding motorcycle.

CL:PULL_DOWN_A_VISOR MOTORCYLE.
'Pull down the visor, (ride) motorcycle.' (3;7.13)

Example (28) illustrates that CC produces a classifier predicate in the absence of recoverable nominal antecedents. It is not entirely clear who carries out the action described by the classifier predicate. Similar cases are observed even after age 4. In sum, classifier handshapes in the early classifier predicates are coreferential with the arguments which could be identified from the discourse. The presence of overt nominal antecedents suggests that CC does not treat classifier predicates as lexical verbs. This is a piece of robust data showing that ambiguous input does not necessarily play a role in language acquisition.

6.5 Chapter Summary

This chapter presents a descriptive account on the emergence of different forms of HKSL VERB. Some predictions made in Chapter 5 are borne out. The findings

[32] More discussion on word order will be given in the next chapter.

show that morphologically simpler verbs (e.g. plain verbs and unmarked agreement verbs) emerge earlier than morphologically complex verbs (e.g. marked agreement verbs and classifier predicates). This conforms to the predictions made on the basis of morphological complexity. The use of space is observed mainly from verbal gestures, agreement verbs and spatial verbs, a smaller proportion of classifier predicates involve the use of space (which is defined as morphemic location for classifier predicates). This variance suggests that the use of space does not necessarily have a positive relationship with the emergence of non-plain verbs (or some of the non-plain verbs). Finally, input ambiguity causes late emergence of verb agreement. Yet the presence of discourse-bound and overt nominal antecedents suggests that CC does not treat classifier predicates as lexical verbs. This shows that input ambiguity does not affect the acquisition of classifier predicates.

Chapter 7

Early Phrase Structure

7.1 Introduction

This chapter extends our discussion on early verbs to the early phrase structure. Verb movement and word order in child language are some areas which illuminate whether early phrase structure contains functional projections (See Chapter 1). V-to-T movement is absent in HKSL, but the V-to-*v* movement evidenced by classifier predicates may support the claim that *v*P is present initially. Word order provides further evidence to the presence of functional projections. If SOV and S-DO-V-IDO orders can be seen in child language, *v*P and TP are present in the early phrase structure. The presence of a number of lexical items like early subjects, modals/auxiliary-like elements and negators reveals further that *v*P, TP and NegP are available. The findings presented in this chapter will lend support to the Continuity view.

7.2 *vP*

7.2.1 Classifier Predicates

Classifier handshapes are realized at *v* in HKSL (See Chapter 3). If CC produces adult-like classifier predicates, one can posit that *v*P is available. In Chapter 6 I have noted that most of the CC's classifier predicates do not occur with overt nominal antecedent, but with antecedents which are recoverable from the discourse. An examination on word order and the types of classifier handshapes of the same verb

root will show further whether the early classifier predicates involve V-to-*v* movement.[1] This in turn reveals whether *v*P is available initially.

Consider the types of classifier handshapes that a verb root may occur with. If CC's classifier predicates are equivalent to lexical verbs, one would expect the same verb root always appear with a particular handshape. I have listed 76 verb roots in CC's classifier predicates in the previous chapter. 22 of them occur only once and they cannot be the evidence justifying whether the classifier predicates of the same verb root may vary in handshapes. The remaining 54 verb roots are observed more than once. 28/54 of these verb roots always occur with the same arguments (e.g. the verb root 'stab' always form a classifier predicate with a handle classifier for 'holding a sword') and hence the classifier handshape remains the same in all instances of the same verb root. 26/54 verb roots show variation on the classifier handshapes:

[1] The verb root is determined by the verb meaning of the classifier predicates.

Table 7.1 Frequency of Verb Roots that Occur with More than One Classifier Handshape

Verb roots	Token	Type
(bite)	2	2
(blow)	7	4
(break)	4	2
(close)	2	2
(cut)	2	2
(eat)	5	5
(fall)	19	13
(fly)	4	3
(give)	11	9
(hide)	5	3
(hit)	25	7
(hold)	10	10
(lift)	4	3
(move)	7	7
(open-door)	9	7
(pull)	6	3
(put)	16	13
(put on)	5	3
(ride)	5	2
(take)	9	7
(take off)	2	2
(throw)	4	3
(turn)	3	2
(walk)	38	13
(wear)	7	5
(wipe)	5	3

The verb roots listed in Table 7.1 involve different handshapes when the arguments are different. An example is given below:

(1) a. Context: CC told the Deaf researcher about what he saw from the TV.

TV SEE_a **CL:THE_ROOF_FALL** HOME
CL:HOUSE_COLLAPSE **CL:THE_ROOF_FALL**.
'(I) saw from the TV that the roof (of the house) fell, the house collapsed, the roof (of the house) fell.' (3;7.13)

b. Context: The Deaf researcher asked why CC had a bruise.

CARELESS **CL:AN_ANIMATE_ENTITY_FALL**.
'(I) fell down because of carelessness.' (4;1.27)

The verb root 'fall' in example (1) may be associated with different classifier handshapes. In (1a) the ▽-handshape () refers to the roof and in (1b) the ĉ-handshape () represents an animate entity. The knowledge of using the same verb root with different handshapes is observed since age 3;1.15. When CC is able to produce different classifier handshapes with the same verb root, it can be concluded that *v*P is present as the early classifier predicates are also multimorphemic.

Word order may also reveal the nature of the early classifier predicates. In Chapter 3 I have mentioned that transitive classifier predicates always have SOV order, contrasting the SVO order with lexical verbs. If CC produces SOV order with classifier predicates, it can be assumed that classifier predicates in the child language is the same as the one in the adult grammar. The number of tokens of classifier predicates that occur with VO, OV, SVO and SOV order is given in Table 7.2 below:

Table 7.2 Early Classifier Predicates and Word Orders

Word Orders	Number of Tokens
V O	7/15 (46.67%)
O V	3/15 (20.00%)
S V O	5/15 (33.33%)
S O V	0/15 (0.00%)

Unlike the adult grammar, CC produces no SOV order with classifier predicates. VO and SVO orders, however, constitute a greater proportion of the word orders in the child language.

(2) a. ***VO***

Context: The Deaf researcher told the story *Rapunzel*.

CL:HIT_WITH_CYLINDRICAL_OBJECT WITCH.
'(The Prince) hits the witch with a cylindrical object.' (4;5.3)

b. ***OV***

Context: CC read a book with a researcher.

TREE CL:HACK_A_TREE_WITH_AN_AXE.
'(Someone) hacks the trees with an axe.' (4;0.23)

c. ***SVO***

Context: CC told a story to a researcher.

WITCH CL:HIT_WITH_CYLINDRICAL_OBJECT YOUNGERS_SISTER.
'The witch hits the younger sister with a cylindrical object.' (4;0.23)

Example (2) lists CC's utterances which contain transitive classifier predicates. The utterances demonstrate three different orders: VO, OV, and SVO. Both VO and SVO

orders show that CC may treat classifier predicates as lexical verbs given the fact that both orders are possible with lexical verbs but not with classifier predicates in adult grammar (cf. Lam et al. 2008). The OV order in example (2b), however, may support the claim the object shift associated with classifier predicates is present in the child language. If null subject precedes OV, CC has actually produced SOV order for classifier predicates. Note that the OV order is the first kind of word order observed with classifier predicates (at age 2;9.29), followed by SVO (at age 2;11.21) and VO order (at age 3;0.13). The SVO/VO order and OV order co-occur since then. The co-occurrence of these orders may be resulted from the fact that object shift is optional for all types of verbs in early HKSL. While the object shift is optional for classifier predicates in the child language, object shift is obligatory for classifier predicates in the adult grammar. Note the V-to-*v* movement could be available even though object shift is optional in the child language.

Taken together, the early classifier predicates are not just lexical verbs, as evidenced by the various classifier handshapes one verb root may be attached to in different instances and the early emergence of OV order. Since classifier predicates are realized at *v*, the fact that CC's classifier predicates is also compositional suggests that *v*P structure is available initially. Using the same verb root with different classifier handshapes before age 3 suggest that *v*P is available at an early age.

7.2.2 Subjects[2]

In Chapter 3 I have mentioned that agentive subject is base-generated at Spec, *v*P. If CC produces agentive subject at an early stage, it can be concluded that *v*P is available in the early phrase structure. Totally 1616 agentive subjects (both overt and null) are observed. Most subjects are null (66.83%) and around one third of the early subjects are overt (33.17%):

(3) a. Context: CC wanted to get a toy from the Deaf researcher.

e THANK *e*.
'(I) thank (you).' (1;10.21)

b. **MOTHER** SLEEP.
'Mother is sleeping.' (2;1.9)

Example (3) illustrates the first clear use of a null subject (in (a)) and overt subject (in (b)). Overt subjects can be further divided into pronominal and nominal subjects. See the table below:

Table 7.3 Distribution of Early Subjects in HKSL

Types of Subjects	Number of Tokens	First Clear Use
Pronominal	133/536 (24.81%)	2;2.0
Nominal		
common nouns	164/536 (30.60%)	2;7.19
kinship terms	49/536 (9.14%)	2;1.9
proper names	25/536 (4.66%)	3;7.13
Other[a]	165/536 (30.78%)	2;2.0

[a] Other kinds of subjects include quantifiers, numerals, determiners and gestures.

[2] One may suggest that subject raising also reflects the early phrase structure (specifically TP). It is generally assumed that subjects moves if the subjects precede interveners like negators and adverbs. While negators are clause-final, the syntactic position of adverbs is unclear in HKSL. It becomes difficult to see whether the subject moves. Alternatively, the shifted object in SOV order suggests that the subject moves out of *v*P. I will return to this in the next section.

Nominal subjects mainly contain common nouns, kinship terms and proper names.[3] A quarter of overt subjects are pronominal:

(4) Context: The Deaf researcher asked CC where Grandmother went.

IX-3p GO@f.
'She goes [i.e. went out].' (2;2.0)

Around half of the overt subjects are nominal. Common nouns constitute the greatest proportion of nominal subjects. Other nominal subjects include kinship terms and proper names. Examples of different types of nominal subjects are given below:

(5) a. Context: CC told a story about seven sheep and a wolf.

CHILDREN MOTHER SLEEP.
'The children's mother [i.e. goat mother] sleeps.' (2;7.19)

b. Context: CC's mother came back home after work.

MOTHER COME@f.
'Mother comes back.' (3;7.13)

c. Context: CC asked a researcher to take him to a room to play.

CC PLAY.
'CC plays.' (3;9.24)

Example (5) shows that overt subject in CC's utterances may be a common noun (*CHILDREN MOTHER* in (5a)), a kinship term (*MOTHER* in (5b)) or a proper name (*CC* in (5c)). Besides proper names, all kinds of overt subjects emerge before age 3. When

[3] It is common for signers to use a common noun like *MOTHER, FATHER* to refer to a specific person in HKSL. These tokens are grouped under the notion of kinship terms in order not to inflate the number of common noun which functions as subject.

null subjects are taken into consideration, early subjects are observed as early as age 1;10.21 (See example (3a)).

I assume that overt and null subjects in early HKSL are base-generated at Spec, *v*P. The presence of early subjects therefore suggests at least the presence of *v*P in early phrase structure. Given the results on early subjects reported earlier, *v*P is present around age 2.

7.2.3 Summary

This section presents the evidence to the presence of *v*P in the early phrase structure. The presence of agentive subjects supports the claim that *v*P is available in child grammar. The fact that CC's verb roots may incorporate different classifier handshapes suggests that his classifier predicates are also formed via V-to-*v* movement in the same way as those in the adult grammar are formed, though the word orders associated with classifier predicates (as shown above) and the nominal antecedents (as shown in Chapter 6) are different in the child language. A summary of the evidence to the presence of *v*P is given below:

Table 7.4 Evidence for the Presence of *v*P

Evidence	First Clear Use
Agentive subjects[4]	
Overt	2;1.9
Classifier Predicates	
Discourse-bound nominal antecedents	2;1.9
Overt nominal antecedents	2;6.17
OV order	2;9.29
Different handshapes of the same verb root	3;1.15

[4] Null subjects appear few months before the emergence of overt subjects. However, null subjects do not have phonetic content and therefore one may argue that utterances that contain null subjects are ambiguous between having no subjects and having null subjects. I therefore rely on the unambiguous evidence (i.e. overt subjects) in the summary of the emergence of early *v*P here.

While overt agentive subjects show that *v*P is available before age 3, the results on classifier predicates suggest that V-to-*v* movement, evidenced by different handshapes associated of the same verb roots, takes time to develop. In any event, *v*P is available at an early age and this supports the Continuity view.

7.3 TP

7.3.1 Object Shift

The SOV order is derived by moving the subjects to Spec, TP and the objects to Outer Spec, *v*P for reasons shown in Chapter 3. The presence of SOV order in CC's data therefore supports the claim that *v*P and TP are available in the early phrase structure. In this section I will compare SVO and SOV orders in CC's utterances. Since null subjects are commonly found in child language, VO and OV orders will also be taken into consideration.[5] In Chapter 5 I have noted that CC's utterances can be divided into different groups. This section will focus on utterances where word orders can be identified. Totally 355 clauses show VO, OV, SVO or SOV orders. VO and SVO orders are often observed regardless of whether the utterance is a simple clause which contains a verb and its argument or whether the utterance contains an embedded clause or a conjoined clause:

[5] CC has also produced orders like OSV (7 tokens), OVS (2 tokens), VSO (2 tokens) and VOS (3 tokens). These word orders are assumed to involve movement to higher functional projections. It becomes unclear whether the object has moved to Outer Spec, *v*P. Hence I will put this set of data aside.

Table 7.5 Word Orders in CC's Utterances[6]

	V O	O V	S V O	S O V
Utterances which contain one verb and its arguments	102/230 (44.35%)	46/230 (20.00%)	80/230 (34.78%)	2/230 (0.87%)
Utterances with embedded clauses[7]				
Matrix Clauses	13/30 (43.33%)	2/30 (6.67%)	15/30 (50.00%)	0/30 (0.00%)
Embedded Clauses	4/8 (50.00%)	0/8 (0.00%)	4/8 (50.00%)	0/8 (0.00%)
Utterances with conjoined clauses[8]	47/87 (54.02%)	11/87 (12.64%)	27/87 (31.03%)	2/87 (2.30%)
Total	**166/355 (46.76%)**	**59/355 (16.62%)**	**126/355 (35.49%)**	**4/355 (1.13%)**

Most CC's utterances are either VO or SVO. OV and SOV orders only constitute a small part. The distribution of these word orders conforms to Sze's (2008) observation on adult grammar noted in Chapter 3. Note that the OV order may be analyzed in different ways. First, one may argue that OV order presented here involve topicalization. In adult grammar, OV order is usually viewed as noncanonical word order which involves a null subject. O, SV on the other hand, is a clearer example of object topicalization. While ASL topics may be marked by brow raise (cf. Chen 2001 and references cited there), HKSL topics do not have consistent

[6] I avoid the terms "monoclausal" and "multiclausal" here because sometimes it is difficult to decide whether an utterance is monoclausal or multiclausal. For instance, the utterance like *POLICEMAN CATCH ELDERS-SISTER GOOD* can be analyzed as monoclausal if the adjective *GOOD* is assumed to be in the same clause of *POLICE CATCH ELDER-SISTER* or as multiclausal if one assumes that the adjective *GOOD* is an adjectival predicate that takes a sentential complement. While the monoclausal-multiclausal distinction in adult grammar can be tested (See, for instance, Reis and Sternefeld 2004 on a list for possible tests), it is unclear whether the tests can be used for child language. Hence I would rather use relatively more general terms to group CC's utterances.

[7] The object in the matrix clauses in utterances with embedded clauses are sentential object where word order can be seen. The orders of these utterances include V[SVO], V[VO], SV[SVO], SV[VO] when both matrix and embedded clauses contain arguments of the verbs. Note that the sentential object may just be a verb (e.g. SV[V]) and the word order cannot be identified. Therefore the number of embedded clauses which show word orders is lower than the number of matrix clauses.

[8] Conjoined clauses can be of different word orders in the same utterances (e.g. VO, SVO; VO, VO; OV, VO, SVO; VO, etc.) Note that conjoined clauses may contain just the verb. Since the word order with only the verb is unclear, these clauses are put aside here.

manual or nonmanual markers (Felix Sze, p.c.). In child language, OV order may be ambiguous between showing a noncanonical word order and involving topicalization. In my proposal noted in Chapter 3, SOV order involves object shift. OV order in child language may either involve a short movement to Spec, *v*P if OV order is analyzed as a noncanonical word order or longer movement to Spec, CP if this order is viewed as an instance of topicalization. Both analyses suggest that the child phrase structure has movement to functional projections (*v*P or CP). So analyzing objects in OV order as topics only provides further evidence to the claim that functional projections are available at an early age. The current proposal that functional projections are available in child HKSL would not be affected.[9]

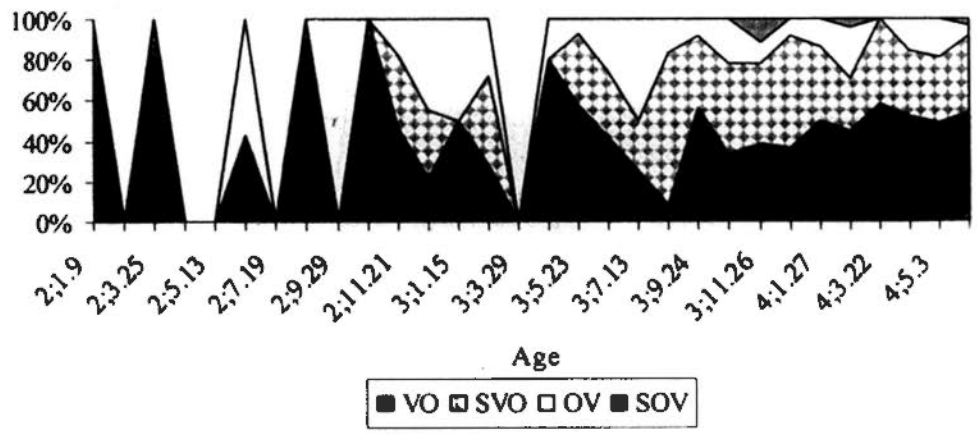
A second analysis of OV order is that this order represents a head-final structure in child HKSL. I have noted in Section 7.2 that VO order may involve null subject. Similarly, utterances with VO and OV orders shown in Table 7.5 may also contain null subjects. The utterances demonstrating the four word orders can be regrouped into two groups: (i) utterances which show SVO order and (ii) utterances which demonstrate SOV order. VO and OV orders involve null subjects and they are grouped under SVO and SOV orders respectively. In the SVO group, 56.85% (166/292) utterances contain null subjects. By contrast, almost all utterances (93.65%, 59/63) in the SOV group contain null subjects. The contrast on the proportion of null subjects in the SVO and SOV groups suggests that the null subjects may be of different natures in the two groups. Or the utterances that show OV order do not contain null subjects. If OV order does not contain any subject, it is unclear whether the early phrase structure contains any functional projection and whether object shift is present. When the null subjects in utterances that demonstrate VO and OV orders

[9] In this thesis I assume that OV order is a kind of noncanonical orders since analyzing objects in OV order as topics requires further evidence on CP. This is an area I will leave for future research.

are examined more closely, it is observed that most null subjects with OV order (74.58%) are pronominal and only half of the null subjects with VO order (49.40%) are pronominal. This results show that the apparent difference on null subjects with VO and OV order is related to the types of null subjects rather than the orders. Instead of treating OV order as an evidence to a head-final structure, I will adopt the view that utterances with OV orders contain null subjects and the objects has undergone movement from VP to *v*P.

Table 7.5 shows a general picture on the word orders observed from CC's utterances. The following figure illustrates further the distribution of various orders produced by CC in the course of acquisition:

Figure 7.1 Distribution of VO, SVO, OV and SOV Orders



The VO order emerges first, followed by OV, SVO and finally SOV order. See the following example:

(6) a. ***VO***

Context: CC wanted to play the computer.

DO IX-obj.
'(I) do that [play the computer].' (2;1.9)

b. ***OV***

Context: CC wanted to get a piece of biscuit from the Deaf researcher.

IX-obj EAT.
'(I) eat this.' (2;6.17)

c. ***SVO***

Context: The researcher showed a set of toys to CC.

IX-loc $HAVE_{loc/exist}$ HOUSE.
'There is a house.' (2;11.21)

d. ***SOV***

Context: The Deaf researcher wore an Ultraman mask in story telling. CC turned to another Deaf researcher after the story telling.

gesture [= get someone's attention] IX-1p IX-det MALE LIKE.
'Hey, I like that Prince (in the story).' (3;11.26)

Example (6) shows that VO order appears first, followed by OV order. SVO order is observed at around age 3. Yet SOV order only emerges around one year later. In this example all but one are plain verbs (*DO*, $HAVE_{loc/exist}$ and *LIKE* are plain verbs and *PUT* is a spatial verb). In (6a) and (6b) the verbs occur with indexical objects. The objects in (6c) and (6d) are common nouns (*HOUSE* and *IX-obj MALE*). This result is similar to what has been reported from spoken languages which allow object shift. Josefsson (1996), for instance, reports that object shift is acquired late (around 5 to 7 years) by

studying longitudinal and experimental data from Swedish children. Boser et al. (1995) also note that German and Dutch children tend to shift pronouns more often than full NPs. Errors are usually observed with shift of full NPs. Object shift in HKSL involves full NPs but not pronouns. The late emergence of SOV order may be related to the type of nominals being shifted.

I have mentioned in Chapter 3 that morphology on the verbs causes word order variations in ASL. While it is not true in HKSL adult grammar, the child language in HKSL may show this correlation. Consider the following table which summarizes the distribution of different verb types under different word orders:

Table 7.6 Verb Types and Word Orders[10]

Verb Types	V O	O V	S V O	S O V
Do not show morphology				
Plain Verbs	103/223	36/223	82/223	2/223
	(46.19%)	(16.14%)	(36.77%)	(0.90%)
Bare Spatial Verbs	5/9	2/9	2/9	0/9
	(55.56%)	(22.22%)	(22.22%)	(0.00%)
Unmarked Agreement Verbs	33/72	10/72	27/72	2/72
	(45.83%)	(13.89%)	(37.50%)	(2.78%)
Show morphology				
Spatially-marked Spatial Verbs	2/2	0/2	0/2	0/2
	(100.00%)	(0.00%)	(0.00%)	(0.00%)
Spatially-marked Agreement Verbs	14/26	7/26	5/26	0/26
	(53.85%)	(26.92%)	(19.23%)	(0.00%)
Classifier Predicates	7/15	3/15	5/15	0/15
	(46.67%)	(20.00%)	(33.33%)	(0.00%)
Marked Agreement Verbs	2/7	1/7	4/7	0/7
	(28.57%)	(14.29%)	(57.14%)	(0.00%)

[10] The data shown here excludes 1 token where the verbs cannot be categorized into the verb types presented in Chapter 6.

Table 7.6 shows that all types of verbs tend to precede their objects and follow their subjects (if the subjects are overt). Similar to the adult grammar, verbal morphology does not play a role in word order variations in child language.[11]

Though the frequency on SOV and OV orders is low, their presence may still suggest the presence of subject raising and object shift in early HKSL. Consider OV order more closely. This order is consistently observed since age 2;6.17:

Figure 7.2 OV order in CC's Utterances

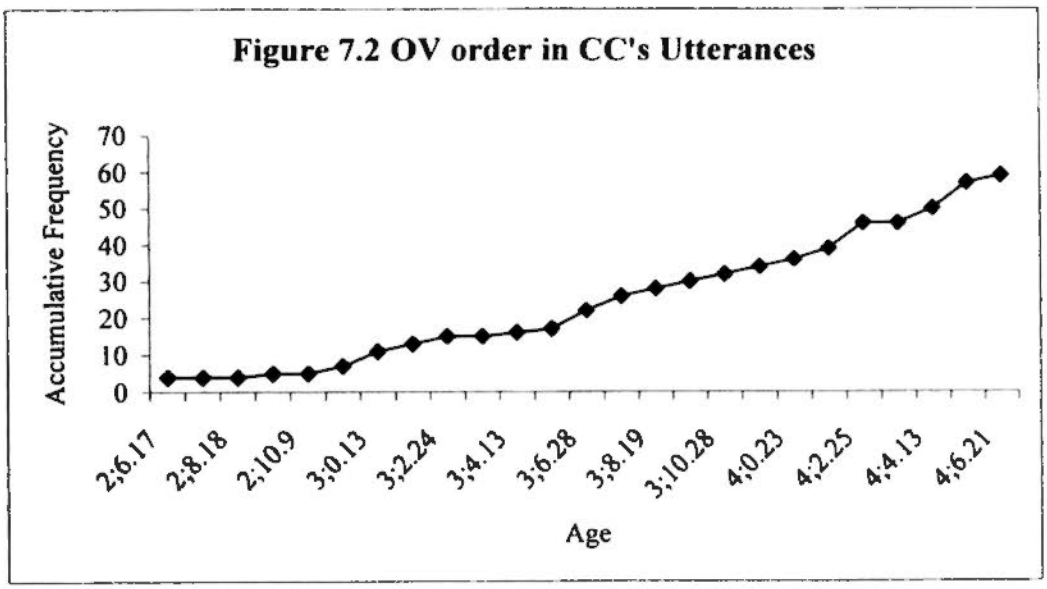
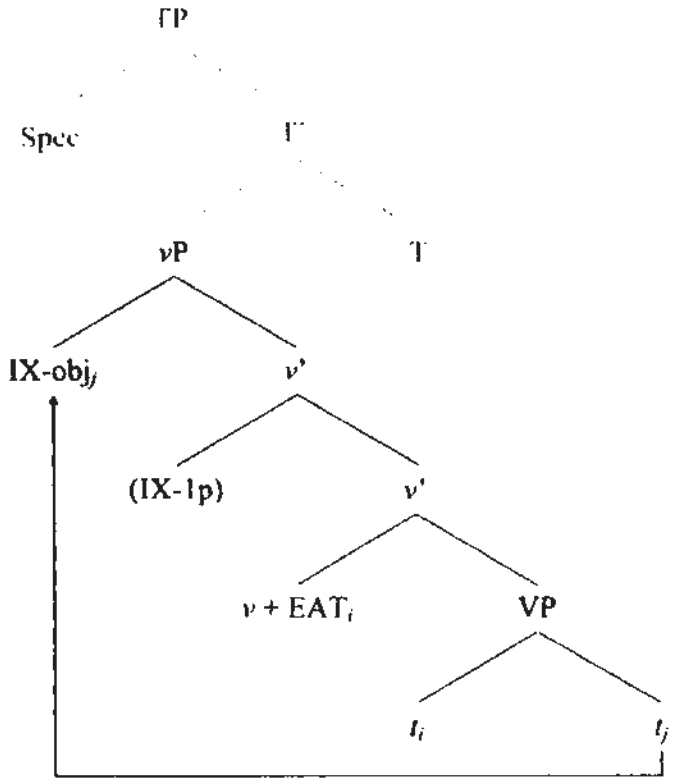


Figure 7.2 shows that the use of OV order increases steadily over time. I suggest that OV order is derived by object shift, as illustrated in the following figure:

[11] The SOV is not observed even with classifier predicates. Most clauses which contain classifier predicates show either VO or SVO orders which are not allowed in adult grammar. See Section 7.2.1 above.

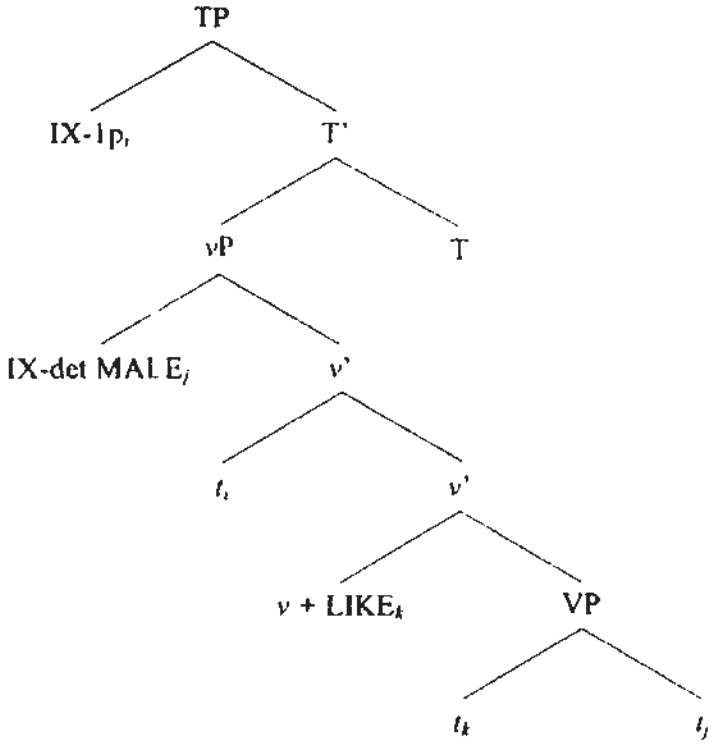
Figure 7.3 Derivation of Example (6b)



Given the OV order, it is assumed that the object originated from VP moves up to Outer Spec, *v*P. Yet it is unclear whether the subject moves to Spec, TP and whether TP is available because the subject has no phonetic content.

A more solid piece of evidence to subject raising is SOV order where the shifted object functions as an intervener. It is assumed that the SOV order in example (6d) involves subject raising and object shift:

Figure 7.4 Derivation of Example (6d)



If the subject *IX-1p* moves from Inner Spec, *v*P to Spec, TP, the intervening shifted object *IX-det MALE* serves as the evidence to subject raising. However, SOV order is rarely produced in CC's utterances and the first clear use only appears at age 3;11.26. It follows that the word order facts in child data only show *v*P is present at age 2;6.17.

7.3.2 Ditransitive Verbs

Ditransitive verbs have three arguments (subject, direct object and indirect object) which occupy all the specifier positions within *v*P (See Chapter 3). An examination of early ditransitive verbs and their arguments therefore gives clue to the presence/absence of *v*P in early HKSL. The S-DO-V-IDO which involves subject raising and object shift provides further evidence to the availability of TP.

As noted in Chapter 3, the only ditransitive verb identified is *GIVE*. In addition to the agreement verb *GIVE*, CC also produces a verbal gesture *gesture [= give me]*, a

home sign *GIVE@f*, and a classifier predicate which has the verb root 'give'. Totally 30 tokens of different forms of 'give' that occur with their arguments are observed. See the following table:

Table 7.7 Distribution of Different Forms of 'give' under Different Word Orders

Word Order	Gesture	Home sign	HKSL verb sign	Classifier Predicates	**Total**	**First Clear Use**
V DO	6	4	3		**13/30 (43.33%)**	2;0.12
V IDO			2		**2/30 (6.67%)**	4;2.25
DO V	6	4			**10/30 (33.33%)**	2;0.12
DO V IDO			2	1	**3/30 (10.00%)**	2;6.17
S V IDO			1		**1/30 (3.33%)**	4;1.27
DO S V IDO			1		**1/30 (3.33%)**	4;2.25

Both verbal gesture *gesture [= give me]* and home sign *GIVE@f* occur with at most one argument and this argument is always direct object:[12]

[12] Children who acquire Cantonese as their first language also start out with using ditransitive verb with one argument. Unlike deaf children acquiring HKSL, Cantonese children tend to produce the verb with indirect object rather than direct object (e.g. *bei2 ze4ze1* 'give sister') (cf. Chan 2004:75).

(7) a. ***DO V***

Context: CC played toys of different colours with the Deaf researcher.

GREEN gesture [= give me].
'Give me the green (toy).' (1;10.21)

b. ***V DO***

Context: CC requested a pen.

gesture [= give me] PEN.
'Give me the pen.' (2;0.12)

(8) a. ***DO V***

Context: CC asked for a piece of biscuit.

FOOD GIVE@f.
'Give me the biscuits.' (2;0.12)

b. ***V DO***

Context: CC asked the Deaf researcher to give him a piece of biscuit.

GIVE@f CL:A_PIECE_OF_BISCUIT BISCUIT.[13]
'Give me a piece of biscuit, biscuits.' (2;7.19)

The verbal gesture *gesture [= give me]* follows the direct object *GREEN* in (7a) and precedes the direct object *PEN* in (7b).[14] Similarly, the home sign *GIVE@f* in example (8) precedes or follows the direct object (*FOOD* in (8a) and *CL:A_PIECE_OF_BISCUIT BISCUIT* in (8b)). The indirect object of both verbal gesture *gesture [= give me]* and *GIVE@f* mainly refer to 'me'. It is possible that the indirect object is encoded in the gesture/home signs and therefore no overt indirect object is observed in most

[13] The object 'biscuit' is signed once with a nominal classifier *CL:A_PIECE_OF_BISCUIT* and once with a lexical noun *BISCUIT* in this example.
[14] Note that *GREEN* is a noun in HKSL.

instances.[15] Given the assumption that both transitive verbs and ditransitive verbs are projected into *v*P, both transitive 'give' and ditransitive 'give' in CC's utterances have a *v*P structure.

While verbal gestures and home signs tend to occur with only one argument, the HKSL verb sign *GIVE* shows the widest range of word orders. 5 tokens of the sign *GIVE* co-occur with either direct object or indirect object:

(9) a. ***V DO***
Context: CC asked the Deaf researcher to give home a piece of biscuit.

GIVE CL:A_BISCUIT_STICK.
'Give me the biscuit.' (2;6.17)

b. ***V IDO***
Context: The Deaf researcher asked who gives Cinderella a letter.

GIVE PRINCESS.
'(The steward) gives (a letter) to the Princess.' (4;6.21)

The verb sign *GIVE* precedes its direct object *CL:A_BISCUIT_STICK* in (9a) and indirect object *PRINCESS* in (9b). Utterances which contain both direct and indirect object serve as other evidence to the presence of *v*P in child language. As shown in Table 7.7 above, 4 tokens of utterances demonstrate DO-V-IDO and DO, S-V-IDO orders. These utterances are examples where both direct and indirect objects occur:

[15] The verbal gesture *gesture [= give me]* and home sign *GIVE@f* occur once with third person indirect object at age 4;3.22 and 2;7.19 respectively. At age 4;3.22, the verbal gesture follows the indirect object in the utterance *PRINCESS gesture [= give me] DIE* '(The witch) gives (the apple) to the Princess, (the Princess) dies'. The home sign *GIVE@f* occurs in a doubling structure *IX-3p GIVE@f IX-3p* 'Him, give the biscuits to him.'

(10) a. ***DO-V-IDO***

Context: CC asked the investigator to give a piece of biscuit to a researcher.

CL:BISCUIT_STICK **GIVE$_a$** [*] IX-3p IX-3p.

'(You) give the biscuit to him/her, him/her.' (2;6.17)

b. ***DO-V-IDO***

Context: CC told the story *Snow White*.

APPLE **CL:GIVE_AN_APPLE** PRINCESS.

'(The witch) gives an apple to the Princess.' (4;4.13)

(11) ***DO, S-V-IDO***

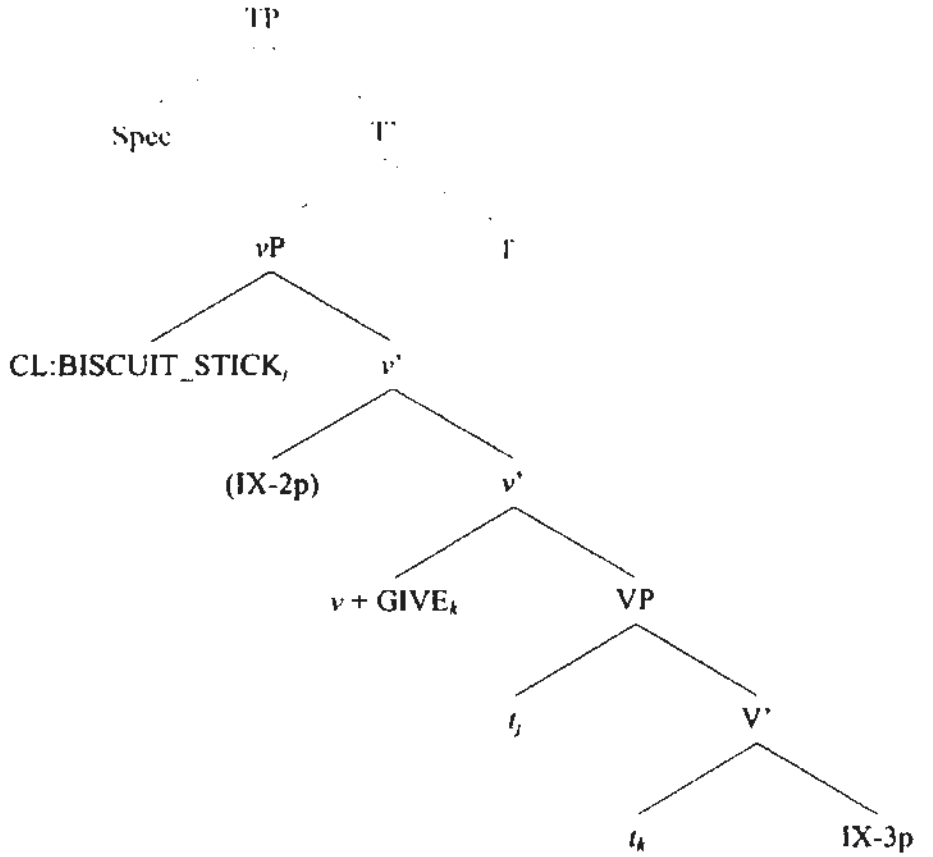
Context: CC told a story to the researcher.

MONEY [*] MONKEY [*] IX-obj GIVE MOTHER.

'Money, the monkey, this [picture], gives mother.' (4;2.25)

Both *GIVE$_a$* and *CL:GIVE_AN_APPLE* in example (10) follow the direct objects (*CL:BISCUIT_STICK* in (10a) and *APPLE* in (10b)) and precede the indirect object (*IX_3* in (10a) and *PRINCESS* in (10b)). Example (10a) is the first occurrence of DO-V-IDO order. Similar to the OV order shown above, it is unclear whether the subject raises to Spec, TP when the subject lacks phonetic content. One may propose that DO-V-IDO order only supports the presence of *v*P in the early phrase structure:

Figure 7.5 Derivation of Example (10a)



The grey color of TP in Figure 7.5 means that it is not clear whether TP is available as far as evidence from word order is concerned. Whether TP is available initially requires other evidence. Example (11), on the other hand, not only serves as evidence to TP, but also to CP as the DO is topicalized:

Figure 7.6 Derivation of Example (11)

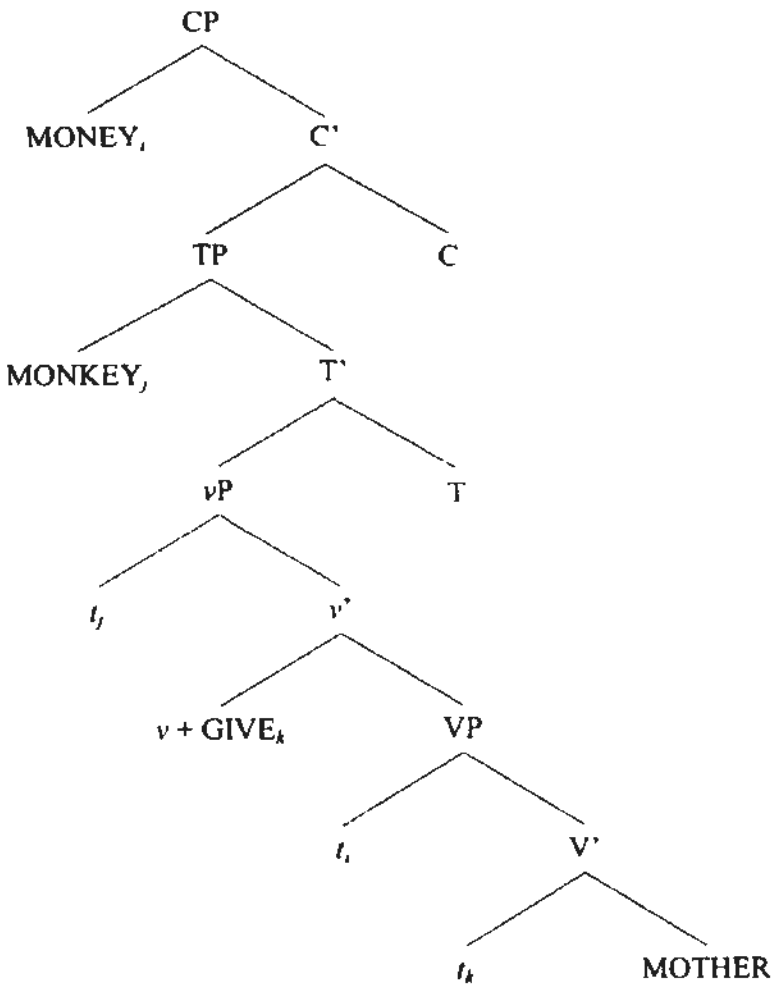


Figure 7.6 illustrates the syntax of example (11). The tree structure shows the derivation of DO, S-V-IDO order where the discourse filler *IX-obj* is put aside. I tentatively assume that CP is head-final because the question markers (e.g. *YES-NO-YES*) and doubled elements in a doubling structure in HSKL are clause-final. Assuming the sentence-initial DO is a topic, the DO, S-V-IDO order is derived by moving the DO to Spec, CP, the subject to Spec, TP and the V to *v*. When CP is present, it is supposed that TP is also present given the theoretical assumption that CP selects TP as its complement. So the DO, S-V-IDO order serves as indirect evidence to the presence of TP in early phrase structure. A caveat at this point is that DO, S-V-IDO occurs only once. It is unclear whether such instance is accidentally

produced. I suggest that more evidence is needed to show that CP is available in the early phrase structure, an issue I will leave for future research. Note that it is common for the signers to use null arguments, especially when the referents are present. Since the referents are mostly present in the conversation, it is not surprising to see so few data which shows all the arguments overtly.

To sum up, CC uses different forms of 'give' with at most one argument initially. Starting from age 2;6.17, CC begins to use 'give' with a direct object and an indirect object. If the null subject is assumed to be present in the utterance, it can be proposed that *v*P is present at an early age.

7.3.3 Modals and Auxiliary-like Elements

The results on word orders associated with transitive verbs and ditransitive verbs in the previous section do not provide solid evidence to the presence of TP at an early stage. This section explores whether TP is available initially by looking at modals and auxiliary-like elements which are supposed to locate at T. If CC uses modals/auxiliary-like elements in the same way as the adults do, it can be concluded that TP is available in early HKSL. 150 utterances contain either modals (*HAVE-TO, CAN* and *CANNOT*) or the auxiliary-like elements ($HAVE_{exist}$, *NOT-HAVE* and *NOT-HAVE@f*). Note that the home sign *NOT-HAVE@f* resembles child conventional gesture *all-gone* of hearing children. The distribution of these elements is given below:

Table 7.8 Early Modals and Auxiliary-like Elements in HKSL

	Number of Utterances	First Clear Use
Modals		
HAVE-TO	1	4;2.25
CAN	7	3;10.28
CANNOT	20	3;6.28
Auxiliary-like Elements		
$HAVE_{exist}$	68	2;8.18
NOT-HAVE	18	3;8.19
NOT-HAVE@f	36	2;1.9

Table 7.8 shows that modals are not frequently produced as there are only 28 tokens of modals in the 34-session longitudinal data. Modals like *HAVE-TO* and *CAN* are rarely observed when compared with *CANNOT*. Auxiliary-like elements, by contrast, appear at a younger age and they are produced more often. Note that auxiliary-like elements can be answers which affirm or negate the proposition introduced by a question in adult grammar.

The utterances listed in Table 7.8 can be further divided into two groups: (i) single-sign utterances which contain a modal or an auxiliary-like element and no other signs (e.g. *CANNOT*.) and (ii) multi-sign utterances in which a modal or an auxiliary-like element occurs with other signs (e.g. *WALK CANNOT*). The distribution of these two groups of modals/auxiliary-like elements is given below:

Table 7.9 Two Groups of Modals/Auxiliary-like Elements in Early HKSL

	Group (i)	Group (ii)
Modals		
HAVE-TO	0	1
CAN	3	4
CANNOT	3	17
Auxiliary-like Elements		
$HAVE_{exist}$	31	37
NOT-HAVE	16	2
NOT-HAVE@f	22	14

Modals that occur in group (i) may be used in questions or declarative sentences following some activities like wearing a hat. Auxiliary-like elements in group (i) are largely answers which affirm or negate the proposition introduced in an earlier question, as exemplified in the following examples:

(12) INV: NOW BRING CANDY HAVE-NOT-HAVE?
gesture [= not have].
'Have you bought candy now? No. '

CHI: $HAVE_{exist}$.
'(I) have (bought the candy).' (3;8.19)

(13) INV: PIG EAT HAVE-NOT-HAVE IX-2p?
'Do you eat pork?'

CHI: NOT-HAVE.
'(I) don't (eat pork).' (3;8.19)

(14) INV: IX-2p ALWAYS NIGHT STUDY HAVE-NOT-HAVE?
'Do you always study at night?'

CHI: NOT-HAVE@f.
'(I) do not (always study at night).' (3;10.28)

In example (12) CC affirms the proposition 'CC brings the candy' by replying with the sign *HAVE$_{exist}$*. Examples (13) and (14), on the other hand, show that CC negates the propositions by using *NOT-HAVE* or *NOT-HAVE@f*. Affirming/negating propositions in this way is first observed at age 3;2;24. The use of auxiliary-like elements in the child language provides evidence to the presence of TP.

A question follows is whether T is head-initial or head-final in early HKSL. Recall that clause-final modals are analyzed as indicator of a head-final T in HKSL (See Chapter 3). I assume that the early TP is identical to the adult one if CC produces clause-final modals. Totally 56 utterances show syntactic orders between modals/auxiliary-like elements and other constituents.[16] Different syntactic positions are observed from the early modals/auxiliary-like elements:

[16] The 75 utterances in group (i) are excluded because the functional elements do not occur with other lexical items and no order can be seen. In addition to these utterances, 19 utterances are not considered as it is unclear whether the modals/auxiliary-like elements are preverbal or clause-final. These utterances include doubling structures (5/19), utterances which contain no verbs/adjectives like *HAVE$_{exist}$ gesture [=xxx], IX-2p HAVE$_{exist}$* (7/19); utterances contain two verbs which sandwich the modals/auxiliaries (7/19). The remaining utterances contain a *HAVE$_{exist}$* which introduces a new clause.

Table 7.10 Syntactic Positions of Early Modals/Auxiliary-like Elements

	Preverbal	Sentence-initial	Clause-final
Modals			
HAVE-TO	4;2.25 1	0	0
CAN	3;9.24 1	4;2.25 1	3;10.28 1
CANNOT	0	0	3;7.13 15
Auxiliary-like Elements			
$HAVE_{exist}$	2;8.18 15	0	2;11.21 7
NOT-HAVE	0	0	4;4.13 1
NOT-HAVE@f	3;8.19 5	0	2;1.9 9
Total	**22/56 (39.29%)**	**1/56 (1.79%)**	**33/56 (58.93%)**

Table 7.10 shows the syntactic positions observed from different modals/auxiliary-like elements. The preverbal and clause-final modals/auxiliary-like elements are generally used more often than the sentence-initial ones. The age of first clear use of clause-final modals/auxiliary-like elements is earlier than that of preverbal ones, as evidenced by clause-final *NOT-HAVE@f* at 2;1.9 and preverbal $HAVE_{exist}$ at 2;8.18.

Consider the modals/auxiliary-like elements more closely. The modal *HAVE-TO* occurs only once and it appears before the verb:

(15) PLAY TOY **HAVE-TO** CL:PUT_BACK_THE_TOY TOY .
'After playing the toys, (one) has to put them back.' (4;2.25)

Native signers would otherwise sign *TOY PLAY FINISH, PUT_a* 'After playing the toys, put them here.' where the modal *HAVE-TO* is omitted. Example (15) actually echoes the ordering of modals and verbs in Cantonese:

(16) waan2 jyun4 wun6geoi6 **jiu3** fong3 faan1 hou2.
play ASP toys **have-to** put back good
'(You) have to put back the toys after playing them.'

The ordering in example (16) looks similar to example (15) except that the Cantonese sentences show additional particles, aspect markers, etc. Given the strong oralist atmosphere in HKSL, it is not surprising that CC's acquisition of HKSL would be influenced by Cantonese. I will discuss this issue further in Section 7.5.

The negative modal *CANNOT* and auxiliary-like element *NOT-HAVE*, on the other hand, always follow the verbs:

(17) a. CL:PRESS_BUTTONS_ON_MOBILE_PHONE **CANNOT**.
'(He) cannot use the phone.' (3;7.13)

b. WALK **CANNOT**.
'(The animals) cannot walk.' (4;0.23)

c. IX-3p UNCLE PUT_ON_SHOES
CL:FIT_ONE'S_FOOT__INTO_THE_GLASS _SLIPPER
CANNOT.
'He, uncle, (Cinderalla's sister) cannot stuff her feet into the little glass slipper.' (4;6.21)

(18) SLEEPY **NOT-HAVE**.
'(I) do not feel sleepy.' (4;4.13)

Example (17) illustrates three instances in which the negative modal *CANNOT* follows the verb. Similarly, in example (18) the auxiliary-like element *NOT-HAVE* is always clause-final in CC's utterances. This order conforms to the one in the adult grammar. At first glance, a head-final TP can be posited for the early phrase structure in HKSL.

However, counterevidence to this claim arises from the syntactic positions of *CAN*, $\text{HAVE}_{\text{exist}}$ and *NOT-HAVE@f* in CC's utterances:

(19) a. ***Preverbal position***

CAN PLAY.

'(I) can play (at the play room).' (3;9.24)

b. ***Clause-final position***

EAT-NOODLES CAN?

'Can (I) have the noodles [i.e. biscuits]?' (3;10.28)

c. ***Sentence-initial position***[17]

IX-obj MONKEY IX-obj,

(assume the role of the monkey)

CAN MATCHES GIVE$_{1o}$,

(assume the role of the monkey's mother)

CANNOT, NOT, FIRE.

'This (picture), monkey, this (picture), can you give me the matches, no, no, (it would cause) fire.' (4;2.25)

(20) a. ***Preverbal position***

IX-obj MOTHER HAVE$_{exist}$ COME@f.

'This [picture], Mother has come.' (3;2.24)

b. ***Clause-final position***

YOUNGER-SISTER CRY IX-loc HAVE$_{exist}$.

'Younger sister cries there.' (2;11.21)

(21) a. ***Preverbal position***

BROKEN, CANDY EAT NOT-HAVE@f.

'(The jar of candies) brokes, (one) has no candy to eat.' (3;5.23)

b. ***Clause-final position***

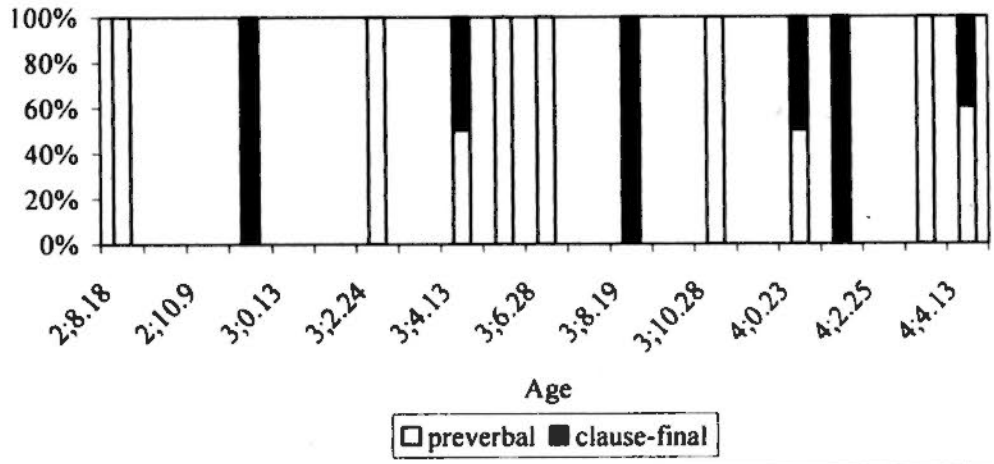
NOT-HAVE@f CRY.

'(I) have not cried.' (3;8.19)

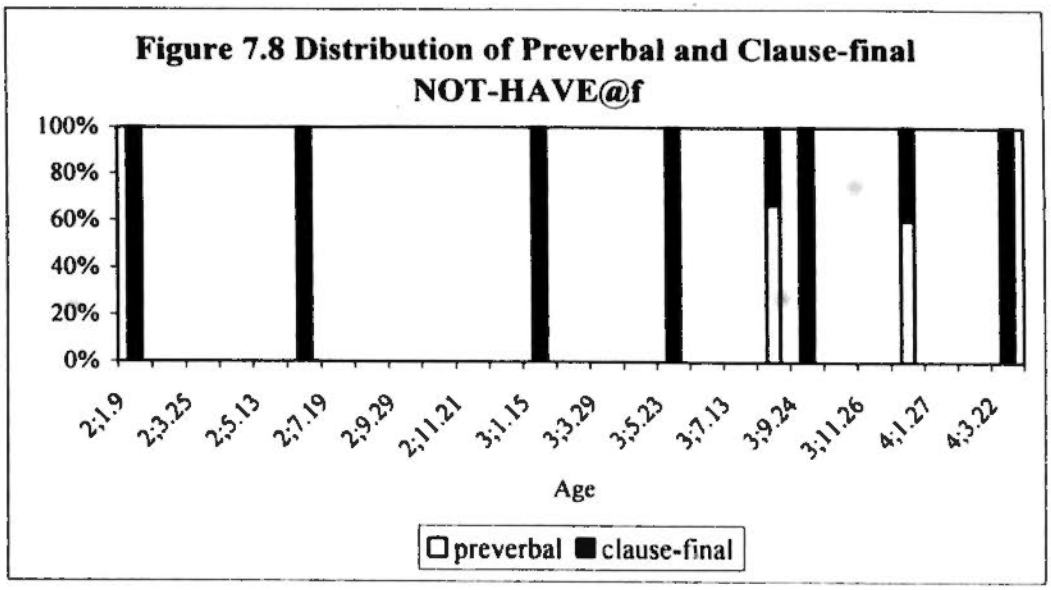
[17] The negative modal *CANNOT* in this example does not occur with the overt subject and verb. It is then unclear whether this modal is preverbal or clause-final. Thus this token of negative modal is excluded in my investigation on syntactic position of modals.

Examples (19), (20) and (21) show different syntactic positions of *CAN*, *HAVE$_{exist}$* and *NOT-HAVE@f*. All these elements occur at the clause-final position in adult grammar.[18] A question at this point is whether there is a developmental sequence from preverbal to clause-final modals/auxiliary-like elements or vice versa. The modal *CAN*, however, may not be a good candidate for exploring this issue given the number of *CAN* produced is very small. Consider *HAVE$_{exist}$* and *NOT-HAVE@f* more closely. While preverbal *HAVE$_{exist}$* emerges before clause-final *HAVE$_{exist}$*, preverbal *NOT-HAVE@f* occurs much later than the clause-final *NOT-HAVE@f*, as shown in the following figures:

Figure 7.7 Distribution of Preverbal and Clause-final HAVE$_{exist}$



[18] Roeper (1999) proposes that the apparent contradicting options like +agreement and –agreement in first language acquisition may be considered as one form of bilingualism (i.e. Theoretical Bilingualism). In the following section I will show that the head-initial and head-final modals/auxiliary-like elements in early HKSL actually echo the adult use of the corresponding elements. I suggest that the early modals/auxiliary-like elements demonstrate characteristics of real bilingualism instead of Theoretical Bilingualism for reasons that will become clear in Section 7.5.



Figures 7.7 and 7.8 show the distribution of $HAVE_{exist}$ and *NOT-HAVE@f* of different positions in the period where these auxiliary-like elements are observed (from age 2;8.18 to 4;4.13 for $HAVE_{exist}$ and from age 2;1.9 to 4;3.22 for *NOT-HAVE@f*). While preverbal $HAVE_{exist}$ is used consistently from age 3;5.13, the use of clause-final $HAVE_{exist}$ is scarcely observed over the period. The result of *NOT-HAVE@f* is closer to the result of the negative modal *CANNOT* which always occurs at clause-final position. It is possible that negative modals and negative auxiliary-like elements behave similarly. I will discuss more on these elements vis-à-vis the negator *NOT* in Section 7.4.

7.3.4 Input Data on Modals and Auxiliary-like Elements

Deaf researchers' utterances in the child HKSL corpus are examined in order to find out if a relation holds between the input data and the child data with respect to modals/auxiliary-like elements in this section. Compare the distribution of modals/auxiliary-like elements produced by CC and native signers in the corpus below:

Table 7.11 Modals/Auxiliary-like Elements in Child Data and Input Data

	Preverbal		Clause-final	
	Child	Adult	Child	Adult
Modals				
HAVE-TO	1	7	0	0
CAN	1	6	1	66
CANNOT	0	0	15	44
Auxiliary-like Elements				
$HAVE_{exist}$	15	22	7	23
NOT-HAVE	0	0	1	74
NOT-HAVE@f	5	0	9	11
Total	**22/55 (40.00%)**	**35/253 (13.83%)**	**33/55 (60.00%)**	**218/253 (86.17%)**

The distribution of modals in the input data echoes with the one in the child data. First, all tokens of *HAVE-TO* occur in the preverbal position, though some Deaf researchers agree to use this modal in the preverbal or clause-final position in the adult grammar:

(22) a. **HAVE-TO** CARE-FOR.
'(You) have to care for (your sister).'

b. IX-2p SELF BRUSH_ONE'S_TEETH IX-2p **HAVE-TO** LEARN IX-2p GROW-UP IX-2p.
'(You) brush your teeth on your own, you have to learn, you has grown up.'

The preverbal *HAVE-TO* which occurs in the input data may explain why CC produces a Cantonese order for *HAVE-TO*. Similarly, the syntactic positions of *NOT-HAVE* and *CANNOT* in the early HKSL also echo those in adult language as adults always produce *NOT-HAVE* and *CANNOT* at the clause-final position:

(23) a. SEE$_a$ **CANNOT**.
'(You) cannot see (the book).'

b. BATTERY NOT-HAVE@f PLAY **CANNOT**.
'(There is) no batteries, (We) cannot play (this toy).'

(24) a. JENNY COME **NOT-HAVE**.
'Jenny hasn't come.'

b. IX-2p WELL-BEHAVED **NOT-HAVE**.
'You are not well-behaved [= You are being naughty].'

Similar to the results on CC's modals/auxiliary-like elements, *HAVE$_{exist}$* and *CAN* in Deaf researchers' utterances occur in both preverbal and clause-final positions:

(25) a. ***Preverbal position***
IX-1p ELDER-SISTER WAIT NEXT-TIME GO BUY BATTERY, CL:PUT_BATTERY_INTO_BATTERY_COMPARTMENT **CAN** PLAY YES-NO-YES?
'Wait, I will go to buy some batteries next time, then (we) can play (this toy), ok?'

b. ***Clause-final position***
IX-2p WORK-HARD STUDY WORK-HARD, GROW-UP DO POLICEMAN **CAN**.
'(If) you study hard, you can be a policeman when you grow up.'

(26) a. ***Preverbal position***

REMEMBER LAST-TIME MOTHER **HAVE$_{exist}$** TAKE
CL:SHRIMP_BISCUIT, ORANGE, CL:SHRIMP_BISCUIT
CL:BREAK_THE_SHRIMP_BISCUIT IX-obj.
'Remember the last time when mother took a shrimp biscuit, (it was) orange, (I) broke the shrimp biscuit, this is that.'

b. ***Clause-final position***

MOTHER FOUND IX-det WOLF **HAVE$_{exist}$**.
'Mother has found the wolf.'

While the clause-final *CAN* outnumbers the preverbal *CAN*, the number of preverbal *HAVE$_{exist}$* and the number postverbal *HAVE$_{exist}$* are almost the same. The use of negative auxiliary-like element *NOT-HAVE@f*, however, is different in the child data and the input data. While CC uses this element in both preverbal position and clause-final position, the adults only use it at the clause-final position:

(27) a. IX-2p $_2$TELL$_1$ **NOT-HAVE@f**.
'You have not told me (the story) yet.'

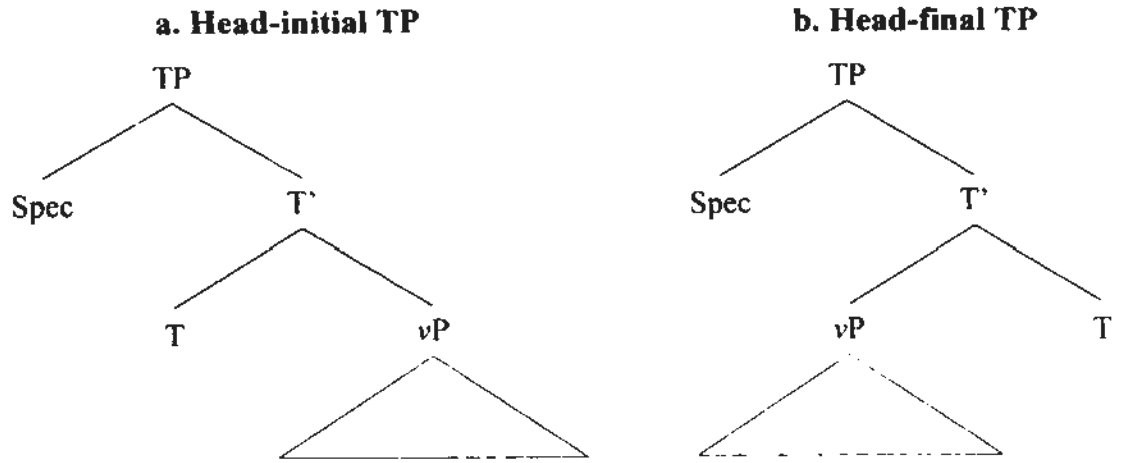
b. IX-1p STEAL **NOT-HAVE@f**, $_2$SHOOT$_1$ WHY?
'Why do you shoot at me when I did not steal anything?'

In sum, CC's use of modals/auxiliary-like elements largely echoes the adult's production of the same set of elements in the child-directed signing (except *NOT-HAVE@f*).

Though Deaf researchers produce preverbal modals/auxiliary-like elements occasionally, they know that which modals/auxiliary-like element follows the order

in Cantonese and which conforms to the HKSL grammar. While the Cantonese grammar has a head-initial TP, HKSL grammar has a head-final TP:[19]

Figure 7.9 Head-initial and Head-final TP



The fact that Deaf researchers use both grammars, albeit unbalanced, suggests that they behave like bilinguals. It has been reported that language mixing in child data is positively related to that in the input data (See for instance Goodz 1989). The fact that CC's use of modals/auxiliary-elements echoes with the adult's ones is then not surprising.

7.3.5 Summary

This section starts out with a study of word orders in CC's utterances which may serve as evidence to an early TP (i.e. Sections 7.3.1 and 7.3.2). Due to the presence of null subjects, it is not entirely clear whether subject raising, being a piece of evidence to the availability of TP, is present in early HKSL. The word orders

[19] In Chinese, the modals can be clause-final in a particular structure (Wong 1999:59):
a. ni zheyang zuo bu yinggai/keyi.
you this way do not should/can
'It is not proper/permissible that you do it (this way).'
Since CC's utterances do not contain elements like *zheyang zuo* 'this way do', I do not suggest the clause-final modals/auxiliary-like elements in early HKSL are identical to this example.

associated with transitive and ditransitive verbs only provide additional evidence to the presence of *v*P. Modals and auxiliary-like elements are therefore examined as alternative evidence to the presence/absence of TP in early HKSL. The fact that $HAVE_{exist}$ emerges before age 3 suggests that TP is present in the early phrase structure. The results shown here echoes the discussion on previous studies on functional projections in Chapter 1. Since different researchers report different results on early verbal inflections, it is controversial whether verb movement is present in the child grammar. However, the syntactic positions of verbs in relation to negators and adverbs show clearer evidence to the presence of verb movement. In other words, some language phenomena in child language may provide clearer picture than the others do. While the availability of TP is unclear as far as word orders associated with transitive and ditransitive verbs are concerned, its presence in the early phrase structure is justified by the early use of modals/auxiliary-like elements. However, the co-occurrence of preverbal and clause-final modals/auxiliary-like elements shows that CC may be confused with the head directionality of TP in HKSL. I will discuss this issue further in Section 7.5.

7.4 Negation

Negation provides further evidence to the presence of functional projections in child language. Totally 321 tokens of negator *NOT* are observed in CC's utterances. 252 tokens of these negators occur in single-sign utterances (e.g. *NOT.*). A small portion of them (57/252) are answers, as shown in the following example:

(28) INV: SLOW
CL:A_MOTORCYCLE_MOVES_SLOWLY
SLOW YES-NO-YES?
'Does the motorcycle move slowly?'

CHI: NOT.
'It is not the case (that the motorcycle moves slowly).' (3;7.13)

In example (28) the negator negates the propositions presented in the researcher's question. This type of negative utterance is first observed at age 3;1.15, suggesting the presence of NegP at an early age.

While the negator in example (28) reflects the presence of NegP, it does not show the head directionality of NegP. In order to find out whether the negators in child language reflect a head-initial NegP or a head-final NegP, only utterances which contain both a negator and a predicate are considered. Totally 50 utterances are of this type. Most negative utterances (38/50) contain a clause-final negator and a small portion of them (12/50) contain a preverbal negator:

(29) Context: CC told a story in which a monkey mother asked her son not to draw on the wall.

CL:DRAW_ON_WALL **NOT** .
'(You do) not draw on the wall.' (2;11.21)

(30) Context: CC lay on the Deaf researchers' laps.

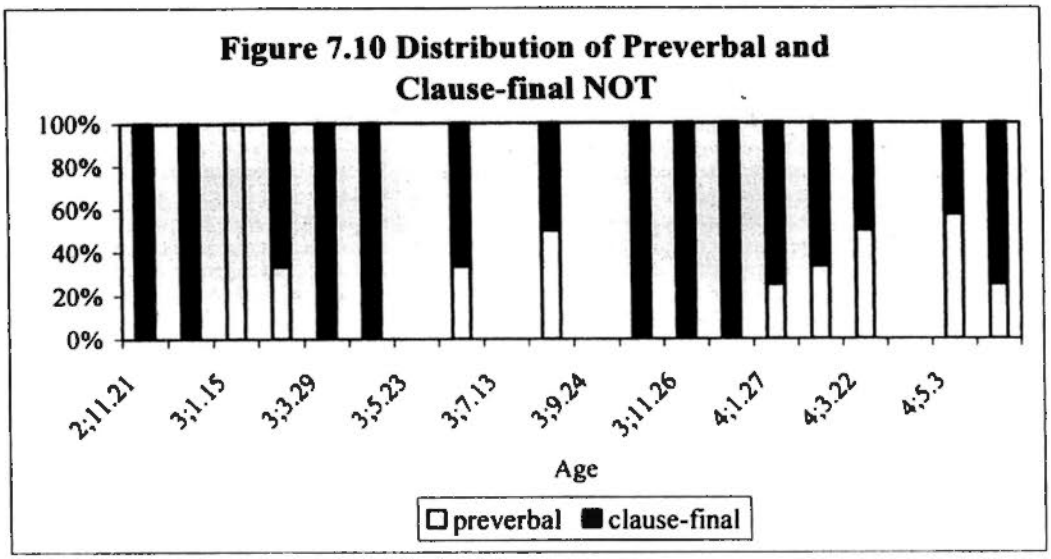
NOT HIT_a.
'(You) do not hit (me).' (3;1.15)

Examples (29) and (30) show the first clear use of a clause-final *NOT* and a preverbal *NOT*. I have mentioned in the previous section that the negative modal *CANNOT* and negative auxiliary-like elements *NOT-HAVE* and *NOT-HAVE@f* are more often placed at a clause-final position in CC's utterances. While the syntactic positions of *CANNOT* and *NOT-HAVE* may be influenced by the input data, the distribution of *NOT-HAVE@f* in child data does not echo that in the input data. Compare the distribution of preverbal and clause-final negators with negative modals and auxiliary-like elements in the following table:

Table 7.12 Distribution of Negators and Negative Modals/Auxiliary-like Elements in Child and Input Data

	Preverbal		Clause-final	
	Child	Adult	Child	Adult
CANNOT	0	0	15	44
NOT-HAVE	0	0	1	74
NOT-HAVE@f	5	0	9	11
NOT	12	1	38	235

Almost all negators and negative modals/auxiliaries in the input data are clause-final. By contrast, CC produces preverbal *NOT* and *NOT-HAVE@f*. I have shown in the previous section that clause-final *NOT-HAVE@f* appears earlier than the preverbal one. A related question is whether the same is true for *NOT*. See the figure below:



Similar to the results on *NOT-HAVE@f*, preverbal *NOT* emerges later than clause-final *NOT*. The earlier emergence of clause-final negators suggests that the head-final NegP is present as early as age 2;11.21. The co-occurrence of preverbal and clausal-final negators can be addressed by a number of analyses. First, the child language has two grammars such that a head-initial NegP and a head-final NegP co-exist. Second, the apparent clause-final negator is resulted from a movement of the subject, the verb and the object. Since both T-elements and negators may be preverbal and clause-final in early HKSL, I will consider the possible analyses on NegP together with TP below.

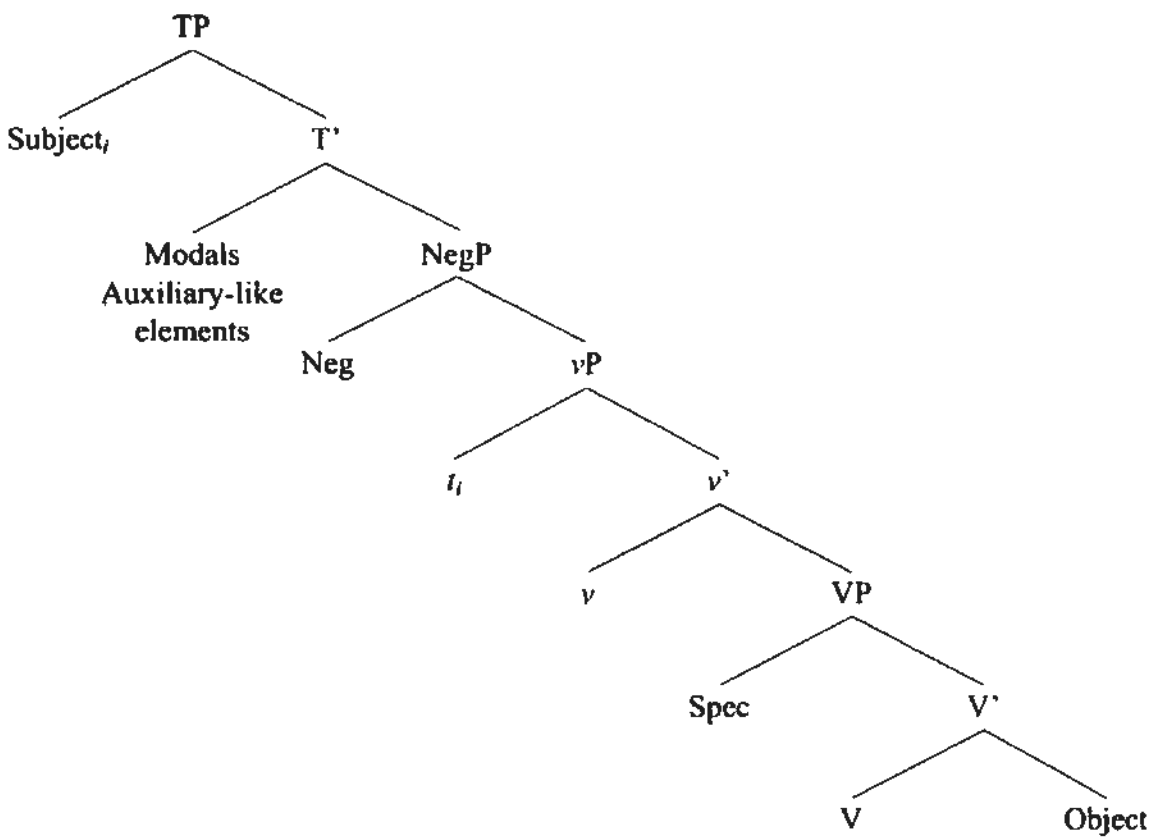
7.5 Discussion

7.5.1 Head Directionality of TP and NegP

In Sections 7.3 and 7.4 I have shown that some T-elements (i.e. modals/auxiliary-like elements) and negators in early HKSL may appear at a preverbal position or at a clause-final position. There are two accounts which may capture the different positions of these functional elements in the child language.

First, the early phrase structure is head-initial. Recall that adults also produce some preverbal modals/auxiliary-like elements and few preverbal negators. The co-existence of preverbal and clause-final functional elements may be viewed as ambiguous input.[20] I have mentioned in Chapter 6 that ambiguous input may delay the acquisition of certain language phenomenon or causes transfer from one language to another in bilingual acquisition. CC is exposed to both signed Cantonese and conventional HKSL, though the former is less predominant in the video-taping sessions. The preverbal functional elements may therefore be caused by a transfer from a Cantonese/Chinese structure where TP is head-initial:

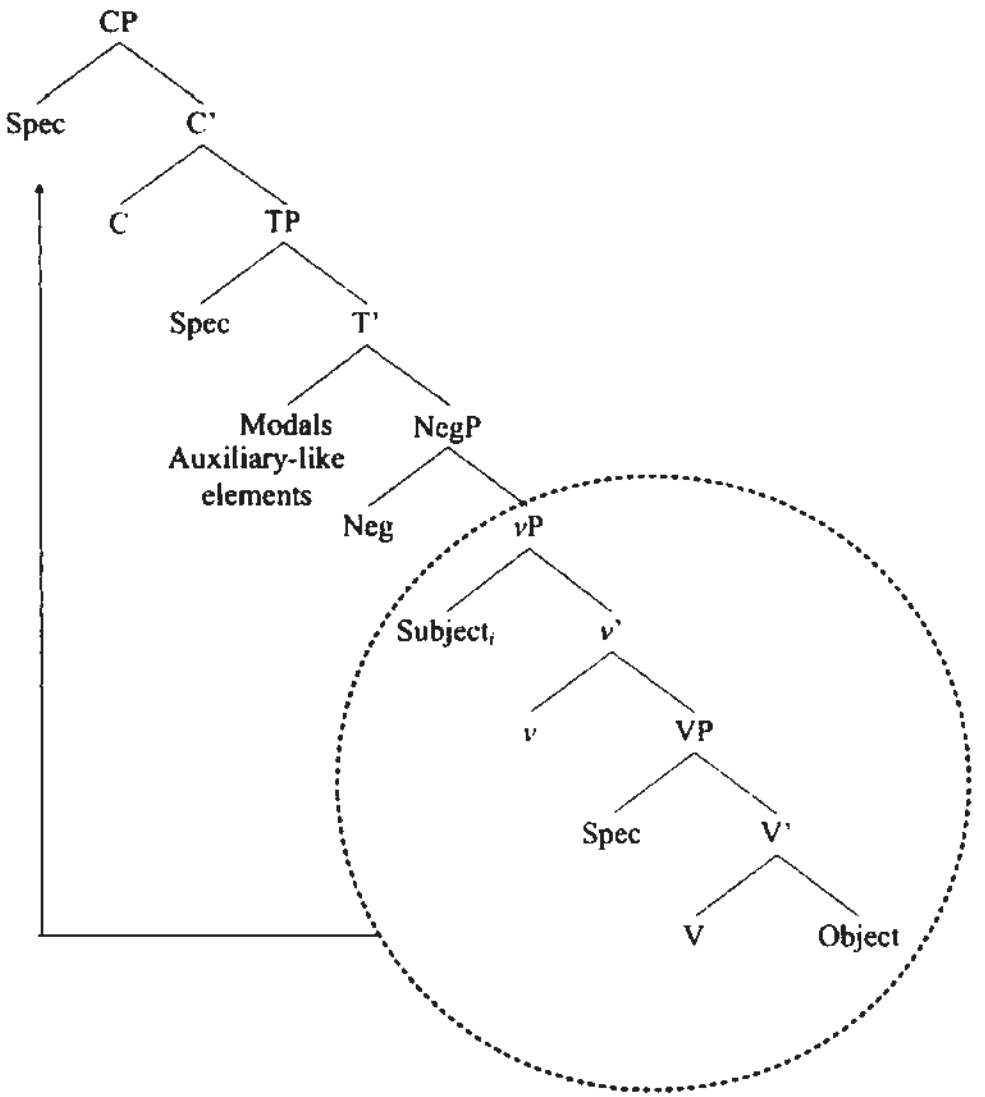
Figure 7.11 Derivation of Preverbal Functional Elements



[20] The learnability issue associated with input ambiguity will be discussed in the next section.

Figure 7.11 shows the abstract structure for deriving preverbal functional elements.[21] The order S-neg/mod-V-O can be derived by moving the subject to Spec, TP. Clause-final modals/negators, on the other hand, are resulted from *v*P fronting to Spec, CP:[22]

Figure 7.12 Derivation of Clause-final Functional Elements



It is assumed that the *v*P which houses the subject, verb and object moves up to Spec, CP. The order S-V-O-mod/neg is subsequently obtained. So the clause-final

[21] In Chapter 3 I have noted that negators and modals do not co-occur. The ordering on NegP and TP are hypothetical here. See Chapter 3 for reasons of assuming the presence of both NegP and TP in HKSL.

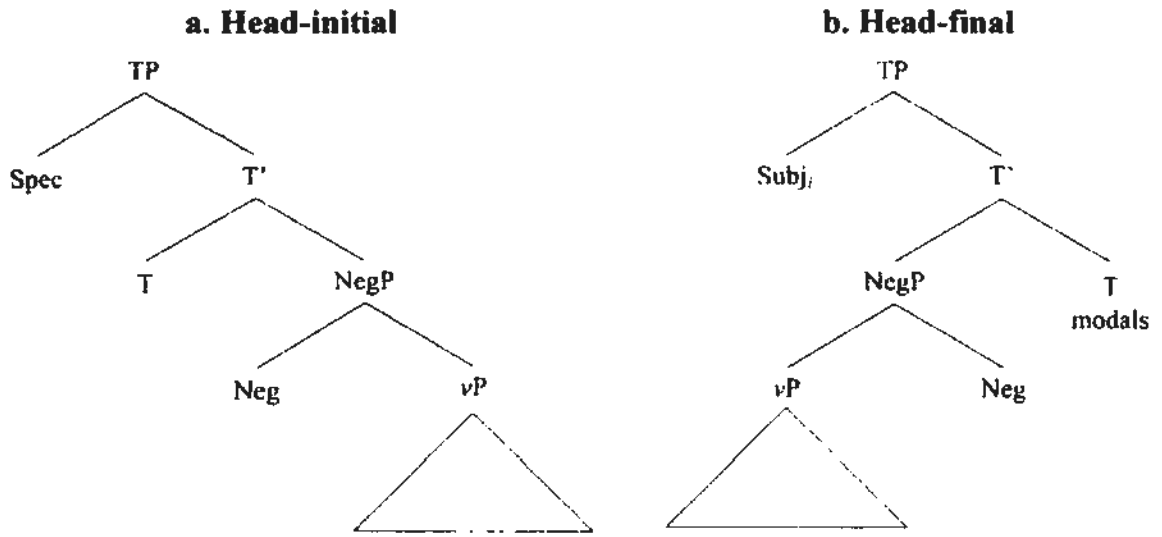
[22] Wurmbrand (2001, 2004) uses a similar analysis to account for definiteness effect in German. In her analysis, indefinite subject stays in *v*P and definite subject moves to Spec, T.

functional elements are resulted from *v*P movement to CP. This account has two problems. The first problem is related to the theory of movement. While subject raising to Spec, TP has been standardly assumed, it is not clear why *v*P has to raise and why subject does not raise to Spec, TP for Case assignment.[23] The technical details on why *v*P moves upward needed to be work out. Also, the co-occurrence of preverbal and clause-final functional elements in child language suggests that *v*P movement is optional. The optionality calls for an explanation. One possibility is to assume that child grammar is different from adult grammar in that child grammar does not observe all the principles in syntactic derivations in adult grammar. Wexler's account on optional infinitives, for instance, is an attempt to account for child data in this way (See Chapter 1). Another possibility is to follow Roeper (1999) in assuming that the co-occurrence of preverbal and clause-final functional elements actually reflects some kind of bilingualism. The idea from Roeper leads us to another account on the early functional elements in HKSL.

Deaf researchers are themselves bilinguals as they could produce utterances which follow two different grammars (Cantonese and HKSL). The preverbal and clause-final functional elements, in fact, represent two grammars. When CC is exposed to two grammars in the course of acquisition, he may produce mixed utterances in the same way as bilingual children do. If two grammars are available in the child language, it is possible that the preverbal and clause-final functional elements each represent a structure:

[23] One may suggest that the subject first moves to Spec, TP for Case, followed by a remnant *v*P movement to Spec, CP. This kind of derivation gives rise to a V-O-S-neg order which is not the kind of word order being discussed.

Figure 7.13 Head-initial and Head-final TP and NegP



While the preverbal functional elements are associated with a head-initial structure (Figure 7.13a), the head-final structure (Figure 7.13b) derives sentences which contain head-final functional elements. The functional elements of different positions actually reflect two different structures instead of one suggested earlier.

7.5.2 Input Ambiguity and Learnability

The previous discussion has focused on how the child data in HKSL can be captured by the effects from input ambiguity. A related question is how a child can walk away from the influence of ambiguous input and attain the adult grammar at the end. Fodor (1998) puts forward the idea that children need some unambiguous triggers, data which are unambiguous, in order to set the parameters right.

CC produces both preverbal and clause-final modals/auxiliary-like elements. Will he finally reanalyze the two types of modals/auxiliary-like elements as linguistic items from two different grammars (Cantonese and HKSL)? If he can distinguish the two types of modals/auxiliary-like elements, a question followed is what triggers

such change. More specifically, what kind of input data serves as the unambiguous trigger for the acquisition of modals/auxiliary-like elements in HKSL?

I have mentioned that functional elements are generally clause-final in the adult grammar in Chapter 3. I have also shown that the input data contain both preverbal and clause-final functional elements. But when the functional elements are examined more closely, negators are the functional elements that are used in a relatively consistent manner. Almost all the negators identified are clause-final. The clause-final negators can therefore serve as the unambiguous trigger that drives CC to reanalyze the modals/auxiliary-like elements in HKSL. Further research will help us verify whether CC will use more clause-final modals/auxiliary-like elements when he grows older.

7.5.3 Continuity and Maturation

In Chapter 5 I have noted a number of predictions on the early phrase structure. The fact that functional projections like *v*P, TP and NegP are available in early HKSL phrase structure conforms to the predictions made by the Continuity view. Though the functional projections appear quite early (before age 3), the syntactic operations observed in the adult grammar seem to be missing.

I have mentioned in Chapter 3 that classifier predicates are formed from V-to-*v* movement and SOV and S-DO-V-IDO orders involve subject raising and object shift in adult grammar. Though *v*P, evidenced by agentive subjects, is present around age 2, the presence of V-to-*v* movement is only identified by the use of different handshapes with the same verb root at around age 3. Similarly, subject raising and object shift occur much later than the emergence of TP. TP is shown to be present before age 3 when CC begins to use modals/auxiliary-like elements. Yet it is until

age 3;11.26 when SOV order is observed. S-DO-V-IDO order is absent in the child data. Though DO, S-V-IDO indirectly suggests the presence of movement, such operation is only observed after age 4. Two questions arise from this result. First, why are the syntactic movements not identified at more or less the same age when the respective phrases are identified? Second, what triggers the child to come to realize that the target grammar requires syntactic movements like V-to-*v* movement, object shift and subject raising?

Consider the first question. The syntactic movements are identified after the respective phrases are observed. Though V-to-*v* movement is a standard assumption in the current theory, the presence or absence of V-to-*v* movement does not give rise to a change in word order in HKSL (See Chapter 3). The most explicit evidence of V-to-*v* movement would be the formation of classifier predicates. Acquisition of classifier predicates requires a long period of time (See Chapter 4). This could be one of the reasons why V-to-*v* movement is observed at a later stage.

Another type of movement that seems to be missing is object shift. Object shift is reported to appear late. In their study, Boser et al (1995) suggest that the acquisition of object shift in German, Dutch and Swedish requires knowledge on semantic interpretation principles and contextual/discourse information on the one hand and syntactic movement principles on the other hand. In HKSL it is not entirely clear to what extent semantic interpretation principles and contextual/discourse information play a role in object shift. Yet the knowledge of types of NPs and verb types are required in addition to syntactic principles associated with object shift. In Chapter 3 I have mentioned that the degree of acceptance of shifted object NPs is the highest with proper names and less with common nouns when the verb is a plain verb. Pronominal index signs, however, cannot be shifted. In order to shift an object as the

adults do, the child needs the knowledge of the types of objects. Since objects are obligatorily shifted when the sentences contain classifier predicates, the child also needs to know the verb types. Acquiring the types of object NPs and verb types may delay the emergence of object shift.

The second question noted above is about the notion of learnability. Syntactic movements like V-to-*v* movement and object shift are not identified at the same time when functional phrases are identified. It appears that overt syntactic movements are not available in the child language initially even though the early phrase structure contains functional projections. A related question is what the trigger of the emergence of overt syntactic movements in early HKSL could be.

V-to-*v* movement occurs with both lexical verbs and verb roots of classifier predicates in adult grammar. While lexical verbs are not attached to any overt markers at *v*, the verb root becomes a classifier predicate when it lands at *v*. Since lexical verbs do not show any overt *v*-elements, they may be analyzed as having V-to-*v* movement or not having V-to-*v* movement. In other words, the knowledge on lexical verbs may not help a child to realize that V-to-*v* movement is present in the target language. Classifier predicates, on the other hand, can be considered as a piece of unambiguous trigger as a classifier predicate consists of minimally a verb root and a classifier handshape. While the verb root is base-generated at V, the classifier handshape of the classifier predicates are identified at *v*. Since classifier predicates show overt *v*-element (i.e. classifier handshape), classifier predicates in the input can help children to realize that V-to-*v* movement is present in the target language.

The knowledge of object shift may also come from sentences with classifier predicates. I have noted in Chapter 3 that object shift is obligatory with classifier predicates but not with other verb types in transitive sentences. This is evidenced by

the fact that sentences with classifier predicates always demonstrate a SOV order. Consistent input is usually viewed as the trigger. Since object shift associated with classifier predicates consistently occurs, it could be a piece of triggering data in the acquisition of object shift in HKSL.

I have been discussing which part of the input data could be the trigger of the later emergence of syntactic movement under the Continuity view. A related question is to what extent the late emergence of syntactic movements in early HKSL could possibly be explained by a UG-constrained maturational account. Wexler (1992) points out that late emergence of certain structures/representations can be captured by maturation. This view is particularly convincing if one observes that certain structures appear late even though the input data is abundant. If the input data is abundant, why triggering does not appear at an early stage but at a later stage? This is a challenge to the Continuity view (See Chapter 1). Input on HKSL is limited, delayed and ambiguous. So it is hard to test whether the late emergence of various language phenomena is due to the nature of input or the biological timetable of the genetic program. I will therefore leave this issue open for future research.

7.6 Chapter Summary

This chapter presents a number of language phenomena which point to the presence of functional projections like *v*P, TP and NegP in early HKSL. Since all three phrases emerge soon after CC begins to combine verbs and their arguments, I assume that the child data do not support the Small Clause Hypothesis. Rather I suggest that CC has full competence of the phrase structure. The fact that CC is exposed to both Signed Cantonese and HKSL also explains why CC produces both preverbal and clause-final functional elements.

Chapter 8

Conclusions

This thesis examines the early phrase structure projected by different forms of the grammatical category VERB in HKSL. HKSL VERB can be divided into 2 types: plain verbs and non-plain verbs. Agreement verbs, spatial verbs and verb roots of classifier predicates are the subtypes of non-plain verbs. Though these verbs have different morphological properties, I assume that they are projected into the same structure which has a head-initial *v*P, a head-final TP and a NegP. The word order differences between lexical verbs (i.e. agreement verbs, spatial verbs and plain verbs) and classifier predicates are captured by object shift.

Though the grammatical category VERB may appear in different forms in HKSL, it does not seem to be a problem in the acquisition of verbs. All but marked agreement verbs appear before age 3. Verbs which are morphologically simpler appear earlier than those that are more complex. Plain verbs, spatial verbs (either spatially-marked or not spatially-marked) and unmarked and spatially-marked agreement verbs appear quite early. At more or less the same time, classifier predicates appear. Marked agreement verbs emerge last. In the discussion of the acquisition of verbs, the use of space and input ambiguity are also considered. The data shows that the use of space is present in the child language. But the early verbs do not always reflect the use of space. Input ambiguity, on the other hand, explains why agreement markings emerge late.

This thesis considers three functional phrases, *v*P, TP and NegP in the exploration of early phrase structure. I have shown that the presence of early subjects, object shift, projection from ditransitive verbs and classifier predicates all point to

the presence of vP in the early phrase structure. While TP is largely evidenced by modals/auxiliary-like elements, NegP is identified by negators in CC's utterances. All these functional elements appear before age 3. This suggests that the early phrase structure may contain all these phrases initially and the results lend further support to the Continuity view. Given the findings on classifier predicates and word order, movement associated with these functional projections appears much later. In addition, I suggest that the preverbal and clause-final T-elements/negators reflect two grammars given the fact that CC is exposed to Signed Cantonese and HKSL in the same period.

Being one of the first acquisition studies in HKSL, this thesis raises a number of questions which invites further research. Phrase structure in this thesis is limited to TP. In the recent version of MP, it is assumed that CP is the full structure. A thorough study on CP will therefore form the basis on whether child grammar has a structure up to CP. While Spec, CP houses wh-words, the head C may be occupied by question markers or focused element in a doubling structure. A study of these elements in child language will illuminate on whether CP is present in the child grammar. The syntactic positions of question markers may also show the head directionality of C. Also, a closer scrutiny on wh-movement, if any, will provide further evidence to whether movement in general appears later than the projection of different functional phrases.

In addition to the theory of phrase structure in adult grammar, the role of Cantonese in both adult HKSL and child HKSL requires further studies. I have pointed out that the preverbal functional elements in HKSL are resulted from the Cantonese influence. The fact that Deaf researchers use both signed Cantonese and conventional HKSL suggests that the Deaf researchers are bilinguals. It may be more

accurate to describe the language acquisition by deaf children as bilingual acquisition. Studying the data from the perspective of bilingualism may shed light on the acquisition of HKSL.

Finally, this thesis faces a number of methodological limitations which may be advanced in further studies. First, CC was not born to native signers and hence he could hardly receive native input until the family joined the research project. The environment he was exposed to was highly oral because he was mainly taken care of by his hearing grandmother and hearing caretakers at home. Due to long working hours in Hong Kong, even non-native HKSL input from the parents is limited. The preference for Cantonese by the seniors at home also hinders CC's acquisition of HKSL. It is possible that a child who was born to native signers would show a different picture on child acquisition of HKSL.

Second, due to a lack of written system of HKSL, transcription of signs is time-consuming and laborious even for native signers. As noted, all the video files in this study are work-in-progress. The use of ELAN for transcription is good for viewing but not for sophisticated calculations. The unclear status of a morpheme in HKSL also makes calculating MLU difficult. This limits the comparison with other studies because age may not truly reflect the stages in acquisition.

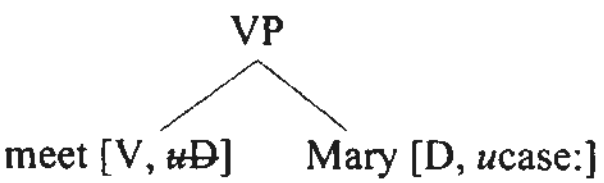
Appendices

Appendix 1 An Illustration of Derivations in Recent MP

Exactly how these syntactic operations operate in recent MP is best illustrated with an example. Snyder (2007), for instance, gives a clear example of how an English sentence *John met Mary* is derived. It is assumed that the following bundles of features enter the derivation: {*John* [D, *u*case:], *Mary* [D, *u*case:], *meet* [V, *u*D], v [*u*D, *u*case:acc, *u*V*, *u*infl:], T [*u*D*, tense:past, *u*case:nom]}. The bundles of features are represented with the square bracket. D and V are syntactic categories; strong feature is marked with asterisk * (e.g. [*u*V*]); values of features follow the colon (e.g. [*u*case:nom]). Uninterpretable features are represented by *u* (e.g. the uninterpretable case feature [*u*case]). Note that selectional features are also marked with *u* (e.g. [*u*D]).[1] A selectional feature is satisfied by sister relationship. The category which has a feature [*u*D], for instance, requires a D to be its sister.

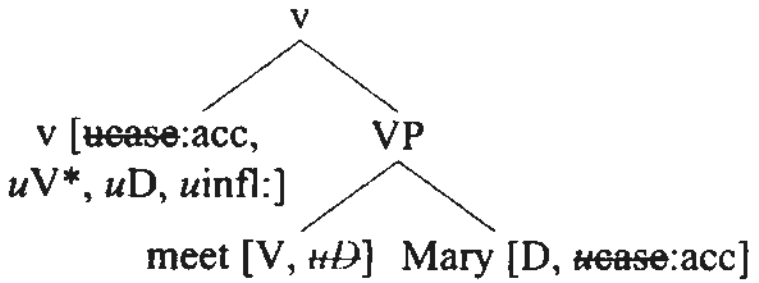
The derivation begins with merging the V *meet* and its complement *Mary*. The selectional feature [*u*D] of the verb is deleted as the verb takes a D (i.e. *Mary*) as its complement:

Figure 1 Derivation of VP



Then the structure is built further by merging *v* with VP. Since *v* and *Mary* both have Case feature, *Mary* gets accusative Case via Agree:

Figure 2 Merge with v and Valuation of accusative Case[2]



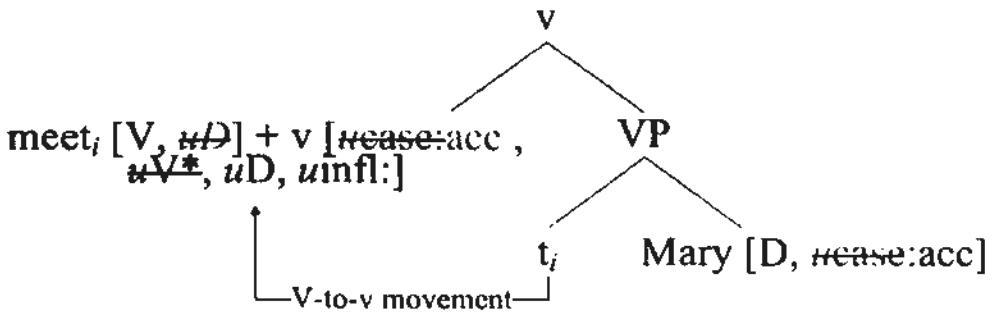
The feature [*u*V*] of v is strong and hence the verb *meet* has to move up and adjoin to v.[3] The feature [*u*V*] is then deleted:

[1] The selectional feature in Snyder's illustration is equivalent to EPP feature.

[2] Deleted features are represented with a strike mark. Words in grey color are features deleted or valued in the previous steps.

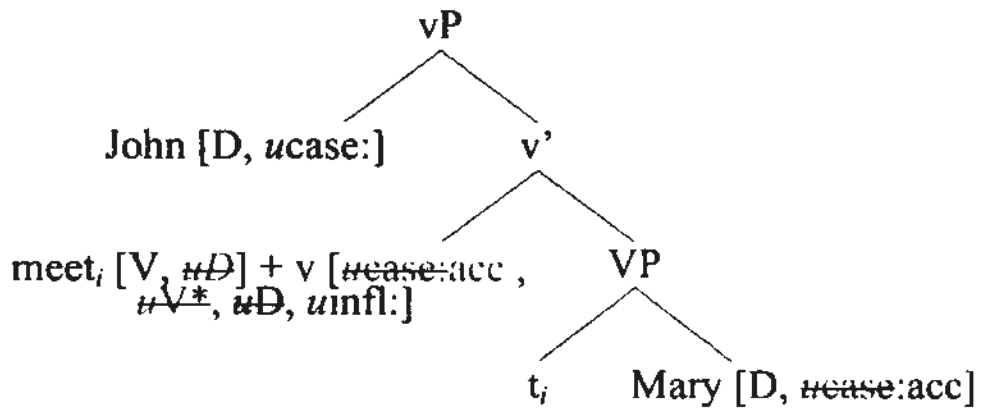
[3] It is not entirely clear why the small v carries a strong feature [*u*V*] which induces V-to-v movement in Snyder's illustration. One possibility is that this movement minimizes the search domain for Agree between the V-feature at T and the matching feature of the verb *meet*.

Figure 3 V-to-v movement due to [*u*V*] at *v*[4]



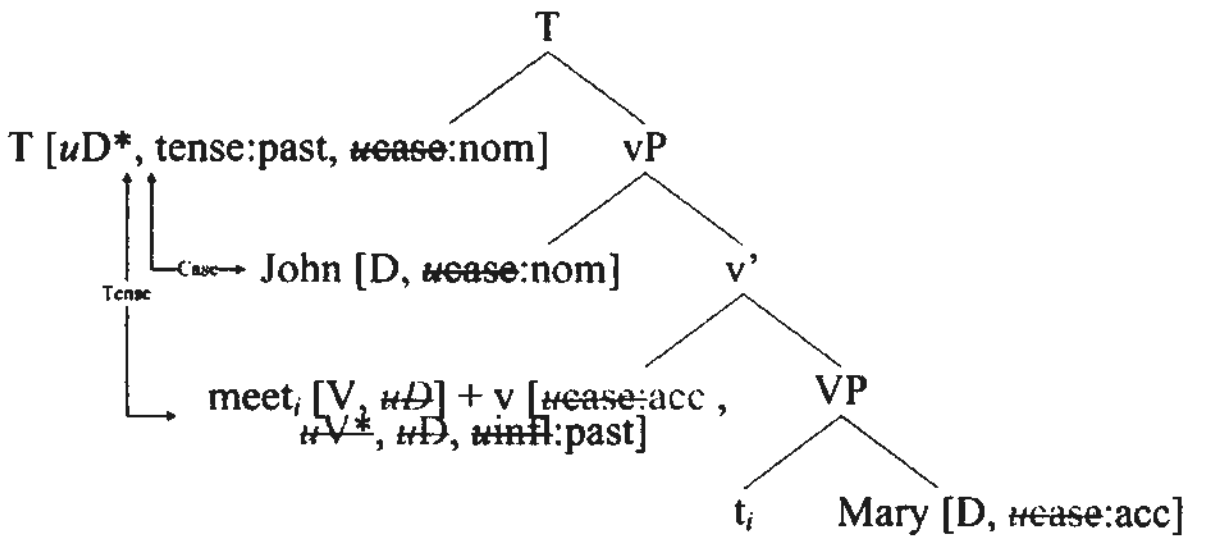
Due to the selectional feature [*u*D] of v, a D has to be a sister of v. The external argument *John* is therefore merged to v and form a *v*P:

Figure 4 Deletion of [*u*D] of *v*



At this point, the external argument *John* does not have nominative Case and the uninterpretable tense feature of v (i.e. [*u*infl:]) remains unchecked. These features can be deleted by matching the Case feature ([*u*case:nom]) and interpretable tense feature ([tense:past]) at T (which is externally merged to the structure) via Agree:

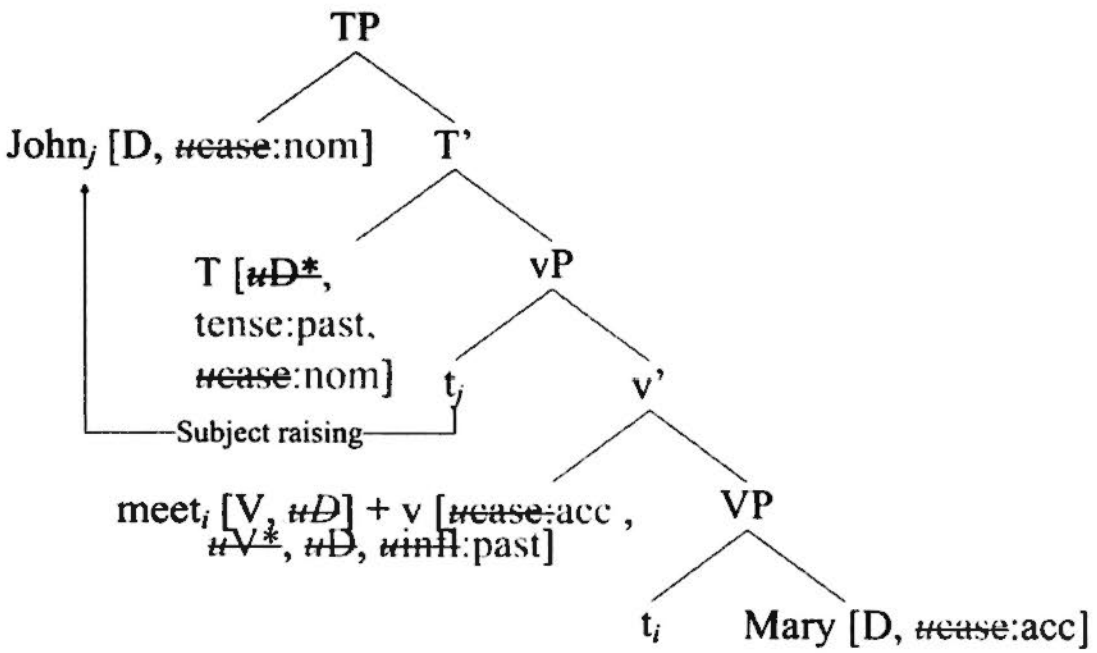
Figure 5 Agree for nominative Case and Tense



[4] Following Snyder, adjunction is represented by '+' to save space.

It follows that only the selectional feature [*u*D*] at T left in the structure. This feature can be eliminated by moving the subject (which is a D) to Spec, TP:

Figure 6 Subject raising due to [*uD] at T



After the subject raising, no more features need to be deleted. The English sentence *John met Mary* is derived.

Appendix 2 Motivations of Eliminating VCLP

Lau assumes that the verb root of classifier predicates undergo incorporation and classifier handshapes are obtained via movement to VCLP. Unlike Lau, I suggest that VCLP fails to capture derivations of sentences with classifier predicates. As noted earlier, the functions of VCLP and *v*P overlap if VCLP is solely for agentivity. One can assume that the agentivity feature, if any, is housed under *v*P such that sentences with classifier predicates can be derived with a simpler structure and fewer movements, in view of the economy of derivation.

Also, the SOV word order associated with classifier predicates cannot be captured with the presence of VCLP. Lau assumes a head-initial VCLP which only derives SVO order. See the figure below:

Figure 1 Word Order and head-initial VCLP[5]

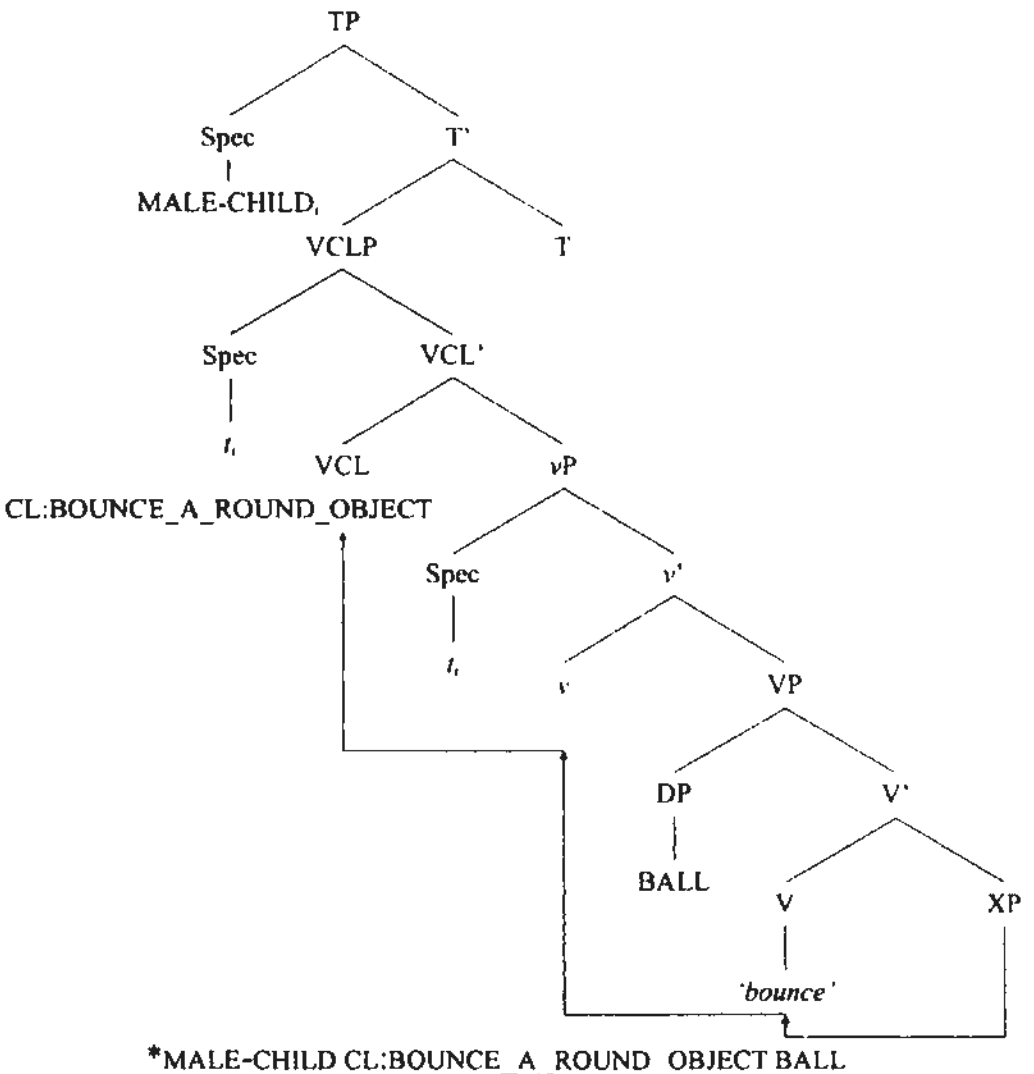
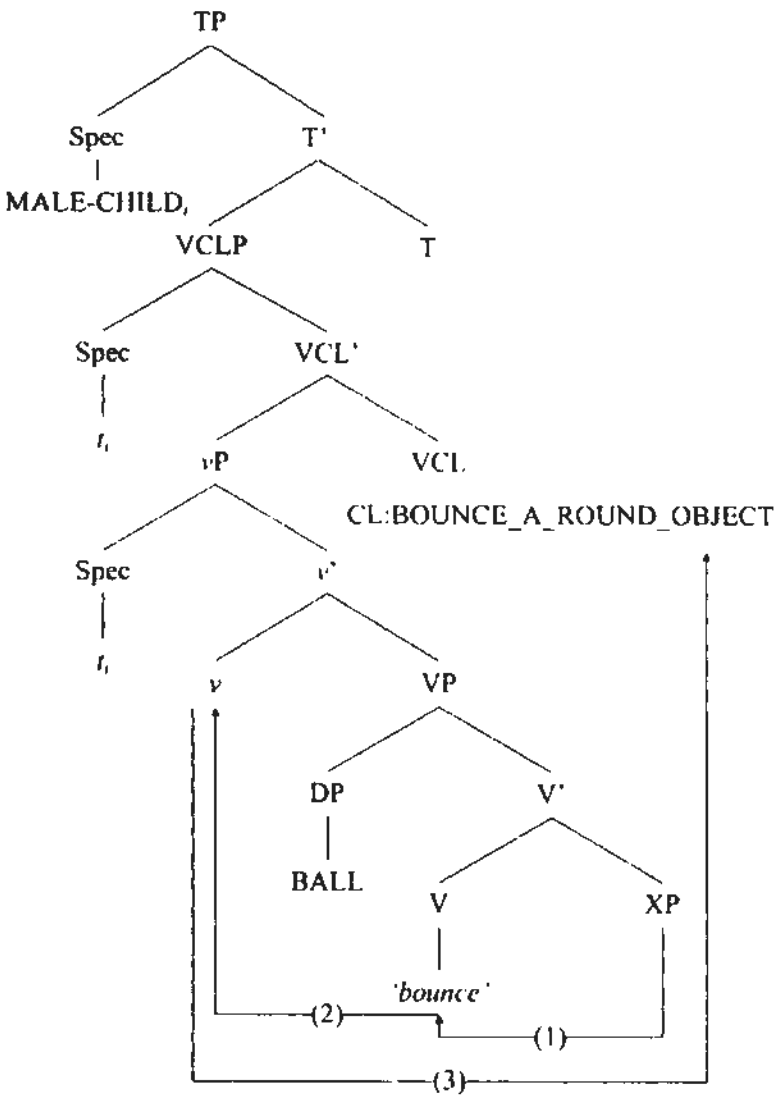


Figure 1 shows that the derivation with a head-initial VCLP results in SVO order which is not allowed in HKSL. One may suggest that the SOV order can be obtained by moving the verb up to the head-final T. However, the fact that modals occur at the

[5] The structure presented in Lau's analysis looks like lexical relational structure in Hale and Keyser's work. Representing the object in the form as 'the ball', it is unclear whether Lau has treated 'the ball' as the actual arguments of the classifier predicates. I assume the direct object is placed at Spec, VP in the discussion on word order and VCLP given the fact that Lau's analysis assumes an incorporation of X which serves as complement position of V.

sentence-final position in sentences which contain classifier predicates suggest that classifier predicates do not raise up to T. Alternatively, one can posit a head-final VCLP to capture the SOV order:

Figure 2 Word Order and head-final VCLP

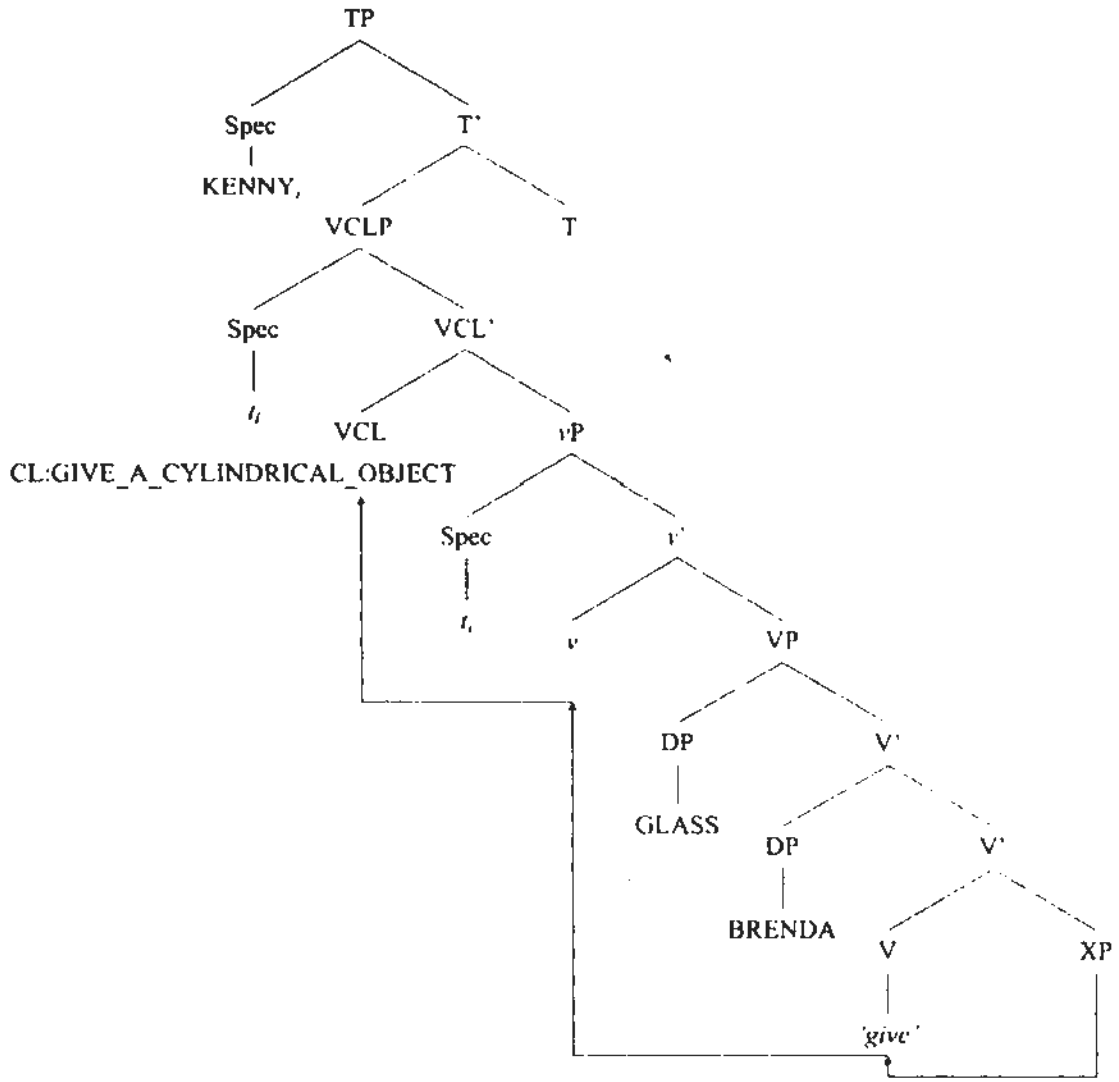


MALE-CHILD BALL CL:BOUNCE_A_ROUND_OBJECT
'A boy bounced a ball.'

When the VCLP is head-final, the SOV order can be obtained by moving the V+XP complex from *v* to a head-final VCL (i.e. movement (3)). At first glance, the head-final VCLP avoids the problems with word order associated with classifier predicates. When a classifier predicate contains a ditransitive verb root, the target S-DO-V-IDO order cannot be obtained by a structure with head-initial or head-final VCLP:[6]

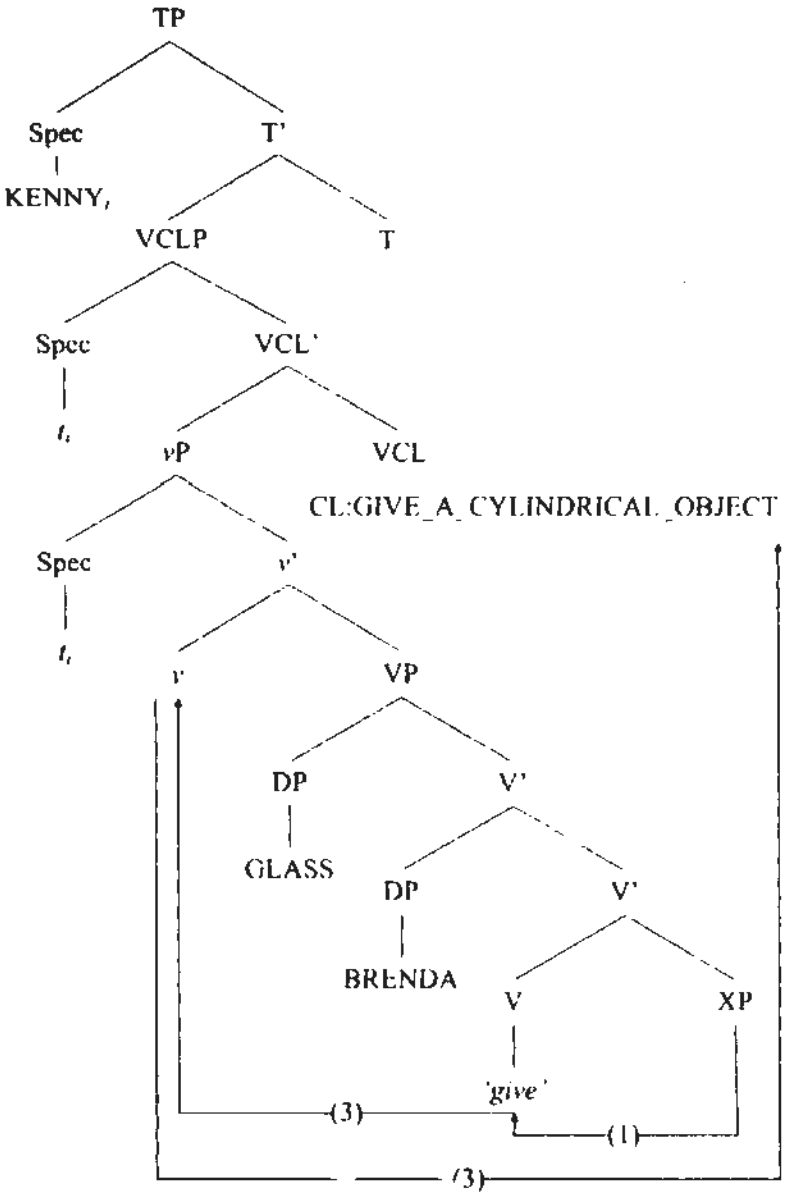
[6] Recall that transitive classifier predicates consistently show SOV order which contrasts which SVO order shown by transitive verbs. It is unclear why the same order S-DO-V-IDO order is observed with lexical verbs and classifier predicates. This issue invites further research.

Figure 3 Ditransitive verbs and head-initial VCLP



*KENNY CL:GIVE_A_CYLINDRICAL_OBJECT GLASS BRENDA.

Figure 4 Distransitive verbs and head-final VCLP

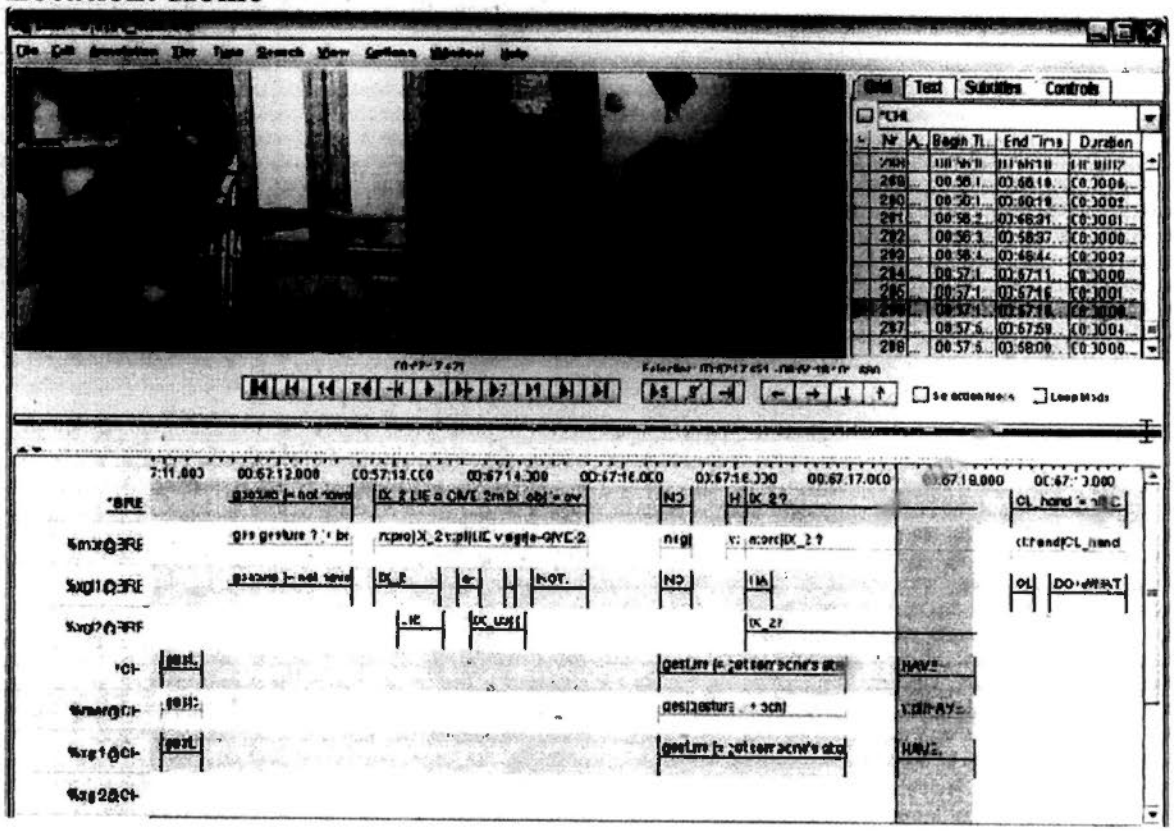


*KENNY GLASS BRENDA CL:GIVE_A_CYLINDRICAL_OBJECT.

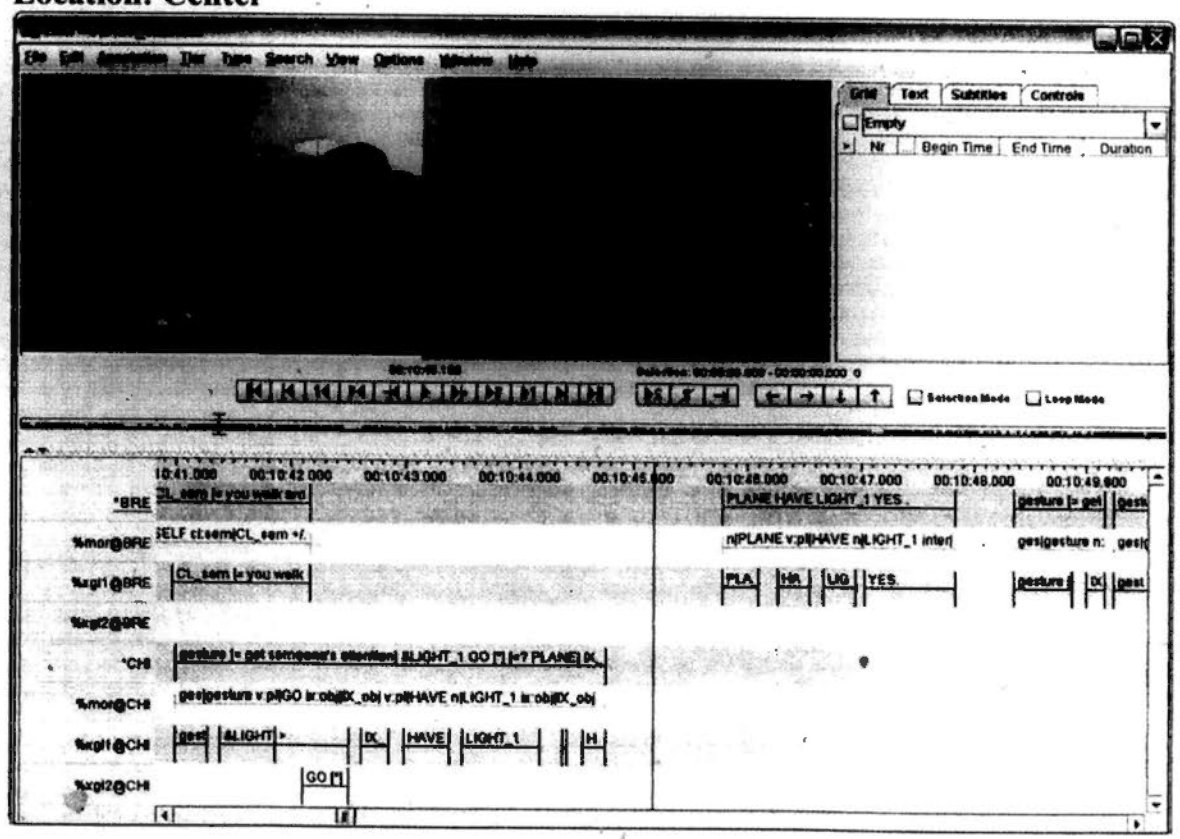
Figures 3 and 4 illustrate the derivations of the sentences with ditransitive classifier predicates with a head-initial VCLP and a head-final VCLP respectively. When the VCLP is head-initial, the sentence has the S-V-DO IDO order. When the VCLP is head-final, the order is S-DO-IDO-V. Both orders are not the word order associated with ditransitive classifier predicates. In order to obtain this order, one may assume that the direct object undergoes object shift to Outer Spec of a head-initial VCLP. When the VCLP is head-final, object shift does not lead to the target word order as the specifier position is still on the left side. The word order associated with ditransitive classifier predicates seems to suggest a head-initial VCLP rather than a head-final VCLP if object shift occurs. If VCLP is head-initial, one need to assume that object always moves into VCLP. Additional assumptions are needed. So I suggest that VCLP can be eliminated and *v*P can take up the function(s) of VCLP.

Appendix 3 Sample Files of ELAN

Location: Home



Location: Center



Appendix 4 Details of Files Used

no.	Date of Video-taping (yyyy/mm/dd)	Age	Location of Video-taping	Time duration
1	2002/5/11	1;9.6	home	1:09:27
2	2002/6/26	1;10.21	home	1:09:38
3	2002/7/13	1;11.8	home	1:30:13
4	2002/8/17	2;0.12	home	1:06:30
5	2002/9/14	2;1.9	home	1:00:44
6	2002/10/5	2;2.0	home	0:46:26
7	2002/11/30	2;3.25	home	0:59:36
8	2002/12/28	2;4.23	home	1:00:06
9	2003/1/18	2;5.13	home	0:44:21
10	2003/2/22	2;6.17	home	1:02:01
11	2003/3/24	2;7.19	home	0:55:10
12	2003/4/23	2;8.18	home	0:59:56
13	2003/6/3	2;9.29	home	0:47:37
14	2003/6/14	2;10.9	home	0:55:14
15	2003/7/26	2;11.21	home, office	1:00:09
16	2003/8/18	3;0.13	home	0:59:54
17	2003/9/20	3;1.15	home	0:59:20
18	2003/10/29	3;2.24	home	0:58:00
19	2003/12/4	3;3.29	center	1:02:00
20	2003/12/18	3;4.13	center	0:58:05
21	2004/1/28	3;5.23	center	0;59:39
22	2004/3/4	3;6.28	home	0:59:39
23	2004/3/18	3;7.13	home	0:54:23
24	2004/4/24	3;8.19	center	0:59:19
25	2004/5/29	3;9.24	center	1:01:31
26	2004/7/3	3;10.28	home	1:00:00
27	2004/7/31	3;11.26	home	0:53:14
28	2004/8/28	4;0.23	home	0:59:28
29	2004/10/2	4;1.27	home	1:00:07
30	2004/10/30	4;2.25	center	1:01:13
31	2004/11/27	4;3.22	center	0:40:35
32	2004/12/18	4;4.13	center	0:50:20
33	2005/1/8	4;5.3	center	1:00:47
34	2005/2/26	4;6.21	center	0:58:41

Appendix 5 Token Frequency of Verb-like Elements

Age	Verb Signs	Verbal Gestures	Verb-like Tokens
1;9.6	5	5	0
1;10.21	2	10	0
1;11.8	4	51	0
2;0.12	27	26	0
2;1.9	16	17	0
2;2.0	11	14	1
2;3.25	25	2	1
2;4.23	7	6	1
2;5.13	5	3	0
2;6.17	44	7	1
2;7.19	17	0	1
2;8.18	13	8	1
2;9.29	21	4	0
2;10.9	36	2	0
2;11.21	90	22	1
3;0.13	69	11	0
3;1.15	35	4	1
3;2.24	65	8	9
3;3.29	25	1	0
3;4.13	56	6	0
3;5.23	52	2	35
3;6.28	68	9	10
3;7.13	80	1	7
3;8.19	111	6	0
3;9.24	89	2	3
3;10.28	61	5	2
3;11.26	109	5	1
4;0.23	129	5	4
4;1.27	172	12	2
4;2.25	182	6	0
4;3.22	176	6	3
4;4.13	142	4	0
4;5.3	262	8	3
4;6.21	193	5	0
total	2399	283	87

Appendix 6 Token Frequency of Verb Signs

Age	Plain Verbs	Unmarked agreement verbs	Spatially-marked agreement verbs	Marked agreement verbs	Non-spatially-marked spatial verbs	Spatially-marked spatial verbs	Classifier Predicates
1;9.6	1	2	0	0	0	2	0
1;10.21	0	2	0	0	0	0	0
1;11.8	1	3	0	0	0	0	0
2;0.12	17	7	0	0	0	3	0
2;1.9	13	0	2	0	0	0	1
2;2.0	7	1	0	0	0	2	1
2;3.25	15	1	4	0	3	1	1
2;4.23	2	3	2	0	0	0	0
2;5.13	5	0	0	0	0	0	0
2;6.17	26	6	11	0	0	0	1
2;7.19	15	0	0	0	2	0	0
2;8.18	9	3	0	0	0	0	1
2;9.29	15	1	0	0	2	0	3
2;10.9	14	4	0	0	1	0	17
2;11.21	61	4	0	0	9	10	6
3;0.13	43	6	7	0	4	4	5
3;1.15	23	3	2	0	1	3	3
3;2.24	29	4	6	0	8	0	18
3;3.29	19	0	2	0	1	0	3
3;4.13	16	11	5	1	4	4	15
3;5.23	30	4	2	1	2	4	9
3;6.28	54	2	1	0	2	3	6
3;7.13	42	5	8	0	2	4	19
3;8.19	71	8	4	0	13	3	12
3;9.24	76	5	0	0	4	0	4
3;10.28	48	5	1	0	3	0	4
3;11.26	62	22	4	2	3	2	14
4;0.23	72	9	7	0	4	3	34
4;1.27	86	22	8	2	14	4	36
4;2.25	80	32	21	2	26	7	14
4;3.22	97	28	6	4	10	2	29
4;4.13	88	23	6	1	5	0	19
4;5.3	129	40	29	5	7	5	47
4;6.21	115	18	15	5	6	2	32
total	1381	284	153	23	136	68	354

Appendix 7 Developmental Pattern (type frequency)

		Repeated Use	
	First Clear Use	Appeared 5 times	Appeared twice in one month
Verbal Gestures	1;9.6	1;11.8	1;9.6
Plain Verbs	1;9.6	2;0.12	2;0.12
Agreement Verbs			
Unmarked	1;9.6	2;2.0	2;6.17
Marked for spatial locations	2;1.9	2;6.17	2;6.17
Marked for verb agreement	3;4.13	4;3.22	Nil
Spatial Verbs			
+Spatially-marked	1;9.6	2;3.25	2;2.0
−Spatially-marked	2;3.25	3;0.13	3;0.13
Classifier Predicates			
Semantic	2;8.18	3;4.13	3;2.24
Handle	2;2.0	2;10.9	2;10.9
SASS	2;1.9	2;10.9	2;9.29

Appendix 8 Token Frequency of Word Order

	VO	SVO	OV	SOV
1;9.6	0	0	0	0
1;10.21	0	0	0	0
1;11.8	0	0	0	0
2;0.12	0	0	0	0
2;1.9	2	0	0	0
2;2.0	0	0	0	0
2;3.25	1	0	0	0
2;4.23	0	0	0	0
2;5.13	0	0	0	0
2;6.17	3	0	4	0
2;7.19	0	0	0	0
2;8.18	1	0	0	0
2;9.29	0	0	1	0
2;10.9	2	0	0	0
2;11.21	5	4	2	0
3;0.13	2	3	4	0
3;1.15	2	0	2	0
3;2.24	2	3	2	0
3;3.29	0	0	0	0
3;4.13	4	0	1	0
3;5.23	8	5	1	0
3;6.28	8	6	5	0
3;7.13	2	2	4	0
3;8.19	1	9	2	0
3;9.24	13	8	2	0
3;10.28	3	4	2	0
3;11.26	7	7	2	2
4;0.23	9	14	2	0
4;1.27	11	8	3	0
4;2.25	12	7	7	1
4;3.22	18	13	0	0
4;4.13	13	8	4	0
4;5.3	18	12	7	0
4;6.21	19	13	2	1
total	166	126	59	4

Appendix 9 List of Video Clips

Chapter 2

chp2_eg4.mpg	Example (4)	p.28
chp2_eg6a.mpg	Example (6a)	p.29
chp2_eg6b.mpg	Example (6b)	p.29
chp2_eg14a.mpg	Example (14a)	p.38
chp2_eg14b.mpg	Example (14b)	p.38

Chapter 5

chp5_eg1a.mpg	Example (1a)	p.137
chp5_eg1b.mpg	Example (1b)	p.137
chp5_eg1c.mpg	Example (1c)	p.137
chp5_eg2a.mpg	Example (2a)	p.138
chp5_eg2b.mpg	Example (2b)	p.138
chp5_eg2c.mpg	Example (2c)	p.138
chp5_eg5a.mpg	Example (5a)	p.140
chp5_eg5b.mpg	Example (5b)	p.140

Chapter 6

chp6_eg1.mpg	Example (1)	p.149
chp6_eg2.mpg	Example (2)	p.150
chp6_eg3.mpg	Example (3)	p.150
chp6_eg4.mpg	Example (4)	p.154
chp6_eg5.mpg	Example (5)	p.154
chp6_eg6.mpg	Example (6)	p.157
chp6_eg7a.mpg	Example (7a)	p.157
chp6_eg7b.mpg	Example (7b)	p.157
chp6_eg8.mpg	Example (8)	p.160
chp6_eg9.mpg	Example (9)	p.162
chp6_eg10a.mpg	Example (10a)	p.163
chp6_eg10b.mpg	Example (10b)	p.163
chp6_eg11.mpg	Example (11)	p.163
chp6_eg12a.mpg	Example (12a)	p.165
chp6_eg12b.mpg	Example (12b)	p.165
chp6_eg12c.mpg	Example (12c)	p.165
chp6_eg13a.mpg	Example (13a)	p.167
chp6_eg13b.mpg	Example (13b)	p.167
chp6_eg13c.mpg	Example (13c)	p.167
ad_umbrella.mpg	Footnote 18	p.167
ad_plane.mpg	Footnote 19	p.168

chi_table6_12_1.mpg	Table 6.12 (1) child classifier handshape	p.170
chi_table6_12_2a.mpg	Table 6.12 (2a) child classifier handshape	p.170
chi_table6_12_2b.mpg	Table 6.12 (2b) child classifier handshape	p.170
chi_table6_12_2c.mpg	Table 6.12 (2c) child classifier handshape	p.170
chi_table6_12_3.mpg	Table 6.12 (3) child classifier handshape	p.170
ad_table6_12_1.mpg	Table 6.12 (1) Adult classifier handshape	p.170
ad_table6_12_2ab.mpg	Table 6.12 (2a, b) Adult classifier handshape	p.170
ad_table6_12_2c.mpg	Table 6.12 (2c) Adult classifier handshape	p.170
ad_table6_12_3.mpg	Table 6.12 (3) Adult classifier handshape	p.170
chp6_eg15.mpg	Example (15)	p.172
chp6_eg16a.mpg	Example (16a)	p.173
chp6_eg16b.mpg	Example (16b)	p.173
chp6_eg17a.mpg	Example (17a)	p.174
chp6_eg17b.mpg	Example (17b)	p.174
chp6_eg18.mpg	Example (18)	p.176
chp6_eg19a.mpg	Example (19a)	p.176
chp6_eg19c.mpg	Example (19c)	p.176
chp6_eg20a.mpg	Example (20a)	p.178
chp6_eg20b.mpg	Example (20b)	p.178
chp6_eg22b.mpg	Example (22b)	p.191
chp6_eg22c.mpg	Example (22c)	p.191
chp6_eg22d.mpg	Example (22d)	p.191
chp6_eg24.mpg	Example (24)	p.193
chp6_eg25.mpg	Example (25)	p.193
chp6_eg27b.mpg	Example (27b)	p.198

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