研究之果

The Joy of Research II
A Festschrift in Honor of Professor William S.Y. Wang
on His Seventy-fifth Birthday

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主编

上海教育出版社
Modality and Variation in Sign Languages

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1. Introduction

In the 1960s, two very important subfields of linguistics emerged. They are sign language research and sociolinguistics. Each has significantly changed our understanding of human language.

The past four decades of research on sign languages — started by William Stokoe and his associates (Stokoe 1960; Stokoe, Casterline, and Corneberg 1965) and later advanced by Klima and Bellugi (1979), Liddell (1980, 2003), Fischer and Siple (1990), Siple and Fischer (1991), by Emmorey (2002) and Meier, Cormier, and Quinto-Pozos (2002), and Sandler and Lillo-Martin (2006) — has clearly demonstrated that human language can be produced in two modalities, visual-gestural modality of signed languages and auditory-vocal modality of spoken languages. The discovery and demonstration that language can be expressed not only through the vehicle of speech but also through the vehicle of sign has profound implications for linguistics, psychology, anthropology and other disciplines under the umbrella of cognitive science. It should be taken as one of the most crucial research findings in the study of language. No longer can we equate language with speech. Nor can we discuss design features of human language solely based on the data from spoken languages (Hockett 1960, Tai 2005). Language

* Language variation and change is a research area to which Professor William S-Y. Wang has devoted himself. It is both an honor and a pleasure to contribute our observations and explanations on variation in sign languages to the Festschrift in honor of Professor William S-Y. Wang’s 75th birthday. We are solely responsible for the errors and indefectibles herein.
universals as well as language disparities can only be drawn from both signed and spoken languages (Sandler and Lillo-Martin 2006).

Sociolinguistics has also come a long way in the past four decades. Departing from Chomsky’s (1965) theory of linguistic knowledge as representing an ideal speaker-hearer in a completely homogeneous speech-community, a series of sociolinguistic research on language variation — started by Labov’s early studies (1966, 1972) and continued by Shuy et al., (1968), Wolfram (1969), Trudgill (1974), Macaulay (1977), and Milroy (1987, 1992) — has shown that there doesn’t exist a homogeneous speech-community, and instead the heterogeneity of language can clearly be quantified not only based on internal linguistic constraints but also on external social factors such as age, gender, education, ethnicity, and social status of speakers.

Variation and language change are closely related. In the late 1960s and 1970s, Wang and his associates (Wang 1969, Cheng and Wang 1972, Chen and Wang 1975, Hsieh 1972, Wang ed. 1977) developed the theory of diffusion to account for language change. In this theory, we can view variation as change in progress or residues due to competing changes. Thus, variation is the result as well as cause for change as competing changes diffuse across different components of the grammar.

Sociolinguistic study of variation in sign languages had started relatively late because sign language researchers in earlier decades have focused on the demonstration of sign language as natural language. Lucas, Bayley, and Valli (2001) have demonstrated that variation in American Sign Language (ASL), like variation in spoken languages, is also systematically constrained by both linguistic and social constraints. Schembri, Johnston and Goswell (2006) have shown that it also holds true to Australian Sign Language (Auslan). Although the constraints on variation parallel between spoken and signed languages, grammatical category constraints seem to play a more important role in sign languages, which could be due to modality discrepancy. Besides, social constraints in sign languages must take into account individual signers’ history of deaf education (Lucas, Bayley, and Valli 2001; Lucas and Bayley 2005; Lucas 2007).

In this paper, we aim to characterize the nature of variation in sign language by summarizing the important findings to date, and by comparing sign language with spoken language with respect to modality effects, acquisition ambiene, and language education policy.
2. Variation in sign languages

Signed languages are produced with two identical articulators, two hands, whereas spoken languages are produced with one articulator, the tongue. Some lexical signs are one-handed and some are two-handed. Since there are two articulators, signed languages make deletion, addition, or substitution of one of the two articulators possible (Lucas 2007). That is, two-handed signs could be one-handed, one-handed could be two-handed, and a table, chair arm, or the signer's thigh might be substituted for the non-dominant hand in a two-handed sign. Similar substitutions are observed in TSL (Taiwan Sign Language). TSL sign FINISH is produced by moving the dominant hand, with extended fingers, to touch the palm of non-dominant. When signing FINISH, some TSL signers would touch a table instead of touching the non-dominant hand.

In addition to handedness, each lexical sign is composed of constituent parameters: handshape, the location at which the sign is produced, the palm orientation, movement, and facial expressions. These parameters are meaningless linguistically contrastive units and are analogous to phonemes or distinctive features in spoken languages. Phonemes are produced linearly, but parameters are produced simultaneously. Like phonemes in spoken languages, each parameter in signed languages is subject to variation. For example, AIRPLANE in TSL could be either produced by extending thumb, middle finger, and pinky or by extending thumb, index, and pinky. This is treated as handshape variation. With respect to location variation, TSL sign I could be produced with 1 handshape either at the location of nose or the chest. Variation involving other parameters can be referred to as palm orientation variation, movement variation, and variation in facial expression.

2.1 phonological variation

Phonological variation in ASL attracted great attention from earlier studies on sign language variation (Battison, Markowicz, and Woodward 1975; Woodward and De

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1 Following the convention, lexical items in sign languages are spelled out in capital letters throughout the paper.
Santis 1977; Liddell and Johnson 1989). Among the possible linguistic constraints on variable, these studies have only mentioned the phonological constraints, that is, the phonological features of the preceding and following signs which constraint the phonological variation. The reason that these researches only examine the phonological constraints alone may have to do with the fact that people actually see the lower and higher location that precede and follow the target sign (Lucas and Bayley 2005).

In 1994, Lucas, Bayley, and Valli (2001) conducted a large-scale research on variation in ASL with the goal of understanding whether linguistic and social constraints on variation such as those defined in spoken languages can be identified for variation in ASL. Therefore, four types of linguistic constraints mentioned by Wolfram (1991) are examined: compositional constraints, sequential constraints, functional constraints, and structure incorporation constraints. Compositional constraints relate to the linguistic feature of the variable itself, for example, handshape, location, or handedness. Sequential constraints refer to the immediate linguistic environment surrounding the variable, such as the immediate phonological environment preceding or following the variable sign. Functional constraints, also known as grammatical category constraints, have to do with the grammatical category of the variable sign. Finally, structure incorporation constraints pertain to the syntactic environment surrounding the variable sign. Social constraints on variations due to factors such as age, regions, gender, ethnicity, and socioeconomic status are considered.

Lucas, Bayley, and Valli start with phonological variation. Several phonological variables in ASL are analyzed: the sign DEAF (Lucas 1995; Bayley, Lucas, and Rose 2000), signs with downward movement (Lucas, Bayley, Rose, and Wulf 2002), signs with 1 handshape (Bayley, Lucas, and Rose 2002), and signs with two-handed (Lucas et al. 2007). The variants of each variable are introduced below.

The sign DEAF could be a noun (e.g. DEAF UNDERSTAND “Deaf people understand”), an adjective (DEAF CAT “a deaf cat”), or a predicative adjective (PRO. 1 DEAF “I am a deaf.”). There are three variants of sign DEAF in ASL. The citation form (the standard form in dictionary) of DEAF is produced by moving the index finger from ear to chin. Variants or non-citation forms of DEAF are signed from chin to ear or signed by contacting the lower cheek with the index finger. Signs with downward movement are a group of signs which are all produced at the forehead or temple. Downward movement signs could be a noun (e.g. BOY, FATHER), adjective (e.g. BLACK, DIZZY), verb (e.g. KNOW, UNDERSTAND), preposition (e.g. FOR), or
an interrogative (e.g. WHY). The citation forms of downward movement signs are produced at the forehead or temple. Variants or non-citation forms are produced at locations below the forehead or temple. Signs with 1 handshape are a group of signs which are produced with the thumb and the fingers closed except for the index finger. Those signs could be first person singular pronoun, second person singular pronoun, third person singular pronoun, wh-word (e.g. WHERE, WHEN), grammatical function word (e.g. FOR), adverb (e.g. REALLY), verb (e.g. GO, CANCEL), adjective (e.g. BLACK, LONG), or noun (e.g. WEEK, MONTH). Signs with 1 handshape in citation form are produced with the thumb and the fingers closed except for the index finger. Variants of these signs are produced with both the thumb and the index finger opened (L handshape variant) or the thumb and all the fingers opened (open-hand variant). Signs with two-handed are signs produced with two hands. Those signs could be a verb (e.g. WANT), noun (e.g. DEER), adjective (e.g. SICK), adverb (e.g. STILL), or wh-word. The citation forms of two-handed ASL signs are produced by two hands. Variants of these signs are produced by only one hand.

By VARBRUL, a variable rule analysis, those studies all indicate that grammatical function significantly constraints the phonological variation in ASL. Furthermore, those studies have also shown that grammatical function, rather than the phonological features of the surrounding signs, is the main linguistic constraint on variation. The results of DEAF study have shown that compounds favor the contact cheek non-citation form and adjective predicates favor the citation form. Nouns and adjectives have very little effect on the choice between citation and non-citation forms. For signs with downward movement, prepositions are likely to be produced at a location lower than the temple (non-citation form), whereas adjectives are tend to be produced at the temple (citation form). As for signs with 1 handshape, first person singular pronoun favors the open-hand variant (non-citation form), while wh-signs, second person pronoun, and third person pronoun favor the L handshape variant (non-citation form). Nouns, adjectives, verbs, and adverbs favor citation form, that is, the 1 handshape sign. With respect to two-handed signs, one-handed variant favors wh-word while two-handed variant favors noun, verb, adjective, or adverb.

There are two other small-scale studies have demonstrated the importance of the grammatical function. Hoopes (1998) points out that some signers would extend their pinkies when signing some signs even though pinky extension is not specified in the citation form. He investigates signs with pinky closed such as THINK, WONDER, and
TOLERATE. Variation of these signs is pinky extension. The results show that most pinky extension occurs with verbs. In the other study, Mulrooney (2002) investigates variation in fingerspelling. The citation form of fingerspelling is articulated with an accurate handshape, orientation, and in the signing space where fingerspelling is most typically produced, the area near the shoulder of the dominant hand. Non-citation form would be any variation of the citation form. That is, it would be articulated by changing handshape, orientation, or the location. The finding reveals that the grammatical category of the word being fingerspelled is a consistent factor in explaining variation: proper nouns favor citation forms, common nouns being neutral, and verbs favor non-citation forms.

The influence of grammatical function on phonological variation also has been examined in Auslan (Schembri, Johnston, and Goswell 2006). They, based on ASL study, investigate the Auslan signs which are produced at or near the forehead. Variants of these signs might be produced at locations that are lower than the forehead, such as at the cheek, jaw or in the space in front of the signer's body. Those signs could be a noun (e.g. NAME), verb (e.g. KNOW), and adjective (e.g. YELLOW). Their findings also suggest that grammatical function interact with lexical frequency. That is, only high frequency verbs significantly favor non-citation forms.

The influence of grammatical function on phonological variation also has been examined in TSL. Chen (2008b) examines phonological variation in sign DEAF-MUTE, which can be signed by contacting the ear and the mouth with both hands simultaneously or by contacting the mouth and then the ear with one hand sequentially. The sign DEAF-MUTE could be used as attribute adjectives (e.g. DEAF-MUTE MAN “a deaf and mute man”), predicate adjectives (e.g. PRO. 1 DEAF-MUTE “I am deaf and mute”), and nouns (e.g. DEAF-MUTE SEE BOY “the deaf and mute man saw a boy”). In terms of grammatical function, noun and attribute adjective tend to favor one-handed variant, whereas predicate adjective have little effect on the choice between two variants. Thus, similar to other phonological variation studies in signed languages, the preliminary result of this study indicate that grammatical function also plays a more important role than the phonological features of the surrounding signs in phonological variation in TSL.

2.2 Lexical variation

There are two kinds of lexical variation: separate lexical variants and phonologically
related variants (Lucas, Bayley, and Valli 2001). Separate lexical variants refer to signs which denote the same referent or concept but which share no formal characteristics in constituent parameters in handshape, location, palm orientation, or movement. For instance, there exist several lexical variants for PIZZA in ASL. One of them is produced with a bent B handshape, palm up, finger tips pointing toward the mouth, imitating the action of taking a bite of a piece of pizza. A second variant is produced with a two-handed sign with bent L handshapes representing the round shape of a pizza (ibid. 178-179). These two variants do not share any parameter. In contrast, phonological related variants have to do with signs that denote the same referent or concept but are all related phonologically. They usually differ in only one parameter, usually the handshape. Take ASL sign BANANA for example, the non-dominant hand is in a 1 handshape (extended index with all other fingers and thumb closed). The dominant hand moves down from the tip of the non-dominant index to its base as if removing the peel of the banana. The handshape of the dominant hand can be an F, an A, an X, a 1, a G, or a V. (ibid. 180).

Phonological related variants should be distinguished from the phonological variation discussed in the above section where the phonological features of the preceding and following signs constraint the phonological variation. However, without a large corpus of discourse, it is not entirely clear to what extent phonological related variants are also affected by the phonological features of the preceding and following signs. As a matter of fact, most of the early works on lexical variation in ASL during 1970s are actually studies of phonological variation.

In TSL, the example of separate lexical variants is PINEAPPLE. There are two lexical variants for PINEAPPLE. One of them is produced with one hand on the head while the other hand under the chin. The fingers of the upper hand open upward and the fingers of the lower hand open downward. The other variant is produced with the non-dominant open hand, palm facing downward, serving as the pineapple, while the dominant hand moves back and forth on top of it, acting as if slicing. One of phonological related variants in TSL is AIRPLANE. AIRPLANE could be either produced by extending thumb, middle finger, and pinky or by extending thumb, index, and pinky.

Lucas, Bayley, and Valli (2001) reexamine 34 lexical signs which have been investigated by previous research on lexical variation in ASL. They focus on three specific questions: first, what is the relative proportion of lexical variation to
phonological variation within lexical items? Second, is there any semantic or functional pattern in the variation? Third, is there any evidence of language change in progress? With respect to the first question, it appears that the most frequently used lexical signs and most widely distributed also have the highest number of phonological variants. Regarding the second question, on the average, verbs and adverbs exhibit higher numbers of distinct variants averages than nouns. As to the third question, there is definitely change in progress. In addition, their findings also indicate that there are lexical differences due to region, age, ethnicity, gender, social class, and language background.

Lexical variation in sign languages also involves fingerspelling based on alphabet and character signs based on logographs. For instance, in ASL, pizza is commonly signed with fingerspelling, sometimes with every letter of English represented, and sometimes with the i deleted or simply as ZZA (Lucas, Bayley, and Valli 2001: 179) Fingerspelling has been regarded as a kind of lexical borrowing from spoken languages to signed languages (Battison 1978). However, Lucas and Valli (1992) treat fingerspelling as an outcome of language contact. They suggest that fingerspelling is the outcome of contact between a sign language and the orthographic system rather than between a sign language and a spoken language. Fingerspelling is a manual system that represents the orthographic system. Fingerspelling takes two different forms: full fingerspelling and in combination with lexical signs. Full fingerspelling produces orthographic letter in sequence and occurs when names and terms are introduced for the first time. Fingerspelling may also co-occur with lexical signs where one element is a lexical sign and the other is fingerspelling.

Parallel to fingerspelling in orthographic systems based on alphabet, TSL, Chinese Sign Language (CSL), Japanese Sign Language (JSL) and Hong Kong Sign Language (HKSL) make use of character signs based on Chinese logographic writing system (Ann 1998; Ann 2001). However, the same character is signed differently in different sign languages and dialects in one sign language. Character signs are constructed in the following ways: first, using the fingers of both hands to imitate the shape of a Chinese character, e.g., 中 and 王. Second, tracing the character in the air with fingers, e.g., 人 and 千. Third, combining tracing and handshape, e.g., 口 and 于. Fourth, using both the mouth and the handshape to represent the whole or part of a character, e.g., 晶 and 回. Character signs are commonly used for the names of persons and places in TSL. Many of the character signs in TSL present variants
through different formations of the same character.

2.3 Syntactical variation

Padden (1990) identifies three classes of verbs with respect to ASL: plain verbs, agreement verbs, and spatial verbs. These three verb classes are also identified in all well-studied sign languages, including TSL (Smith 1989; Chang, Su, and Tai 2005; Tai and Su 2006). They contribute to the relative uniformity of syntax across different sign languages. Agreement verbs use movement to inflect their subject and/or object referent to show subject-object relationship. Spatial verbs move to provide real-world information about the movement path of an entity. Plain verbs do not move to incorporate subject and object into their forms. Thus, plain verbs have to co-occur with separate uninflected signs for subject and object and rely on word order to indicate subject-object relationship.

However, Lucas, Bayley, and Valli (2001) observe that plain verbs in ASL do not always co-occur with separate signs for subject and object. Rather, subject presence is variable. Overall results show less than 40 percent occurrence of subject pronouns. Thus, ASL can be considered as a Pro-drop language, in contrast with English, which is not a Pro-drop language. Null subject variation is considered from the viewpoint of both linguistic and social constraints. The linguistic constraints include coreference with the subject of the preceding clause, person, number, constructed action, and English influence. The social factors include gender and age.

The results show that English influence is the most important linguistic factor in null subject variation. That is, if a sentence has some English-like structure because of the influence from spoken English, signers tend to produce the subject pronoun. Older signers and women tend to produce pronoun more than middle-aged and younger signers.

Fischer indicates that some JSL plain verbs do not co-occur with separate signs for subject and object either. The absence of subject and object is due to converting plain verb into agreement verb by some signers (personal communication). That is, plain verbs would act like agreement verbs by incorporating subject and object into their forms. The conversion is restricted to some signers in certain area.

Contrary to JSL, some TSL agreement verbs would behave as plain verbs do. That is, these agreement verbs do not inflect to incorporate subject and/or object. They co-
occur with separate signs for subject and objects. There are two mechanisms for TSL signers to use these agreement verbs as plain verbs. Smith (1990) has shown that these agreement verbs tend to appear in an uninflected form when they are preceded by the auxiliary verb AUX-1. AUX-1 occurs before the main verb and its primary function is to convey subject-object relationship by moving in path from subject to object location with 1 handshape. Since AUX-1 already indicates agreement information, when co-occurring with AUX-1, an agreement verb need not inflect to indicate agreement information. Thus, these agreement verbs would behave like plain verbs. Sometimes, agreement verbs in TSL could also behave as if plain verbs by employing SVO order to show the subject-object relationship (Chen 2008a). This phenomenon could be due to the influence of Chinese SVO word order. Spoken language influencing is also manifested in TSL.

In sum, the most important contributing factor to syntactic variation in sign languages is the influence from the spoken languages.

3. Effects of modality

Modality refers to the means by which languages are produced and perceived (Meier 2002). Spoken languages are produced and perceived by auditory-vocal modality but signed languages are produced and perceived by visual-gestural modality. Therefore, the set of properties shared between signed and spoken can be referred to as non-effects of modality. These non-effects of modality as identified in Meier (2002) are; (1) conventionality of pairing between form and meaning; (2) duality of patterning by means of which meaningful units are built of meaningless sublexical units; (3) productivity of new vocabulary through derivational morphology, compounding, and borrowing; (4) syntactic structure building on syntactic categories such as nouns and verbs and embedded clauses such as relative and complement clauses; (5) similar timetables for acquisition; and (6) laterализation in left hemisphere. At the same time, there are also modality effects responsible for the structural differences between signed and spoken languages in lexicon, morphology, syntax, and semantics. Two most important effects are iconic representation of objects and actions and indexic/ostensive identification of referents in signed languages (Meier 2002). Furthermore, as pointed out by Liddell (2000, 2003), signed languages also utilize general non-linguistic spatio-
cognitive principles to construct meanings.

With respect to variation, we can also refer to those linguistic and social constraints shared by both modalities as non-effects and those specific to visual-gestural modality as modality effects. Those research findings mentioned above have shown that, like variation in spoken languages, variation in signed languages is also systematically constrained by linguistic and social constraints, which can be taken as non-effects of modality. Nonetheless, specific linguistic constraint manifested in variation in signed languages is different from those of spoken languages. This discrepancy would be a reflection of modality effect (Lucas, Bayley, and Valli 2001; Lucas and Bayley 2005; Lucas 2007). We have seen that although phonological factors play a role, but their role is not as strong as the one played by the grammatical category of the variable sign. Lucas and her associates suggest that the relative importance of the linguistic constraints may be due to modality effect. Meaningful segments in spoken languages are embedded in phonological environment, which influence phonological variation. Thus, it is reasonable to look for the cause of phonological variation in terms of immediate environment in which the segments are surrounded. It is therefore natural for most studies of spoken language variation to show that the immediate phonological environment plays the key role in governing phonological variation. In signed languages, morphological compositions are mostly simultaneous rather than sequential. The variables that examined in sign language variation are not sequential affixes as in spoken language. Therefore, grammatical category turns to be the first-order linguistic constraint.

Lucas and Bayley (2005) raise an issue on the parallels between ASL and spoken Cantonese, that do not use many affixes just like ASL. They mention Bourgerie’s (1990) research on sociolinguistic variation in Cantonese. Bourgerie examine three variables; initial n/l-, initial ng/∅, and initial k/h- in third-person pronouns. He found that both initial [n-/l-] and initial [ng-/∅] are constrained by grammatical category. Bourgerie’s findings suggest that modality effects alone may not fully explain the relative importance of the grammatical constraints on phonological variation in signed languages. However, Lucas and Bayley (2005) propose that it is better to describe the role of grammatical constraints in governing phonological variation in terms of a matter of degree. In signed languages, grammatical constraints are more important than phonological constraints; but in spoken languages, the vice versa. It is our view that the similarity between spoken Cantonese and sign languages in this aspect of variation
constraint may be accounted for by the lack of sequential morphology rather than modality effect. Further research on linguistic variation in spoken languages lacking sequential morphology can help settle the issue.

The correlation between linguistic variation and grammatical category can also be found in mouthings in sign languages. Mouth can either be moving or be stationary while signing. Co-occurrence of mouthing and signing is clearly due to modality effects since sign languages are produced by both manual articulators, two hands, and non-manual articulators such as mouth, tongue, eye, and head for facial expressions. It is possible for a signer to employ all the articulators at the same time.

During the production of manual signs, mouth can be in relaxed position with the positioning of the lips remaining unchanged. Mouth can also be move during signing. There are three kinds of mouth movement in signing. The phenomenon of opening one’s mouth to breathe is one kind. The second kind is related to spoken language utterances. The third kind does not resemble a spoken language mouth movement. They are mouth gestures and non-manual adverbials such as “mm” or “th” identified by Liddell (1980).

Nadolske and Rosenstock (2007) investigate the relation between the third kind of mouth movement and grammatical category in ASL. Grammatical categories are defined on the basis of both the semantic value of a sign and its function in a sentence. There are seven major grammatical categories in ASL: nouns, adjectives, adverbs, plain verbs, directional verbs, pronouns, and classifiers. The findings demonstrate that nouns and adjectives have mouthings occurrences near 80%, and adverbs and plain verbs have occurrences between 50%–60%. Pronouns and directional verbs are between 30%–40%. Classifiers have the least occurrences with less than 7%. They also point out that several studies on mouthings in European sign languages also find a correlation between grammatical category and mouthing occurrence. Nominal signs are accompanied by mouthings more frequently than morphologically more complex signs, such as inflected verbs or classifier constructions.

In section 2.2, we briefly discussed the role which fingerspellings and character signs can play in language variation in sign language. One might want to consider the phenomenon as due to modality effects. Yet strictly speaking, it has to do with language contact between sign languages and the orthographic systems rather than modality effects per se. Thus, as far as variation is concerned, the most obvious modality effects seem to be the constraint of grammatical category on phonological variation and mouthings. Other discrepancies in patterns of variation between spoken and signed
languages can be attributed to language acquisition environment and language education policy for the deaf.

4. Acquisition environment and language policy in deaf education

Despite the fact that spoken and signed languages have similar acquisition timetables, their acquisition environments are quite different. Only a few deaf children are exposed to native signing at home because less than 10% of the deaf children are born to deaf parents. In other words, more than 90% of the children are born to hearing parents who do not sign. For them, simple home signs might be developed for communication in the family. But lacking a sign community parallel to speech community in spoken language, they are not exposed to a full-fledged language in early childhood. For them, the sign community only comes to exist when they enter the deaf school. There, they meet with other deaf children with different home sign systems and are exposed to conventionalized sign language as well as sign language patterned after spoken language for educational purposes. For example, in Taiwan, the deaf children when entering deaf schools are exposed to different home sign systems, more or less conventionalized TSL as well as Signed Chinese, the syntactic structure of which is very different from that of TSL. Thus, they have to develop a linguistic system on the basis of impoverished and inconsistent inputs. This situation is similar to the situation in which creole speakers of the first generation develop a language from a pidgin in the mixed environment of other languages. Just as young creole languages evolve from pidgins and other ambient languages, sign languages develop from inconsistent and mixed sources of home signs and gestures (Meier 2002; Aronoff, Meir, and Sandler 2005). Yet, sign languages differ from young creole languages in that each generation of deaf children faces the same conditions of inconsistent and impoverished inputs. In this sense, sign languages are re-creolized with each and every generation of signers (Fischer 1978). As a matter of fact, native deaf can only be properly defined as the third-generation deaf who have at least one native-signing parent and a deaf grandparent (Meier 2002). Furthermore, a language could arise and last only when there is a stable community of people to identify the community and meet regularly. In most cases of sign languages, the community comes to exist in school settings, where deaf children who are
born to hearing parents acquire sign language from their peers, who born to deaf parents and thus are exposed to native signing at home. Thus, lacking a stable community to start with and the re-creolization in each and every generation, sign languages cannot be as conventionalized and consistent as spoken languages. Therefore, it is not surprising to find that every social factors being equal, sign languages tend to exhibit more variation from community to community and from individual to individual than spoken languages.

Among the social factors on variation, age consistently constrains the choice among the variants in both spoken languages and signed languages. One of the implications of age-related variation is language change in progress. In the process of re-creolization, language change in signed languages is led by younger signers. In ASL variation study, younger signers tend to use more non-citation variants when signing DEAF or signs which are produce at the forehead or temple. Similar result is reported in Auslan study.

Furthermore, while age factor play a role in variation reflecting change in progress in both spoken and signed languages, it must be explained in reference to the role of sign languages in deaf education as well as the social structure of the deaf community. As pointed out earlier in most situations, the transmission of sign languages takes place in school for deaf rather then in the family. Only when deaf schools have been established, deaf people then have the opportunity to gather together and use sign languages to communicate. There would be neither social group of deaf existing nor sign language developing in hearing societies where no special education is provided for deaf. The status of sign languages and the policy in the deaf education would have influenced the patterns of variation (Lucas, Bayley, and Valli 2001; Schembri, Johnston and Goswell 2006).

Before the congress of deaf educators held in Milan, Italy in 1880, sign languages were the instructional language in deaf schools. After the congress, the use of sign languages was not allowed in classroom. Instead, oralism was proposed and practiced until the early 1970s when special educators proposed the manual codes for spoken languages due to the failure of oralism. The Total Communication method was therefore adopted for teachers to use the manual codes while they are speaking. By doing so, deaf students could see the language through the manual code.

Participants in the research conducted by Lucas, Bayley, and Valli (2001) are divided into three age groups according to the development in language policy in deaf education: 15 – 25, 26 – 54, and 55 and older. Participants in 15 – 25 group have been
exposed to Total Communication. Participants in 26 - 54 group have been exposed to oralism. Participants over 54 would most likely have been educated through the oral method and possibly also through fingerspelling. Take the study of DEAF for example, older signers tend to use more non-citation form because at the time they were attending schools, ASL was suppressed and forbidden. While they were fluent users of the language, there was very little metalinguistic awareness. By contrast, the 25 to 54 year-old signers were in school at the time when ASL was beginning to be recognized and valued as a language from English. Thus, this group prefers citation form. Finally, the youngest signers attend school at a time when that the status of ASL was no longer in question. The status of the language is not threatened by the use of non-citation forms. This would be a reason why youngest signers tend to favor non-citation forms.

Participants are recruited in four age groups in Schembri, Johnston and Goswell’s (2006) study: 15 - 30 (younger), 31 - 50 (mature), 51 - 70 (older), and 71 and older (elderly). Participants in the elderly group had been exposed to fingerspelling. Auslan was used in the dormitories and on the playground. Participants in the older group had experienced the shift to oralism. Participants in mature group had experienced Total Communication and the use of Australian Signed English. The youngest group has experienced the increasing recognition of Auslan as a natural language, some would have been educated in schools with Auslan. But most of them have been educated with Australian Signed English. The results show that the older the signer, the more they use fingerspelling. The results reflect the education experience of the oldest group of participants, who were instructed with approaches that emphasized the use of fingerspelling.

5. Conclusion

While sign languages share a set of properties with spoken languages in both linguistic and social constraints, they are different in several important ways. Some of these differences might be due to modality effects in that sign language is a visual-gestural mode of communication. The most viable candidate so far is the linguistic constraints in terms of grammatical category, pending further investigation on language like Chinese, which lack inflectional affixes. Other differences such as variation involving fingerspellings and character signs can be more appropriated account for by
language contact between sign languages and orthographic systems, in spite of the fact that both are visually based. Still other fundamental differences are due to acquisition ambiences of a sign language and language education policy in different generations. Indeed, research of variation in sign languages is still far behind that in spoken languages. It is our hope that in the future, there will be more studies of variation on TSL, HKSL in Hong Kong and CSL in mainland China for us to obtain more facts of variation in different sign languages. Hopefully, with enough data on variation and change in sign languages, we can launch preliminary research on variation and language change in sign languages in the light of lexical diffusion theory constructed by Professor William S-Y. Wang and his associates.

References
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