

## Acquisition of simultaneous constructions by deaf children of Hong Kong Sign Language

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### 1. Introduction

Signed languages are well known for their complex morphology, which can be represented by a set of morphemes articulated simultaneously. Typical examples that surface in many signed languages are the rich inflectional system of verb agreement and verbal aspect, as well as classifier predicates (Klima & Bellugi 1979; Meir 1998, 2001; Meier 2002; Lam 2003). That morphemes are combined compositionally in a simultaneous fashion poses a very interesting research question from a language acquisition perspective. Specifically, how do deaf children acquire the knowledge that some signs are not conventional and their component parts are predictably meaningful? What is more, some of these component parts can be 'stacked up' simultaneously with spatial configurations to encode predicative relations between objects and entities. Previous signed language acquisition literature reports that aspects of grammar involving space like verb agreement or classifier predicates tend to develop late (Schick 1990; Slobin, Hoiting, Kuntze, Lindert, Weinberg, Pylers, Anthony, Biederman & Thumann 2003) While inflectional verb agreement involves a lexical category (i.e. a verb) simultaneously superimposed by direction of movement or palm orientation to mark various pronominal arguments in space, classifier predicates involve the adoption of one or two specific meaningful handshapes embedded in a form of movement that encodes certain predication.

Our focus is the acquisition of simultaneous constructions that incorporate classifiers. These include typical classifier predicates as well as other simultaneous constructions that combine a lexical sign with a classifier (see also Section 2.2). On the basis of the data collected from fourteen deaf children whose signed language development was charted along three levels: elementary (Level 1), pre-intermediate (Level 2) and intermediate (Level 3), we attempted to establish a

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developmental sequence of these simultaneous constructions in Hong Kong Sign Language (HKSL). In the following sections, we will first provide a working definition of simultaneity in signed language research, with particular reference to the grammatical representation of classifier predicates. Then, we will summarize the previous literature on how deaf children acquired this grammatical construction. This is followed by a report on our current study, its methodology, results and a final discussion.

## 2. Simultaneity in signed language

Signed language research in the past decades has shed light on our understanding of the origin and nature of signed languages, in particular, how modality of communication interacts with organization of grammar in natural language. Meier (2002) discusses whether modality has an effect on linguistic structure. Pertinent to our discussion is the hypothesis that the signing modality may induce qualitative differences due to the number of articulators adopted as well as the perceptual cues generated by the visual-gestural system of communication. Given these characteristics, information transmission in a signed language is prone to be multi-channel and this factor provides a potential source for simultaneity as an organizing principle of signed language grammars.

### 2.1 Simultaneity: A definition

There has been some discussion on simultaneity and sequentiality at the level of phonology (Stokoe 1960; Liddell & Johnson 1989); morphosyntax (Padden 1988; Emmorey 2002) and signed language discourse (Morgan 2002; Morgan & Woll 2003). Miller (1994a) represents the first attempt to provide a systematic analysis of the types of simultaneous constructions, quoting data from American Sign Language (ASL), British Sign Language (BSL), Danish Sign Language and Sign Language of the Netherlands (SLN). He puts forward a definition of simultaneous constructions whereby "(a) distinct lexical elements are produced independently and simultaneously in autonomous channels, and (b) these elements are bound together in some kind of syntactic relationship." (Miller 1994: 133). This definition is too narrow in the context of our investigation because, while it discusses a broad range of simultaneous constructions, it excludes classifier predicates. We propose to revise this working definition of simultaneity by incorporating the analysis of classifier predicates while not losing sight of Miller's contribution.

In our working definition, a simultaneous construction is a set of morphemic units set up in a sign articulation, which may be free or bound. These units may be lexical or morphological, simultaneously produced in autonomous channels.

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They are either bound in some kind of morphosyntactic relationship, or they co-exist with other morphemic units for discourse purpose. This definition allows us to investigate a classifier predicate as an independent morphosyntactic unit or the occurrence of classifiers in other simultaneous constructions.<sup>1</sup>

## 2.2 Classifier constructions in Hong Kong Sign Language

Classifier constructions are good exemplars demonstrating simultaneity in the grammars of signed languages. Typical constructions are classifier predicates that involve combinations of distinct handshape and movement morphemes in the formation of various types of predicates, stative or process (Carlson 1981). Their unique properties have led to both interesting accounts and controversy, in particular, in relation to the grammatical properties of handshape and movement components (Supalla 1990; Schembri 2003; Tang 2001, 2003; Tang & Gu in press; Benedicto & Brentari 2004).<sup>2</sup> Nevertheless, closer scrutiny of classifier predicates also suggests that simultaneity and sequentiality are at play in the organization of the grammars of signed languages. In predicating an event of motion in HKSL, it is common to find a locative predicate preceding a motion predicate, in accord with Talmy's (2000) conceptual model of a motion event where a spatial reference for ground is necessarily established before figure is introduced in a motion predicate. This can be seen in example (1) below:

- (1) The cat steps into a box.
- BH: BOX  
 LH: CL:CONTAINER-BE-LOCATED-AT<sub>i</sub>-----  
 "A box is located here"  
 RH: CAT CL:ANIMATE-ENTITY-STEP-INTO-A-CONTAINER<sub>i</sub>  
 LH: -----  
 "The cat steps into a container (i.e. box)."

1. A caveat of this definition is the role ascribed to gesture in signed articulation. This definition by no means undermines the importance of gesture in signing, particularly when classifier predicates are regarded as depictive and iconic, strewn with stylized but phonologically conditioned handshape and movement components (Schick 1990; Slobin et al. 2003).

2. The analysis of this construction has been controversial. This is in part due to associating the handshape configuration with classifiers in spoken languages of the Athapaskan family (Schembri 2003; Slobin et al. 2003). As for movement, unlike agreement verbs where the directionality of movement serves to distinguish grammatical subject and object, movement of the classifier can be stylized, as in handling an object entity; or gradient, as in locating the motion of an entity through space; if not depictive of the qualitative dimension of a referent object through a path and/or local movement of the classifier. As such, classifier constructions are said to be iconic, gestural and analogous to visual imagery in depicting real world properties (De Matteo 1977).



BH: BOX



BH: CL:CONTAINER-BE-LOCATED-AT,

LH: CL: CONTAINER-BE-LOCATED-AT,-----  
RH: CATLH: CL: CONTAINER-BE-LOCATED-AT,-----  
RH: CL:ANIMATE-ENTITY-STEP-INTO-A-CONTAINER,

In (1), a locative predicate for *box* is signed first at a locus in space.<sup>3</sup> The classifier for *box* on the non-dominant hand is sustained while the dominant hand denoting an agentive subject encodes the verbal root of *STEP-INTO* through a translational movement of the dominant hand to the spatial locus (i.e. *CL:CONTAINER*)

3. Emmorey (2003) and Engberg-Pedersen (1993) make similar observations in American Sign Language and Danish Sign Language respectively.

occupied by the non-dominant hand. Example (1) also demonstrates how the verb root *STEP-INTO* differs from other lexical verbs in HKSL. While a lexical sign like *RUN* is decomposable at phonological level, one cannot analyze these sub-lexical units at the morphosyntactic level because they are not meaningful morphological units. In contrast, (1) shows that the sub-lexical units of a classifier predicate are decomposable because both the movement, and the classifier handshapes are meaningful morphological units. Its decomposability is evident when the classifier on the non-dominant hand in the locative predicate is retained for the subsequent motion predicate. The original figure entity for the locative predicate now becomes ground in the motion predicate. The classifier is a constant for both predicates (i.e. a container) referring to the lexical antecedent *box*, suggesting that it is possible to incorporate other morphemic units in the formation of a simultaneous construction. Newport (1982) suggests that a classifier would lose its morphemic status in the process of lexicalization and become a phoneme of the derived sign. Our data from HKSL suggest that the grammatical status of a classifier predicate and a corresponding, derived lexical sign is not as clear cut as we may have originally thought. In HKSL at least, our data show that even a lexicalized verb sign derived from a classifier predicate may resume this morpho-syntactic property and behave like a classifier predicate in a natural signing stream.

Besides the typical classifier predicates reported above, there are other simultaneous constructions in HKSL that involve a classifier on the non-dominant hand and a distinct lexical sign articulated by the dominant hand. Our data show that there is a syntactic relation between the classifier and the lexical sign. The classifier may be a complement of the lexical verb sign, as in example (2), or a complement of the determiner realized by the index sign, as in example (3). These examples show that a classifier morpheme is not restricted in terms of occurrence to classifier predicates, but may also impact on other grammatical relations in signed languages like HKSL. To what extent this is a universal phenomenon is still subject to debate. The HKSL data show that classifier morphemes can be incorporated in some other constructions. Alternatively, the classifier can be retained over a long stretch of signing for discourse regulatory function as reported in the literature (Friedman 1975; Engberg-Pedersen 1993; Liddell 2003), as in example (4).<sup>4</sup>

4. Liddell (2003) calls this classifier on the non-dominant hand a 'depicting buoy', which is sustained either briefly or over a long stretch of discourse as the other classifier predicates are produced.

(2) The referee examined the injured person, dropped his flag and blew the whistle.

RH: IX-DET<sub>i</sub> REFEREE COME LOOK-AT<sub>j</sub> DROP-FLAG

LH: CL:LEGGED-PERSON<sub>j</sub> -----

RH: BLOW-WHISTLE

LH: -----



LH: CL:LEGGED-PERSON<sub>j</sub> -----  
RH: COME



LH: CL:LEGGED-PERSON<sub>j</sub> -----  
RH: LOOK-AT<sub>i</sub>

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(3) A player kicked the leg of another player who then fell down. He was in pain.

RH: KICK-PERSON'S-LEG IX-DET; PAINFUL  
 LH: CL:PERSON(LEG)-HERE; CL:PERSON-FALL-DOWN -----



LH: CL:PERSON(LEG)-HERE;  
 RH: KICK-PERSON'S-LEG



RH: KICK-PERSON'S-LEG-----  
 LH: CL:PERSON-FALL-DOWN



LH:CL:PERSON-FALL-DOWN-----  
 RH: IX-det;



LH:CL:PERSON-FALL-DOWN-----  
 RH: PAINFUL

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- (4) The plane flew (in the sky). Many birds flew together with the plane.

RH: CL:PLANE-FLY -----  
 LH: HAVE MANY BIRD CL:MANY-BIRDS-FLY-BY



RH:CL:PLANE-FLY



LH: HAVE  
 RH:CL:PLANE-FLY-----



LH: MANY  
 RH:CL:PLANE-FLY-----



LH: BIRD  
 RH:CL:PLANE-FLY-----



LH: CL:MANY-BIRDS-FLY-BY  
 RH:CL:PLANE-FLY-----

Miller (1994a) argues that simultaneous constructions involving classifiers are accessible to syntax due to the principle of compositionality at the morphological level. We argue that it is this linguistic principle of compositionality in classifier

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predicates that leads to the many instances of simultaneous constructions cited above. The classifier morpheme is accessible to syntax as an argument in the predicate. As an argument, the morpheme is grammatically a complement in many syntactic structures. For example, Benedicto & Brentari (2004) argue that classifier morphemes are associated with different types of arguments on the grounds of their grammatical behaviours in both transitive and intransitive predicates. Hence, it is understandable why certain simultaneous constructions may potentially violate the symmetry or dominance conditions put forward by Battison (1978) to account for the ASL lexicon. In our observations in HKSL, the grammar may require that the articulators encode different predicates subsumed under the same event in one complex sign, as in examples (5)–(7).<sup>5</sup>

(5) (The man) was drinking while driving.

RH: CL:DRINK -----

LH: CL:DRIVE -----



RH: CL: DRINK -----  
LH: CL: DRIVE -----



5. This argument by no means implies that classifier constructions do not conform to the two phonological conditions of two-handed signs. On the contrary, they usually do but may violate them when the grammar of predication requires that the two articulators encode meaning differently (cf. Supalla 1982). We predict that conjoined or temporal embedding of clauses are sites for such potential 'violations'.

- (6) (The plane and the birds) flew alongside each other.

RH: CL:PLANE-FLY -----  
 LH: CL:BIRDS-FLY -----



RH: CL:PLANE-FLY -----  
 LH: CL:BIRDS-FLY -----

- (7) The football player carried the stretcher away with his own leg on it.

RH: CL:PERSON-MOVE-FORWARD<sub>i</sub>-----  
 LH: CL:PERSON<sub>j</sub>-WITH-LEG-ON-STRETCHER-MOVE-BEHIND-(PERSON)<sub>i</sub>



RH: CL:PERSON-MOVE-FORWARD<sub>i</sub>-----  
 LH: CL:PERSON<sub>j</sub>-WITH-LEG-ON-STRETCHER-MOVE-BEHIND-(PERSON)<sub>i</sub>-----

Examples (5)–(7) are not typical classifier predicate constructions but they do occur in signed discourse. Example (5) involves two conjoined predicates over a single argument while (6) and (7) involve a single predicate over two conjoined arguments. These data would be hard to explain if we did not resort to morphological compositionality in classifier predicate constructions.

### 3. Implications for signed language acquisition

#### 3.1 Classifier predicates: Previous acquisition findings

Despite the fact that classifier predicates are iconic in their representation, full mastery of this grammatical domain can be as late as age 8–9 (Schick 1990; Slobin et al. 2003). Earlier studies of ASL acquisition showed that different components of the predicates were not acquired in a holistic and analogue fashion; rather, they showed different developmental sequences, and errors of handshape, movement and location were found in the acquisition process (Kantor 1980; Supalla 1982; Newport 1981; Newport & Meier 1985). In Schick's (1990) study, the developmental sequence of American Sign Language classifiers is semantic > SASS (size and shape specifier) > handle.<sup>6</sup> However, in terms of the development of different predicate types, predicates with handle classifiers encoding locative transfer of a direct object in space occurred developmentally earlier than those predicates involving semantic classifiers, and SASSs were most difficult because they required an accurate depiction of spatial configuration of entities through different handshape configurations. A recent study by Slobin et al. (2003) reports that knowledge of morphological handshapes may emerge as early as age 2–3. They also observe that deaf children learn how to 'pare down' gestures adopted in adult signing and incorporate them into their interim grammars. However, coordinating the two articulators to represent predicate relations between entities in space is developmentally late because it entails a concomitant development of movement and location morphemes. Also, full mastery of classifiers for ground is later than that of figure and errors include omission of handshapes or adoption of inappropriate ones, as well as inconsistent assignment of ground to locations in space. In classifier predicates, ground is usually represented by the non-dominant hand (Tang 2003), to which we shall now turn.

#### 3.2 The non-dominant hand in the acquisition of classifier constructions

A canonical mapping in HKSL, possibly in other signed languages too, is that the dominant hand encodes figure while the non-dominant hand encodes ground. Thematically, figure encodes agent, causer or theme arguments. Ground is associated with location in locative predicates, source and goal in motion predicates, as well as affected theme in transitive causative predicates (Tang & Gu in press). Hence, the non-dominant hand is crucial because it is fundamental to the devel-

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6. She argues that handle classifiers are more complex compared with semantic classifiers because deaf children have to learn to manipulate the hand internal configuration to reflect the size and shape of the direct object being manipulated.

opment of some relatively more complex predicates like the transitive causative predicates. CL:PERSON-WALK requires a theme argument and is a morphologically less complex structure than CL:PERSON-WALK-INTO-AN-ENCLOSURE because the latter involves ground configured in space to express a relation (i.e. WALK-INTO) between a theme and a location argument. In terms of signed language acquisition, deaf children need to develop knowledge that specific thematic information is assigned to the two articulators independently. Also, the learners need to develop knowledge that the dominant hand that bears the movement component encodes the root of the predicate while the non-dominant hand is responsible for other linguistic information required for predication, as in example (8):

- (8) A person dived from the boat.  
 RH: CL:PERSON-DIVE-FROM  
 LH: CL:BOAT -----



BH:CL:BOAT

RH: CL:PERSON-DIVE-FROM  
LH:CL:BOAT-----

In example (8), the verb DIVE requires an agentive argument and selects a prepositional phrase (PP) with a Noun Phrase (NP) complement (i.e. cl:BOAT). Where the non-dominant hand consistently presents the conceptual ground, we might see this as constituting positive evidence for acquiring the morphology of this con-

struction. Without the non-dominant hand, grammatical constituents like PP or NP as direct object would be hard to realize overtly in classifier constructions.

### 3.3 Triggering experiences in language acquisition

It is generally assumed in the language acquisition literature that positive evidence to children provides triggering experiences in the acquisition of a target structure (Crain & Lillo-Martin 1999). Triggers are defined as robust linguistic data inducing a language learner to reformulate her hypothesis about the structure she is acquiring, which allows her to revise her current hypotheses in the course of language development (Lightfoot 1991). In the English language child data, it has been claimed that the child's development of functional categories triggers a corresponding development from a stage of null subject to overt subject in finite sentences (Valian 1990; Hyams 1986, 1996).

By the same token, one may ask what triggers deaf children to realize that classifier predicates are morphologically compositional, given the assumption that their previous acquisition experiences probably involve development of conventional lexical items articulated sequentially. One plausible trigger is the development of verb agreement where the direction of movement of the articulator marks person and number agreement (Padden 1988; Meir 1998). Lillo-Martin (1999) argues that linguistic development of verb agreement morphology is independent of the development of spatial memory (i.e. associating non-present referents with locations in space). Her data show that development of verb agreement may be as early as age 3 or 3;6, but representing this knowledge in signing space is not fully mastered until age 5.

Classifier predicates are more intriguing because, in addition to a conceptual use of space for grammatical representation (i.e. surrogate and token space in Liddell's (1994, 1995) sense of the word), a reanalysis of the sub-lexical handshape and movement components into a set of meaningful, morphemic units is also required. How do deaf children come to such a state of knowledge? Surely native deaf signers have knowledge of these complex structures, and access that knowledge in sign articulation. At some stage of signed language development, deaf children need to learn that handshape is morphological in some constructions, and can be 'stacked up' simultaneously with the movement and location morphemes. We argue that developing knowledge of the morphological properties of classifiers helps children realize that classifier predicates are compositional. Second, use of the non-dominant hand is a crucial determinant for developing other types of simultaneous constructions that incorporate classifiers. Hence, developing knowledge of the morphological composition of classifier predicates enables deaf children to 'extract' the classifier from the predicates for some other simultaneous constructions. Therefore, we predict that simultaneous constructions involving a combination

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of a classifier and a lexical sign are acquired later developmentally than typical classifier predicates.

### 3.4 Research questions

On the basis of the acquisition issues discussed above, we put forward the following research questions:

1. What is the developmental sequence of the different types of simultaneous constructions? We predict that predicates involving one argument are acquired earlier than those involving two because predicates involving two arguments reflect a higher degree of morphological complexity, requiring a more elaborate form of spatial configuration by the two articulators.<sup>7</sup>
2. What is the developmental sequence of classifiers in HKSL? Given sufficient positive evidence, deaf children will realize that certain handshapes are associated with noun categories and are reflective of the thematic roles of the arguments in the predicate.
3. What types of errors would occur when learners are developing classifier predicates in HKSL? Do they produce a similar set of errors such as handshape, movement and location as reported in the literature for ASL? (Slobin et al. 2003; Schick 1990; Supalla 1982)
4. What is the role of the non-dominant hand in the acquisition of simultaneous constructions?

## 4. The present study

### 4.1 Subjects

Fourteen deaf children ranging in age from six to thirteen were invited to participate in the study. They were students of a deaf day school with hearing abilities ranging from moderately severe to profound hearing loss. With one exception, all the children were born to hearing parents and did not develop a signed language until they joined the deaf school. This happened at different ages for each of them. Table 1 shows the background of the subjects.

The students were categorised on the basis of their HKSL proficiency into one of three groups. They were assessed by two native signers who were instructed

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7. A reviewer suggests that this research question may also be related to the development of transitivity with verbs and arguments. While agreeing that there is a very close relation between categories of classifier constructions and transitivity, we would like to leave this topic to a separate discussion on how deaf children acquire verb structure in HKSL.

Table 1. Age and background of the subjects

Subject Codes	Age	Years of exposure to HKSL	Averaged score	Levels of proficiency
001	10	5	1.1	Level 1
002	8	1	1.3	Level 1
003	11	3	1.4	Level 1
004	8	3	1.4	Level 1
005	9	5	1.9	Level 2
006	9	2	2.1	Level 2
007	12	8	2.2	Level 2
008	9	5	2.4	Level 2
009	12	4	2.5	Level 2
010	6	2	3.2	Level 3
011	11	4	3.4	Level 3
012	9	2	3.4	Level 3
013	13	4	3.6	Level 3
014	13	Since birth	4.1	Level 3

to judge the subjects' general performance on a production task that involved a retelling of a story from a comic strip along a scale from 0–5.<sup>8</sup> The native signers were not told the aims of the study but were encouraged to give their judgment of the degree of native signing and clarity of content demonstrated by the deaf child subjects. The scores awarded were then averaged out for each student, and on the basis of this score, each subject was allocated to one of the three categories of proficiency.

#### 4.2 Methodology

The subjects were invited to narrate six comic strip stories. Each story had no more than four pictures to ensure a clear and straightforward story line. They were instructed to study the comic strips one by one and to narrate them to a deaf research assistant. Two native deaf signers were invited to narrate the same set of comic strips to provide baseline data for comparison. All video recordings were

8. Assessing HKSL proficiency in signing was adopted because these children entered the deaf school at different ages, hence different years of exposure to the target language. In addition, in Hong Kong, years of exposure shows no direct relationship with signed language proficiency either because the school environment is not conducive to HKSL acquisition because it adopts an oral approach and students are discouraged from using HKSL in the classroom, not to mention that some parents prohibit signing at home. A reviewer suggested that the results of the current study could be hampered by the failure to control for either age or years of exposure to HKSL. While it may be the case, the use of proficiency assessment in HKSL with guidelines given to the native deaf signers at least provides some objective measures for categorizing the subjects' proficiency at different levels.

later transcribed using ELAN, a software package developed by Max Planck Institute of Psycholinguistics, Nijmegen. The coding of the data adopted the following criteria:

*a. Types of simultaneous constructions*

To address research question (1), which relates to the developmental sequence of different types of simultaneous constructions, where we predict that predicates involving one argument are acquired earlier than those involving two due to their higher degree of morphological complexity, we coded the simultaneous constructions into five categories:

1. S1: Classifier predicates that involved one classifier. They included intransitive motion predicates usually with semantic classifiers or transitive predicates with handle classifiers. Use of the dominant hand was expected and the non-dominant hand was not required. Examples such as CL:PLANE-FLY, CL:PERSON-WALK-AROUND, CL:HOLD-UMBRELLA, CL:PLACE-HAT-ON-NEST.
2. S2: Classifier predicates that involved two classifiers to encode the spatial configuration of the entities. They included both intransitive motion predicates and locative predicates. Examples such as:
  - Motion – CL:CAR-FALL-FROM-HILL, CL:BIRD-ENTER-PLACE
  - Locative – CL:PANEL-ON-PLANE, CL:HANDLE-HOOKED-ON-NEST
3. S3: Simultaneous constructions that used a classifier as a discourse 'buoy' (Liddell 2003) while articulating some other distinct lexical signs on the dominant hand. Example (4) cited above belongs to this category.
4. S4: Simultaneous constructions that combined a classifier with some distinct lexical signs to form a grammatical constituent. Examples are locative existentials: CL:NEST // HAVE BIRD ('The nest has birds in it'); or verb phrases: SEE<sub>i</sub> // CL:ROCK<sub>i</sub> ('saw the rocks'), LOOK-AT<sub>i</sub> // CL:LEGGED-PERSON<sub>i</sub> ('looked at the person')
5. S5: Classifier predicates that involved two conjoined predicates of the same event, comprising either one or two arguments. Examples are: CL:DRINK-AND-DRIVE-AT-THE-SAME-TIME, CL:BIRDS-AND-PLANE-FLY-ALONGSIDE-EACH-OTHER, CL:PERSON-WITH-LEG-ON-STRETCHER-MOVE-BEHIND-ANOTHER-PERSON

*b. Types of classifiers*

To address research question (2), regarding identifying the developmental sequence of classifiers in HKSL, we focused on the three types of classifiers reported in the acquisition literature: (a) semantic classifiers for animate objects such as humans and birds; (b) handle classifiers for humans and objects and (c) SASS for inanimate objects.

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### *c. Types of errors observed in S2s*

To address research question (3), which asked what types of errors would occur when learners are developing classifier predicates in HKSL, we focused on the learners' development of the morphological properties of S2, namely, classifier predicates that involved two classifiers to encode the spatial configuration of the entities, including both intransitive motion predicates and locative predicates. We isolated S2 type constructions in our analysis because they involved a combination of figure and ground, which allowed us to compare our results with those of the previous analysis. We examined the types of errors produced by the learners at all levels.

### *d. Development of use of the non-dominant hand in simultaneous constructions*

To address research question (4), which asks what role the non-dominant hand plays in the acquisition of simultaneous constructions, we examined the learners' performance on the dominant and non-dominant hands by comparing the errors they produced in S2 (i.e. classifier predicates involving two classifiers to encode the spatial configuration of entities). We also analyzed the frequency of retention of the non-dominant classifier in subsequent signing. We coded the occurrence of the classifier handshape on the non-dominant hand according to whether it was sustained while the other signs were produced. We predicted that the number and types of simultaneous constructions increased as a function of the learners' development of retaining the non-dominant hand in subsequent signing.

## 5. Results

### 5.1 Production of simultaneous constructions

Figure 1 shows the average number of simultaneous constructions produced by the two adult native signers and the learners based on the six comic strips in our analysis. The adult data show a high occurrence of S1 (classifier predicates that involved one classifier), S2 (classifier predicates that involved two classifiers to encode the spatial configuration of the entities, including both intransitive motion predicates and locative predicates) and S3 (simultaneous constructions that used a classifier as a discourse 'buoy'), some S4 (simultaneous constructions that combined a classifier with some distinct lexical signs to form a grammatical constituent) but few S5 (classifier predicates that involved two conjoined predicates of the same event, comprising either one or two arguments).

S1 and S2 represent typical classifier predicates with varying degrees of morphological complexity, i.e. one argument as against two argument predicate types. That a classifier serving as a 'discourse buoy' (Liddell 2003 for ASL) in a narrative

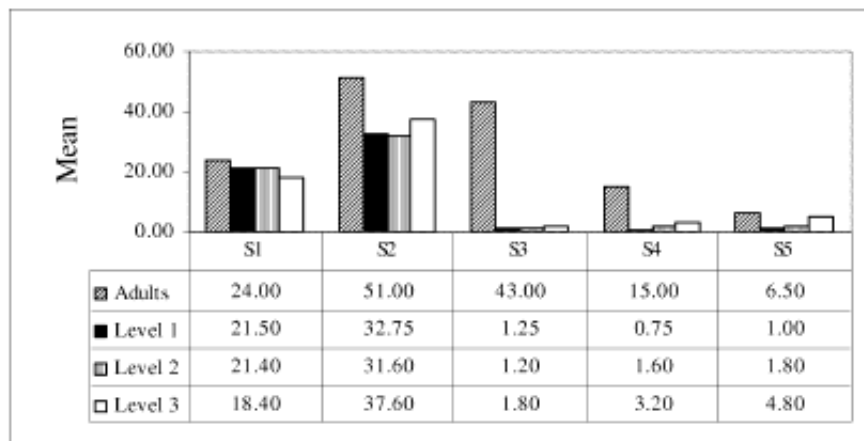


Figure 1. Simultaneous constructions produced by adults and learners

discourse features prominently in the adult data (i.e. S3) shows that using a classifier to sustain a prolonged narrative discourse is characteristic of adult signing in HKSL. This finding is in line with Morgan & Woll's (2003) analysis of British Sign Language in which they also report a significant proportion of body/semantic classifiers (i.e. around 30%) for reference maintenance in discourse. There are some instances of S4 that use a classifier and a lexical sign to form a single grammatical constituent. The low distribution of S5 that involves two simultaneous events in one classifier predicate sign may be due to task specific reasons.<sup>9</sup>

On the other hand, the average number of S3, S4 and S5 produced by the learners is significantly lower than that produced by the native signers, suggesting that these three types of constructions could be acquired at a developmentally later stage. In fact, retaining a classifier for subsequent simultaneous constructions as demonstrated by S3 and S4 proved remarkably difficult for the learners.

Figure 2 shows the percentages of target production produced by the subjects at each level, based on the tokens observed in Figure 1.

S1 generally receives a higher score because of the relatively simple morpho-syntactic structure (i.e. one-place predicate). Although the target production rate for categories S3, S4 and S5 can be as high as between 60%–80% in some cases, note that the actual number of production tokens is extremely low, some as low as 1 to 1.8 tokens on average (cf. Figure 1). One reason why the percentage score of S5 is quite high for all three levels is that the score comprises mainly the classifier predicate, CL:DRINK-AND-DRIVE-AT-THE-SAME-TIME, which involves two handle

9. The comic strips did not elicit many classifier predicates that involve two simultaneous events as described in S5.

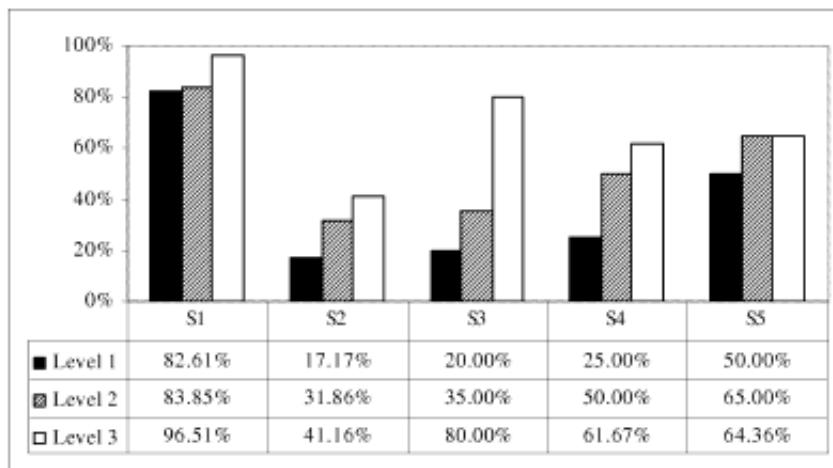


Figure 2. Learners' target performance of simultaneous constructions

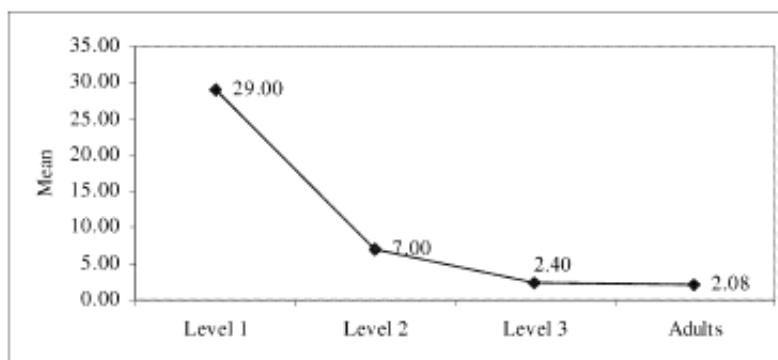


Figure 3. Use of gesture

classifiers and a depictive movement of gestural origin, thus explaining its early mastery by the learners. If tokens of this classifier predicate were removed from the set, the average percentage of target S5 produced by the learners as shown in Figure 2 would be reduced drastically to 25%, 33.33% and 29.33% for Level 1, 2, and 3 respectively.

Figure 3 shows that the average tokens of gesture are highest among Level 1 learners who had limited knowledge of lexical signs. While the adults gestured within signing space, on most occasions, our subjects' gestures extended beyond the signing space (e.g. a subject lay on the floor to stand for CL:PERSON-SLEEP-ON-BED). This echoes Slobin et al.'s (2003) argument that gestures are default production strategies used by learners at the initial stage of signed language ac-

quisition. In the current elicitation, these gestural productions were adopted to substitute the classifier predicates. In many of these instances, the learners assumed the role of figure and/or ground and some Level 1 learners even gestured the entire plot. More interestingly, using their body to represent ground, some learners also performed the action of figure on their own body (i.e. ground). This is typical of those learners who produced a predicate that involved a handle classifier to transfer an object to ground.<sup>10</sup> Nevertheless, as HKSL proficiency improved, these learners gradually replaced gestures with lexical signs or classifier predicates, albeit inaccurately.

## 5.2 Performance on classifiers

Figure 4 shows the averaged tokens of classifiers produced by the adult signers and the deaf learners. Occurrences of SASS are highest in the adult data, followed by semantic classifiers, while handle classifiers are lowest.

Figure 4 shows that the production of handle classifiers is similar across the three levels of proficiency. The production of SASS is the lowest but increases as proficiency improves. The production of semantic classifiers is highest in terms of frequencies of occurrence but Level 1 and Level 2 learners show no obvious increase in production. Compared with the adult signers, the deaf learners across

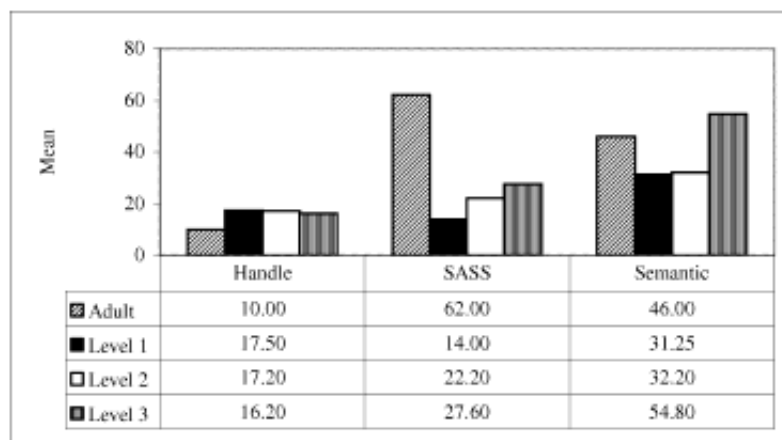


Figure 4. Production of classifier types

10. One reviewer queried whether gesture was just an alternative strategy of these learners while they might have already acquired the grammatical knowledge of classifier predicates. This possibility of performance error can be ruled out because most of these learners were observed to gesture the entire plot quite consistently and did not display any systematic articulation of other lexical signs in the study.

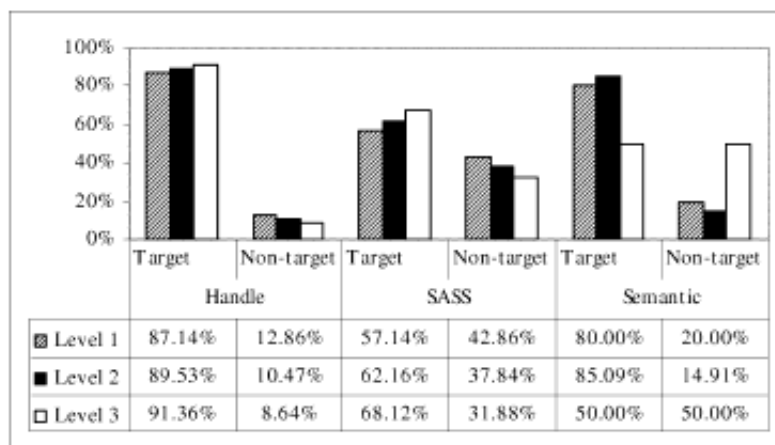


Figure 5. Performance on classifier types

all three levels produced relatively fewer SASSes. In addition, given the fact that our narratives typically represent ground with SASSes, and figure with semantic classifiers, the low production rate of SASSes among the learners at all three levels suggests that this category of classifiers poses learning difficulty. This may be due to the initial difficulty in developing ground for S2, or in acquiring the various features for SASSes to encode the objects' size and shape, as well as dimensionality.

Figure 5 shows the percentage scores of the target classifiers recorded in each category. Overall, there is more target formation with handle classifiers, implying that they pose little difficulty to the learners. Note that all handle classifiers elicited in this study involve a gestural depiction of holding an object through the use of S-handshape, G-handshape, and open-5-handshape. Slobin et al. (2003) make a similar observation for American Sign Language and Sign Language of the Netherlands, and they ascribe it to the gestural advantage in signed language acquisition. On the contrary, against the backdrop that the production of SASSes among the HKSL learners is low (cf. Figure 4), the much higher rate of non-target formation suggests that SASSes are relatively more difficult to develop than other classifier types. In sum, based on the data recorded, the developmental sequence of HKSL classifier thus observed is handle > semantic > SASS.

At first glance, this finding differs from what Schick (1990) reported for her deaf subjects acquiring ASL. In her study, the developmental sequence thus established was semantic > SASS > handle. However, Schick's study focused on those handle classifiers that incorporated a transfer movement path, which she referred to as 'locative transfer'. In our study, only a subset of the handle classifiers produced by the deaf learners involves such spatial displacement; this explains why

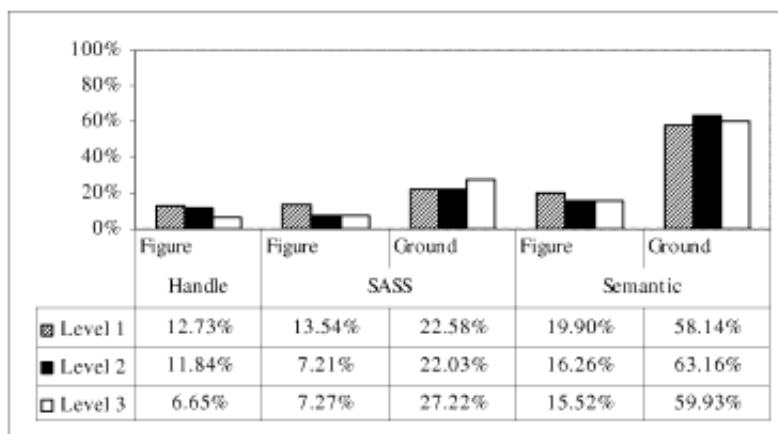


Figure 6. Errors of classifier handshapes for figure and ground

our finding is not compatible with that of Schick (1990). We will come back to this issue in the discussion section below.

Figure 6 shows that there are more errors associating with ground than figure for SASSes and semantic classifiers, suggesting that developing the use of the non-dominant hand to encode ground in classifier predicates poses difficulty to the learners. This finding accords with our expectation that the development of simultaneous constructions rests upon the learners' knowledge of encoding ground with the non-dominant hand. In the next section, we will focus on a description of the errors produced by the learners with respect to the dominant and non-dominant hands in S2 constructions (i.e. classifier predicates with two arguments to encode figure and ground).

### 5.3 Morphological development of dominant and non-dominant hands in S2 constructions

S2, which involves two arguments in the predicate, is usually realized as two-handed signs in HKSL. Generally speaking, the learners' performance in encoding figure with the dominant hand is better than in encoding ground with the non-dominant hand, where more errors arise. Of the 477 tokens of S2 constructions in our data,<sup>11</sup> 125 and 198 errors were identified for figure and ground respectively.

11. The number of errors here includes those S2 that were actually produced by learners during the process of elicitation. Apart from these instances, however, learners sometimes adopted a range of simplification strategies in places where an S2 or S5 was normally expected. These include the use of gestures, role shift, locative pointing, lexical signs or the sequential production of series of S1 or lexical signs in place of a more complex S2 or S5.

Table 2. Error production on dominant and non-dominant hands

Levels of Proficiency	# of S2 produced	Errors of dominant hand as figure	Errors of non-dominant hand as ground
Level 1	131	26.0% (34/131)	43.5% (57/131)
Level 2	158	15.8% (25/158)	57.0% (90/158)
Level 3	188	35.1% (66/188)	27.1% (51/188)

For learners at Level 1 and Level 2, errors of ground outnumber those of figure significantly. For Level 3 learners, the error rate of figure is higher than that of ground. The decrease in errors of ground at Level 3 indicates an improved mastery of the non-dominant hand in simultaneous constructions. Note that due to an increase in the number of attempts made by learners at Level 3 to produce S2, we observed more errors for figure at this level because these learners failed to configure figure and ground in space to express the underlying conceptual relationship between the entities morphologically.

Figure 7 below provides a summary of the error types recorded in the learners' production grouped between the dominant hand (dh) and the non-dominant hand (ndh). The percentages are based on the total number of errors produced by the three groups of learners. The results show that most of them are orientation errors of the dominant hand against the non-dominant hand (i.e. dh of E-O), in line with our expectation. Interestingly, there are few errors of location and movement, which suggests that the learners have already developed the concept of using space to assign loci to the referents by the time they develop classifier predicates.

Among the types of errors recorded for all three levels, most errors involve an absence of ground (i.e. E-ABSe) in an obligatory S2 context.<sup>12</sup> This error constitutes a major proportion of all the errors produced and is most noticeable at Level 1 and 2. Although there is improvement at Level 3, the proportion of errors remains highest of all non-dominant hand errors at this level. In (9), for instance, the ground classifier for 'canopy of a tree' (i.e. goal argument) is absent in the predicate, which adult native intuition judged as ungrammatical.



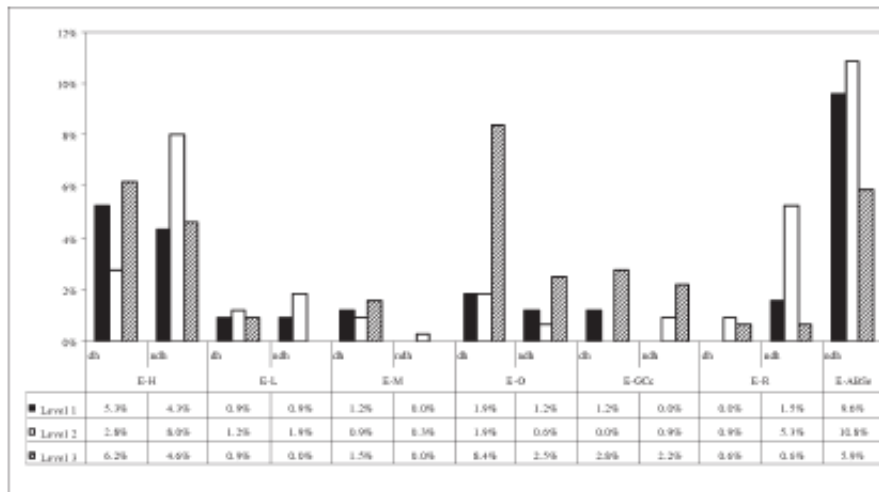
(9) A car plunged down (the diff into a tree canopy)

\*CAR CL:CAR-PLUNGE-DOWN

This result suggests that the non-dominant hand for encoding a ground object emerges at a later stage of the acquisition process. Interestingly, absence of figure does not surface in our data.

When the learners managed to realize ground overtly, they generated numerous instances of inappropriate handshapes (i.e. E-H), both for figure and ground. Preliminary observation suggests that before an accurate SASS for ground was

12. Adult signers were recruited to judge if the absence of ground constituted an error.



\* E-H =inaccurate handshape; E-L=inaccurate location; E-M=inaccurate movement; E-O=inaccurate spatial orientation; E-GCc=use of a lexical handshape as classifier; E-R=reduction of multiple figures or grounds to one only; E-ABSe=absence of a ground object

Figure 7. Types of error in S2

adopted, tracing with a 1-handshape as a production strategy was common at Level 1. This is understandable, as tracing is gestural in nature and resorting to gesture is always a default simplification strategy. Dimensionality also appears to be a factor determining the development of SASSes. It seems that a two-dimensional flat surface to refer to the wingspan of an airplane or a road is relatively easier than a three-dimensional round object such as ‘canopy of a tree’, or ‘boulders in a river’. To refer to three-dimensional objects, learners at Level 1 and Level 2 used a B-handshape or a relaxed spread-5 that are usually reserved for two-dimensional objects.

Another major source of handshape errors came from the semantic classifiers. While the learners were able to identify a Y-handshape for human entities at an early stage of development, they failed to extend it to the category of birds; instead, unmarked handshapes like S-handshape or O-handshape were adopted. Alternatively, some learners simply adopted the handshape of the corresponding lexical antecedent as classifiers. Examples are observed in using the handshape of TREE for d:CANOPY and that of BIRD for d:ANIMATE-ENTITY, as shown in example (10):

- (10) (Some) birds were located under the panel. The plane then flew away.  
 LH: CL:PANEL ----- CL:PLANE-FLY-AWAY  
 \*RH: CL:BIRDS-BE-LOCATED



Spatial orientation errors (i.e. E-O) refer to either an erroneous orientation of an independent classifier for figure or erroneous spatial configuration of figure and ground. In fact, this type of error is more prominent for figure than ground. This pattern is expected, as figure generally exhibits more variation in spatial orientation than ground in classifier predicates when encoding information such as manner of location or spatial configuration. In example (11), a Level 3 learner was describing a picture in which several birds landed under the wingspan of an airplane. He mistakenly placed the classifier representing the birds on top of the classifier representing the wingspan of the plane rather than under them:

(11) An array of birds entered the plane and landed under the wingspan.

\*LH: PLANE -----

\*RH: AN-ARRAY-OF-BIRDS-BE-LOCATED



As reported in Tang (2003), semantic classifiers for animate entities in HKSL can be further decomposed into smaller meaningful manner components through different palm orientations. As such, they pose a great challenge to learners and this language-specific reason accounts for a high occurrence of errors. Moreover, the data show that errors involving spatial orientation are an advanced error as it is more prominent among learners at Level 3. This also seems to apply to the spatial orientation between the dominant and non-dominant hand.

Another common error observed in our data is the reduction of multiple classifier predicates to a single construction in contexts where a series of identical classifier predicates are required to express the predication such as CL:PERSON-MOVE-FROM-ONE-BOULDER-TO-ANOTHER.

Our observation is that multiple classifier predicates obligatorily involving ground are more prone to this process of simplification than multiple figures, as shown in example (12):

(12) A man stood there. He jumped from one boulder to another.

\*LH: CL:PERSON-STAND CL:ROUND-OBJECT -----

\*RH: HAVE CL:PERSON-WALK

\*LH: -----

\*RH: CL:PERSON-FALL



In sum, learners across all levels produced more errors for ground than for figure. Nonetheless, the error types associated with ground and figure differ in a number of respects, reflecting the different grammatical functions of figure and ground in the predication. Figure, especially when encoded by semantic classifiers, allows a much wider range of spatial and orientation possibilities than ground, and this leads to a higher occurrence of orientation errors associated with the dominant hand. Nevertheless, while absence of ground is prevalent in the data, especially at Level 1 and 2, absence of figure is not observed. This may be attributable to the

conceptually more prominent role of figure in a motion event (cf. Talmy 2000) and semantically, it assumes the role of agent or theme in the predication, thus making omission impossible.

Despite the fact that ground is conceptually less salient to the learners, as it typically encodes source, goal, or location, it still contributes to grammatical information essential to the well-formedness condition of predication. The priority of figure over ground in the acquisition timetable inevitably highlights the role of the dominant hand in the process towards acquiring adult-like competence in the production of simultaneous constructions.

#### 5.4 The non-dominant hand in the acquisition process

In this analysis, we examined the extent to which the learners had developed the knowledge that associated the non-dominant hand with classifiers. We argue that such knowledge has the potential to support the development of the different types of simultaneous constructions identified in the current study.

In order to examine this issue, we attempted to adopt a coding system where classifiers occurring on the non-dominant hand were coded according to whether they supported one (i.e. –continuous) or more signs (i.e. +continuous). When a classifier construction was coded as [–continuous], the classifier was observed not to be retained in subsequent signing. We further divided this group of [–continuous] classifier constructions into two subgroups, depending on whether or not there was a lexical antecedent referring to a referent in the discourse context (i.e. [±referent]). Classifier constructions having an antecedent were coded as [+referent], otherwise [–referent]. Example (13) contains no referent for the classifier, and is a typical learner error:



(13) The ducks entered (the airplane) and landed under (the wings).

RH: BIRD  
 \*BH: (CL:PANEL) CL:BIRD-LANDED-UNDER-WINGS(OFF-PLANE)

In example (13), neither a lexical sign for AIRPLANE nor a classifier d:PANEL (flat object) was introduced into the discourse to support the motion predicate CL:BIRD-LANDED-UNDER-WINGS(OFF-PLANE).<sup>13</sup> Only the lexical sign BIRD, but not AIRPLANE, was mentioned in the preceding discourse. Hence, the figure classifier

13. This phenomenon also occurs with the classifier for figure. However, in the current analysis, we only focus on the classifier on the non-dominant hand that was being retained in the subsequent signing stream.

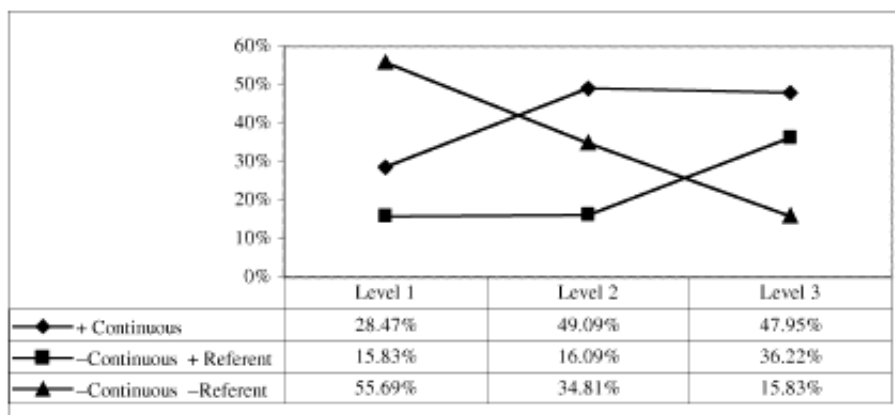


Figure 8. Use of non-dominant hand in simultaneous constructions

for BIRD was marked as [+referent], whereas the ground classifier for PANEL is [-referent].<sup>14</sup>

Figure 8 presents the frequency of incorporating the non-dominant hand in the simultaneous constructions produced by the learners. The percentage scores were generated by dividing the total number of tokens produced that involved the non-dominant hand in each of the three identified categories within each subject. As shown, the use of [+continuous] classifiers increased steadily from Level 1 to Level 2, which suggests an incrementally increasing ability on the part of the learners to retain a classifier in space in a narrative discourse. However, there is little difference in performance between Level 2 and Level 3. Given findings that there are very few S3, S4 and S5 produced by the learners (i.e. Figure 1), this result means that most of the retained classifiers are used to support the production of S2, which requires a figure-ground configuration.

[-continuous] classifiers are also common in the data, that is, classifiers that only occur once and are seldom retained in the subsequent signing stream. As mentioned earlier, this category is also analyzed in terms of whether the learners also bind the classifier to a proper antecedent. The results show that the learners show an increasing knowledge of introducing an antecedent in the discourse (i.e. [-continuous +referent]) before associating it with a classifier; as such, the percentages for [-continuous -referent] decrease as a function of increasing proficiency. In sum, the improvement in sustaining the non-dominant hand in a narrative discourse suggests that the learners are gradually acquiring the knowledge

14. Referent identification was based on whether the lexical antecedent (a) immediately preceded the classifier predicate, or (b) appeared in the preceding discourse and was therefore recoverable.

that classifier constructions can be decomposable into meaningful morphological units, which can be 'sustained and stacked up' with some other morphological or syntactic units in the construction.

This improvement also shows that the learners are developing knowledge of the referential properties of classifiers, which are potentially [+definite] and [+referential] through a binding relation between the classifier and the antecedent. This semantic knowledge also enables the learners to develop classifier constructions in token space, as suggested by Liddell (1995).

## 6. Discussion

The findings reported above suggest that the acquisition of simultaneous constructions in HKSL is contingent upon whether the learners have developed knowledge that the handshape component is morphological, hence decomposable. This knowledge is crucial: without it learners have no way of knowing that they can treat the non-dominant hand as an independent morphological unit and incorporate it into the different types of simultaneous constructions identified in this study. Engberg-Pedersen (2003) cautions against an 'over-simplistic' assumption that learners are behaving like adults in embarking on the acquisition process with a well-developed knowledge of decomposition. She observes that producing lexicalized classifier predicates for FALL as a verb may form the first stage of the developmental sequence. Our data provides further support to her observation, namely that lexicalized classifier predicates that select a single argument may represent an intermediate stage towards the production of morpho-syntactic classifier predicates that encode two arguments (i.e. figure and ground).

In our data, a majority of the early adult-like S1 produced by Level 2 learners have corresponding lexicalized forms. Examples are verbs such as SWIM, JUMP, WALK, FOOTBALL (frozen legged classifiers), FALL, SIT, STAND, JUMP (frozen semantic classifiers for animate entities), CAR and AIRPLANE (frozen semantic classifiers for vehicles and planes). Interestingly, the lack of a lexicalized counterpart often made the Level 2 learners in our study resort to gesture.

We might then ask what causes the learners in our study to eventually reanalyze these 'conventionalized' verb signs into morphologically decomposable units? Although handle classifier predicates pose little difficulty initially, as reported in Slobin et al. (2003), we argue that they do not provide unique linguistic information about the morphological status of handshape; they are too ambiguous to act as triggers because linguistic and communicative gestures tend to blend to some extent. Note that while showing little difficulty in developing handle classifiers, Level 1 learners produced few other classifier types and replaced a lot of classifier predicates with gestures. This suggests that while gesture has the role of providing

a 'latch' for developing classifier predicates, the handle classifiers, if combined with simple body actions, do not trigger formal grammatical reanalysis.

Instead, semantic classifiers are good candidates for triggering a reanalysis of the grammatical status of handshape at this initial stage of development. Emmorey & Herzig's (2003) study shows that location or depictive use of signing space is gradient while handshape for size and shape is categorical. Semantic classifiers are equally, if not more, categorical, and have the potential for uniquely associating generic classes such as humans, animals, vehicles and the like with specific handshapes. They can be ascribed with specific referential properties (i.e. +referential, +definite) as discussed in Tang & Sze (2002). These semantic properties would trigger a grammatical reanalysis of the classifier predicates, turning the handshape component from a purely phonological sub-unit to a morphophonemic sub-unit. Given this, we suggest that the handshape and orientation errors observed in S2 are output evidence of this linguistic process where the learners are consistently testing the hypotheses of mapping a particular handshape onto a noun category, or mapping a specific orientation onto a certain manner as a meaning component. Therefore, the reanalysis is semantically driven by the learners' perception of the morphemic status of classifiers, which can be triggered by the anaphoric nature of semantic classifiers because these handshape classifiers are consistently bound to an antecedent in the signing discourse.

As argued, the acquisition of morphological decomposition in classifier predicates has implications for the development of incorporating the non-dominant hand in other simultaneous constructions. Hence, another triggering experience may be obtained from reanalyzing the classifier on the non-dominant hand in S2 because it satisfies some grammatical relations (e.g. a complement of the main verb) in those constructions. Conservatism as a learning principle also shows that these learners initially refrained from extending the knowledge of morphological decomposition to the non-dominant hand to encode grammatical relations as well as discourse functions, as demonstrated in their performance in S3–S5. S2 seems to provide the 'window of opportunity' in the acquisition of simultaneous constructions, resulting in a high concentration of developmental errors. Therefore, the acquisition of ground encoded by the non-dominant hand in S2 may serve as a precursor for developing other functions in other more complicated simultaneous constructions like S3, S4, and S5 (cf. Section 3.2).

Another possible explanation rests upon our assumption that simultaneity is a processing principle rather than a linguistic principle in signed language grammar. Conceptually speaking, these learners had already demonstrated knowledge of ground in their performance through production of certain lexical signs or gestures. Moreover, even at Level 1, they had displayed knowledge of how to configure objects in space for location even at Level 1, albeit through gesture or gesture superimposed with classifiers. The difficulty appears to be one of spatial mapping; in

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other words, processing linguistic information simultaneously in space. To couch the analysis in Liddell's (1994, 1995) discussion of mental spaces and signed languages, learners have to map different linguistic constructions onto the various types of mental spaces. Except for handle predicates that invoke surrogate space, classifier predicates generally invoke token space representations. Since initial acquisition adheres to the 'here-and-now-principle', we assume that deaf learners of a signed language will first adhere to real space. Handle classifiers are easy because they are associated with role shift and gesture in surrogate space. As acquisition of S2 involves learners' development of representing figure and ground relationships in token space, where, regardless of how depictive they may appear, the classifiers formally encode the referent as an argument in predication. In token space, classifiers for ground are necessary because they provide crucial thematic information about source, goal or location. When the learners' intermediate knowledge of morphological decomposition is developing, they may experience a heavy cognitive processing load in coordinating this linguistic information simultaneously through multiple channels (e.g. the two articulators, the body and space types). Therefore, economy of labour would stipulate that less prominent information encoded by ground tends to be ignored, if not simplified, or, in the initial stages, grappled with difficulty.

Therefore, we observed that some learners resorted to sequential production to bypass the difficulty in presenting a complex configuration of figure and ground. In fact, the learners from all three levels tended to adopt avoidance strategies, producing a series of simple S1 or lexical signs instead of a simultaneous construction. However, there are qualitative differences: Level 1 learners typically produced lexical signs and gestures in sequence in contexts where classifier predicates were called for. Level 2 and Level 3 learners chose to 'break up' S2 or S5 into series of S1 (i.e. figure only predicates) articulated at appropriate locations in space. For a classifier predicate glossed as CL:PUT-HAT-ON-BIRD'S-NEST which was articulated as a two-handed sign in token space by native adults, the learners would first produce a one-handed sign CL: BIRD'S-NEST-BE-LOCATED<sub>i</sub>, followed by another one-handed sign, an S1 with a single handle classifier to refer to the figure, and lastly another one-handed sign CL:PUT-HAT-AT<sub>i</sub>. These examples suggest that the learners were attempting to reduce the processing load by simplifying the sign from a two-handed sign to a series of one-handed signs and by assuming surrogate space in their production. In sum, the learners' progression from real/surrogate space to token space is evident by a decrease in gestures and a concomitant increase in developing classifier handshape as a morphological unit in a classifier predicate. This is in line with Zeshan's (2003) proposal that evolution from depictive gestures to conventional classifier predicates is a process of grammaticalisation. The data shows that gesture plays a pivotal role in the initial stages in the development of classifier predicates. Volterra & Iverson (1995) suggest that

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at the early stage of signed language development, the gestural modality provides a powerful resource for communication before the emergence of the first sign. In the HKSL data, gesture pervades the course of acquiring simultaneous constructions as a resource to support formal grammatical development. An example of transition from surrogate to token space is shown by signs that show that the learners attempted to combine gesture with a semantic classifier for figure. In one instance, a Level 2 learner gestured a fall but both his hands carried a semantic classifier typically used to encode *cl:PERSON*. We take this as evidence that the learner was gradually becoming aware of the semantic and morphological function of classifier handshapes.

## 7. Conclusion

The current study provides some preliminary findings concerning how deaf learners of HKSL developed various types of simultaneous constructions that involve classifiers. We have described the process of acquisition in terms of developmental sequence and triggering experiences and have identified the important role played by the semantic classifiers of HKSL in triggering grammatical reanalysis of the handshape component from a phonological unit to a morpho-syntactic unit. We have also made some preliminary observations that apart from gesture, deaf learners of HKSL may have recourse to lexicalized classifier predicates at the initial stage of acquisition. They may assume from the outset that predicate constructions are lexical in nature, resulting in many instances of seemingly accurate classifier predicates in the absence of an associated antecedent. A break from this incorrect hypothesis seems to come from their reanalysis of the handshape component of the classifier predicates, as in S2 of the adult input, which always occur in combination with other morphological handshapes. To conclude, what we have projected is a plausible working assumption, which awaits further analysis and verification in future research, particularly from cross-linguistic comparison with data from other signed languages.

## Notation conventions

In this paper, HKSL signs are glossed in capital letters. Glosses are hyphenated when they combine to form one sign. The list below provides an explanation of the notation conventions adopted in the paper:

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1st tier:	glosses in capital letter
2nd tier:	English translations
BH:	both hands
LH:	left hand
RH:	right hand
----	the hand articulator is sustained in space
CL:	classifier predicates
cl:	classifiers

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