

Taiwan Sign Language and Beyond

Edited by

James H-Y. Tai and Jane Tsay

國立中正大學臺灣人文研究中心
The Taiwan Institute for the Humanities
National Chung Cheng University

Contents

Preface

i

Articles

1 Sign Language Field Methods: Approaches, Techniques, and Concerns

Susan Fischer *University of California, San Diego*

21 Acquiring FINISH in Hong Kong Sign Language

Gladys Tang *Chinese University of Hong Kong*

49 Modality Effects Revisited: Iconicity in Chinese Sign Language

Marjorie K. M. Chan and Wang Xu *The Ohio State University*

83 The Morphology and Phonology of Taiwan Sign Language

Jane Tsay and James Myers *National Chung Cheng University*

131 Lexical Variation and Change in Taiwan Sign Language

Yijun Chen and James H-Y. Tai *National Chung Cheng University*

**149 Lexical Comparison of Signs from Taiwan, Chinese, Japanese, and
American Sign Languages: Taking Iconicity into Account**

Shioufen Su and James H-Y. Tai *National Chung Cheng University*

177 漢語對於台灣手語地名造詞的影響

張榮興、柯綉玲

National Chung Cheng University

Preface

This edited volume is intended to be a sequel to the edited volume by James Myers and James H-Y. Tai (2005) on Taiwan Sign Language.¹ Our original goal was to have a volume on a comparative study of East Asian Sign Languages based on the papers presented at the First International Conference of Comparative Study of East Asian Sign Languages, which was held at National Chung Cheng University on September 16-17, 2006. However, no papers on either Japanese Sign Language or Korean Sign Language were presented. Moreover, Qunhu Gong (Fudan University, China) has not been able to contribute his paper “Lexical Variation in Chinese Sign Language” for inclusion in this volume. In consultation with Susan Fischer, we have decided to entitle this edited volume *Taiwan Sign Language and Beyond*, to more accurately reflect its scope and contents, and to postpone until a future date the compilation of a volume comparing East Asian Sign Languages.

The topics covered in this edited volume are wide-ranging, from issues concerning field methods, through sign language acquisition, analyses of different levels of linguistic structure, and explorations of language variation and change, and other challenges in sign language research. Field methods are fundamental for the collection of data on sign languages because most sign linguists are neither deaf nor native in the sign language that they attempt to analyze. Susan Fischer’s paper discusses ethical concerns, technical issues, and elicitation techniques in doing fieldwork on sign languages based on her over 35 years of extensive fieldwork experience on several different sign languages. Some of the concerns, issues, and techniques apply to any type of fieldwork; others apply especially, though not exclusively, to the study of stigmatized or marginalized languages; and some apply almost exclusively to issues in the study of signed languages.²

Research on sign language acquisition is even more challenging than research on spoken language acquisition. Little has been done on how deaf children acquire aspect in

¹ Myers and Tai (2005) is a special issue of *Language and Linguistics* (6.2).

² The keynote speech given by Susan Fischer at the Conference was “Asian and Western Sign Languages: Commonalities and Differences.”

sign language. Gladys Tang's paper reports on how a deaf child acquired the sign FINISH as a Perfective Marker in Hong Kong Sign Language (HKSL). In the child data, FINISH first emerged as a lexical verb. Subsequently, the sign also occurred as a perfective aspect marker that consistently followed a verb in clause-final position, in line with the adult data. FINISH as a main verb was inherently telic and marked the end of an atelic predicate (i.e. an activity). As an aspect marker, it occurred initially in accomplishments before other situation types. As for temporal reference, FINISH as a main verb was used mostly for present reference, but was initially used for past or future reference if it was an aspect marker. These results suggest that the deaf child in this study largely observed the grammatical constraints in the acquisition of FINISH in HKSL.

The paper by Marjorie K.M. Chan and Wang Xu compares Taiwan Sign Language (TSL) with Chinese Sign Language (CSL) with respect to iconic devices employed in lexical items. They use 100 words from the Swadesh list that was modified by Woodward (1993) for sign language comparison. The lexicon in the CSL database is part of Qunhu Gong's Swadesh list of 200 words in different varieties of CSL, collected through video-recording in different parts of China. The CSL corpus for the current study is a subset of that Swadesh list. The TSL database for this study is a corresponding set of 100 words that are in the modified Swadesh list. This preliminary comparison between the two historically unrelated Asian Sign Languages points out the importance of taking iconic devices into consideration in comparing lexical items for historical relatedness, variation and change, as well as for typological similarities not due to historical relatedness and language contact.

The paper by Jane Tsay and James Myers describe in detail the morphology and phonology of TSL. Inflectional morphology includes noun and verb inflection, while derivational morphology covers affixation, serial compounding, and parallel compounding. Agreement is analyzed with respect to grammatical relation and classifier predicates, as well as gender and number agreement. Aspect markings for perfective, progressive, and protractive aspects are also attested. As for TSL phonology, phonemic inventory, allophonic variation, feature co-occurrence restrictions, alternations, and word-internal prosodic structure are illustrated and discussed. This paper provides a set of

well-document data with analysis for future cross-linguistic comparison of sign languages.

Language variation and change in spoken languages have been the focus of historical linguistics and sociolinguistics. However, there has been very limited research on variation and change in sign languages. Yijun Chen and James H-Y. Tai review the research on American Sign Language—the most thoroughly studied sign language that has a much longer history than TSL—and give a preliminary analysis of variation and change in TSL lexical items that have taken place over the past ten years. As in ASL, phonologically different variants are more productive than phonologically related variants in TSL. This may be due to the fact that lexical items referring to the same object or concept in sign language can be formed with totally different iconic motivations. With respect to phonological parameters, patterns of variation in TSL are similar to those in ASL, yet patterns of change in TSL are quite different from those in ASL.

Comparative lexicostatistics has been used by Woodward (1993) and others to posit hypotheses on possible historical relationships between sign languages. Shioufen Su and James H-Y. Tai examine the earlier studies and find that it is necessary to take iconic motivations into consideration in using comparative lexicostatistics to establish historical relationship between sign languages. Excluding lexical items with similar iconic motivations from Woodward's modified Swadesh list, their study shows that Taiwan Sign Language (TSL) and Japanese Sign Language (JSL) can be considered languages of the same family, while TSL and Chinese Sign Language (CSL) can not. TSL and American Sign Language (ASL) are least similar among the four languages under comparison. The similarity between TSL and CSL is also due to language contact, thus higher than that between TSL and ASL. Nonetheless, signs with iconic motivations are prevalent in sign languages. For typological studies of lexical formation, lexical comparison of sign languages can also be conducted with respect to various types of iconic devices, even for historically unrelated languages such as TSL and ASL.

The last paper by Jung-hsing Chang and Xiu-ling Ke discusses the formation of place-name signs in Taiwan Sign Language (TSL). In finding that a great number of TSL

place names are borrowed from Chinese names, they propose that the place names are based on five different ways of rendition: (a) exact loan translations of the Chinese place names, (b) partial loan translations of the Chinese place names, (c) exact copying of Chinese written word, (d) partial copying of Chinese written word, and (e) mixture of the loan translation and the written word. The different sign-formation processes discussed in this research have shown how Chinese language and its writing system are blended into TSL, at the same time providing an account for some of the important ways by which TSL expands its lexicon.

In putting together this volume, the editors would like to thank all the contributors and the Taiwan Institute for the Humanities at National Chung Cheng University for their support of the Conference and the publication of this volume. We would also like to thank our TSL consultant, Ku Yu-shan, and other TSL signers for providing us with illustrations. It is our hope that this volume adds to our understanding of TSL and sign language in general and that a volume on the comparative study of East Asian Sign Languages can come into being in the near future.

James H-Y. Tai and Jane Tsay

July 31, 2009

Sign Language Field Methods: Approaches, Techniques, and Concerns¹

Susan Fischer

Center for Research on Language, UCSD

Abstract. Doing sign language fieldwork has a lot in common with doing fieldwork on other languages, particularly stigmatized languages, but there are also issues unique to sign languages. Ethical considerations are paramount: obtaining truly informed consent is key, as is the issue of maintaining confidentiality when using video data. Also important is the establishment and maintenance of rapport with consultants. I discuss practical issues such as the setup for recording, types of video to use, and transcription options. Finally I discuss elicitation protocols, with an emphasis on monolingual techniques, and share some ideas that have worked well for me over the years.

0. Introduction

In this paper I shall discuss my ideas about doing fieldwork on signed languages. I shall address three primary topics: ethical concerns, technical issues, and elicitation techniques. Some of the topics on which I shall touch apply to any type of fieldwork; others apply especially, though not exclusively, to the study of stigmatized or marginalized languages; and some apply almost exclusively to issues in the study of signed languages. These observations are based largely on my extensive experience in over 35 years of fieldwork on several different sign languages. My original training in fieldwork was under the late master Kenneth Hale, who also directed my dissertation on language acquisition (collecting data from children presents many problems parallel to those related to working with a language one doesn't know!). For over 35 years I have worked on American Sign Language (ASL), but I have also worked for the last 15 years on Japanese Sign Language (JSL), and have conducted workshops where the languages under scrutiny were British Sign Language (BSL), Ugandan Sign Language, and

¹ I would like to express my gratitude to the many Deaf consultants from whose insights and patience I have learned about how to elicit sign language data. Thanks to audiences at National Chang Cheng University, the University of Central Lancaster and the Center for Deafness, Cognition, and Language at University College London for stimulating discussions. Thanks also to Gladys Tang for permission to reproduce some of her Hong Kong Sign Language data. I also owe a debt of gratitude to the late Kenneth Hale, an inspiration to any fieldworker. Some of my JSL data were collected under a senior research grant from the Japan Foundation.

Brazilian Sign Language. I have also taught sign language field methods at two summer linguistics institutes.

1. Concerns about stigmatized languages

Signed languages have historically been stigmatized; especially in the past, users were often ashamed to admit that they even knew the language. This is true not only of users of sign languages but also of those who speak nonstandard dialects and creole languages (see, for example, Fischer, 1978). Such stigmatized languages or dialects help to define a community, and are often a marker of ingroup solidarity. What this means for fieldworkers is that in protecting the language from outsiders, users of the language may not let the fieldworker see the real language. In the case of sign languages, a fieldworker may get signing that is colored to a greater or lesser extent by the surrounding spoken language, e.g., signed English rather than “real” ASL or BSL. This can occur for two reasons: first, as just mentioned, users of the language want to protect it from outside scrutiny; second, since the language is stigmatized, users of the language may wish to prove or even show off to the investigator that they know the matrix spoken language. See the work of Labov (1966) and many others for examples in stigmatized dialects of English. Many of the ideas below are intended to get around this obstacle.

2. Choosing consultants

When studying an endangered language, a fieldworker may not have the luxury of being able to pick and choose among consultants; sometimes there are only one or two speakers of the language left. In the case of sign languages, the ideal consultant will come from a Deaf family, having been exposed to the native sign language from birth by parents or at least older deaf siblings. This restricts the possible number of informants. It has been estimated that about 0.5% of the population of the US are prelingually deaf (Schein & Delk, 1974f). Of that number, only about 8-10% have even one deaf parent. So only one in at most 2,000 people will be a deaf native signer. There are, of course, many hearing native signers, called CODAs (children of deaf adults), but there is a wide variation in the sign language abilities of hearing children of deaf parents (the eldest will often be highly skilled, but younger hearing children may not be), and their signing may be more influenced by the spoken language, not only because of exposure in school and on the playground, but also because deaf parents of hearing children may sign more like the surrounding majority spoken language in order to give their children a linguistic leg up.

Still, there is often more choice of native signers than among native users of endangered languages.² That said, not all native signers make good linguistic consultants. This includes some sign language teachers. The rise of sign language

² Trevor Johnston (personal communication) suggests that Auslan may soon be an endangered language, as close to 100% of deaf Australian children are receiving cochlear implants.

textbooks has also given rise to a certain amount of prescriptivism among sign language teachers, who will, for example, say that a particular structure is not used and in the next breath use that very structure. What should one look for in a good sign language informant? Most important is a metalinguistic skill, the ability to distance oneself from a particular situation and focus on form rather than content. A lot of linguistic elicitation involves introspection; ideal consultants should be able to think about what is grammatical and what is not. They should also have the temperament to “stand up to” the researcher when the researcher is barking up the wrong grammatical tree. A sense of humor and the ability to play with the language are an asset, as this also demonstrates metalinguistic skills. In my experience, some of the best consultants have some background in theater or are at least extroverted.

3. Ethical Issues

American and European universities usually have standards for working with human subjects. This includes such issues as informed consent and guarantees of anonymity. In the case of sign languages, as with some indigenous languages, both informing and obtaining consent can be problematic. Providing information in the written or spoken majority language may be insufficient; if the investigator has inadequate skills in the sign language, an interpreter may be required. Similarly, a signer may be illiterate or unable to write their name. In these cases, what I usually do is obtain the consent right on the video. This leads us to the question of anonymity. Because sign language researchers must use video rather than audio, it is impossible to guarantee anonymity, if one is going to show videos of the signer. If a signer wishes not to have their video shown on the outside, what one can do is to have a “talent” re-sign the data in as exact a copy as possible. Another possibility is to simply transcribe the data and publish it without video. I have had the problem of having incomplete releases of old data (If I collected data 20 years ago, I wouldn’t have thought to ask if I could use the person’s data on a passworded Website, for example), and am thus forbidden to use it in any way other than the way the consultant specified.

I generally use a release form (written or signed) that specifies a number of possibilities. The first is to ask the consultant if they want to be thanked by name or remain anonymous. In my experience, about 95% of my consultants have wished to be thanked by name. I then specify (and provide places to sign or initial or assent/refuse) several levels of permission: for example, may I show the video to other researchers? May I show the video to my students? If I publish a multimedia article, may I include clips from the informant’s data? May I post data on a passworded or unpassworded website? May I put it on You-Tube? (I haven’t asked this yet, but might in the future!) Occasionally, a consultant will ask for a copy of the video that I make, and I am always

willing to provide it.³ One consultant I worked with in 2006 turned the tables and videotaped me talking about ASL!

Children constitute a special case for informed consent. In the case of young children, one must obtain the consent of the parents. However, with older children, it is important to get the child's as well as the parents' consent. Also, there can be complications depending on the situation. Suppose, for example, that one is taping a particular child in the classroom. In that case, it is important to obtain the permission of the person in authority at the school, such as the principal, as well as the teacher. If other children show up in the video, it is necessary to get the permission of all of their parents as well.

4. Gaining Trust

One of the most important things about working with a native consultant is building trust and developing rapport; from trust flow many advantages both to the investigator and to the consultant. The first piece of advice I have for gaining trust is to learn the language one is trying to investigate. Some researchers believe that they can do research on a language without learning it; such a tack may be possible with users of languages that are well-established in their own countries, but it works less well for stigmatized languages. There are a number of reasons for learning the language: First, it gives one credibility in the community and with the individual consultant. Indirectly, at least, it shows respect for the language and the culture. By so doing, it gains access into the community. Remember that users of stigmatized languages often "circle the wagons" to prevent outsiders from getting in. Learning the language makes one more of an insider ally than an outsider.

A second, more practical, reason for learning the language is that it is the best way to know whether the data one is collecting are valid and appropriate. It also helps one to figure out what the linguistically interesting elements of the grammar are.

In developing trust and rapport, it is important to avoid both the appearance and the actuality of exploitation. Exploitation occurs in a lot of language communities, and some people have been burned by outsiders and are rightly wary of them.⁴ It is important to remember that without the consultant, we as linguists are nothing. Therefore

³ Indeed, one of my consultants died tragically, and I gave the parents a copy of the videos of our sessions; it was the last pictures they had of the consultant.

⁴ This is one area where informed consent becomes crucial. I once collected some data from a native signer. Another linguist wanted to see the data, and I asked permission from the consultant to make a copy for the other linguist. The consultant agreed to the copy, but the other linguist then used the data in a way that the consultant had not approved, resulting in the consultant's becoming upset. One gray area is the use of purchased commercial videos for purposes other than those intended, e.g., using a video designed to teach a grammatical point for the training of interpreters. I've even seen some deaf people use the term "linguist" as a pejorative, based on the attitudes of linguists they've met.

it behooves us to find ways to **give something back to the community**. Exploitation comes in several flavors: one is economic. Given that consultants are key to the success of our research, we mustn't treat them like convenient slaves; they deserve reasonable payment or equivalent for their time. In my work in Japan, I have often encountered consultants who refuse to accept money. In that case, I have bought them gifts, or done favors for them such as helping out in teaching an interpreting class or giving a talk to a group of Deaf women. Sometimes a struggling student may not have the wherewithal to pay a consultant; in that case there are many alternatives that may cost time but not much money, e.g., inviting them over for a meal, or exchanging information. For example, some of the consultants I've worked with in Japan wanted to learn some ASL, so we divided up the time of each session so that they got something out of it. Another example might be to help someone with the written or spoken language in exchange for help with the sign language of an area.

A second type of exploitation is scholarly; many linguists make a name for themselves on the basis of their fieldwork. I have known linguists who did not even acknowledge the help of their consultants; this is taking anonymity too far, in my opinion. Part of giving back to the community is explaining to the consultant what one is doing and why, and providing training in linguistics and transcription that may help to further the consultant's career. Ultimately, the researchers with the best insights into a sign language are its native users; our goal should be to train native linguists, both formally (i.e., graduate degrees) and informally; this is true not only for sign languages but for indigenous languages as well, and the field as a whole will benefit. I see a path from consultant to co-author to full-fledged professional.

A third type of exploitation is what we might call cultural. It is all well and good to train a few linguists from the community, but the rest of the community may still feel exploited. It is understandably frustrating for users of a language not to understand an article about their own language. Part of giving back means making one's insights accessible to the community whose language one is writing about. This can take several forms. Probably the best is to provide enough training to native linguists so that they can in turn explain one's findings to the general population. A second way might be to work with native users of the language to provide materials to set up classes in the language; this is particularly important for endangered languages. I would like to emphasize that the issue of one's work going over the heads of the people one is working with is not at all unique to sign languages; Scholars of indigenous minority languages face the same issues (Leslie Saxon, personal communication). A third way is to become an advocate for the community, *if the community wants it*; otherwise, one can be seen as patronizing.

One of the factors in developing rapport with consultants, then, involves demonstrating respect for consultants, their language, and for their community. It is also important to show respect for the culture, both of the Deaf community and of the surrounding hearing community. Let me illustrate this by discussing the issue of how to

find consultants in the first place. It helps to be vouched for by a respected member of the community; this will open doors that might otherwise be closed. Another avenue is through volunteering or otherwise participating in community activities, so that members of the community can see that the researcher is committed. It is natural and positive in such situations to form close friendships; in my own field experience, during the longest two periods of fieldwork, I was “adopted” once by an older Deaf woman and once by an entire Deaf family. We spent a lot of time together inside and outside the “research” situation. One word of warning: this friendship has to be genuine; consultants can spot a phony a mile away.

5. Technical issues

5.1. Observer’s paradox

I would like to turn now to some practical technical issues that can influence how well the research will come out. The first issue is the so-called Observer’s paradox: simply stated, being in the situation changes the situation itself. (Labov, 1972) In my earliest days of sign language research, I was in a group that was studying the acquisition of ASL. One child came into our lab and sat reading books with her mother, in the same way we had done this with other children. But this child didn’t utter a word for weeks. It turned out that she associated going to the lab with going to school, and since she attended an oral school, she assumed she *wasn’t* supposed to sign!! After we changed the dynamic and started playing with her more naturally, she opened up.

A second anecdote comes from an experience I had many years ago; I was working with someone who, though a college student, was older than I was. He came from a large Deaf family in Appalachia and had a really good sense of ASL. But he wouldn’t sign ASL with me, because I was a professor and because the ethos of my university at the time was that one was supposed to sign English. One summer day, I was eliciting from him as usual and a terrible thunderstorm began; the sky got black, and lightning blazed from threatening clouds. This engendered a vivid recollection of a similar thunderstorm that the consultant had experienced many years before, and [finally!] a real ASL narrative came pouring out. Foolishly, I interrupted him with the observation that this was the kind of language I was after. Fortunately for my research, he told me to shut up and let him finish his story, which continued in ASL. As Labov points out, getting a consultant to focus more on content than on form gives us a form that is truer to what the consultant actually does in real life, rather than a veneer of what they think you want to hear or see.

How do we minimize the observer’s paradox? There are three ways. First, just as it contributes to rapport, a more-than-basic knowledge of the language can tell the investigator when s/he is getting data that is, say, influenced by the spoken language. When I start doing fieldwork with a new consultant, I give them tasks that might lead to signing that is influenced by the spoken language. If it is produced, I then joke or tease the consultant, telling them that I already know the spoken language and that we should

throw it out the window. But in order to do this, I have to know some of the language already.

A second way, which was used by Labov in his studies of African-American Vernacular English (AAVE), is to use a Deaf person to elicit data rather than doing the elicitation oneself. This can be accomplished in several ways; one is to record two consultants at once; a second is to use a Deaf confederate (this can be part of their training as a researcher). As described in Fox (2007), even a Deaf researcher who doesn't know the language being investigated can sometimes obtain more reliable data than a hearing investigator.

A third way to avoid the observer's paradox is to use extremely small equipment in as naturalistic a setting as possible. When I first started doing sign language research, we had to use cameras much larger than a breadbox, connected to even larger reel-to-reel video recorders. Lighting requirements made the situation even more artificial. Now one can get camcorders just a bit larger than a pack of cards, which furthermore function extremely well in low light. A remote control permits one to control the camcorder without jumping up and down all the time to turn the camera on or off.

5.2. Video setup

We have just mentioned the use of a camcorder. This leads us to the general question of video setup. How and where one sets up the camcorder is determined by a variety of factors. One is exactly what one is investigating. If, for example, one is investigating the grammatical use of facial expression, it is important to be able to see the face. This may even entail using two cameras, one of which shows a closeup of the face and the other of which shows the general conversation. The use of two cameras would then require a special-effects generator in order to put both pictures in one frame; this could also entail using separate cameras and video recorders. Just as focusing on facial expression might require close-ups, recording a group of people requires a wide shot.

The next question that many people ignore is handedness. For various reasons, one may not wish to record with the camera straight on; it is therefore important that the signer's body not block visibility of their signing. For a righthanded signer, that would mean a setup such as that in Figure 1. I include the researcher in the figure because if the researcher isn't on camera, one can't always figure out what the signer is responding to. The researcher is slightly ahead of the signer so that when the signer looks at the researcher, s/he doesn't have to turn to the side, and thus the signing is more visible. For a left-handed signer, a mirror-image setup from Figure 1 would be used.

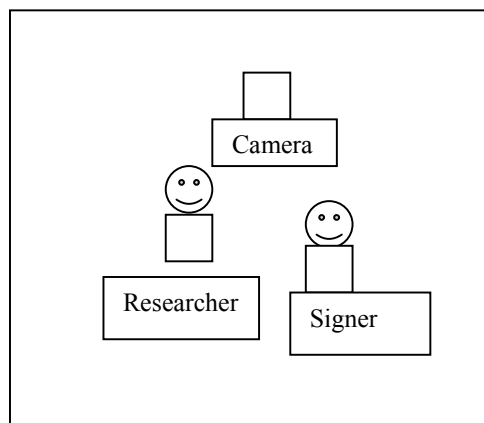


Figure 1: Video setup for right-handed signer

Lighting is another important factor. Fluorescent lights can cause video flicker, this this is less of a problem than it used to be. There is always a tradeoff between good lighting and naturalness. It is important that the consultant be as comfortable as possible and not feel overwhelmed or overheated by equipment. At the same time, a certain amount of shadow provides definition that makes a two-dimensional image significantly clearer. If the signer wants to wear a baseball cap or sunglasses, this is an indication that the lighting is too bright.

5.3. Transcription systems

For now we shall elide the big question of how to conduct an elicitation session. Let us assume for now that we have collected some data. How shall that data be transcribed? As with the issue of how close up we want the camera to be, the purpose of the elicitation will determine the amount of granularity required in the transcription. If, for example, one is interested primarily in phonology, one will want to use systems such as those described by Liddell & Johnson (1989) or Sandler (1989). Stokoe's notation system (Stokoe, Casterline, & Croneberg, 1965) is also useful as a rough and ready way of notating signs, and many people are now using Sign Writing (Sutton, 1995) or Hamnosys (Prillwitz et al, 1989). If one is interested more in syntax, one will use a broader transcription system. The latter two systems are enabled for computer input, but both have serious drawbacks in my opinion.

Whether one is looking at phonology or syntax, it is important to realize that because of the degree of simultaneity in sign languages, notation in *tiers* is ideal. There are three systems that I know of for notating in tiers, one of which was explicitly designed for use with sign languages. They are the SIL Linguist's Toolbox, SignStream, and ELAN. Of these, only ELAN is cross-platform; SignStream is Mac only, and Toolbox is PC only. Both SignStream and Elan permit the coordination of video with transcription; that is,

one can see transcription move along with the playing of video. ELAN is free, downloadable from the Max-Planck website in Nijmegen; SignStream requires a nominal payment. In neither system can one export what one has transcribed and put it into a text. The practice of transcribing in tiers predates these systems by many years, however; see Baker & Padden (1978) for an early example.

As in work on nonlinear phonology, tiers are used for degrees of freedom, though in practice depending on what one is looking at, one will in all likelihood use fewer tiers than there are degrees of freedom. So, for example, the angle of the head is independent of the degree of closure of the eyes, which are at least partially independent on the position of the eyebrows. Other degrees of freedom include the shape of the mouth, the shaking or nodding of the head, the position of the tongue, and the direction of the eyegaze. At the phonological level, the number of hands used, extension of each finger, opposition of the thumb, position of the hand with respect to the body or another hand, point of contact, orientation of the fingertips, orientation of the palm of the hand[s], local movements such as wiggling or nodding, and type of path could all have their own tiers.

One important reason for using tiers is that they permit one to show the scope of both nonmanuals and handshapes; for handshapes, this is particularly important if the handshape changes during the execution of a sign. For nonmanuals, this is important especially in the case of signals that overlap or have different scopes.

Below is a simplified example from Hong Kong Sign Language (HKSL), courtesy of Gladys Tang:

| | | |
|---------------------------------|-------------|----------|
| (1) head angle: | _____ | fwd |
| head movement: | <u>neg.</u> | |
| eyes: | _____ | open |
| eyebrows: | _____ | up |
| hands: | INDEX2 | BUY BOOK |
| ‘didn’t you buy a book?’ (HKSL) | | |

In example (1), note the partial overlap among the four nonmanual signals.

5.4. Video recording and compression

Just as audiotape is an essential tool for the field linguist working on spoken language, so video is essential for a field linguist working on sign languages. Budget will determine the exact type of equipment one can use, but there are a few general guidelines.

First, even on a limited budget, it is important to use digital video, for several reasons: first it is necessary in order to interface well with a computer. Secondly, it is lossless; with previous video technologies, every copy generation resulted in loss of signal; but with digital video, even if one copies a tape, no signal is lost. Third, in purely practical terms, once the video signal is transferred to DVD or CD, the medium is

much more stable than tape and takes up far less space. The decision to whether to go with HD video or regular digital is probably to be determined by budget more than anything else. Camcorders have a variety of storage formats (mini-DV, hard drive, mini-DVD, etc.), and it is important to choose a storage format that is compatible with one's computer and software.

Digital video can be is also relatively lossless with regard to compression; once copied to a computer, there are a variety of ways that a video can be compressed. Again, it is important to make sure that the resulting compression is compatible with video playing and editing software. One can play with different parameters for compression, but it is important to keep the frame rate as high as possible; otherwise the video will look jerky and especially fingerspelling can be lost. This is true even it must be at the expense of overall picture clarity (Kamata et al, 2002). The bitrate is also important to keep high; a minimum of 1600 kbits/second is key, according to a Sorensen technician with whom I consulted. More is better, but will drastically increase file size, as will the actual size of the video frame.

Choosing a computer for text processing is more a matter of "religion", temperament, and personal preference; however for manipulating videos and other graphics, even people in PC labs have told me that the video manipulation software available for Macintoshes is cheaper, better, and far easier to use than that available for PCs, both for low-end (iMovie, Quicktime Pro) and high end (Final Cut Express or Pro) software. When I go to a sign language conference, I have noticed that the vast majority of presenters will use Macs, precisely because of the ease in producing videos. That said, when converting video to DVD, it is important not to actually "produce" a video that can be shown on a DVD player. The reason is that once a DVD has been produced, it is then extremely difficult to extract clips from the resulting video. One might want to use clips in, for example, a multimedia article. Instead of producing DVD, one can compress the video to, say, mpeg4 format and copy the mpeg4 files to DVDs, to view on a computer in Quicktime⁵.

Whatever computer is chosen, for extensive work it is good to have the fastest computer possible. Video rendering is highly processor-intensive; a desktop machine will therefore generally work better than a laptop. Having two monitors (one for viewing video and the other for transcribing), while not absolutely necessary, ends up being more efficient.

Note that when compressing videos, it is necessary to have about twice as much free space on one's hard drive as the resulting video will require. A large external hard drive is thus very convenient. Future technological developments may make the contents of this section obsolete, so the reader should check for them.

⁵ Quicktime is again cross-platform; Windows Media Player is no longer being developed for the Mac.

6. Elicitation pointers and techniques

In this section, I will discuss things that I have found to work and not to work; the cautions are for almost any field environment, signed or spoken. We begin with general pointers and then continue to specific elicitation techniques for specific kinds of structures.

6.1. Dos and Don'ts

It is just as important to know what *not* to do as to know how to proceed positively. The examples below are no-no behaviors I have observed in some fieldworkers.

6.2. Don'ts

6.2.1. Don't translate from spoken language.

Except perhaps for vocabulary, I strongly believe in *monolingual* elicitation. Thus my first pointer is, whenever possible, *not* to use translation from the spoken language, especially in the case of stigmatized languages such as sign languages or creoles. There are several reasons for this caution:

- The consultant may not know the spoken language that well. Especially when in sophisticated grammatical territory, therefore, what you think you are getting may not be what you are actually getting. Basic vocabulary is the one exception I would permit, though even there, pictures or videos may work for at least some words.
- It is natural, particularly in the case of sign languages, for the signer to adjust to the language of the interlocutor. Using translation makes it more likely that the consultant will be influenced by the grammar of the spoken language. In the case of a stigmatized sign language, the consultant may be trying to show they know the spoken language. They may also think that that is what the investigator is aiming at.

6.2.2. Don't try to push the consultant into a particular judgment or try to get them to change their mind.

The interplay between data and theory can be extremely delicate. I believe that theory is valuable in that it helps us to know where to look for interesting data; however, when that theory becomes a set of blinders that doesn't let us see or accept data that might contradict the theory, good science does not result. Even the best consultant can get confused or feel pushed into a particular judgment. Obviously, when training a consultant in linguistics, we want to let them in on where we're going, but it's best to do so after the elicitation session is complete.

That said, if a consultant comes up with an utterance or a judgment that seems wrong, it is of course permissible to probe, but it is important to do so without browbeating the consultant. Attention must be paid to the degree of certainty that the

informant displays; if they are absolutely certain, back off; if they hesitate, a probe or clarifying example may be in order.

6.2.3. Don't have a closed mind.

There are several ways in which this admonition is important. The first harks back to the previous paragraph; if we get data that goes against our theory, the problem may be with the theory, not the data. A second is that an avenue of inquiry may turn out to be a dead end. This is when it is important to cut one's losses and either move on to another topic or go back to square one and figure out an alternative way to ask the same question.

6.3. Things that help

Below are some general tips for successful elicitation. Some may perhaps seem obvious to experienced researchers, but nonetheless bear repeating.

6.3.1. Have an idea of what you're looking for.

Although it is important not to get stuck in a rut, it is equally if not more important to be involved in *directed* elicitation. Otherwise, one risks wasting one's own time as well as that of the consultant. If one is interested in, say, relative clauses, one should prepare materials designed to elicit relative clauses. (see, however, section 7.3. below)

6.3.2. Overprepare!!

Elicitation sessions can go in unpredictable directions. One can prepare many pages of prepared material counting on the idea that one has "enough" for an hour, only to have it dismissed or rejected by the consultant in a few minutes. Another thing that can occur is that a particular task one has thought of trying turns out to be opaque to the consultant. It is thus important to have a plan B, or at least more stuff in Plan A than one thought necessary.

6.3.3. Take breaks and change the pace

It is important to avoid consultant fatigue. I often alternate between form and content in order to break the session up. For example, again using the relative clause case, if I ask a question related to a relative clause, I might then pick up on the content of what the consultant has uttered and have a "real" conversation about it. This increases the rapport by showing that I'm interested in the consultant as a person and not just a language machine.

There are other ways of changing the pace. In any case, recall that elicitation materials that are too ordered can unduly influence grammatical judgments. Obviously, when writing up data, they need to be organized, but mixing things up in elicitation is a wise direction to take; not only does it avoid fatigue, but it may help to disguise what one is really looking at.

One way to change the pace is to work in pairs. The idea of working in pairs was

born of necessity when I was teaching field methods and we had half the number of hours per week as we had students in the class. There turn out to be a few advantages to working in pairs:

- As mentioned, if two people are working on different topics, it is a natural way to change the pace of elicitation.
- One person can take notes while the other person is eliciting.
- One person may notice signals or data that the other overlooks.

In this situation, there must be a spirit of good will between the field partners; time should be divided equally, unless a different division of labor is agreed upon in advance. I try to encourage cooperation rather than competition. If one partner notices things that are relevant to the other's research topic, they should yield some of their time. Give information about yourself. Be prepared to make a fool out of yourself.

6.3.4. Be ready to switch; embrace serendipity

As in other scientific pursuits, one may make a discovery while investigating at an entirely different topic. A number of years ago, a few of us were involved in a psycholinguistic study on the role of inference in ASL narratives (see Brown, Fischer, & Janis 1991). However, while collecting data for that project, the two linguists noticed a structure that was occurring frequently. When we investigated further, we realized that this was a structure that had not previously been described (Fischer & Janis, 1990). When something strikes you as interesting, it usually is, and may be more interesting to pursue than what you were originally interested in!

7 Materials and techniques

As discussed above for lighting and camera placement, what kinds of materials and techniques one uses will depend in large part on what one is trying to investigate; in particular, much depends on the level one wishes to investigate.

7.1. Phonology

This will be the shortest subsection; I must admit upfront that I haven't done a lot of research on sign language phonology, having been more interested in morphology and morphosyntax. What I have done suggests, however, that the important factor in doing phonology research in the field is to be systematic and meticulous. In concrete terms, this means laying out possible variations in advance and coming to the elicitation session with big lists of possible things to try. One of the major things we want to find out in phonology is what counts as the same, and what formations are different. So we learn some signs and then try minute variations on formational degree of freedom at a time to see if the consultant accepts them as variations, rejects them, or sees them as different signs. For example, possible variations in handshape could include tense vs. lax, fingers

spread or closed, number of extended fingers, degree of bending of fingers, and at which joint[s], or opposition of the thumb. For location, we could again try small changes in placement and ask the consultant if they make a difference or only look funny. With orientation, one could try different angles of the hand with respect to various planes. Another way of getting at acceptable variation is to ask the consultant to repeat signs, and look for changes in pronunciation which should not count as different.

Similarly, in looking at phonological processes, we would go up a unit and look at possible effects on preceding and following context on the pronunciation of a sign. So, for example, we could give the consultant two signs and ask them to put them together, in either order. It is important to make clear to the consultant that we are interested in form rather than content.

7.2. Morphology

When looking at word structure, having a plan ahead of time is crucial. One could make a grid, for example, and plug different verbs (or other parts of speech) into a grid of morphological processes to see what restrictions there might be in the use of those processes. To get ideas for which verbs to use in which processes, I highly recommend Levin (1993) as a reference resource.

In sub-areas of morphology, charts and pictures can be useful. One technique used by Ulrike Zeshan in her cross-linguistic project on possession is the family tree; this is a great tool for getting kinship systems. Such charts and pictures can also be useful in studies of lexical semantics. Just to remind the reader, the techniques and materials I am discussing are designed to minimize translating from or even thinking in the spoken language in the community. The one area where translation from the spoken language does little harm is at the level of the individual word; however, as cautioned above, it is important to make sure that the consultant actually knows the meaning of the word one is trying to translate, and here, too, it is a good idea to stick to very specific kinds of words; for example, if the consultant is new to the game of acting as a consultant, and one asks, say, for the sign for “take”, rather than asking “which ‘take’ do you mean?” the consultant may simply give one sign, ignoring all of the sundry meanings of the word “take”. Since semantic overlap between languages is never total, the reader is cautioned to remember the ambiguity of many words in many languages.

7.3. Syntax

In the case of syntax, here too we need to change our elicitation materials and/or methods depending on what kinds of structure are of interest. That said, how can we structure monolingual elicitation materials to maximize the amount of useful data we obtain? We want to avoid translation but at some level also channel the response. One powerful tool I have used extensively is the deceptively simple task of using a sign in a sentence. The choice of signs is planned, of course, but one is not determining the response so much that the data become contaminated. Suppose, for example, that one is

interested in wh-questions. One can then prepare a list of wh-words and ask the consultant to use them in sentences. It is important to have fillers and changes of pace so that the consultant doesn't become fatigued. After a sentence with a wh-word in it is produced, it is then possible to probe and ask if other orders are possible and if so, whether they change the meaning.

Sometimes it is difficult to get the idea of this task across. In such cases it helps to take turns. That way one can model the length of sentence one wants and at the same time get the consultant more involved in the process; it also breaks the monotony. Another technique to exploit in taking turns is to deliberately make errors and ask for corrections. This is a good monitoring device to make sure that the consultant is willing to correct the researcher. Criticizing someone of perceived higher social status is frowned upon in many cultures; the sillier and more egregious the error one makes, the easier it is to overcome that taboo. I have had consultants in both ASL and other languages who will try to trip me up with a slang word that they think I don't know. They enjoy laughing at my ignorance. This often results in very fruitful exchanges. If I don't know the sign, I'll ask for an explanation. After the explanation I'll try again to use the sign in a sentence, and if it doesn't work, I get further clarification with examples.

If the consultant produces several variations, or if by this time the investigator suspects that other orders are possible, s/he can ask for preferences: does A feel better than B or vice versa? When asking for preferences, order is important as there is a tendency to choose the second of two choices.

An extension of the "use a sign in a sentence" task is to use two signs. If, for example, one is interested in negations and interrogatives, this technique can produce interesting scope phenomena. Again, it is a good idea, once a sentence has been produced, to ask about other possible orders.

Another technique, which is useful for complex sentences, is sentence combining. For example, if one is interested in relative clauses, the two sentences to be combined can share a noun phrase. If one is interested in the expression of cause and effect or temporal sequence, the two sentences can have that relationship (try two different orders). If long-distance dependencies are the topic du jour, the two sentences can be structured so as to guide, but not overdetermine, the consultant into demonstrating such dependencies.

One way to elicit questions is to give a sentence, then specify one word to be omitted with a question word or phrase substituted for it. In my experience, this is a difficult concept to get across, so examples help.

For a variety of structures, it can be useful to use video clips or series of pictures. While this is a powerful tool, it has its limitations; specifically, only activities or objects that can be pictured are conducive to this task. If you are interested in comparing, say, two systems of justice, such materials may not work; in those cases, a conversation about real topics is often more productive.

7.4. Discourse

In sign languages, there are some grammatical processes that occur most frequently above the sentence level. If only for that reason, it is important to collect narratives and other structures above the sentence level. As in any ethnographic study, narratives (or their lack) can provide a rich insight into both the language and the culture of the community. For example, the kinds of bedtime stories most middle-class American children experience daily are infrequent in mainstream American Deaf culture. However, there is a lot of folklore and storytelling that is prized within the adult Deaf community. So-called ABC stories are not to be expected in a sign language such as that used in Hong Kong, but I found that instead they have number stories.

As in the technique of using signs in sentences, to partially control the content of a narrative, one can ask for a story about a particular topic; this is useful, for example, if one is interested in eliciting classifiers. Asking about dreams can help us to tap unreal structures such as counterfactuals. Of course, Labov's old standby of asking for the scariest thing that ever happened to a person is also useful. However, since in some cases, retelling the story of one's scariest experience can be traumatic, one alternative is to ask someone instead for the funniest experience they ever had.

Discourse can be dialogue as well as monologue. If one is fortunate enough to have two consultants at once, this opens up a number of possibilities. For example, one person could teach the other how to play a game or give the other person directions to a particular place. Other communication tasks can be used as well, such as picking out a particular configuration of figures in a set of pictures.

Let me re-emphasize here that just collecting texts can be a valuable source of information. Things that one notices in a narrative can be explored later in more structured elicitation sessions. For linguistic purposes, just collecting texts is insufficient, for a couple of reasons. First, there can be gaps in paradigms that simply do not show up in a narrative. Secondly, without at least having another native user look at the narrative, one doesn't always know if the consultant might have made some kind of performance error while telling the story.

As mentioned earlier, switching back and forth between focusing on form and focusing on content can help to hold the consultant's attention. And even when one is ostensibly focusing on content, one can try to use the form one is targeting to see how the consultant responds. An example of such a ploy is given in. The situation is as follows: I have been invited to the home of a native JSL signer along with another native JSL signer for elicitation, tea, and cookies. I am really interested in wh-questions, including covert wh-questions (Lillo-Martin & Fischer, 1992), which consist of a regular sign with a wh-facial expression that turns it into a wh-word. For simplification, in the example below, I'm using WH-KAU as a shorthand for KAU ('buy') with a wh-facial expression added to it:

- (1) HONTOU SITUMON. INDEX_a KOPPU_a *SUKI* KEDO NIHON MI-NAI.
WH-KAU?

Really question That mug love but Japan see-not
wh-buy

‘This is a real question: I love this mug, but haven’t seen any like it in Japan; where did you buy it?’

The native signer responded appropriately by indicating that one has to go to a specialty shop to buy such a mug. This suggests that she accepted the structure as well as the content of my question. Obviously, it is necessary to follow up with structured elicitation, but this device permits more naturalistic data to occur.

8. Admonitions and concluding remarks

It is of course important to treat the consultant with the respect and dignity that they deserve and to protect their privacy insofar as is both possible and requested. It is important to establish one’s “street cred” in terms of knowing enough of the language to recognize interesting evidence when one sees it. It is important to be well-prepared for as many possible contingencies as one can imagine. And it is crucial to give something back to the community. For me personally, collecting data is a challenge, but an extremely enjoyable one. Viewing the session as a game lightens the mood and helps the consultant to relax. It is therefore important to have fun!! Teaching, joking, and playing with signs adds immeasurably to the experience and furthers the goal of figuring out how language works.

References

- Baker, C. & C. Padden (1978) Focussing on the nonmanual components of ASL.
- Brown, P., Fischer, S., & Janis, W. (1991) Pragmatic and linguistic constraints on message formulation: A cross-linguistic study of English and ASL. *Journal of Speech and Hearing Research* 34: 1346-1361.
- Fischer, S. (1978) Sign language and creoles. In P. Siple, ed., *Understanding Language through Sign Language Research*. New York: Academic Press: 309-331.
- Fischer, S.D., & Janis, W. (1990) Verb Sandwiches in ASL. In S. Prillwitz & T. Vollhaber, eds. *Current trends in European sign language research*. Hamburg: Signum Press: 279-294
- Fox, M. (2007) *Talking Hands*. New York: Simon & Schuster.
- Kamata, K., Fischer, S., et al (2002) Relation between playback rate of signing picture and perception. Institute of Electronics, Information, and Communication Engineers, (Denshi-Joho-Tsuushinn Gakkai) Yokohama, Japan.
- Labov, W. (1972) *Language in the Inner City*. Philadelphia: University of Pennsylvania Press.
- Labov, W. (1966) *The social stratification of English in New York City*. Washington, DC: Center for Applied Linguistics (republished in 2006 by Cambridge University Press).
- Levin, B. (1993) *English verb classes and alternations: A preliminary investigation*. Chicago: University of Chicago Press.
- Liddell, S. & R. Johnson (1989) American Sign Language: The phonological base. *Sign Language Studies*, 64, 195-277.
- Lillo-Martin, D., & S. Fischer (1992) Overt and covert Wh-questions in American Sign Language. Presented at the 5th TISLR conference, Salamanca Spain.
- Prillwitz, S., R. Leven, H. Zienert, T. Hanke, & J. Henning. HamNoSys version 2.0: Hamburg Notation System for sign languages. An introductory guide. *International studies on sign language and communication for the deaf* 5. Hamburg: Signum.
- Sandler, W. (1989). *Phonological Representation of the Sign: Linearity and Nonlinearity in American Sign Language*, Dordrecht: Foris.
- Schein, J. D. & M.T. Delk (1974) *The deaf population of the United States*. Silver Spring, MD: National Association of the Deaf.
- Stokoe, W. D. Casterline, & X Croneberg (1965) *Dictionary of American Sign Language based on linguistic principles*. Washington: Gallaudet University Press.
- Sutton, V. (1995) *Lessons in sign writing*. La Jolla: Deaf Action Committee For SignWriting.

手語的田野調查：方法、技術、和考量

蘇珊·費雪

語言研究中心
加州大學聖地牙哥分校

摘要

手語的田野調查與其他語言，尤其是與那些被認為較弱勢的語言有許多相同之處。但手語的田野調查也有它獨特的地方。採集語料時最重要的是學術倫理的考量，首先一定要取得顧問的同意；使用影像資料時，一定要保護顧問的隱私。另外，與手語顧問建立並維持良好的關係也是很重要的。本文探討的範圍著重在實用的層面，包括如何設置攝影器材錄製語料，各類影像格式與播放軟體的使用技術，以及各種手語語料轉記的方式等。最後本文探討語料調取的通則，尤其強調使用單一語言（研究對象的語言）來調取語料的技術，並分享一些對我非常受用的田調經驗與方法。

Acquiring FINISH in Hong Kong Sign Language¹

Gladys Tang

*Centre for Sign Linguistics and Deaf Studies,
Department of Linguistics and Modern Language,
Chinese University of Hong Kong*

Abstract. L1 studies on the acquisition of grammatical aspect in spoken languages show that the process interacts closely with the development of lexical aspect and tense. In this paper, we focus on a deaf child's acquisition of the sign FINISH in Hong Kong Sign Language (HKSL). In the adult grammar, there are two entries of FINISH which we assume head their own syntactic positions: VP and AspP, the latter of which marks the perfective aspect in the language. In the child data, FINISH first emerged as a lexical verb. Subsequently, and in parallel to a verb, the sign also occurred as a perfective marker and consistently followed a verb in clause final position, in line with the adult data. There is also a systematic distribution of the sign according to situation types. FINISH as a main verb was inherently telic and marked the end of an atelic predicate (i.e. an activity). As an aspect marker, it occurred initially in accomplishments before other situation types. As for temporal reference, FINISH as a main verb was mostly for present reference but initially for past or future reference if it served as an aspect marker. These findings show that the acquisition of perfective aspect in HKSL largely conforms to the grammatical constraints as observed in the spoken language literature; however, some minor differences are observed.

1. Introduction

There are two levels to the study of aspect: lexical aspect and grammatical aspect. Lexical aspect, or 'Aktionsart', refers to the 'inherent meaning of situations' (Comrie 1976) or 'situation types' (Smith 1997). It offers information about the internal, temporal structure of situations characterized by oppositions like events versus states, telic versus

¹ This research was supported by grants from RGC# CUHK4278/01H entitled "Grammatical Development of HKSL by Deaf Children (to Gladys Tang). Earlier versions of this paper have been presented at The First Conference on Comparative Study of East Asian Sign Languages Chung Cheng University, Chiayi, Taiwan, September 16-17, 2006; and Workshop on Acquisition of Functional Categories in Asian Languages, December 26th, 2007, The Chinese University of Hong Kong. I am grateful to the parents of the deaf child and the deaf researchers who have participated in this project. I thank the audiences at both conferences for their invaluable comments and feedback on my research.

atelic, punctuals versus non-punctuals. Based on these distinctions, verbs have been classified into different aspectual classes: states, activities, accomplishments, and achievements (Vendler 1967). Recent analyses show that the verb's inherent meaning alone is not enough in determining the aspectual properties of the clause, rather, it is the verb's lexical semantics – its arguments and the related semantic properties, or sometimes the different types of adverbials that contribute to a clause' aspectual interpretation (Smith 1997, Tenny 2000). Whereas lexical aspect focuses on the internal temporal contour of eventualities, grammatical aspect focuses on how speakers view the eventualities at a given point in time, either as perfective or imperfective. Imperfective aspect views a situation as ongoing whereas the perfective aspect views a situation in its entirety as 'complete' with clear boundaries (i.e. beginning point and endpoint). Perfectivity and telicity interact in the computation of completion entailment. Telic predicates entail culmination of an event, reaching a natural endpoint of the event contour itself, where culmination is realized under the conditions specified by different eventualities (Rothstein 2004). On the other hand, the perfective aspect applies to eventuality descriptions to provide a perspective on the situation, asserting its initial and final boundaries while establishing a relation between the event time and the reference time in the temporal domain (Klein 1994).

L1 studies on the acquisition of aspect have been studied intensively for a variety of languages (cf. e.g. Antinucci and Miller 1976 for Italian; Hyams 2005 for Greek; Shirai and Andersen 1995 for English; Brun et.al. 1999 for Russian; Shirai 1998 for Japanese and Li and Bowerman 1989 for Mandarin, to name but a few). These studies show that children produced aspectual morphology as early as age 2;6 before full mastery of the tense morphology. The findings that were based on production data also converge on the significant relationship between the development of perfective/imperfective and telic/atelic distinctions. Specifically, the perfective aspect tends to occur initially in telic predicates (i.e. achievements and accomplishments) with past reference whereas the imperfective aspect in atelic predicates (i.e. activities) with present reference. This 'aspect first' phenomenon is also being studied intensively within the framework of Root Infinitive (RI) in child language.² Olsen and Weinberg (1999) argue that the verbal forms thus observed reflect an initial mapping of lexical aspect onto grammatical aspect rather than tense. It is difficult to tease apart the independent contribution of lexical and grammatical aspect in the initial acquisition process, particularly when the language in question like English do not have distinct morphology for these two grammatical categories and in most cases lexical aspect in natural languages is not encoded by distinct morphology but rather either inherently manifested in the root of the verbs or compositionally derived through the verb and the semantic properties of its arguments.

² The RI Stage has been attested in early child language of a number of languages. During this stage of development, young children use both finite and non-finite verbs in root contexts. In addition to analyzing the related morphosyntactic properties, Hyams (2005) show that this stage also demonstrates young children's acquisition of aspectual and modal properties.

However, it is intriguing to observe in many of these studies that young children tend to employ grammatical aspect initially to mark temporal properties of events. Children aged 1;5-2;5 acquiring Russian that has a rich system of verbal inflection tense, aspect and person agreement used the perfective marker to refer to past events and imperfective with present events (Brun et. al. 1999). Greek children during the RI stage adopted the ‘bare perfective’ for eventive but not stative predicates.³ Hyams (2005) argues that it is perfectivity rather than telicity that is responsible for event closure at the RI stage, marking an event as ‘closed’ or ‘terminated’. Even with languages like English that do not have rich aspect morphology, young children used ‘-ed’ for telic predicates (i.e. completed events with clear results,) and ‘-ing’ for atelic predicates (i.e. ongoing events). Van Hout (2007) also found that the perfective aspect was acquired systematically before the imperfective aspect.

For languages that do not have tense morphology, similar results are observed. Mandarin-acquiring children use ‘-le’ with achievement and accomplishment verbs and ‘-zai’ with activities and stative verbs (Li and Shirai 2000). But a recent study by Chang (2002) found 28% of atelic verbs (i.e. activities and statives) produced by Mandarin-acquiring children that were followed by a perfective marker ‘-le’. As for Cantonese, Chan (2000) found that young children initially used a verbal particle ‘jyun’ (finish) in place of the perfective ‘-zo’ in the process of acquiring perfective aspect.⁴

These results suggest that perfective aspect marking is prominent in child language and interacts closely with lexical aspect and temporal reference of events, past or present. It could be that grammatical aspect also concerns time – how situations develop over time or how speakers view situations at a given point in time. It seems that young children typically adhere to the ‘here-and-how’ principle and choose to view situations at a point in time, perceiving them as either ‘ongoing’ or ‘finished’.

Both functional and formal accounts have been put forward for this acquisition phenomenon. The prototype account proposes that achievements with inherent aspectual characteristics of being telic and punctual constitute the prototype of the category of perfective aspect while activities constitute the prototype of the progressive aspect. Therefore, children acquire the past morphology by first associating it with the prototype (i.e. achievements) and later with other non-prototype members like accomplishments, activities and statives. Young children will start with the form-meaning mapping of the prototypes before expanding it to the less prototypical relations such as perfective and atelic predicates (Li and Shirai 2000). These researchers argue that input from the environment is a determining factor because a similar distributional bias for verbs and

³ It is a verb form which lacks tense, agreement morphology or modal particles but attached with perfective morphology.

⁴ Cantonese has a verbal particle ‘jyun’ (finish) as in ‘ngo mei se jyun feng seon.’ (I-not_yet-write-finish-CL-letter ‘I haven’t yet finished writing the letter’). It comes after a verb and marks either termination or completion of an event. If it is completion, it marks a change of state.

grammatical aspect is also observed in the adult discourse. Arguing against the input-driven approach, Olsen and Weinberg (1999) claim that this state of perfective-telic versus imperfective-atelic mapping reflects the ‘initial hypothesis’ of young children’s acquisition of aspect in all languages. In other words, lexical and grammatical aspect categories are part of Universal Grammar. This initial hypothesis allows young children initially to restrict the English ‘-ed’ to perfective marking rather than tense marking, but this rule will be relaxed upon positive evidence. They further propose that it is lexical aspect that guides the acquisition of grammatical aspect. To pursue this proposal further, Torrence and Hyams (2003) predict that when neither tense nor grammatical aspect is morphologically specified initially, inherent aspect (i.e. telicity) provides the temporal reference for the clause.

Little has been done on how deaf children acquire aspect in sign language. In this paper, we report on how a deaf child acquires the sign FINISH in Hong Kong Sign Language (HKSL). Initial analysis of the adult grammar has identified FINISH as a perfective marker in the language (Lee 2002). In what follows, we will first provide a grammatical description of FINISH with its related aspectual properties in HKSL. Then, we will outline the methodology of the current study and a summary of the research findings.

2. Grammatical Aspect in HKSL

Except for ASL, not much analysis has been done on aspect in sign languages so far.⁵ Some preliminary analysis conducted by Lee (2001) on HKSL concludes that while no manual sign for imperfective aspect is found, FINISH in HKSL mainly serves as a perfective marker (77.1% of her conversational corpus), as shown in (1) and (2).⁶ Other grammatical functions of FINISH include being a main verb (3), and a discourse marker meaning ‘That’s it’ signaling the end of a topic and the switch to a new one, as in (4).⁷

⁵ Studies on other sign languages have also identified a sign glossed as FINISH. Among the many functions cited, perfective aspect marking is most common. This sign is a function word on its own, and its syntactic position varies among different sign languages and even within an individual sign language. (Sutton Spence and Woll 1999 for BSL; Johnston and Schembri 2007 for Auslan; Meir 1999 for ISL; Fischer and Gough 1972, Grose 2003, Janzen 2003, Rathmann 2005 for ASL).

⁶ Grose (2003) analyzes FINISH in ASL as a functional aspect marker for completion, which he refers to as ‘completive aspect’. He argues that FINISH in ASL correlates with telic events only because only telic events may be completed. In other words, FINISH does not occur in those cases in which a telic event is closed but incomplete, or with an atelic event that is closed but lacks a natural endpoint. As we shall see, HKSL allows FINISH to mark an incomplete event as closed, using FINSH.

⁷ There is one function of FINISH which was not reported in Lee (2002). FINISH may be an adverb denoting the upper bound of a quantized object, as in (i). This use of FINISH occurs in our child data but we will not include it in our analysis because we suspect that it belongs to the study of quantification rather than aspect.

- (1) LAST SUNDAY PARENT COME-BACK FINISH. WHY COME-BACK WHY?
IX-pro1 HOME BUSINESS, IX-pro1 GRANDFATHER DIE FINISH.
'My parents came back last Sunday. You know why? My family business, my grandfather died. (Lee 2002)
- (2) FINISH? ALL MONEY PAY FINISH?
'Have (you) paid all money? (Lee 2002)
- (3) COME-BACK, FUNERAL-CEREMONY ALL FINISH. YESTERDAY,
DAY-BEFORE-YESTERDAY, SLEEP NIGHT-TILL-MORNING.
'(I) came back. All matters about the funeral ceremony were finished. Yesterday and the day before yesterday, I slept.' (Lee 2002)
- (4) ...RIGHT, FINISH, UNCLE-SIXTH LAST-YEAR NATURALLY SLEEP
PAINLESS, DIE.....
'Alright, That's it. Uncle-sixth died naturally and painlessly during sleep....' (Lee 2002)

Following Giorgi and Piansi (1997), we assume that the closure or termination of an event obtains in two ways: (a) perfective aspect, or (b) telicity. However, termination does not necessarily entail completion. Comrie (1976) makes a distinction between an event being viewed as 'complete' or 'completed'. A terminated event may be viewed as 'complete' but it may not be completed or culminated, which is needed to satisfy the requirement of telic predicates. Following Pustejovsky (1995), telic predicates involve two event variables. The first event variable 'e1' reflects the process and the second event variable 'e2' (i.e. a *telo*) denotes a change of state. The introduction of a second event variable marking the event as completed, which is potentially viewed as 'terminated' or 'closed', allowing the speaker to view the event as a whole with clear boundaries. This understanding of event termination and event completion is crucial for the current analysis of FINISH in HKSL, and probably in some other sign languages.

-
- (i) A: YESTERDAY BBQ SAUSAGES IX-pro2 EAT HOW_MANY?
'How many sausages did you eat during the barbecue yesterday?'
B: ONE FINISH, SALTY_{very}, DISLIKE.
'Just one; (the sausages) are very salty, I didn't like them.'

FINISH in HKSL encodes termination or completion of a situation, or sometimes both. In (5), FINISH may encode just termination, but not completion because the sign imposes a temporal boundary on the atelic predicate CRY.⁸

- (5) IX-det BOY CRY FINISH, GO HOME.
'After the boy had cried, he went home.'

FINISH also marks experiential perfect, as in (6):

- (6) A: IX-pro2 AFRICA TRAVEL FINISH?
'Have you ever traveled to Africa?'
B: TRAVEL FINISH; IX-pro2 NOT_YET?
'(I) have traveled (to Africa) already. Haven't you been (to Africa)?'

Being a perfective marker, FINISH poses constraints when interacting with different situation types. It co-occurs with achievements, activities, semelfactives, accomplishments, but not with statives (7).

- (7) *IX_a WOMAN DISLIKE DOG FINISH.
'The woman has disliked dogs.' (Lee 2002)

In HKSL, whether FINISH marks an event as terminated or completed depends on how it combines with different situation types (Lee 2002). With achievements and accomplishments, FINISH entails termination as well as completion. For activities like RUN or CRY, FINISH only refers to event termination. Derived accomplishments involving an activity and a result with FINISH indicate both completion and termination. Statives are incompatible with FINISH because they do not entail an endpoint to an event. This observation is similar to Rathmann (2005) in which he suggests that FINISH in ASL correlates with stage-level predicates which are bounded eventualities; hence it is incompatible with statives which may be about individual-level predicates and unbounded event types.

Syntactic position offers some clues for the grammatical status of FINISH as a main verb. In (3), FINISH is a verbal predicate and occurs after the syntactic subject 'FUNERAL_CEREMONY' that is modified by ALL, a quantifier. It appears that the phonology of a main verb is different from that of a perfective marker. Phonologically, main verb FINISH may be one-handed or two-handed, and both may be marked by the feature [repeat], especially when the sign occurs on its own as an utterance. FINISH as a

⁸ Israeli Sign Language marks termination and completion with distinct aspectual markers. FINISH in ISL denotes completion and ALREADY termination. In ISL, FINISH is taken to be a perfective marker and ALREADY a perfect marker which relates a terminated situation to present relevance.

perfective marker is realized by a single movement of wrist rotation. As a perfective marker, FINISH occurs after a verb. Distinguishing FINISH between a perfective marker and a discourse marker is always difficult because both may occur in contexts where there is a sequence of events. However, there appears to be a difference in the prosody. Where FINISH is a perfective marker, it consistently occupies the end of a prosodic unit, as it either immediately follows a blink, if not overlaps with it, as in (8):⁹

- (8) CC CANDY GIVE BRENDA FINISH TAKE ANOTHER GIVE KENNY.
 ‘CC gave Brenda a candy, then he took another one and gave it to Kenny.’

A discourse marker is not necessarily accompanied by this prosodic cue. Instead, it is preceded by a prosodic break usually in the form of a pause, as in (4). As a discourse marker, we assume it forms its own prosodic unit.

In HKSL, FINISH as a perfective marker is consistently postverbal and clause final. In ASL, FINISH can be clause final (9a) or preverbal (9b). However, in HKSL, preverbal FINISH is ungrammatical, as shown in (10a) and (10b):

ASL

- (9a) JOHN CLEAN ROOM FINISH.
 ‘John cleaned the room.’ (Rathmann 2005)
- (9b) JOHN FINISH CLEAN ROOM.
 ‘John cleaned the room.’
 ‘John has cleaned the room.’ (Rathmann 2005)

HKSL

- (10a) *IX_a FEMALE FINISH COMPUTING.
 ‘The woman has finished (working with) the computer.’
- (10b) *IX_a FEMALE FINISH COMPUTING FINISH.
 ‘The woman has finished (working with) the computer.’

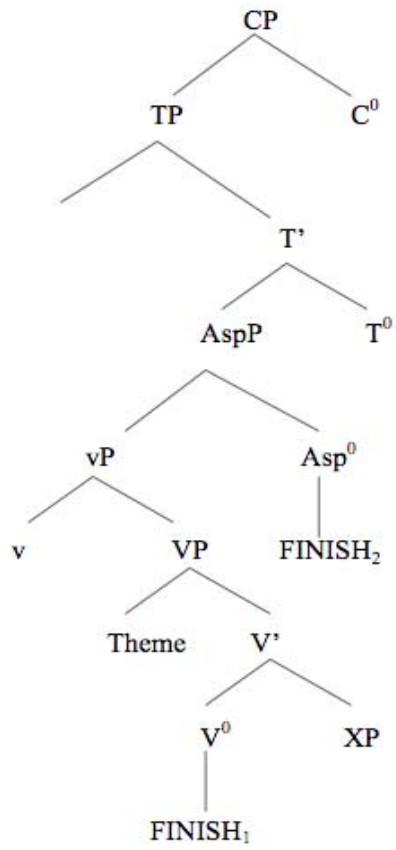
As FINISH may appear either as a lexical or a functional element, we assume that FINISH comes with two entries in the lexicon, as shown in (11). As a lexical element, FINISH₁ occupies V⁰ of the lower VP and heads an unaccusative predicate with the theme subject in the spec of lower VP. Following Chomsky (1995), we assume that the morphosyntax of temporal, aspectual and modal interpretation of an event is determined by the functional structure of the clause. Hence, the functional projection of grammatical

⁹ The prosodic unit may be an intonational phrase or a phonological phrase in HKSL, depending on the syntactic constituent marked by the blink, as reported in Tang et.al (In press).

aspect is posited to be above vP. We posit that FINISH₂ occupies the head of AspP and is licensed by the [perfective] feature attracting the verb from the VP to merge with it at this higher position. The head of this functional projection is final rather than initial as the sign FINISH consistently follows the verb in clause final position.¹⁰ The main verb FINISH₁ being inherently aspectual agrees with the feature [perfective] in the head of AspP and stays in situ. Recent analyses of aspect show that there may be different tiers in the syntactic representation, reflecting the crucial components of an event structure. Tenny (2000), following Cinque (1999), aligns these tiers with different ‘semantic zones’ which are defined syntactically on a hierarchy of functional projections representing an event structure. In this case, FINISH₂ heads a functional AspP at the zone of ‘middle aspect’ which is one zone higher than the zone of ‘core event’. This middle aspect ‘sees the event in its entirety rather than participating in its composition’ (Tenny 2000, p. 321). At this current stage of development, we make no assumption as to how many tiers of functional projections for aspectual properties in HKSL. However, it is possible to assume that lexical aspect may head its own functional projections and aligns itself more within the vP domain, in line with Travis (2000). FINISH₁ is inherently aspectual as it denotes a state of completion and termination. Therefore, FINISH₁ and FINISH₂ do not co-occur as the natural endpoint is already lexically specified.

¹⁰ Recent analyses of Hong Kong Sign Language also confirm that the functional elements under study so far such as negators or modals are clause final, giving further proof that the head of functional projections is final rather than initial (Lee 2006 on negation; Lam 2009 on modals).

(11) Syntactic positions of FINISH in HKSL



FINISH is not a tense marker with past interpretation because FINISH may occur in sentences with present, past and future interpretation, as in (12a-c):

- (12a) EVERYDAY IX-pro1 SLEEP FINISH, EMAIL GIRL-FRIEND.
 ‘Everyday after I have slept, I email my girlfriend.’
- (12b) YESTERDAY IX-pro1 SLEEP FINISH, EMAIL GIRL-FRIEND.
 ‘Yesterday, after I had slept, I emailed my girlfriend.’
- (12c) TOMORROW IX-pro1 SLEEP FINISH, EMAIL GIRL-FRIEND.
 ‘Tomorrow after I have finished working, I will email my girlfriend.’

In ASL, where FINISH occupies the clausal final position of a preceding clause in a bi-clausal construction, a controversy arises as to whether it is a perfective marker or a subordinating conjunction. Grose (2003) and Rathmann (2005) argue against a conjunction analysis suggested by Fischer and Gough (1972) and Janzen (2003). Both claim that FINISH remains an aspectual marker in this position. Rathmann justifies that FINISH as a perfective marker in this position reflects the typical properties of inducing narrative advancement (i.e. event listing condition). In HKSL, if FINISH is a subordinating conjunction and occupies head of a CP, it will be difficult to explain the grammaticality of (13). In that example, the manual sign IF is clause initial and is assumed to occupy the head of CP. As syntactic projections cannot be doubly-headed, FINISH has to be head of AspP rather than head of CP.¹¹

- (13) IF KENNY BATH FINISH, GIVE₃ TOWEL.
 ‘If Kenny has finished bathing, give (him) a towel.’

In this study, one crucial question is whether the child knows that FINISH in HKSL assumes different grammatical status. If language acquisition involves a progression from lexical to functional categories, we would expect FINISH to occur initially as a main verb and FINISH as a perfective marker will occur at a subsequent stage of development. From the perspective of language acquisition, how deaf children differentiate the different functions of FINISH and assign the sign to different grammatical categories is a moot point. Equally important is the development of FINISH as a functional category. In this study, we assume the continuity approach that young children have the underlying representations of the lexical and functional categories the configuration or which may be subject to parametric variation and acquisition is based on positive evidence (Lust 2006). When FINISH emerges as a perfective marker, we need to verify whether it typically marks a telic predicate with a past reference, as a way to confirm whether the observations from the acquisition of spoken language also hold true in child sign language.

¹¹ Note that the sentence initial IF could be due to Cantonese influence. In fact, IF is not required in conditional sentences and one normally finds brow raise instead.

3. The Study

3.1. Background

The study is based on longitudinal data of a deaf child acquiring HKSL. This child, CC, was born of deaf parents but he had not been exposed to sign language input systematically until he was 1;9 when the project began. CC attended a special child care centre which promoted oral education and spent most of his day at home with his hearing grandmother and domestic helper because both his parents were working. Since his mother was not native and attended a hearing school, CC's exposure to HKSL mainly came from the deaf signers who were native signers, and his father who was a graduate of a local deaf school. The data covered the period between age 1;9 and 4;6. We extracted one hour of recording in each month. The recordings were transcribed using ELAN, documenting the interactions between CC and the deaf researcher most of the time, and very occasionally with a hearing researcher. The contexts and verbs associated with FINISH were identified and classified according to situation types. Some were produced during spontaneous conversations and some during narration of stories and daily events. All together we have 34 hours of transcribed data out of which 21 sessions contain tokens of FINISH.

In child language research, Mean Length Utterance is adopted as a general reference for measuring children's morphological and syntactic development (Brown 1973). However, there does not appear to be a single method for calculating MLU; some use words and some morphemes as units, and some use phonological criterion and some grammatical rules to segment utterances in the calculation. Applying MLU to child sign language research is even more taxing as conventional concepts of 'word' and 'morpheme' require a new understanding because whether a manual sign assumes wordhood or a phrasal status depends a lot on how it is signed and configured in space, not to mention whether one would take the different parts of the manual articulators or the non-manuals on the face to be morphemic. In this study, therefore, we made no attempt to use MLU as a general reference of CC's syntactic development, particularly also when CC's first exposure to HKSL is late, at age 1;9, and documenting his HKSL development based on MLU may not be too revealing. As a preliminary measure, we adopted a convention of using duration of sign language exposure as a reference and divided the period of observation into three phases, as shown in Table 1. The first two phases consists of 12 months of sign language exposure and the last phase ten. Table 1 also shows the mean number of utterances and FINISH produced by CC during the three phases. The difference is big between Phase 1 and Phase 2 but minimal between Phase 2 and Phase 3 for both number of utterances and number of FINISH produced.

Table 1. Background of raw data

| Periods of Observation | Age | Mean no. of Utterances | Mean no. of FINISH |
|------------------------|-----------|------------------------|--------------------|
| Phase 1 | 1;9 – 2;8 | 217.58 | 0.58 |
| Phase 2 | 2;9- 3;8 | 297.08 | 4.25 |
| Phase 3 | 3;8-4;6 | 300.7 | 4.58 |

3.2. Results

3.2.1. Production of FINISH from Phase 1 to 3

Appendix 1 provides the exact number of utterances and tokens of FINISH produced by CC in each session. From the 34 hours of recording, we extracted a total 112 utterances which contain the sign FINISH. Seven tokens of FINISH were judged to be imitations from the mother or the native deaf signer, hence discarded, leaving a total of 105 tokens for the analysis. Although we did not adopt MLU to mark CC's syntactic development with age, CC's HKSL production saw a progression from one sign per utterance to two signs. Towards the end of the period of observation, the length of CC's utterance was longer with bi-clausal constructions. There were very few tokens of FINISH produced by CC in Phase 1 as it was non-existent in 9 out of 12 sessions. It was only in Phase 2 that FINISH began to occur systematically in a number of linguistic contexts to serve different grammatical functions (7 out of 12 sessions). In Phase 3, FINISH occurred in all sessions.

Next, we examined the distribution of FINISH according to whether it serves as (a) a main verb, (b) a perfective marker, (c) a discourse marker meaning 'That's it.', or (d) a quantifier meaning 'just or only'. In the current set of data, most tokens were categorized into main verbs or perfective markers. There were very few tokens of FINISH as a discourse marker and they occurred only towards the end of the period, suggesting that using FINISH as a discourse marker is developmentally late. A few tokens of FINISH meaning 'just or only' were also found. Table 2 and Figure 1 give the distribution of FINISH for these four categories.

Table 2. Development of the Different Grammatical Functions FINISH

| | Age 1;9-3;8 | Age 2;9-3;8 | Age 3;9-4;6 | Total (raw tokens) |
|--------------------|-------------|-------------|-------------|-----------------------|
| Main Verb | 5 (100%) | 39 (82.9%) | 17 (32.01%) | 61 |
| Perfective Marker | 0 (0%) | 3 (6.38%) | 32 (60.37%) | 35 |
| Discourse Marker | 0 (0%) | 0 (0%) | 2 (3.78%) | 2 |
| 'Just or Only' | 0 (0%) | 5 (10.64%) | 2 (3.78%) | 7 |
| Total (raw tokens) | 5 | 47 | 53 | 105 |

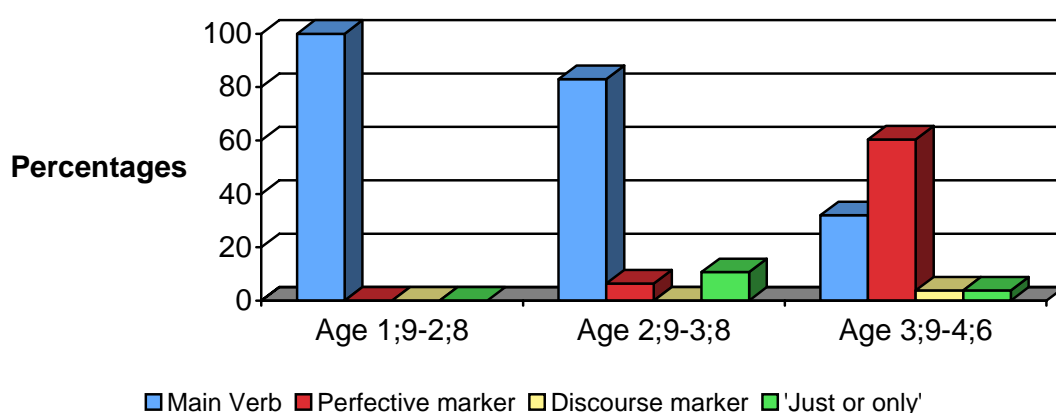


Figure 1. Development of FINISH

Although it is not feasible to adopt MLU as a way to chart CC's morphological and syntactic development, the current method does show interesting developmental patterns. Between age 1;9-2;8, CC only produced 5 tokens of FINISH as independent utterances and they were all main verbs, as in (14). All of the tokens produced during this period have the phonological feature [repeat] in the sign articulation.

(14) CC, aged 2;2.

*CHI BLACK.
'Black.'

*EXP BLACK.
'Black, gesture [showing CC's handshape configuration]

*CHI BLACK (passing a stuffed toy to experimenter) FINISH.
'Black, finished.'

*EXP FINISH WHAT FINISH WHAT?
'What have you finished?'

*CHI FINISH.
'Finished.'

In (14), CC was learning color terms from the deaf researcher who taught CC how to sign BLACK. Then, CC passed a stuffed toy to the deaf researcher and signed FINISH. When the researcher asked him what he had finished, he responded by signing FINISH with [repeat] again.

Between age 2;9-3;8, there was an upsurge in the production of FINISH as main verbs. Out of the 39 tokens, 28 of them constituted independent utterances like (14) above. The remaining 11 tokens were embedded in run-on clauses. In (15), FINISH combines with a preceding index sign to form a simple sentence, signaling the end of a book reading activity. In (15), CC was signing to a deaf researcher asking for another book to teach his sister. He told her that the book he was holding was finished but the deaf researcher told him that his sister was holding a book, but CC insisted on another book since he had finished his:

(15) CC, aged 3;0.

- *CHI FINISH, IX-book_a FINISH.
'It's finished. This book is finished.'
- *EXP IX-book_b.
'Pointing at the book. (You have that book).'
- *CHI NO, FINISH, NO.
'No, it's finished. No.'

During the same period, we also found a few tokens of FINISH as a perfective marker. (16) shows the first emergence of FINISH as a perfective marker in the data. CC's helper was asking CC and his sister to take a bath. His sister refused and CC told his helper to wait until they had finished eating and drinking some snacks. This articulation of FINISH is similar to the main verb FINISH, containing the feature [repeat] in the articulation. This is rather unusual of FINISH as a perfective marker because it usually requires a single movement.

(16) CC, aged 3;0

- *CHI EAT FINISH, DRINK FINISH.
'(Let us) finish eating and drinking.'

Between 3;8 and 4;6, there was a significant increase in CC's production of FINISH as a perfective marker (60.37%) while main verb FINISH continued to occur in the data (32.01%). Out of the 17 tokens of FINISH as main verbs, only 8 occurred as one sign utterance and the rest occurred in run-on clauses, as in (17):

(17) CC, aged 4;5

*CHI IX-book_a bl
FINISH, IX-book_b CHANGE GOOD.
'It's better to change to that book when this book is finished.'

In (17), a deaf researcher was discussing with CC which book they should start narrating first. CC insisted on reading a book he preferred before reading the one the researcher chose for him. In this example, FINISH occurred at the end of a preceding clause of a bi-clausal construction and was immediately preceded by a blink that marks the end of a prosodic unit.

As a perfective marker, FINISH consistently followed the verb and was clause final, as shown in (16) above. Among the 32 tokens of FINISH, 9 occurred at the end of the preceding clause of the multi- or b-clausal constructions, as in (18) and (19):

(18) CC, aged 4;5

*CHI EAT FINISH, CHANGE DIE.
'After she ate the apple, she became dead.'

(19) CC, aged 4;6

*CHI IX-picture_a CL:open_door_with_two_hands; Gesture "open the door, sit
 bl
down, and close the door" FINISH, CL_ride_the_horse.
'(In this picture), (the soldiers) opened (the door of the carriage),
(Cinderella) sat down, and (they) closed the door. They rode away.'

Again, one way to verify whether FINISH occupies the final position of the subordinating clause or the beginning of the matrix clause is to identify the position of the eye blink in these sentences. As mentioned in Section 2, in HKSL, blinks mark the right edge of intonational phrases. Not all the FINISH signs in the 9 multi- or bi-clausal sentences are marked with a blink. With the three tokens that occurred with one, it either overlaps with FINISH or precedes it. This suggests that FINISH forms a prosodic unit with the subordinating clause but not the matrix clause. Following the analysis of FINISH discussed in Section 2, these cases are taken to be a perfective marker for closing the event in the subordinating clause before the next event sets in, as a form of narrative advancement (Rathmann 2005).

Towards the end of Phase 3, we observed two tokens of FINISH as a discourse marker. In (20), CC was narrating SNOW WHITE to a native deaf signer. After signing QUEEN, CC paused for a long while and signed FINISH, followed by another long pause before he continued to sign the second sentence. Although no blinks were observed in these two lines of data, that the sign is bracketed by relatively long pauses suggests that it may form its own prosodic/syntactic unit. At this stage, it is difficult to make

generalization about CC's development of FINISH as a discourse maker because only 2 tokens were found in the data.

(20) CC, aged 4;4

- *CHI IX-picture_a HOUSE, SEE INSIDE HAVE QUEEN, FINISH,
 'This picture, there is a house. Looking inside, there is a queen. That's it.'
- *EXP IX-page_b?
 'How about this page?'
- *CHI PRINCE LOVE SEE HAVE INSIDE HAVE QUEEN.
 'The prince, loves to see inside the house. There is a queen (inside the house).'

In sum, we observed a gradual development of FINISH from a lexical element to a functional element. We assume such a development reflects a concomitant change in the syntactic positions that the two entries of FINISH occupy at the two stages of development. Such a development conforms to the syntactic representation we posit for FINISH in adult HKSL.

3.2.2. Verifying the Acquisition Hypotheses

To verify whether CC's production of FINISH as a perfective marker is initially associated with telic predicates and past reference, as reported in the acquisition studies of spoken languages, we analyzed the distribution of FINISH according to (a) situation types and (b) temporal reference. In this analysis, telicity is defined as whether the situation has a natural endpoint leading to a change of state (i.e. compositional telicity). Typical telic predicates are achievements and accomplishments where a change of state is inherently entailed. Typical atelic predicates are activities, semelfactives and statives where the situation is perceived as unbounded without clear initial and final endpoints. The results are summarized in Table 3. On the whole, 35 FINISH have been identified to be a perfective marker in the data. Since the total number is quite small, we will present the raw tokens rather than percentages.

As reported, FINISH as a perfective marker did not show up in Phase 1 (i.e. age 1;9-2;8). In Phase 2 (i.e. age 2;9-3;8), only three tokens of FINISH were recorded, 1 for past reference (i.e. example 16) and two for future reference (i.e. example 17). However, during Phase 3 (i.e. age 3;8-4;6), there was a preference for past to future reference (30 tokens for past and only 2 tokens for future reference). We categorized these situations as accomplishments because in most of these cases, CC was referring to the completion of a book reading activity. As a perfective marker, FINISH did not yield present interpretation for the events in question during the entire period of observation. Therefore, except for the initial two tokens of future interpretation, findings from the previous studies that the perfective aspect initially yields past interpretation also holds in CC's data, suggesting that although no manual signs are available for temporal marking, CC's use of FINISH

TANG: ACQUIRING FINISH IN HKSL

and temporal reference is systematic, lending some support to the Aspect First Hypothesis.

Table 3. FINISH as an Aspect Marker

| | Age 1;9-3;8 | Age 2;9-3;8 | Age 3;9-4;6 | Total (raw tokens) |
|-----------------------------|----------------|--|---|--|
| Temporal Reference | | | | |
| Past | 0 | 1 | 29 | 30 |
| Present | 0 | 0 | 0 | 0 |
| Future | 0 | 2 | 3 | 5 |
| Eventualities | 0 | <u>Past</u> 1 accomplishment <u>Future</u> 2 accomplishments | <u>Past</u> 17 accomplishments 6 achievements 3 activities 3 semelfactives <u>Future</u> 3 activities | <u>Past</u> 18 accomplishments 6 achievements 3 activities 3 semelfactives <u>Future</u> 2 accomplishments 3 activities |
| Aspectual Properties | | | | |
| Completion & Termination | 0 | 3 <u>Past</u> : 1 accomplishment <u>Future</u> 2 accomplishments | 21 <u>Past</u> 4 achievements 17 accomplishments | 24 <u>Past</u> 4 achievements 18 accomplishments <u>Future</u> 2 accomplishments |
| Termination only | 0 | 0 | 9 <u>Past</u> 3 semelfactives 3 activities <u>Future</u> 3 activities | 9 <u>Past</u> 3 semelfactives 3 activities <u>Future</u> 3 activities |
| Experiential | 0 | 0 | 2 <u>Past</u> 2 achievements | 2 <u>Past</u> 2 achievements |

TANG: ACQUIRING FINISH IN HKSL

As a main verb, FINISH initially yielded a present reference and this tendency remained high throughout the three phases (ref. Table 4). CC's habitually used FINISH to either terminate or demand a termination of the current activity. However, from Phase 2 onward, we also observed an increasing number of instances where CC used the main verb FINISH for past reference: 5/34 token for age 2;8;-3;9 and 7/9 tokens for age 3;8-4;6. Taken as a whole, we suspect that associating the main verb FINISH with present reference represents early acquisition. As a main verb, the sign inherently provides the aspectual interpretation of the event, marking it as completed or terminated. When FINISH was subsequently used as a perfective marker, there was a preference for FINISH to be associated with past, and occasionally for future reference. It was also during this stage of development that CC began to associate the main verb FINISH with past reference, signaling an extension of FINISH to cover other temporal domains.

Table 4. FINISH as a Main Verb

| | Age 1;9-2;8 | Age 2;9-3;8 | Age 3;9-4;6 | Total (raw tokens) |
|---------------------------|--------------------------------|--|--|--|
| Temporal Reference | | | | |
| Present | 5 | 34 | 9 | 48 |
| Past | 0 | 5 | 7 | 12 |
| Future | 0 | 0 | 1 | 1 |
| Eventualities | <u>Present</u> 5 activities | <u>Present</u> 34 activities <u>Past</u> 5 activities | <u>Present</u> 9 activities <u>Past</u> 7 activities <u>Future</u> 1 activity | <u>Present</u> 48 activities <u>Past</u> 12 activities <u>Future</u> 1 activity |

Next, we examined the type of eventualities that FINISH occurred with during the period of observation. Table 3 shows no records of statives but 20 tokens of accomplishments, 6 tokens of activities, 6 tokens of achievements and 3 tokens of semelfactives. The results do not entirely conform to the prototype account. Although FINISH first occurred in telic predicates, it is accomplishments but not achievements that the sign was initially associated with in Phase 2. Telic predicates involving achievements only came at Phase 3. In fact, all accomplishments in the data involved a null object with a definite and specific referent as direct object, as in (21). The deaf researcher and CC were fighting over a story book which the deaf researcher wanted CC to narrate to him. CC was trying to grab the book from the researcher and said 'TELL FINISH'.

(21) CC, age 4;5

*EXP gesture “attention” ₂TELL₁ NOT_HAVE. Gesture “attention” ₂TELL₁
NOT_HAVE. AGAIN ONCE.

‘You haven’t yet told (this story) to me.’ You haven’t yet told (this story) to
me. Come on, say it again, just once.

*CHI TELL FINISH.....HAVE.

‘I have told (this story) already, I did.’

We observed that the verbs produced by CC subcategorizes for a definite or quantized direct object as an internal argument. Examples are TELL (a story), READ (a book), and DRINK (a cup of poison), which when followed by FINISH, lead to a configuration for telic interpretation.¹² As accomplishments are conceptualized as having a sub-event structure made up by a process and a change of state, the activity verbs in fact form the first sub-event of the complex event structure. Therefore, the perfective marker here does not offer an arbitrary endpoint of an activity as most typical atelic predicates may be encoding, it in fact marks the completion of the activity leading to a change of state. Evidence for FINISH to associate with other typical telic predicates was also found between age 3;9 and 4;6 when CC produced 6 achievements.

In terms of perfective meaning, CC’s initially used FINISH to mark ‘completion’ and ‘termination’ in accomplishments and achievements. It was only during Phase 3 that FINISH occurred with activities and semelfactives to encode ‘termination’ or ‘experiential’ aspect, as shown in (22) and (23). Smith (1997) suggests that semelfactives are single-stage events with no result or outcome and may become multi-stage activities with repeated events. For activity verbs, FINISH entails an arbitrary endpoint of termination rather than completion.

(22) CC age 3;11

*CHI IX-picture YOUNGER_SISTER RAIN FINISH WET_ALL_OVER
_CLOTHES

‘In this picture, the sister, when the rain stopped, her clothes was wet all
over.’

(23) CC, age 4;4

*CHI SLAM_a SLAM_a SLAM_{a++} FINISH, DIE.

‘I slammed (an insert there), slammed many times, it died.’

During the same period, we also found 2 tokens of experiential perfect with achievement verbs, as shown in (24). In this episode, the deaf researcher was discussing the content of SNOW WHITE with CC and he was surprised to learn that CC knew that

¹² Following Lee (2002), the internal movement of sign articulation for TELL, READ and DRINK marks event completion in HKSL.

the queen turned herself into a witch. CC replied by signing that he had seen it on TV.

(24) CC age 4;5

- *CHI DIE CHANGE WITCH.
 ‘(The queen) died and turned into a witch.’
- *EXP IX-pro2 KNOW IX-pro2?
 ‘You know it?’
- *CHI IX-pro2 SEE SEE FINISH.
 ‘I have seen (it).’
- *EXP WATCH_TV IX-pro2?
 ‘Did you watch it on TV?’
- *CHI HAVE
 ‘I did.’

Taken as a whole, the findings are in line with Lee’s (2002) observation that FINISH in adults HKSL marks termination with activities but completion and termination in accomplishments and achievements. It is probably due to this separation of termination from completion with activities that allows the child to perceive a temporal boundary of the event independently of its internal constituency, thus further grammaticalizing FINISH as a functional element and ultimately achieving the status of a perfective marker. That CC subsequently encodes experiential aspect with FINISH gives further evidence of this process of grammaticalization.

4. Discussion

To recapitulate, the sign FINISH first appears as a root verb which is inherently telic as CC used it mostly to terminate or demand a termination of a current activity, leading to a change of state from activity to non-activity. This seems to echo Slobin’s (1995) proposal that young children are initially prone to conceptualizing a basic distinction between process and result. However, while this basic cognitive knowledge holds at the initial stage of development, formal analysis of the different functions of FINISH is called for because the child needs to learn that FINISH assumes different grammatical functions and occupies different positions in the phrase structure: V^0 as a main verb and Asp^0 as a perfective marker. As a functional element, FINISH denotes not only completion but also termination or experiential aspect. If we assume that FINISH as a perfective marker occupies the head of a functional projection, a crucial question to pursue is whether CC possesses the underlying representations of functional categories at an early stage. In the literature, If knowledge of tense is a crucial test for the existence of functional categories, at least the occurrence of FINISH provides some evidence that CC has some knowledge of temporal reference. In CC’s data, the first emergence of FINISH as a perfective marker occurs at age 3;0 not for present, but future reference, after 13 months of exposure to HKSL. The next recorded data is at age 3;4 and for past

reference¹³ As there is no manual marking for tense in adult HKSL, it is possible that the perfective aspect anchors the events to the temporal dimension since the perfective aspect generally involves a polarity transition in the temporal domain because of the typical entailment of ‘change of state’ from ‘not P to P’ or vice versa. This issue has been discussed in Chinese, a language that lacks tense marking. In this case, the perfective markers encode both temporal and aspectual meanings as it is tense sensitive (Lin 2003). Therefore, we claim that the occurrence of FINISH as a perfective marker offers some evidence for the existence of a functional category that encodes the temporal reference of events in child HKSL. This functional projection in HKSL is at a level between TP and VP. In the analysis of early temporal-aspectual system, tense and aspect cannot be treated separately because they both deal with the temporal structure of situations and their functions are complementary. Following Gueron and Hoekstra (1989), if we assume that the temporal interpretation of a clause is given by a tense chain of which AspP is a member, a tense chain cannot be formed if AspP is underspecified at the child’s initial development. Therefore, AspP represents the border between the lexical and functional domains of the tense chain and takes up the task of providing a spatial-temporal interpretation for the event. A number of child language studies have already proposed that young children do have a temporal system although they do not produce overt tense marking initially; in this case, an aspectual marker may be adopted for temporal interpretation.

What causes CC to reanalyze FINISH as a functional element? The first possibility is the availability of positive evidence from the adult data in which FINISH features quite prominently either as a main verb or as an aspectual marker. If the acquisition of grammatical properties is based on the subset principle and going from the subset grammar to the superset requires the availability of positive evidence, then the acquisition of FINISH typically reflects that this learning principle is at work. Table 4 shows that main verb FINISH with present reference constitutes the initial subset grammar, yet positive evidence from the adult HKSL allows CC to reanalyze FINISH as a perfective marker, ultimately allowing two variants of the same sign to fulfill different grammatical functions. While positive evidence is available, the inherent aspectual meaning of the main verb FINISH also bootstraps CC’s development of grammatical aspect, allowing him to view the event in its entirety as ‘completed’ or ‘terminated’. Torrence and Hyams (2003) propose that in the absence of morphologically specified tense and grammatical aspect, inherent aspect (i.e. telicity) offers the temporal reference for the clause in child language. Therefore, FINISH as a main verb becomes a candidate for grammaticalization, extending its function to cover perfective aspect due to its intrinsic aspectual properties.

¹³ It is not clear why FINISH as a perfective marker first appeared with future reference but not past reference. However, as there are only two tokens based on one single utterance, we suspect this occurrence is explainable due to methodology such as the frequency of data collection.

5. Conclusion

The current study offers some preliminary observation about how a deaf child acquires the grammatical functions of FINISH in HKSL. The results generally show that the acquisition process is systematic. CC initially assumed the most restrictive hypothesis about FINISH, perceiving it as a main verb; this hypothesis was then relaxed upon positive evidence, which eventually allowed him to acquire FINISH as an aspectual marker. CC also initially used main verb FINISH for present reference and perfective FINISH for past reference, displaying a systematic distribution of the temporal reference that FINISH is associated with. That CC associate the perfective FINISH with past reference and telic predicates to some extent lends some support to the Aspect First Hypothesis. Despite this similarity in the acquisition process, some subtle differences do occur. In this study, tokens of associating FINISH as a perfective marker with future reference were also observed. Also, the prototype account which stresses the importance of achievements for initial form and meaning mapping is not entirely confirmed in the current study. As mentioned, the telic predicates are mainly accomplishments which in the current set of data are largely built upon activity verbs with null objects. In fact, it has been argued in the literature that compositional telicity represents a more advanced stage of development in child language because it is more complex than inherent telicity, yet CC initially used FINISH with accomplishments rather than achievements.

Another unresolved issue is how deaf children acquire imperfective aspect in HKSL and how lexical aspect interacts with grammatical aspect in the acquisition process. The current study is made possible because there is a manual marker for perfective aspect in HKSL and one can approach the topic and analyze the associated word order in order to verify the underlying syntactic representation of perfective aspect. This study fails to verify the interaction between imperfective aspect and atelic predicates in the acquisition process. As studies on aspect in the adult grammar are few, a lot needs to be done in order to see whether deaf children learning sign language in a different modality observe similar constraints. This study at least shows that grammatical constraints are independent of modality and CC entertains a similar set of constraints in the acquisition process. In terms of methodology, there is a need to identify some appropriate criteria to calculate MLU in sign language acquisition research against which one may investigate the morpho-syntactic development of sign language systematically or compare the results against those documented in the spoken language literature. Moreover, the current study is based on production data. Although it is generally assumed that comprehension precedes production, experimental data will certainly enable us to tap comprehension and to appreciate the acquisition process more in depth. In fact, some studies show that the comprehension of perfective aspect develops at a later stage than the production of aspectual morphology in some child languages (Hodgson 2003). It is possible because the perfective aspect comes with a range of aspectual interpretations and young children need to map out the semantic scope of the form systematically. The present study shows that the entire semantic scope of FINISH does not obtain in one go initially: interpreting an

event as ‘terminated’ or ‘experiential’ is developmentally later than interpreting it as ‘completed’. In order to verify this initial observation, experimental elicitation is a better procedure in future investigation.

References:

- Antonucci, F.; Miller, R. 1976. How children talk about what happened. *Journal of Child Language*, 3:167- 189.
- Brown, R. 1973. *A First Language*. Cambridge: Harvard University Press.
- Brun, D.; Sergey, A.; Babyonyshev, M. 1999. Aspect and its temporal interpretation during the optional infinitive stage in Russian. *Proceedings of BUCLD 23/1*: 120-131. Somerville: Cascadilla Press.
- Chan, Y.L. 2000. Verb semantics and aspect in the language of Cantonese-speaking preschoolers. B.A. Dissertation. The University of Hong Kong.
- Chomsky, N. 1995. *The Minimalist Program*. Cambridge, Mass.: MIT Press.
- Cinque, G. 1999. *Adverbs and functional heads: a cross-linguistic perspective*. Oxford: Oxford University Press.
- Comrie, B. 1976. *Aspect*. Cambridge, UK: Cambridge University Press.
- Fischer, S.; Gough, B. 1972. Some unfinished thoughts on FINISH. Reprinted in *Sign Language and Linguistics* 1999, 2/1:66-77.
- Giorgi A.; Pianesi, F. 1997, *Tense and Aspect: From Semantics to Morphosyntax*. Oxford University Press, New York.
- Grose, D. 2003. The perfect tenses in ASL: Nonmanually marked compound tenses. Unpublished Master Thesis, University of Purdue.
- Gueron, J. and Hoekstra, T. 1989. “T-chains and constituent structure of auxiliaries”. In Cardinaletti, A.; Cinque, G.; Giusti, G. (Eds.) *Constituent Structure: Papers from the Venice GLOW*, pp. 35-99. Dordrecht: Foris
- Hodgson, M. 2003. The acquisition of Spanish perfective aspect: a study on children’s production and comprehension. *ZAS Papers in Linguistics*, 29: 105-117.
- Hyams, N. 2005. Child non-finite clauses and the mood-aspect connection: evidence from child Greek. In Kempchinsky, P.; Slabakova, R. (Eds.) *Aspectual Inquires*. Dordrecht: Kluwer Academic Publishers, pp. 293-316.
- Chang, H.H. 2002. Child Acquisition of the Aspect marker –le in Mandarin. Unpublished M.A. Dissertation. Michigan State University.
- Janzen, T. 2003. FINISH as an ASL conjunction: conceptualization and syntactic tightening. Paper presented at the 8th International Cognitive Linguistics Conference, University of La Rioja, Spain.

- Johnston, T.; Schembri, A. 2007. *Australian Sign Language (Auslan): An Introduction to Sign Language Linguistics*. Cambridge University Press.
- Klein, W. 1994. *Time in language*. London: Routledge.
- Lam, W.S. (In preparation). Early Phrase Structure in Hong Kong Sign Language. Ms. The Chinese University of Hong Kong.
- Lee, W.F. 2002. Aspect in Hong Kong Sign Language. Unpublished MPhil Dissertation, Chinese University of Hong Kong.
- Lee, Y.F. 2006 Negation in Hong Kong Sign Language. Unpublished MPhil. Dissertation. The Chinese University of Hong Kong.
- Li, P. ; Bowerman, M. 1998. The acquisition of lexical and grammatical aspect in Chinese. *First Language*, 18: 311-350.
- Li, P.; Shirai, Y. 2000. *The Acquisition of lexical and grammatical aspect*. In Studies on Language Acquisition Series, 16. Berlin & New York: Mouton de Gruyter.
- Lin, J.W. 2003. Temporal reference in Mandarin Chinese. *Journal of East Asian Linguistics*, 12: 259–311. Kluwer Academic Publishers.
- Lust, B. 2006. *Child Language: Acquisition and Growth*. Mass.: Cambridge University Press.
- Olsen, M.B.; Weinberg, A. 1999. Innateness and the acquisition of grammatical aspect via lexical aspect. *Proceedings of BUCLD 23*: 132-151, Somerville, M.A.: Cascadilla Press
- Meir, I. 1999. A perfect marker in Israeli Sign Language. *Sign Language and Linguistics*. 2/1:41-60.
- Rathmann, C. 2005. Event Structure in ASL. Unpublished Ph.D. Dissertation, University of Texas at Austin.
- Rothstein, S. 2004. *Structuring events: a study in the lexical semantics of aspect*. Malden, MA: Blackwell.
- Pustejovsky, J. 1995. *The Generative Lexicon*. Cambridge, Mass.: MIT Press.
- Shirai, Y.; Andersen. R.W. 1995. The acquisition of tense-aspect morphology: prototype account?. *Language*. 71: 743–62.
- Shirai, Y. 1998. The emergence of tense-aspect morphology in Japanese: universal predisposition?. *First Language*. 18: 281–309.
- Slobin, D. I. 1985. Cross-linguistic evidence for the language making capacity. In D. I. Slobin (Ed.) *The Cross-linguistic Study of Language Acquisition* (Vol. 2). Hillsdale, NJ: Erlbaum, pp.1157–1256.
- Sutton-Spence, R.; Woll, B. 1999. *The Linguistics of British Sign Language: an introduction*. Cambridge: Cambridge University Press.
- Smith, C. 1997. *The parameter of aspect*. (second edition) Dordrecht: Kluwer Academic Publishers.
- Stephany, U. 1997. The Acquisition of Greek. In Slobin, D. (Ed.) *The Crosslinguistic Study of Language Acquisition*. Vol. 4. New Jersey: LEA.
- Torence, H. and Hyams, N. 2003. Finiteness and temporal interpretation in early grammar:

TANG: ACQUIRING FINISH IN HKSL

- the role of lexical aspect. Van Kampen, J.; Baauw, S. (Eds.) *Proceedings of GALA 2003*, pp.
- Tang, Gladys. 2006. "Acquisition of Aspect in Hong Kong Sign Language by a Deaf Child." Paper presented at First Conference on Comparative Study of East Asian Sign Languages. Chung Cheng University, Chiayi, Taiwan, Sept 16-17, 2006.
- Tang, Gladys. 2007. "Grammaticalizing FINISH into a perfective aspect marker in HKSL. Paper presented at The Workshop on Acquisition of Functional Categories in Asian Languages, December 26th, 2007, The Chinese University of Hong Kong.
- Tang, G.; Brentari, D.; González, C.; Sze, F. (In Press). Crosslinguistic variation in the use of prosodic cues: The case of blinks. In Brentari, D. (Ed.) *Sign Languages: A Cambridge Language Survey*. Cambridge University Press.
- Tenny, C. 2000. Core events in adverbial modification. In Tenny, C.; Pustejovsky, J. (Eds.) *Events as Grammatical Objects*. CSLI Publications. pp. 285-334.
- Torrence, H.; Hyams, N. 2003. Finiteness and temporal interpretation in early grammar: The role of lexical aspect. In van Kampen, J.; Baauw, S. (Eds.) *Proceedings of GALA, LOT, The Netherlands*.
- Travis, L. 2000. *Event Structure in Syntax*. In Tenny, C.; Pustejovsky, J. (Eds.) *Events as Grammatical Objects*. CSLI Publications. pp. 145-185.
- Van Hout, A. (2008). *Acquiring perfectivity and telicity in Dutch, Italian and Polish*. *Lingua*.
- Vendler, Z. 1967. *Linguistics in philosophy*. Ithaca, NY: Cornell University Press.

TANG: ACQUIRING FINISH IN HKSL

Appendix 1. Number of Utterances and FINISH per Session

| Age | Raw number | Accumulative | No. of FINISH |
|---------|------------|--------------|---------------|
| 1;9.27 | 94 | 94 | 0 |
| 1;10.21 | 169 | 263 | 0 |
| 1;11.22 | 194 | 457 | 0 |
| 2;0.26 | 267 | 724 | 0 |
| 2;1.9 | 204 | 928 | 3 |
| 2;2.0 | 230 | 1158 | 3 |
| 2;3.5 | 162 | 1320 | 0 |
| 2;4.23 | 205 | 1525 | 0 |
| 2;5.23 | 117 | 1642 | 1 |
| 2;6.17 | 357 | 1999 | 0 |
| 2;7.19 | 298 | 2297 | 0 |
| 2;8.18 | 314 | 2611 | 0 |
| 2;9.29 | 203 | 2814 | 0 |
| 2;10.9 | 262 | 3076 | 0 |
| 2;11.21 | 416 | 3492 | 7 |
| 3;0.13 | 296 | 3788 | 7 |
| 3;1.15 | 204 | 3992 | 1 |
| 3;2.24 | 298 | 4290 | 7 |
| 3;3.29 | 167 | 4457 | 2 |
| 3;4.13 | 473 | 4930 | 2 |
| 3;5.23 | 398 | 5328 | 5 |
| 3;6.28 | 278 | 5606 | 0 |
| 3;7.13 | 201 | 5807 | 0 |
| 3;8.19 | 369 | 6176 | 20 |
| 3;9.24 | 237 | 6413 | 1 |
| 3;10.28 | 238 | 6651 | 5 |
| 3;11.26 | 286 | 6937 | 4 |
| 4;0.23 | 301 | 7238 | 3 |
| 4;1.27 | 347 | 7585 | 4 |
| 4;2.25 | 387 | 7972 | 7 |
| 4;3.22 | 223 | 8195 | 1 |
| 4;4.13 | 241 | 8436 | 6 |
| 4;5.3 | 471 | 8907 | 20 |
| 4;6.21 | 276 | 9183 | 3 |
| | | Total | 112 |

香港手語完整貌的習得

鄧慧蘭

手語語言學及聾人研究中心
語言學及現代語言系
香港中文大學

摘要

在口語第一語言獲得體的研究中發現到語法體跟詞性體及時態有很密切的關係。本文重點討論一個香港手語的聾兒在學〔完〕這手語的過程。成人語法中〔完〕是兩個語類—動詞短語和體短語—的中心語，他們都有自己的語法投射。體短語中〔完〕標誌著〔完成體〕。在這個聾兒的語料中，〔完〕首先用作動詞；其後除了動詞之外，〔完〕也標誌著〔完成體〕。後者往往出現在動詞後面或者句末，跟成人語法一樣。〔完〕在這兩個語類也有系統性的分佈；作為動詞，〔完〕是帶有終結體，把一個活動完結。作為體標誌，它首先出現在成就動詞（accomplishments）後面。〔完〕作為動詞它大多帶有現在時的指涉意義。〔完〕作為完成體標誌在語法開始發展的時候就指涉過去時和將來時。總括來說，聾兒在發展〔完〕這手語是受到語法規範的，但跟口語第一語言獲得研究也有一些不同的地方。

Modality Effects Revisited: Iconicity in Chinese Sign Language (CSL)*

Marjorie K.M. Chan and Wang Xu

Department of East Asian Languages and Literatures

The Ohio State University

Abstract. Tai (2005) argues for the importance of iconicity as a fundamental property of language, illustrating the modality effects of iconicity through the study of a set of iconic devices used in Taiwan Sign Language (TSL). This paper extends Tai's research, in exploring the iconic devices used in another East Asian sign language, namely, Chinese Sign Language (CSL). Some preliminary comparisons are made in this paper between CSL and TSL lexical items, based on an examination of the iconic devices used in the CSL and TSL signs, and on determining the iconic motivations underlying the signs that are formed. The study provides a glimpse into the prevalence of iconicity in CSL and TSL, a strong trend across sign languages, making iconicity one of the most significant modality differences between signed and spoken languages, with important ramifications for future studies on such topics as language structure, language acquisition, language processing, contact linguistics, and historical linguistic change.

* This paper is an extended version of the paper for the 20th North American Conference on Chinese Linguistics (NACCL-20). We thank the attendees at the NACCL-20 panel for questions raised after our presentation. Special appreciation goes to Professors E.G. Pulleyblank, Mary Beckman, and James Tai, who had contributed to the lively and interesting discussion. The authors thank Professor Tai for reading earlier drafts of the paper. We are, needless to say, solely responsible for any infelicities herein.

0. Introduction

The seminal work of William C. Stokoe and his associates (Stokoe 1960; Stokoe et al. 1965) and the ensuing research by Klima and Bellugi (1979) and their associates have firmly established that signed language is natural language, with a full system of linguistic structures: phonetics, phonology, morphology, syntax, etc. Moreover, as natural language, signed language shares with spoken language such non-effects of modality as conventional vocabularies involving pairings of form and meaning; duality of patterning (i.e., combining of discrete, meaningless components into meaningful units); productivity in the creation of new vocabulary through derivational processes, compounding, and borrowing; syntactic structures involving same parts of speech, embedding structures, and trade-offs between marking of agreement in grammatical relations and freedom in word order; similar acquisition timetables; lateralization in the left hemisphere; etc., as analyzed by Meier (2002).¹

The fundamental difference between spoken and signed languages lies in the modality each uses for production and perception. Spoken language makes use of the auditory-vocal modality, whereas signed language utilizes the visual-gestural modality. Despite commonalities between the two modalities, there are some fundamental differences in their properties that are ascribable to modality effects. Iconicity has been singled out as one of the modality effects playing a greater role in signed languages than in spoken languages, and the degree to which it is employed in the former has generated much interest.²

Studying Taiwan Sign Language (TSL), Tai (2005) examines (visual) iconicity in TSL in the context of modality effects on the structural differences between signed and spoken

¹ Tai (2008), however, offers a few words of caution, noting that these non-effects of modality are only first approximations; offers a few words of caution, noting that these non-effects of modality are only first approximations; his further scrutiny reveals more nuanced differences between the two modalities, as a result of a deeper understanding of signed language based on linguistic analysis, psycholinguistic studies, etc.. See Tai (2008) for details.

² See Taub (2001), Pietrandrea (2002), Pizzuto and Volterra (2000), Quinto-Pozos (2007a), etc. For example, Quinto-Pozos (2007b:15, citing Liddell 2002) notes, “The degree of iconicity in signed language can be considered a true modality difference between sign and speech: Both have iconicity, but signed languages are much more characterized by visual iconicity than spoken languages are by auditory iconicity.”

languages, and argues that iconicity is a fundamental property of natural language.³ In this paper, we revisit iconicity in signed languages by examining the iconic devices used in another Asian sign language, Chinese Sign Language (CSL), and comparing some of the lexical items in CSL with those in Tai's (2005) study of TSL. This paper will also explore the various iconic motivations that underlie the signs in CSL and TSL that may use similar or different iconic devices. The interrelationship between iconic motivations and iconic devices that emerge in this study will be examined across four distributional patterns.

The paper is organized as follows: Section 1 provides a brief background on the deaf population in China and Taiwan, and on research on CSL and TSL; section 2 outlines the corpora for this study on CSL and TSL; section 3 is on iconicity and a set of seven iconic devices that are used in CSL and TSL; section 4 discusses the temporal ordering of iconic devices; section 5 examines four patterns in the interplay of the selection of iconic motivation and iconic device in corresponding CSL and TSL signs; and section 6 concludes with a few remarks on the pervasiveness of iconicity across signed languages and some implications of this truly striking modality difference between signed and spoken languages.

1. Background

China today has a large population with hearing impairments. As shown in recent statistics from the report prepared by China Disabled Persons' Federation (2006), there are an estimated 20.04 million people with hearing impairments in that country.⁴ The

³ Tai (2005) also argues that iconicity, rather than arbitrariness, is a fundamental property of language and offers reasons for the apparent arbitrariness observed in spoken languages. He further makes the bold suggestion that, due to modality effects in the duality of patterning, human language may have evolved from gestures prior to the development of speech. See Tai (2005) for further details.

⁴ The 2006 CDPF survey is based on a sampling of 2,526,145 people in 771,797 households, in which 38,370 people have hearing impairment. The estimate of 20.04 million hearing-impaired in China in 2006 is based on statistical extrapolation from the sampling survey. Fairly large discrepancies can, therefore, occur. For instance, the 2003 CDPF survey gives an estimate of 20.57 million people with hearing and speech impairments (with no break-downs for each subcategory), compared to the 2006 estimate of 31.31 million, a rather drastic change over a mere three-year period. A national census in the future, with clear definitions of deafness, consistency

total population of China at the time (which excludes Hong Kong, Macao, and Taiwan) was 1.30948 billion people. For comparative purposes, Tai (2005:21) gives a figure of 110,000 deaf and hearing-impaired people in Taiwan, based on government census. The overall estimate of the hearing-impaired in China is probably low, as many Chinese may still be unwilling to admit to suffering from major hearing impairments or deafness, since deafness is often viewed negatively in Chinese society.⁵

Chinese Sign Language (CSL) is a term that may be used to refer to a language family with regional varieties that are used in China. The two most important varieties are the Beijing variety and the Shanghai variety, with Shanghai the more prominent. In addition, there is also a Hong Kong variety (which, following current trends, will be referred to as Hong Kong Sign Language (HKSL), to distinguish it from CSL varieties used in the mainland⁶). In this paper, unless stated otherwise, CSL refers specifically to the Shanghai variety.

The history of Chinese Sign Language (CSL), broadly construed or limited to the Shanghai variety, is largely unknown. Western research on Chinese Sign Language is also very limited (e.g., Bellugi & Klima 1979, Woll 1984, Callaway 2000). There has been relatively more research done by Chinese linguists themselves. Zhao (1999), for example, discusses the history and features of Chinese Sign Language, while Song (2000) discusses the history of the Chinese deaf community. More recent studies of CSL include Lytle et al. (2005/6).⁷ Potentially relevant for the study of contact linguistics with respect to the Shanghai variety of CSL and American Sign Language (ASL) is the role played by

in collecting methods, etc., is needed to obtain more accurate and reliable statistics.

⁵ The U.S. has also encountered difficulties in collecting reliable, accurate statistical data, as indicated in Mitchell (2005:112) where four constraints are identified: (1) the context of the inquiry, the indicators used to establish group membership, (3) the methods employed to collect indicator data, and (4) the resources available to execute the project.

⁶ Earlier studies on the Hong Kong variety of CSL (e.g., Bellugi & Klima 1979; Fok et al. 1986, etc.) simply refer to that signed language as Chinese Sign Language (CSL). Tang (2007) identifies the sign language as “Hong Kong Sign Language” in her trilingual dictionary.

⁷ For a brief overview of the historical background of CSL, see Xu (2006:9ff).

Zhengang Zu⁸ (d. 2003) who, in 1955, became the first deaf Chinese person to matriculate at Gallaudet College (renamed Gallaudet University in 1986), in Washington, D.C. Obtaining an education funded by Yale University, Zu returned to China in 1956 with a B.A. in sociology. He taught at the Shanghai Technical School for Deaf Youth and Shanghai School Number 1 for the Deaf. Thus, some borrowings from ASL into CSL may have taken at that time.

Turning to the other major sign language in this study, Taiwan Sign Language (TSL), as in the case of CSL, also has more than one regional variations. Smith (2005:188) divides TSL into two main varieties, with one founded in 1915 in the south in Tainan, and the other in 1917 in the north in Taipei. Furthermore, due to Japanese occupation of Taiwan, Japanese Sign Language (JSL) was also introduced, with the Osaka variety of JSL taught by teachers from Osaka in Tainan, and the Tokyo variety taught by teachers from Tokyo in Taipei. At the same time, the situation accounts for TSL belonging to the JSL language family. Additional sign language contact took place in 1949 when mainland refugees brought CSL with them (among whom included teachers who have taught the Nanjing, Shanghai, Nantong, and other varieties of CSL); and later, Hong Kong visitors and students studying in Taiwan contributed the HKSL variety of CSL to the mix. Smith (2005:189) observes that “years of separation have now resulted in numerous differences between TSL, JSL, and CSL, but the basic relationship among them still holds.” Note that Hurlbut’s (2008) survey report on sign language in Taiwan, based on wordlists, found just over 50 percent similarity between TSL and JSL. However, the report was based on only ten subjects, and the JSL signer was from Akita City in Akita Prefecture, Japan, and very likely did not use the Tokyo or Osaka variety of JSL.

Overall, the above shows that TSL is much better documented than CSL. Records of TSL research date back to the late 1950’s (Smith 2005), with more recent studies (e.g., Sasaki (2001, cited in Smith 2005), Myers & Tai 2005, Sasaki 2007, Ann et al. 2007) building upon that collection of TSL research.⁹ Given the paucity of linguistic studies on

⁸ The description of Zhengang Zu (a.k.a. Norman Zsu) is from Lytle et al. (2005/2006:458-459), which in turn, cited one of its authors’ unpublished manuscripts (Yang 2002) as one of its sources of information.

⁹ Also see Miles (2007-08) for an extensive, European-language bibliography of sources on

CSL in general, there have not been detailed comparisons of CSL and TSL, or across CSL varieties.

2. The CSL and TSL Corpus

The corpus for this study consists of a combination of two video databases, one for each of the two sign languages, CSL and TSL. The CSL database is part of a larger project—led by Professor Gong Qunhu (龚群虎) at Fudan University, Shanghai—entitled, “Chinese Deaf People and Linguistic Research on Chinese Sign Language.” The TSL database is also part of a larger project, namely, “A Study of Taiwan Sign Language: Phonology, Morphology, Syntax and Digital Graphic Dictionary,” which is headed by Professor James H-Y Tai (戴浩一) at the National Chung Cheng University in Taiwan.¹⁰ The CSL corpus draws from the Shanghai variety of Chinese Sign Language, a natural sign language that is used on the Chinese mainland, while the TSL corpus represents a naturally-occurring variety of sign language used by deaf communities in Taiwan, one that, for historical reasons, belongs to the Japan Sign Language (JSL) family.

The lexicon in the CSL database is part of Professor Gong’s Swadesh list of 200 words in different varieties of CSL, collected through video-recording in different parts of China. The CSL corpus for the current study is a subset of that Swadesh list, namely, 100 words from the Swadesh list that was modified by Woodward (1993a) for sign language comparison. The TSL database for this study is a corresponding set of 100 words that are in that modified Swadesh list.

3. Iconicity and Iconic Devices

Signed and spoken languages make use of different modalities, or channels of transmission, one visual-gestural and the other auditory-vocal. Meier (2002) offers three ways in which these modalities may differ that may be potential sources for the linguistic differences between these two modes of human language. One pertains to differing

disability and deafness in East Asia.

¹⁰ We are immensely grateful to Professors Gong and Tai for their generosity in providing us with the video clips that are used for this paper. In an earlier comparative study that uses the same set of video data, Xu (2006) proposes a new model for lexical comparisons across sign languages.

properties of the articulators that affect production (e.g., light source is external to the signer vs. sound source is internal to the speaker). A second pertains to differing properties of the sensory and perceptual systems that subservise the comprehension of sign and speech (e.g., signer must be in view of the addressee vs. speaker need not be in view of the addressee; high bandwidth of vision vs. lower bandwidth of audition; visual stimuli generally not categorically perceived vs. categorical perception of speech; etc.). And the third pertains to the two modalities' differing potential for iconic representation and indexical/ ostensive identification of referents. Of particular importance to us is the third difference, in the greater potential of the role for iconicity in the visual-gestural modality over that in the auditory-vocal modality. The pervasiveness of iconicity in signed language stems, in part, from the medium, or channel, through which signed language is conveyed in interpersonal communication. The visual-gestural modality has access to three-dimensional space for forming of signs in the language plus the time dimension, hence a quad-dimensional channel for transmission (Meier 2002:11). The auditory-vocal modality, in contrast, is much impoverished, being strictly limited to one dimension, that of temporal space, which is measured uni-dimensionally as a line (cf. Saussure (1916/1983) on the linear character of the sign).

The recognition of the greater role that (visual) iconicity plays in signed languages provides the launching ground for this paper. The study examines the similarities and differences in the use of iconic devices in the CSL and TSL lexicon, and explores the iconic motivations that may underlie the selection of one iconic device over another for the production of a given sign in CSL and TSL.

Taub (2001) considers language, in any modality, to be motivated, contra Saussure's Principle I on the arbitrariness of the linguistic sign (i.e., the arbitrariness in the link between signal (sound pattern) and signification (concept)). Iconic motivation comes from language drawing on structures and associations in the speaker/signer's conceptual system. As elaborated by Taub (2001:231), "Iconicity, a feature of all languages, is based on our ability to associate sensory images with concepts, simplify those images, and create analogues of them using the resources of the language, all the while preserving the essential structure of the original images."

In her model for the creation of an iconic sign, Taub (2001: 44) offers the following steps: "one *selects* an image to represent, modifies or *schematizes* that image so that it is

representable by the language, and chooses appropriate forms to show or *encode* each representable part of the image.” Since iconic devices serve as a means to encode the schematic sensory images, Taub proposes ten iconic devices, and illustrates them using American Sign Language (ASL). These devices are: (1) physical entities represent themselves; (2) shape of articulators represents shape of referent; (3) movement of articulator represents movement of referent; (4) a special set of patterns: representation of body parts; (5) shape of articulators’ path represents shape of referent; (6) locations in signing space represent locations in mental spaces; (7) size of articulation represents size of referent; (8) number of articulators represents number of referents; (9) temporal ordering of signing represents number of referents; and (10) signing represents signing.

Tai (2005) proposes a different set of iconic devices for the study of TSL, based on the synthesis and simplification of the sets developed by Mandel (1977, cited in Tai 2005) and Taub (2001) that use ASL as the language base. Tai presents eight iconic devices for the study of TSL: (1) direct presentation; (2) number representation; (3) shape representation; (4) size representation; (5) part- for-whole representation; (6) proform representation; (7) temporal order representation; and (8) metonymic/metaphorical representation. Among these eight iconic devices, all but two (the sixth and seventh) deal with the lexical level. We will, therefore, take a closer look at the six iconic devices that are relevant to the present study of the CSL and TSL lexicon. Adding to the six iconic devices is a seventh one for this CSL-TSL lexical comparison, namely, movement representation, which corresponds to Taub’s third iconic device, movement of articulator represents movement of referent.

The rest of this section is organized as follows. Section 3.1 studies direct presentation, section 3.2 that of number representation; Section 3.3 shape representation, section 3.4 movement representation, section 3.5 size representation, section 3.6 part-for-whole representation, and section 3.7 metonymic/metaphorical representation. In the following subsections, the presentations of the iconic devices from Tai (2005) are based largely on his descriptions. Overlaps with Taub’s set of iconic devices are mentioned where relevant.

3.1. Direct Presentation

Direct presentation involves pointing to an object as a means to name the object. As Tai (personal communication) explains, the device is so-named both to emphasize the

function of pointing in generating meaning and to sharpen the contrast with other kinds of representations. This iconic device corresponds to Mandel's (1977) indexical presentation and to Taub's first iconic device, in which physical entities represent themselves. As Tai (2005) observes, both TSL and ASL name body parts by pointing to them. CSL uses the same iconic device. For example, the CSL and TSL signs NOSE are formed by the signer pointing to his/her own nose (Figures 1 & 2).



Figure 1. CSL NOSE



Figure 2. TSL NOSE

3.2. Number Representation

Number representation is a means to indicate directly the number of referents by the number of fingers. Taub (2001) describes this as “number-for-number iconicity.” The CSL and TSL signs THREE illustrate this iconic device. CSL uses the middle finger, ring finger and little finger (or pinky) to represent the number “three” (Figure 3), while TSL uses the index finger, the middle finger, and the ring finger (Figure 4). There are only two main differences between the two signs: (1) the specific fingers used, and (2) the direction that the hands are facing, namely, towards the signer (CSL) or away from the signer (TSL).



Figure 3. CSL THREE



Figure 4. TSL THREE

3.3. Shape Representation

Shape representation refers to the signer using certain handshapes and hand- forearms to depict particular shape images of the referents. Taub (2001) refers to this device as “shape-for-shape iconicity.” An example is BIRD in CSL and TSL. The CSL sign BIRD (Figure 5) is a compound sign (BEAK[^]BIRD-FLY): the sign starts with using the right hand to represent the shape of a bird’s beak (Figure 5a), and then uses both hands and forearms to represent the shape of a bird’s wings, together with movement representation, in the up- and-down motion to represent the flapping of the wings (Figure 5b).¹¹ In the sign BIRD in TSL (Figure 6), the signer uses the right hand to represent the shape of a bird’s beak and left hand to represent the shape of a bird’s wing, with up-and-down movement of the hand through wrist movement to represent the flapping of a bird’s wing.

¹¹ It is worth noting that the CSL sign BIRD appears to be identical to the old form of BIRD in ASL, depicted in Frishberg (1975:708-709). This suggests that at least some CSL signs (in the Shanghai variety of CSL at least) have been borrowed from ASL at some earlier stage of sign language contact, potentially allowing for rough dating of the time period for when the borrowing took place. A reasonable suggestion would be the mid- to late 1950s, after Zhengang Zu (cf. section 1) returned to China from study abroad at Gallaudet College to teach at the Shanghai Technical School for Deaf Youth and the Shanghai School Number 1 for the Deaf, before China closed itself to the world with the Culture Revolution (1966-1976). While the contact situation is likely more complex, this is at least potentially part of the overall picture.

Clearly, much research is needed to study sign language contact between CSL and other unrelated sign languages, as well as that among different CSL varieties, such as HKSL and the Shanghai variety of CSL, given the large number of refugees, including wealthy families and entrepreneurs, from the Shanghai area to Hong Kong in the first half of the twentieth century. For example, CSL TREE (Figure 23) is very similar, or identical, to HKSL TREE, based initially on the line drawing in Fok et al. (1986:179), and later confirmed in the description in Klima & Bellugi (1979:21): “the two hands symmetrically encompass the shape of a tree’s trunk and move



Figure 5a. CSL BIRD (BEAK)



Figure 5b. CSL BIRD (BIRD-FLY)



Figure 6. TSL BIRD

Shape representation may also involve tracing, in which the signer may trace out the referent's shape in space. An example of tracing is MOUNTAIN in CSL and TSL. In both cases, the signers move their hands in front of their body, going from one side to the other, with undulating movements to trace the outline of the mountains (Figures 7 & 8). Taub (2001:77-78) refers to this device as “path-for-shape iconicity” since “shape of articulators’ path represents shape of referent.”

upward.” Note that the HKSL TREE in Tang (2007:163) is slightly different, suggesting either a variant or a somewhat evolved form of the sign: the tracing of the tree trunk is not strictly perpendicular but widens upwards, somewhat like a fan-shape. In contrast to the CSL-HKSL pair of signs, TSL TREE (Figure 24) is quite similar to ASL TREE (Klima & Bellugi 1979:21, also in Fok et al. 186:179). The latter pair of signs differs from each other primarily in the configuration of the fingers, namely, fingers side-by-side and touching in TSL versus fingers spread apart in ASL.



Figure 7. CSL MOUNTAIN



Figure 8. TSL MOUNTAIN

3.4. Movement Representation

Movement representation depicts movements of the referent by means of movement of the hands, fingers and/or forearms. This iconic device involves movement iconicity. Taub (2001:70) notes that this form of iconicity often occurs in conjunction with shape-for-shape iconicity; this is because “when the articulators themselves are configured to represent a referent’s shape, the signer can move that configuration around to represent movement of the referent.” This is already encountered in the second component of the CSL compound sign BIRD (Figure 5b). Another example is CSL and TSL signs WORM (Figures 9 & 10), where a finger—index finger in the case of CSL and little finger in the case of TSL—is used to represent the longish shape of the worm’s body, and its wiggling movement depicts the image of a worm inching along on the ground. In the CSL sign, the index finger moves away from the signer, and in the TSL sign, the little finger of the right hand moves across from right to left.



Figure 9. CSL WORM



Figure 10. TSL WORM

3.5. Size Representation

Taub (2001) refers to this iconic device as “size of articulation represents size of referent,” and is a case of “size-for-size iconicity.” Tai (2005:27) points out that size representation can “represent both absolute and relative sizes of the referents” and gives as his TSL example the absolute size of a sheet of paper which, if small enough in dimension, can be traced to represent its actual physical size.

Tai further notes that size representation also applies to length representation as well as to distance representation. A pair of CSL examples is LONG and SHORT (Figures 11 & 12). In the sign LONG (Figure 11), the signer moves her hands away from each other to lengthen the distance between the two hands. This contrasts with signing of SHORT (Figure 12), where the signer moves her hands toward each other, along the horizontal axis, thereby visually shrinking the distance between the two hands. A corresponding pair in TSL for LONG and SHORT is given here for comparative purposes (Figures 13 & 14). As one can see, in the TSL sign as well, expanding the distance visually between the hands is used to depict something as being long, and shrinking or reducing that distance serves visually to depict something as being short.



Figure 11. CSL LONG



Figure 12. CSL SHORT

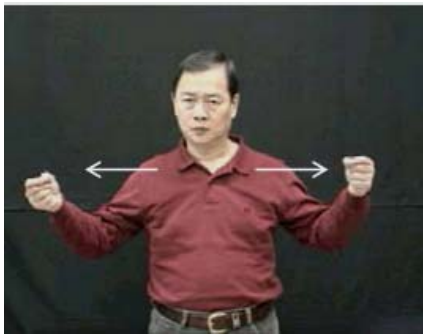


Figure 13. TSL LONG



Figure 14. TSL SHORT

3.6. Part-for-Whole Representation

Tai (2005:27) describes the part-for-whole representation as using the characteristic part of the referent to represent the referent. Tai illustrate using TSL DOG, represented by flapping the two hands on either side of the head to depict a dog flapping its ears. One component of the dog, namely, its head—with its ears flapping—is used to represent the entire dog. (Note that CSL DOG simply depicts the action of shooing away the dog.) The example here is the CSL and TSL signs CAT (Figures 15 & 16), where the head portion of the cat is represented and the focus is on the cat's whiskers. In the case of CSL CAT, the signer first puffs up her cheeks to depict the cheeks of the cat, and, with the middle, ring, and little fingers of the hands representing the whiskers, the hands are moved outwards across the cheeks, thus tracing the cat's whiskers. The palms of the hand face the signer. In the case of TSL CAT, the signer's fingers are extended, with the tip of the index finger in each hand touching the tip of the thumb; in this way, the handshape represents a cat's

whiskers. The signer’s cheeks correspond to the cat’s cheeks, and two hands are placed on the signer’s cheeks, where the whiskers are located on the cat; the handshape is then accompanied by a rotating motion. Thus, in these two animal examples, the head is represented to depict some salient characteristics of that animal—the ears flapping in the case of TSL DOG and the cat’s whiskers in the case of CSL and TSL CAT.



Figure 15. CSL CAT



Figure 16. TSL CAT

While the CSL and TSL signs CAT (Figures 15 & 16) involve nouns, a pair of examples using verbs is CSL and TSL WALK (Figures 17 and 18). Both CSL and TSL signs depict a person walking. As can be seen in the figures, the person is represented by the depiction of only his/her two legs (part-for-whole representation), which is the important body part that will be doing the “walking.” Both CSL and TSL signers use their index and middle fingers to represent a person’s two legs (which can also be analyzed as involving “shape-for-shape iconicity”). Thus, the index and middle fingers represent the two legs (shape representation); the legs in turn represent the whole person (part-for-whole representation); and the back-and-forth movement of the index and middle finger represents the action of “walking” (movement representation).



Figure 17. CSL WALK



Figure 18. TSL WALK

3.7. Metonymic/Metaphorical Representation

Tai (2005:30) notes that, as in spoken languages, “abstract ideas can be expressed through metonymic and metaphorical representations.” Whereas metonymic devices express abstract concepts by means of association, metaphorical devices express abstract concepts by means of metaphorical mappings. A metonymic example given by Tai is the TSL sign HUNGRY. The signer lightly presses both hands against his stomach to indicate “hungry”—that is, the stomach is depicted concave in shape to represent a person not having eaten for some time. A CSL example is the sign WOMAN (Figure 19). The signer pinches the earlobe to indicate the earrings that women wear, in associating earrings with women.

For metaphorical devices involving “metaphorical mappings,” a TSL example is the sign MARRY (Figure 20). As Tai (2005:30) explains, the TSL sign uses the thumb to stand for “male” and the pinky to stand for “female”; the thumb and the pinky are then brought together to express the concept, “to marry,” to depict the union of a man and a woman.¹²

¹² The TSL sign DIVORCE involves physically moving those two fingers apart.



Figure 19. CSL WOMAN



Figure 20. TSL MARRY

In this section, seven iconic devices are exemplified using CSL and TSL. These iconic devices are, by no means, complete or exhaustive. As Tai (2005:31) points out, the iconic devices used in sign languages are based on the following: “(i) our perception of overall shapes, locations, and movements signified by means of hands, arms, and fingers; (ii) our ability to see the structural correspondence between human bodies and animal bodies; and (iii) our ability to represent particular activities with body movements.”

From the CSL and TSL signs presented here, a sign may involve only one iconic device, as in CSL and TSL NOSE (Figures 1 & 2), or it may involve two (or more) iconic device, as in CSL and TSL WORM (Figures 9 & 10), and CSL and TSL WALK (Figures 17 & 18). Moreover, iconic devices may involve simultaneity or sequentiality. The temporal ordering of iconic devices is the topic that will be discussed briefly in the next section.

4. Temporal Ordering of Iconic Devices: Simultaneous versus Sequential

Different iconic devices can be used by themselves, or together, either simultaneously or sequentially. The TSL and CSL signs WORM (Figures 9 & 10) illustrate the use of different iconic devices that are produced simultaneously. The representation of a worm’s shape using the little finger involves shape representation, while the movement of the finger that of movement representation.

Iconic devices can also be used in sequence, and this is particularly relevant in the case of compound signs, such as the CSL sign BIRD (Figure 5). The signer first places the thumb and the index finger in front of the mouth and repeatedly taps the thumb with the index finger to represent a bird’s beak, and then puts her hands and forearms flat out on both sides of the body, waving them up and down to represent a bird’s wings. We can see

in this sign that there is a mixture of different devices used simultaneously and in sequence. The corresponding TSL sign BIRD (Figure 6) involves the simultaneity of iconic devices. The signer uses his right hand to depict the shape of the bird's beak and, simultaneously, uses his left hand to depict the bird's wing, accompanied by up-and-down movement of the hand (through wrist movement) to represent the flapping of the bird's wing.

Having briefly discussed the temporal ordering of iconic devices in sign production, we turn to the final section before the conclusion, to examine the interplay of the selection of iconic motivations and iconic devices in the corresponding signs used in CSL and TSL.

5. Patterns and Selection of Iconic Motivations and Iconic Devices

In section 3, a set of seven iconic devices, six from Tai (2005) and an additional one from Taub (2001) were discussed and illustrated using examples from CSL and TSL. The examples offer a glimpse into the richness and prevalence of iconicity in these two signed languages. Iconicity plays a crucial role in CSL and TSL. All the signs that are presented in section 3 are iconically motivated, realized via the iconic devices that were chosen to form a given sign. Studying across the two signed languages, it can also be seen in section 3 that some signs in CSL and TSL share the same iconic motivation and use the same iconic device, such as CSL and TSL signs NOSE (Figures 1 & 2) and THREE (Figures 3 & 4). However, many of the signs in these two unrelated signed languages may differ in iconic motivation or in iconic device used, or, the corresponding signs in these two unrelated signed languages may differ both in iconic motivation and in their choice of iconic device(s).

The two parameters, *iconic motivation* and *iconic device*, yield four simple combinations with respect to same or different parameters in the corresponding signs in CSL and TSL. As shown in Table 1, the result is a set of four possible patterns, A through D, for comparing across two (or more) signed languages. In the table, the plus (+) sign represents 'same' while the minus sign (-) represents 'different' for selection of iconic motivation or iconic device. A few examples are given in the table. KILL appears twice due to dialectal differences for this sign in TSL. In general, TSL exhibits few significant, regional differences (Smith 2005:188), probably due to convergence from decades of

contact on the island. In the following subsections, the four patterns will be discussed in turn.

Table 1. Iconic Motivation and Iconic Device: Patterns A to D

| Parameter | A | B | C | D |
|----------------------|-----------------------------------|---|---|---|
| 1. Iconic Motivation | + | + | - | - |
| 2. Iconic Device | + | - | + | - |
| <i>Examples</i> | | | | |
| Pattern A: | MOUNTAIN, WORM, KILL _a | | | |
| Pattern B: | KILL _b | | | |
| Pattern C: | TREE | | | |
| Pattern D: | MAN | | | |

5.1. Pattern A: Same Iconic Motivation and Same Iconic Device

For Pattern A, two (or more) signed languages have a common iconic motivation in the choice of image to represent the referent or concept, and a common iconic device by which the referent or concept is depicted. As an example, the same iconic motivation and iconic device are used in CSL and TSL signs MOUNTAIN (Figures 7 & 8). Both CSL and TSL signs are motivated by the image of mountains and their outline, and both utilize shape representation via tracing the outline of the mountains. Another example discussed earlier is CSL and TSL WORM (Figures 9 & 10). The CSL and TSL signs are both motivated by the same iconic image of a small, longish-shaped creature wiggling and inching along the ground, and both adopt the same iconic device, or iconic devices, in this case, as the sign involves not only shape representation (index finger for the worm's body) but also movement representation (the wiggling of the worm as it inches along the ground).

5.2. Pattern B: Same Iconic Motivation and Different Iconic Device

In Pattern B, the signs in the two signed languages share a common iconic motivation in the choice of image to represent the referent or activity, but different iconic devices are adopted to convey the concept. For example, the CSL and TSL signs KILL are both motivated by the image of killing people by beheading, in making a cut at the neck. However, CSL KILL (Figure 21) chooses to use the part-for-whole representation as its iconic device: the left hand is used to represent a person, with the thumb representing the head, and the bottom of the thumb then representing the neck portion of a person's body. The action of beheading the person is accomplished using the right hand as a knife. TSL KILL_b (Figure 22), in contrast, adopts direct presentation to depict the action of beheading a person as a means to kill him/her. (TSL KILL_a is similar to CSL KILL in sharing the same iconic motivation and iconic devices; hence, that pair of signs is appropriately placed under Pattern A.)



Figure 21. CSL KILL



Figure 22. TSL KILL_b

5.3. Pattern C: Different Iconic Motivation and Same Iconic Device

In Pattern C, signs from the two signed languages are motivated by different images to represent the referent or activity, but share in using the same method, that is, the same iconic device, to convey the image or concept. A pair of examples is CSL and TSL TREE (Figures 23 & 24). The CSL sign TREE (Figure 23) is motivated by the image of the trunk of the tree; the depiction of the concept uses the iconic device of shape representation via tracing the outline of the trunk of the tree. The TSL sign TREE (Figure 24) is motivated by

the image of the entire tree standing tall and erect on the ground. As in the case of the CSL sign, the TSL sign TREE uses the iconic device of shape representation.

Note, however, that despite a shared choice of shape representation in the pair of CSL and TSL signs, the iconic device is actually executed differently in the two signs, in that the tree trunk is traced in the case of CSL, while handshape and positioning are used in TSL to represent the tree. Moreover, because the TSL sign depicts both the trunk and the upper portion of the tree (its branches and leaves), it also takes advantage of the option of adding movement to the branches and leaves, by rotating the wrist back and forth to capture a more dynamic image of the tree. The result is that, although both signs use the same iconic device of shape representation, the actual signs are, in fact, quite different. Our limited corpus yields no examples of a simpler pair of signs to illustrate Pattern B; hence, more research is needed to explore examples of Pattern B and the frequency of occurrences of signs that use precisely the same iconic device but are motivated by different images.



Figure 23. CSL TREE



Figure 24. TSL TREE

5.4. Pattern D: Different Iconic Motivations and Different Devices

Pattern D pertains to signs from two signed languages that are motivated by different images to represent the referent, and also use different methods by which the image is conveyed. It may seem self-evident that the greater is the remoteness of two unrelated signed languages, the greater will be the proportion of lexical items in the two signed languages falling under Pattern D. Nonetheless, empirical evidence is still need for substantiation.

An example of Pattern D in CSL and TSL is the sign MAN (Figures 25 & 26). CSL MAN (Figure 25) is iconically motivated by the image of men's short hair. TSL MAN (Figure 26), on the other hand, is motivated by the social status of men. Hence, the two signs have different iconic motivations. Given the different iconic motivations, one would not be surprised to find the use of different iconic devices. Whereas CSL uses metonymic representation for MAN, associating men with short hair, TSL uses metaphorical representation for the sign, depicting men as high in social status (i.e., as number 1). Observe that the CSL pair MAN : WOMAN (Figures 25 & 19) is produced using metonymic representation. The corresponding pair in TSL is produced using metaphorical representation: MAN is signed via displaying the thumb (Figure 26) and WOMAN via displaying the little finger (Figure 27).

Having introduced the four patterns, future research can explore which pattern or patterns are more frequent, and potential reasons behind that frequency. In a lexical comparison of two unrelated signed languages, one might predict that Pattern D would be the most common pattern, and Pattern A the least so. However, which of Patterns B and C is likely to be more common in occurrence can only be determined through further research. The current, preliminary study paves the way to more in-depth investigation of the present (or extended) set of iconic devices and their distribution patterns across the lexicon.



Figure 25. CSL MAN



Figure 26. TSL MAN

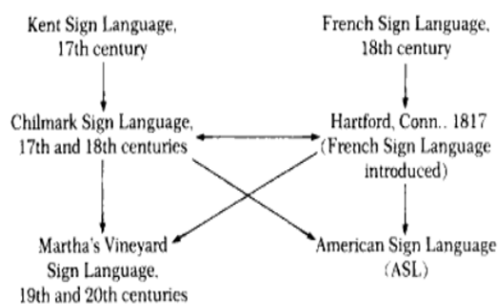


Figure 27. TSL WOMAN

6. Concluding Remarks

Over the past half century since the pioneering research of William C. Stokoe and his associates, there have been tremendous linguistic research on signed languages in current use in the world, with ASL the most studied. Unlike spoken languages, signed languages have generally had very short histories and have not been well documented, with the oldest dating back perhaps to no more than three centuries (Meier 2002:12).¹³ Given sign

¹³ Meier (2002:12) links the history of ASL to Martha's Vineyard Sign Language based on Groce's (1985) study, where she proposes that the Vineyard sign language is derived from a dialect of British Sign Language, perhaps a Kentish dialect, dating back to the 17th century. The schematization from Groce (1985:74) of the cross-fertilization and contact among Martha's Vineyard Sign Language, French Sign Language, and American Sign language is presented below. Groce's proposal differs from the conventional treatment of



ASL as having simply evolved from French Sign Language. For further details on that analysis, see Groce (1985).

In contrast, in her analysis of historical changes in ASL, Frishberg (1979:67-68), for example, traces ASL's history back to deaf education in mid-18th century France by Charles Michel de l'Épée, whose successor at the Paris National Institute for the Deaf-Mutes, the Abbé Ambroise Sicard, taught Thomas Hopkins Gallaudet. On returning to the U.S., together with a star student from that Institute, Laurent Clerc, they founded the American Asylum for the Deaf and Dumb (now the American School for the Deaf) in Hartford, Connecticut, in 1817.

languages' relatively short history of development, factors such as the youth of signed languages and the multi-dimensional nature of the visual-gestural modality have, undoubtedly, contributed to the pervasiveness of iconicity that is found in signed languages.

As a result, unrelated signed languages show some lexical similarities that can be attributed to the role played by iconicity. At the same time, signers of unrelated languages with very different lexicons can, nonetheless, communicate more easily with each other than can speakers of unrelated languages. Quinto-Pozos (2007b:15) states, for example, that “visual iconicity perhaps allows deaf people to communicate with each other across the globe more easily than hearing people who speak different languages.” However, he also cautions against interpreting the greater interlinguistic intelligibility of sign languages—true for both deaf and for hearing, non-signing people—as due to “the existence of potential universals across sign languages,” a proposal made by Pizzuto and Volterra (2000:283) based on their study.¹⁴ Quinto-Pozos argues, instead, that the interlinguistic intelligibility is mainly due to the prevalence of iconicity in the visual-gestural modality, with the use of iconic and mimetic forms interspersed amongst linguistic materials that are more abstract in nature (i.e., more conventionalized).

One potential way to view the “universality” across sign languages, particularly involving those signs that are iconically-based and culture-independent, is through the recognition of the experiential basis of the iconic motivations underlying the formation of those signs, and the selection of iconic devices that would be suitable for picking out the most salient features of a referent or concept for representation. In some cases, there may be only one unique choice. A concrete example from the present study is the direct presentation of the sign NOSE, a body part that is not only visible but also located prominently on the signer's face. Hence, not surprisingly, the sign NOSE is produced in a similar way across CSL (Figure 1), TSL (Figure 2) and HKSL (Tang 2007:106), namely,

¹⁴ Quinto-Pozos (2007b:15) describes Pizzuto and Volterra's research and findings very succinctly: “they compared the performance of deaf signing versus hearing nonsigning participants from throughout Europe in a test of their ability to comprehend transparent and nontransparent Italian Sign Language (LIS) signs. In general, some LIS signs are transparent to deaf and hearing people alike, whereas others are more difficult to decipher. However, deaf signers consistently guessed the meanings of signs even though they were not LIS signers.”

by pointing directly to the nose, and that is done using the tip of the index finger in all three cases. ASL (Mandel 1977:100) is similarly produced through pointing to the nose, although there is also a variant¹⁵ in which the sign is rendered more dynamically, by tapping on the nose twice with the tip of the index finger.

By the same token, WORM is very similar across CSL (Figure 9), TSL (Figure 10), HKSL (Tang 2007:98), and ASL (Grayson 2003:197), with wiggling of the worm's body the most salient feature that is captured through the use of the finger to represent the worm's longish body and wiggling of the finger across an imaginary surface (ground, leaf, etc.) in the case of CSL, TSL and HKSL, while in ASL, the "worm" wiggles on an actual physical surface, namely, the palm of the left hand, representing a leaf on which the worm wiggles. For other concepts such as TREE, KILL, MAN, WOMAN, and so forth, there may be different iconic motivations and different iconic devices to represent the referents. Nonetheless, even though the iconic motivations and the iconic devices chosen may not be unique for a given referent, the options rooted in iconic motivation are limited in a way that totally conventionalized signs are not. That is particularly true in the case of referents that are concrete and culture-independent, such that the experiential basis can potentially restrict the range of possibilities for selecting the salient characteristics of a referent for representation.

For concepts that are culture-specific, or culture-bound, iconically-based signs will be more transparent and more easily decipherable among those signers who share common social, cultural, and religious practices and beliefs. Consider, for example, the ASL (Sternberg 1994:383)¹⁶ SIGN MARRIAGE (marry, marriage, wedding), with clasping of the hands, depicting a crucial part of the wedding ceremony. The importance of the wedding ceremony is also captured in the CSL¹⁷ and HKSL (Tang 2007:64) sign for MARRIAGE

¹⁵ ASL Dictionary: <<http://www.lifeprint.com/asl101/pages-signs/n/nose.htm>>. While "variant" is used here, Mandel (1977) and the ASL Dictionary, in fact, each provided only one form: pointing of the nose in Mandel and double-tapping of the nose in the ASL Dictionary. In the dictionary (photo and textual description ("Tap your nose twice with the tip of your index finger.")), the index finger is used; in the case of Mandel (1977), it can be presumed that the index finger is used in this example for the first of his iconic devices, that of "indexical presentation."

¹⁶ ASL Dictionary: <<http://www.lifeprint.com/asl101/pages-signs/m/marriage.htm>>.

¹⁷ Our CSL data set does not contain the sign MARRIAGE as a lexical sign. However, MARRIAGE occurs as the second component of the compound signs in WIFE (WOMAN^MARRIAGE) and in

(marry, wedding, marriage). However, in a traditional Chinese wedding ceremony, the bride and groom do not clasp each others' hands; instead, they bow to each other in the third of a series of bows. It is the ceremonial bowing to each other that is depicted in the CSL sign (Figure 28) and HKSL sign using shape representation, with the thumb of each finger representing the bride and groom, and the thumbs facing each other and bending forwards, each forming a hook, to depict the bending forwards of the body to make a bow to each other. In the case of TSL (Figure 20, repeated here as Figure 29), an understanding of the metaphorical mapping of the thumb to “male” and the little finger to “female” is prerequisite. The two fingers are then brought together to depict the abstract concept of the union of a man and a woman, as a means of expressing the concept of marriage.



Figure 28. CSL MARRIAGE



Figure 29. TSL MARRIAGE

Hence, the greater interlinguistic intelligibility of sign languages, with iconicity the underpinning factor, depends on such factors as whether the concepts depicted are culture-independent or culture-specific, the range of iconic motivations and devices (limited in the case of WORM, but potentially more varied if there are more different salient features that can be selected). The determination of the factors that play a role in interlinguistic intelligibility of sign languages deserve more in-depth investigation and exploration, as are general questions concerning the extent to which signed lexical items, conveyed through iconic motivations and the multi-dimensionality of iconic devices, are

HUSBAND (MAN[^]MARRIAGE). Hence, we will use the sign MARRIAGE in this pair of CSL compounds for our cross-linguistic comparison. The CSL sign for MARRIAGE appears to be identical to the corresponding HKSL sign.

contributing to the greater intelligibility of signed languages. Rather than ignore the iconically-motivated signs and treat them as peripheral and somehow “trivial,” their study— through interlingual lexical comparisons—merits scholarly attention to gain a deeper understanding into the nature and extent of iconicity in sign languages and their effects on cross- linguistic intelligibility.

Given the relative youth of sign languages as one of the important factors that contribute to the pervasiveness of iconicity in the lexicons of signed languages, the study of language change constitutes an integral part of the overall research paradigm. Historical changes often alter the formation of the signs that lead to reduction in transparency of both the iconic motivations and the iconicity in the representation of the referents. An increase in opacity can then potentially result in a greater sense of arbitrariness in the formation of those signs. A case in point is ASL CAT. For comparative purposes, this lexical sign has already been discussed earlier for CSL and TSL (Figures 15 & 16). In addition, very similar to the CSL sign is HKSL CAT (Tang 2007:601), which differs from CSL only in that the five fingers are spread apart in HKSL. CSL, TSL, and HKSL signs for CAT are two-handed signs, which trace the cat’s whiskers on both sides of the face. For ASL CAT, Frishberg (1979:73) identifies the sign as one of several signs that was a two-handed sign at an earlier stage, based on an earlier source, namely, Long (1918);¹⁸ however, by the time of Stokoe et al. (1965), ASL CAT has become a one-handed sign. A two-handed sign is also given in Sternberg (1994:83), who describes ASL CAT as follows:

The thumbs and index fingers of both hands stroke an imaginary pair of whiskers at either side of the face. The right hand then strokes the back of the left, as if stroking the fur. This latter sign is seldom used today,

¹⁸ Frishberg (1979:70) refers to a 1918 manual by J. Schuyler Long entitled, *The Sign Language: A Manual of Signs*. It lists approximately 1500 signs, accompanied by black-and-white photos, English glosses, and descriptions of the signs’ formation. Frishberg also notes that about 15 to 20 percent of the signs have since undergone formational changes. In other words, in a short span of about half a century, close to 20 percent of the ASL signs in the 1918 manual have already undergone structural changes.

however. Also one hand may be used in place of two for the stroking of the whiskers.

The modern, one-handed sign for ASL CAT is given in Klima and Bellugi (1979:58), where the right thumb and index finger move to the side of the face. William Vicars¹⁹ also notes the use of one hand, but adds an interesting comment: “This sign uses just one hand for most everyday conversation. For effect, I sometimes use two hands when signing stories to young children.” The two-handed, symmetrical signs in CSL, HKSL, and (pre-current) ASL are similar in the straight movement of the hand away from the center of the face; they differ only in detail with respect to the number of fingers and which fingers are used. TSL CAT is also two-sided and symmetrical, differing only slightly from the other three sign languages in the use of a circular motion. The two-handed, symmetrical signs are indisputably more iconic and more transparent, while the ASL sign has evolved, some time during the twentieth century, and developed from the use of two hands to one hand. Despite the historical change, for greater iconicity—and greater ease of comprehension, such as for children storytelling—the use of two hands re-surfaces in ASL CAT. The description in Sternberg (1994:83), which includes a second gesture, that of the right hand stroking the back of the left hand, involves a still greater degree of miming that is absent in the three East Asian signs (CSL, TSL, HKSL). If the CSL and HKSL signs for CAT are borrowed from ASL, the borrowing would have taken place before the mid-1960s, prior to when ASL CAT became a one-handed sign.²⁰

To conclude, the present comparative study of two East Asian sign languages, using a small set of CSL and TSL lexical items, is a very preliminary step to pave the way

¹⁹ ASL Dictionary: <<http://www.lifeprint.com/asl101/pages-signs/c/cat.htm>>.

²⁰ If CSL had borrowed CAT from ASL, it is conceivable that it was borrowed at the same time that ASL BIRD was borrowed; that is, prior to ASL simplifying the sign BIRD to just the first component, namely, representing the bird’s beak only, and deleting the second component that is still found in CSL BIRD (Figure 5b), viz., the flapping of the bird’s wings. More research is needed to determine if TSL BIRD (Figure 6) was originally borrowed from ASL, and then evolved and underwent its own independent simplification process. HKSL BIRD (Tang 2007: 279) is similar to modern ASL sign BIRD, representing only the beak of the bird. More research would be needed there as well to determine if HKSL BIRD was borrowed from ASL in its modern form.

towards addressing some of the questions and issues raised in this paper. The discussion that follows in the concluding section—which brings in ASL and a third East Asian sign language, HKSL—touches upon issues pertaining to iconicity and its role in interlinguistic intelligibility on the one hand, and issues pertaining to iconicity and the effects of language change on the other. These topics also point to future directions for further study. There is much exciting research that lies ahead.

References

The URL's were last accessed in early August 2008.

- Ann, Jean; Wayne H. Smith; and Chiangsheng Yu. 2007. In: Quinto-Pozos (editor), 235-58.
- American Sign Language University. *ASL Dictionary*. URL: <<http://www.lifeprint.com>>. (The online ASL dictionary is maintained by Dr. William Vicars.)
- Bellugi, Ursula, and Edward Klima. 1979. *The Signs of Language*. Cambridge: Harvard University Press.
- Callaway, Alison. 2000. *Deaf Children in China*. Washington, D.C.: Gallaudet University Press.
- Chan, Marjorie K.M. and Hana Kang (editors). 2008. *Proceedings of the 20th North American Conference on Chinese Linguistics (NACCL-20)*, 2 vols. Columbus, OH: The Ohio State Univ.
- China Disabled Persons' Federation (CDPF) 中国残疾人联合会. URL: <<http://www.cdpf.org.cn>>.
- Fok, Angela; Ursula Bellugi; and Diane Lillo-Martin. 1986. Remembering in Chinese signs and characters. *Linguistics, Psychology, and the Chinese Language*, edited by Henry S.R. Kao and Rumjahn Hoosain, 177-202. Hong Kong: Centre of Asian Studies, University of Hong Kong.
- Frishberg, Nancy. 1975. Arbitrariness and iconicity: Historical changes in American Sign Language. *Language* 21.3: 696-719.

- Frishberg, Nancy. 1979. Historical change: From iconic to arbitrary. In: Klima and Bellugi, 67-83.
- Grayson, Gabriel. 2003. *Talking with Your Hands, Listening with Your Eyes: A Complete Photographic Guide to American Sign Language*. Garden City Park, NY: Square One Publishers.
- Groce, Nora E. 1985. *Everyone Here Spoke Sign Language: Hereditary Deafness on Martha's Vineyard*. Cambridge, MA: Harvard University Press. (ACLS Humanities E-Book. URL: <<http://hdl.handle.net/2027/heb.02825.0001.001>>.)
- Harrington, Tom. 2007. Frequently asked questions: Deaf population of the United States. Gallaudet University. URL: <<http://library.gallaudet.edu/deaf-faq-stats-us.shtml>>.
- Hurlbut, Hope M. 2008. A survey of sign language in Taiwan. *SIL Electronic Survey Reports SILESR 2008-001*. URL: <<http://www.sil.org/silesr/abstract.asp?ref=2008-001>>.
- Klima, Edward S. and Ursula Bellugi. 1979. *The Signs of Language*. Cambridge, MA and London, England: Harvard University Press.
- Lytle, Richard R; Kathryn E. Johnson; and Jun Hui Yang. 2005/2006. Deaf education in China: History, current issues, and emerging deaf voices. *American Annals of the Deaf* 150.5: 457- 469.
- Mandel, Mark. 1977. Iconic devices in American Sign Language. *On the Other Hand: New Perspectives on American Sign Language*, edited by Lynn A. Friedman, 57-107. New York: Academic Press, Inc.
- McBurney, Susan Lloyd. 2002. Pronominal reference in signed and spoken language: Are grammatical categories modality-dependent? In: Meier et al. (editors), 329-369.
- Meier, Richard P. 2002. Why different, why the same? Explaining effects and non-effects of modality upon linguistic structure in sign and speech. In: Meier et al. (editors), 1-25.
- Meier, Richard P.; Kearsy Cormier; and David Quinto-Pozos (editors). 2002. *Modality and Structure in Signed and Spoken Languages*. Cambridge: Cambridge University Press.
- Miles, M. 2007-08. Disability and deafness in East Asia: Social and educational responses, from antiquity to recent times. A bibliography of European-language materials with introduction and some annotation. (The bibliography introduces and

lists 900 articles, chapters and books connected with social and educational responses to disability, deafness and mental disorders in China, Korea and Japan, from antiquity to 2007, some with annotation.)

URLs: <<http://independentliving.org/docs7/miles200708.html>> and

<<http://independentliving.org/docs7/miles200708.pdf>>,

Mitchell, Ross E. 2005. How many deaf people are there in the United States? Estimates from the survey of income and program participation. *Journal of Deaf Studies and Deaf Education* 11.1: 112-119.

Pietrandrea, Paola. 2002. Iconicity and arbitrariness in Italian Sign Language. *Sign Language Studies* 2.3: 296-321.

Pinker, Steven, and Paul Bloom. 1990. Natural language and natural selection. *Behavioral and Brain Sciences* 13: 707-84.

Pizzuto, Elena, and Virginia Volterra. 2000. Iconicity and transparency in sign languages: A cross-linguistic cross-cultural view. *The Signs of Language Revisited: An Anthology in Honor of Ursula Bellugi and Edward Klima*, edited by Karen Emmorey and Harlan Lane, 261-86. Mahwah, N.J.: Lawrence Erlbaum.

Quinto-Pozos, David (editor). 2007a. *Sign Languages in Contact*. Washington, D.C.: Gallaudet University Press.

Quinto-Pozos, David. 2007b. Introduction: Outlining considerations for the study of signed language contact. In: Quinto-Pozos (editor), 1-28.

Sasaki, Daisuke. 2001. Comparing the lexicon of sign languages in East Asia: The influence of Japanese Sign Language over Taiwan Sign Language and Korean Sign Language. Paper presented at the Conference on Sign Linguistics, Deaf Education and Deaf Culture in Asia. Hong Kong: Chinese University of Hong Kong.

Sasaki, Daisuke. 2007. Comparing lexicons of Japanese Sign Language and Taiwan Sign Language: A preliminary study focusing on the differences in the handshape parameter. In: Quinto-Pozos (editor), 123-50.

Saussure, Ferdinand de. 1916/1983. *Course in General Linguistics*. Edited by Charles Bally and Albert Sechehaye with the collaboration of Albert Riedlinger. Translated and annotated by Roy Harris. La Salle, IL: Open Court Publishing Company.

Smith, Wayne H. 2005. Taiwan Sign Language research: An historical overview. *Language and Linguistics* 6.2: 187-215.

- Sternberg, Martin L.A. 1994. *American Sign Language Concise Dictionary*. Revised edition. NY: HarperPerennial.
- Stokoe, William C. 1960. *Sign Language Structure: An Outline of the Visual Communication System of the American Deaf*. [University of Buffalo, Studies in Linguistics. Occasional Paper, No. 8.] (Reprinted in the *Journal of Deaf Studies and Deaf Education* 10.1: 3-37. URL: <<http://jdsde.oxfordjournals.org/cgi/reprint/10/1/3>>.)
- Stokoe, William C.; Dorothy C. Casterline; and Carl G. Croneberg. 1965. *A Dictionary of American Sign Language on Linguistic Principles*. Washington, D. C.: Gallaudet College Press.
- Tai, James H.-Y. 2005. Modality effects: Iconicity in Taiwan Sign Language. *POLA FOREVER: Festschrift in Honor of Professor William S-Y. Wang on his 70th Birthday*, edited by Dah-an Ho and Ovid J. L. Tzeng, 19-36. Taipei: Academia Sinica.
- Tai, James H.-Y. 2008. The nature of Chinese grammar: Perspectives from sign language. In: Chan and Kang (editors), volume 1, 21-40.
- Tang, Gladys (鄧慧蘭). 2007. *Hong Kong Sign Language: A Trilingual Dictionary with Linguistic Description* (香港手語詞典). Hong Kong: The Chinese University Press.
- Taub, Sarah F. 2001. *Language from the Body: Iconicity and Metaphor in American Sign Language*. Cambridge, UK: Cambridge University Press.
- Woll, B. 1984. The comparative study of different sign languages: Preliminary analysis. *Recent Research on European Sign Languages*, edited by F. Loncke, P. Boyes Braem, and Y. Lebrun, 79-91. Lisse, The Netherlands: Swets and Zeitlinger.
- Woodward, James. 1993a. Lexical evidence for the existence of South Asian and East Asian sign language families. *Journal of Asian Pacific Communication* 4.2: 91-106.
- Xu, Wang. 2006. *A Comparison of Chinese and Taiwan Sign Languages: Towards a New Model for Sign Language Comparison*. Columbus, OH: Ohio State University M.A. thesis.
- Yang, Jun Hui. (2002). A chronology of deaf education in China. Unpublished manuscript, Gallaudet University, Washington, D.C.

語言表達方式效應之再探：中國手語的象似性

陳潔雯、徐望

東亞語言與文學系

俄亥俄州立大學

摘要

戴浩一（2005）藉由研究台灣手語特有的象似性的機制，來解釋手語與口語由於表達方式不同所造成的差異（modality effects），並論證象似性是語言最根本的特性。本文延續戴（2005）的研究，探究另一個東亞手語，即中國手語的象似性機制。本文比較中國手語及台灣手語的詞彙，一方面檢測中國手語及台灣手語使用象似性的機制，一方面找出構成這些詞彙背後的象似性動機。中國手語及台灣手語中廣泛呈現的象似性機制，亦常見於各國手語。此象似性機制為手語與口語的表達差異中最顯著的。由於表達方式不同所造成手語與口語的差異是一個重要的課題，值得更進一步深入研究。其相關研究的議題包含：語言結構、語言習得、語言處理、語言接觸及語言之歷史演變等。

The morphology and phonology of Taiwan Sign Language*

Jane Tsay and James Myers

Institute of Linguistics
National Chung Cheng University

Abstract. This chapter introduces in detail the morphology and phonology of Taiwan Sign Language. Inflectional morphology (including verb inflection, noun inflection) and derivational morphology (including affixation, serial compounding, parallel compounding) of Taiwan Sign Language are demonstrated and discussed. Agreement for grammatical relation, predicate classifier, and gender and number agreement are found in TSL. Aspect markings for perfective, progressive, and protractive aspects are also attested. Regarding Taiwan Sign Language phonology, the following aspects are illustrated and discussed: phonemic inventory, allophonic variation, feature cooccurrence restrictions, alternations, and word-internal prosodic structure. Data and analysis reported here can be used for cross-linguistic comparison for future studies.

1. Introduction

Nowadays, people do not doubt about sign languages having morphology and phonology. However, it still seems more difficult to conceptualize about the morphology and phonology of sign languages. We hereby introduces in details the morphology and phonology of Taiwan Sign Language (TSL).

Forty some years of research shows that sign languages are natural languages, and one piece of evidence for this is the existence of sign language morphology, that is, a

* Research for this paper was supported in part by grants to Prof. James H.-Y. Tai and the first author from the National Science Council, Taiwan. The following research assistants helped collect part of the data used in this paper over the years: Hsin-Hsien Lee, Shiou-fen Su, Yen-an Lee, Ya-Ching Tsou, Zhen-Hao Qiu, Xiu-Fang Yan, Li-Chia Huang, Fang-yu Lin, and Shih-Chun Kuo. Thanks also go to Hsin-Hsien Lee, Shiou-fen Su, and Yichun Chen for their help during the preparation of this paper. Portions were presented by the authors at a tutorial on Taiwan Sign Language, organized by the Linguistics Society of Taiwan in April 2004.

system for associating form and meaning within words. Sign language words are often made out of meaningful form units, including free roots, bound roots, and affixes, formed via compounding and affixation processes that are used for both derivation and inflection.

Like all natural languages, sign languages also have phonology. There are both functional and formal reasons for recognizing sign language phonology. On the functional side, any communication system requires special mental processes and representations for handling the mental/physical interface. (For previous arguments that TSL phonology is processed the same way as spoken language phonology, see Myers, Lee, and Tsay, 2005.) On the formal side, structural analyses show that the operations and representations used in the interface systems of spoken and signed languages are deeply similar. (For previous formal analyses of TSL phonology, see Smith and Ting 1979, 1984; Smith 1989; Ann 1992, 1993, 1996, 2006; Lee 2003.)

The term *phonology* is thus justified, differing from its etymology (literally “study of sounds”) no more than *morphology* (literally “study of form”) or *syntax* (literally “arranged together”). Although the term *cherology* (literally “study of hand”) was once proposed by Stokoe, Casterline, and Croneberg (1965), nobody uses this term anymore.

Sign languages are indeed more iconic than spoken languages, but that does not mean they do not also have formal structure, just as the Chinese character 能 (*neng* “be able to”) is supposed to look like a bear (or 熊 *xiong*, “bear”), but still has purely formal pieces that also appear in other Chinese characters 公 (*gong* “public”), 朋 (*peng* “friend”), 北 (*bei* “north”). Also, some signs have become less iconic over time in order to conform to formal principles (see examples below).

Like spoken phonology, sign phonology also involves phonemic contrast, allophonic variation, feature cooccurrence restrictions, alternations, word-internal prosodic structure, intonation, and interaction with morphology.

Section 2 below introduces various aspects of TSL morphology, including two types of morphological operations: inflection (verb inflection, noun inflection) and derivation (affixation, serial compounding, parallel compounding).

2. TSL morphology

The morphological operations in TSL might seem more complicated than spoken language because of the simultaneity of signed language (i.e., morphemes overlapping in

time), but they can be classified systematically.

2.1. Types of morphological operations

Morphological operations can be categorized according to three basic parameters: morpheme type (root vs. affix), phonological form (serial vs. parallel vs. reduplication), and function (derivation vs. inflection). TSL has most of the possible combinations (assuming that reduplication and inflection must be inherently affixal).

(1) Morphological operations found in TSL

| Morpheme | | Root (compounding) | | Affix | | |
|-----------------|------------|--------------------|----------|--------|----------|--------|
| | | Serial | Parallel | Serial | Parallel | Redup. |
| Function | Inflection | NA | NA | | ✓ | ✓ |
| | Derivation | ✓ | ✓ | ✓? | ✓ | ✓? |

As in other sign languages (see e.g. Aronoff, Meir, and Sandler 2000), there is a strong tendency for derivational morphology in TSL to be expressed through compounding rather than through affixation, and for inflection to be expressed through parallel (i.e. nonconcatenative) affixation, rather than through serial (i.e. concatenative) affixation.

2.2. Inflection

Inflection can be roughly defined as morphology that interacts with the syntax (Anderson 1992), and can be categorized by whether it occurs on verbs or nouns and whether it involves agreement with other words in the sentence, or marks inherent properties of a word that other words in the sentence can refer to.

2.2.1. Verb inflection

The classic work on TSL verb inflection is Smith (1989). Verb inflections in TSL include agreement and aspect markers, but apparently not tense markers.

Agreement includes subject-object agreement (usually simultaneous /nonconcatenative), verb-subject agreement (using predicate classifier), gender agreement, and number agreement. Aspect marking includes perfective, progressive, and durational

aspect which indicates prolonged status and/or intensity and frequency.

Agreement

Here are some general observations about agreement in TSL. First of all, agreement showing a grammatical relation is marked by nonconcatenative morphology, specifically by moving the hand away from the subject and/or towards the object. This appears to be a sign language universal (Aronoff, Meir, and Sandler 2000) leading some to question whether this should be understood as grammatical agreement at all, rather than an iconic representation of relations between entities in some mental space (e.g. Liddell 2003).

In the following example “The dog bit the cat,” the verb BITE moves from the agent DOG (co-indexed with *j*) towards the patient CAT (co-indexed with *i*).¹ (Note that the patient CAT is signed first, possibly due topicalization or a topic-comment structure.)²

(2) The dog bit the cat.



CAT_{*i*}



DOG_{*j*}



BITE_{*j*→*i*}

Secondly, some verbs also show agreement with the subject via the use of (predicate) *classifiers* (though again Liddell 2003 and Chang, Su, and Tai 2005 disagree with this analysis).

In the following example “The dog entered the house”, HOUSE_{*i*} is mentioned first (3a). Then the subject DOG_{*j*} is signed in full form in (3b), but in the form of an animal

¹ The notation convention in this paper follows mostly MacLaughlin 1997. Glosses of signs are written with capital letters. A dotted marker is used in a multiword gloss, as in SHOW.UP or RUN.INTO. “^” is used between parts of a compound sign. e.g., MARRY (MALE^FEMALE). “□” marks simultaneous signing with both hands.

² Pictures in this paper are from the TSL Database of the Sign Language Research Team at the National Chung Cheng University, Taiwan, unless otherwise noted. The demonstrator is Mr. Yushan Gu. .

classifier DOG_{pro} being inflected on the verb $ENTER_{j \rightarrow i}$ as in (3c) (This kind of predicate classifier is considered a “proform (pro)” in Chang, Su, and Tai, 2005.)

(3) The dog entered the house.



a. $HOUSE_i$



b. DOG_j



c. $HOUSE_{pro} + DOG_{pro} - ENTER_{j \rightarrow i}$

Thirdly, there also appears to be agreement with gender and number features. Gender agreement (if used) is also indicated by predicate classifiers. In the following example “Tell her,” the third person singular pronoun, indicated by the left position, is marked with the female classifier, the pinky. (Note that the default form of the sign TELL uses the thumb. See example TELL (one person) (8) below.)

(4) Tell her.



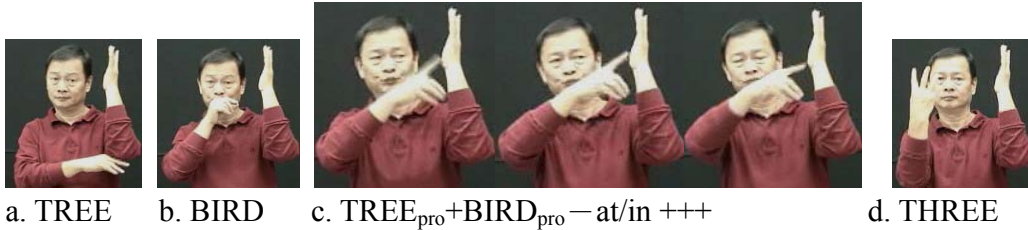
$WOMAN_{pro} + TELL$

Number agreement is only indicated by classifiers for a lexically restricted set of subjects. A more productive way to indicate number is to reduplicate that subject's standard classifier (proform) in the verb.

In the following example, “There are three birds in the tree,” TREE in (5a) is the full form, while in (5b) it is a proform (pro) which also represents the Ground (G) that is present till the end of the sentence. BIRD in proform in (5c) is repeated three times (+++)

indicating that there are three birds (at/in the tree). The number is emphasized again in (5d).

(5) There are three birds in the tree.



Plural agreement is one type of number agreement. It may appear on verbs, as a fully simultaneous affix, with subjects that are seen as a collective of multiple exemplars of the same type of entity. Phonologically this morpheme is realized in a way similar to nonspecific number agreement (e.g. THEY rather than THEY-TWO), namely as an arc path movement.

As with other sign languages, this morpheme interacts with aspect marking in that the articulation of the verb (in particular its handshape change, if any) can either be spread across the entire arc path, indicating that the process affects all entities at once, or else the articulation of the verb can be repeated as the arc path is followed, indicating that the process is repeated separately for each entity. In other words, it is either the entity or the event that is pluralized. Note that plural agreement here can only be with the object, not the subject. Examples are given below. Plurality (PL) is noted as an arc path (usually from left to right for right-handed signers).

(6) Examples of plural (object) agreement

- | | | |
|----|--------------------------------------|-----------------------------|
| a. | TELL – PL (arc path) | “tell (many people)” |
| b. | TURN.ON (the light) – PL (arc path) | “turn on (all the lights)” |
| c. | TURN.OFF (the light) – PL (arc path) | “turn off (all the lights)” |
| d. | ASK – PL (arc path) | “ask (many people)” |

As illustrated below, ASK is signed with the extended palm (facing sideways)

moving forward towards the classifier for “person (singular)” (7a). When inflected for plurality, the movement is along a horizontal arc, meaning “asking person (plural)” (7b).

(7) ASK (person) vs. ASK (person, plural)



a. ASK



b. ASK – PL (arc path)

TELL is another example similar to ASK. It is signed with closed fingers moving forward and opening the fingers towards the object (8). When inflected for plurality, the movement of opening the fingers is repeated along a horizontal arc as in the above example ASK, meaning “telling person (plural)”.

(8) TELL



As to distributive plurality, it is expressed by reduplication. For example, TELL+distributed means tell each one (of several persons) and PUT+distributed means put at each place (of several places).

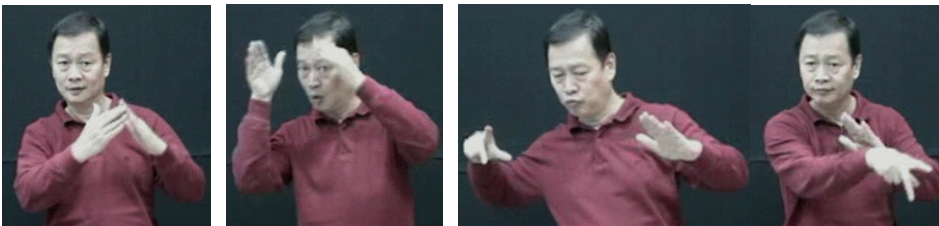
(9) TELL each one (of several people)



Aspect marking

Regarding aspect marking, we also have some observations. First, TSL marks perfective aspect on verbs of motion by holding the final position at the end of the verb, similar to what Sandler (1993) observed for ASL. In the following two examples, there is a hold at the end of each sentence marking the termination of the action.

(10) The dog ran (has run) into the room.



a. HOUSE b. DOG c. HOUSE_{pro}+DOG_{pro}-run.into_[hold]

(11) He went (has gone) to Kaohsiung from Taipei by train.



a. HE b. Kaohsiung_i c. Taipei_j d. TRAIN-move_{j→i} [hold]

A more common way of expressing perfective is adding a morpheme “finished,

terminated” after the verb. However, this statement could be controversial and this morpheme might be suspected to be affected by Chinese which uses a perfective marker LE after the verb.

(12) He has come (arrived).



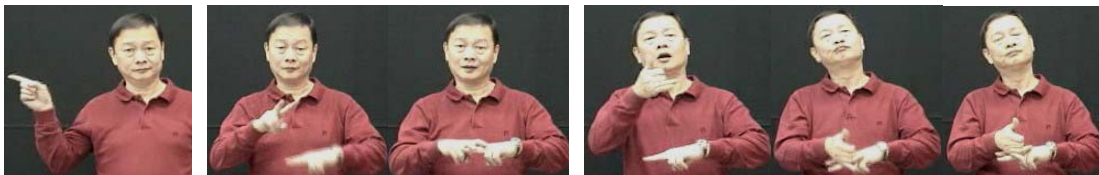
a. HE

b. COME

c. FINISH

Second, progressive is marked by holding in state verbs (13) and by reduplication in dynamic verbs (14), again, similar to ASL.

(13) He is sitting on the chair.



a. HE

b. CHAIR

c. CHAIR_{pro} + HUMAN_{pro} – SIT_[hold]

(14) The dog is running in the room.



a. HOUSE

b. DOG



c. HOUSE_{pro} +DOG_{pro} –RUN++ (repeated circling)

Third, protractive aspect is marked by trilled movement on some verbs (e.g. wiggling the fingers in LOOK-AT or GAZE). Durational aspect also includes intensity and frequency. It could be marked by prolonged duration, circular movement, or reduplication.

For example, SEE is signed with the extended index and middle fingers moving outward from the eyes, while GAZE (look longer) is signed exactly the same way with the movement prolonged (with a bit of wiggling).

(15) SEE



Intensity and frequency are often marked by reduplication. For example, in the following examples, the reduplication does not only indicate the repetition (i.e.

frequency), it has a connotation of getting more annoying (intensity).

(16) Intensity and frequency marked by reduplication

- | | |
|----------------------|-----------------|
| a. ASK-ASK-ASK | “keep asking” |
| b. TELL-TELL-TELL | “keep telling” |
| c. SCOLD-SCOLD-SCOLD | “keep scolding” |

Reduplication with a simultaneous raise of the hand(s) also indicates the increase of degree or intensity in either quality or quantity. For example, ADD is signed with the side of one fist (facing outward) touching the side of the other fist (facing inward). When the movement in ADD is reduplicated together with the reduplicated raise of the two hands, it means “keep increasing.”

(17) Intensity and frequency marked by reduplication

- | | |
|---|---|
| a. ADD (reduplication \boxplus raising the hands) | “keep increasing” |
| b. QUARREL (reduplication \boxplus raising the hands) | “keep quarreling (getting more and more serious)” |
| c. ARGUE (reduplication \boxplus raising the hands) | “keep arguing (getting more and more intensive)” |

2.2.2. Noun inflection

There does not seem to be any noun inflection. Inherent nominal properties such as number and class are only marked on the verb (if at all). Number agreement is only indicated by classifiers for a lexically restricted set of subjects. A more productive way to indicate number is to reduplicate that subject's standard classifier in the verb, as mentioned in (5) in Section 2.2.1 above. Note that there are cross-language differences: number agreement is found in American Sign Language (ASL), but not gender agreement (Smith 1989).

2.3. Derivation

In this section, derivational affixation is discussed first, following by serial compounding and parallel compounding. Nominalization is also one of the mechanisms

in noun derivation.

2.3.1. Derivation other than compounding

While ASL and other sign languages seem to have at least some derivational affixation, we have only found one weak possibility in TSL. This is an apparently bound form, similar but not identical to the sign for EYE, that appears before predicates (verbs and adjectives) to form semantically related verbs. Intriguingly, Israeli Sign Language has a very similar prefix (Aronoff, Meir, and Sandler 2000).

(18) EYE (bound form) as a prefix

- a. BELITTLE = EYE + FEW or EYE + DISAPPEAR
- b. RESPECT = EYE + HEAVY

The following examples show affixational derivation where negation morpheme Negation (a bound form signed with opening the hand) is added to LIKE form an antonym DISLIKE. As shown in (19), LIKE is signed with thumb and index touching the face (together with a positive/pleasant expression), while DISLIKE in (20) is signed as LIKE – NOT in (20). Note that there is also a contrast in facial expression in LIKE in this pair of antonyms.

(19) LIKE



LIKE

(20) DISLIKE (LIKE – opening the hand)



a. LIKE



b. opening the hand (affixed on LIKE)

A similar sign NO is also found in the following pair of antonyms CLEAR (21) and UNCLEAR (CLEAR^NO) (22). However, the negation sign NO in UNCLEAR might better be analyzed as a root morpheme in a serial compound, instead of suffix. (See next section for discussion of serial compounding.)

(21) CLEAR



(22) UNCLEAR (CLEAR^NO)



a. CLEAR



b. NO (root morpheme)

2.3.2. Serial compounding

Compounding differs from affixation in that more than one root morpheme is involved. There are many examples of serial compounds in TSL, which are distinguished from phrases by the order of the morphemes (sometimes reverse of that found in phrases), semantic opacity, and phonological simplification. Below we illustrate the first two of these diagnostics (originally established for ASL by Liddell and Johnson 1986; see also Smith 1982).

Noun phrases in TSL usually have the order [noun^modifier]. So the [modifier^noun] or [noun^noun] structure suggests compounding. Examples in (23) illustrate non-phrasal morpheme order.

(23) Serial compounds: [modifier^noun] or [noun^noun]

- a. APPLE = RED^FRUIT
- b. JUDGE = LAW^MALLETT
- c. PERSONALITY = PERSON^HABBIT
- d. HEARSE = COFFIN^CAR

Examples in (24) illustrate semantic opacity (also illustrated by some examples above, and the following examples also show non-syntactic morpheme order).

(24) Serial compounds: semantic opacity

- a. COFFEE = BROWN^STIR
- b. ONE O'CLOCK = TIME^ONE
- c. DEFICIT = RED^HIGH LEVEL
- d. SURRENDER = WHITE^FLAG

Some serial compounds seem to follow templates. For example, [X^PLACE] and [Y^LEADER] are productive compounding templates, as shown in the following examples.

(25) Serial compounds with template [X^PLACE]

- a. TRAIN STATION = TRAIN^PLACE
- b. COURT = LAW^PLACE
- c. POLICE OFFICE = POLICE^PLACE

(26) Serial compounds with template [Y^LEADER]

- a. PRESIDENT = NATION^LEADER
- b. PRINCIPAL = SCHOOL^LEADER

2.3.3. Parallel compounding

We differ somewhat from previous analyses of sign morphology in positing this category. Some of our examples may be historically derived from serial compounds through fossilized phonological operations. Others are standardly treated as if they were monomorphemic, though this seems to us to miss some important observations.

For example, in MARRY, one hand with the sign MALE and the other hand with the sign FEMALE move simultaneously to meet each other in front of the chest (27), while in DIVORCE, the hand with the sign MALE and the other hand with the sign FEMALE move simultaneously apart from each other (28). (“∪” indicates that the two roots are produced simultaneously, i.e. parallel compound.)

(27) MARRY = MALE \cup FEMALE (hands moving to meet each other)



a. MALE \cup FEMALE – together

(28) DIVORCE = MALE \cup FEMALE (hands moving away from each other)



a. MALE \cup FEMALE – separate

Another pair is BUY and SELL. In BUY, one hand, with the sign of MONEY, moves outward as if giving out money, while the other hand, with the open palm facing up, moves simultaneously inward as if accepting goods being purchased. In SELL, the movements have the opposite direction, with the hand of MONEY moving inward as if receiving money, and the other hand moving outward as if giving out goods.

(29) BUY = HAND (moving inward) \cup MONEY (moving outward)

(30) SELL = HAND (moving outward) \cup MONEY (moving inward)

Interestingly, parallel compounds may be contained within serial compounds, while

the reverse is apparently impossible. This is consistent with phonological arguments (given below) that different compound types may be “ordered differently” in a lexical phonology analysis (or in equivalent constraint-based analyses). In WIFE and HUSBAND, MARRY (a parallel compound with MALE \cup FEMALE) is signed followed by FEMAIL and MALE, respectively.

(31) WIFE = MARRY (MALE \cup FEMALE) ^ FEMALE



a. MARRY



b. FEMALE

(32) HUSBAND = MARRY (MALE \cup FEMALE) ^ MALE



a. MARRY



b. MALE

The notion of “parallel/simultaneous compounding” allows us to analyze many iconic signs into component morphemes, even if these forms are somewhat like *cranberry morphs* (i.e., forms like English *cran* that are not reused by other words, making their morphemic status unclear). Here are some iconic signs that may possibly be

polymorphic.

For example, BANANA is signed with the middle finger of one hand pointing up representing the banana, while the other hand acts as if peeling it.

(33) BANANA = PEEL \cup oblong object



SUNRISE is signed with one hand (index and thumb curved to form a semi-circle) representing the sun and the other arm put horizontally representing the ground. The “sun” hand rises from below to above the “ground/horizon.”

(34) SUNRISE = SUN \cup ground



TELEVISION is signed with one hand forming the half-square as the TV screen and the other hand, palm facing inward, moving up and down behind the screen.

(35) TELEVISION = moving picture ∪ screen



2.3.4. Nominalization by reduplication

Nominalization can be made by reduplicating the movement in the verb. For example, in OPEN (a lock), one hand in the shape of holding a key with the thumb and the index finger turns once as if turning the key in a lock. When the turning action is reduplicated, it becomes KEY. Similar processes are found in SIT and SEAT. SIT is signed with the extended index and middle fingers (representing the buttock) hitting one time the other hand's index and middle fingers (representing the surface of the chair). If the hitting movement is repeated, it becomes SEAT. (cf. Wu 2007 for a different view.)

(36) OPEN (a lock)(turn once) vs. KEY (turn twice)



(37) SIT (hit once) vs. SEAT (hit twice)



3. TSL phonology

In this section, we introduce various aspects of TSL phonology, including phonemic inventory (section 3.1), allophonic variation (section 3.2), feature cooccurrence restrictions (section 3.3), alternations (section 3.4), and word-internal prosodic structure (section 3.5).


3.1. Phonemic inventory

A physical aspect of language is *phonemic* if it serves to indicate lexical contrasts (i.e. unpredictable from other aspects of physical form). This property of *duality of patterning* (Hockett 1960) is fundamental to human phonology. TSL Signs can differ phonemically along several parameters, including handshape, location, path movement, local movement, hand orientation, and nonmanual features, as have been proposed in studies on sign language phonology (Stokoe et al. 1965, Liddell and Johnson 1989, Sandler 1989, Corina and Sandler 1993, Uyechi 1996, Brentari 1998, Sandler and Lillo-Martin 2006, among others).

3.1.1. Handshape inventory in TSL

Updating Smith and Ting (1979, 1984), Lee (2003) claims that TSL has 57 phonemic handshapes. (See Appendix 1 for the list of handshapes from Smith and Ting 1984, and Appendix 2 for the list of handshapes Chang, Su, and Tai, 2005).³ For convenience, TSL handshapes usually are named after the signs in which they appear, but they are *not* themselves morphemes. The following are some examples.⁴

³ Handshapes are named in Chinese characters following Smith and Ting, 1979, 1984. Handshape names in Mandarin Pinyin, a romanization system for Mandarin, are also given next to the Chinese characters for easier access for non-Chinese readers. Some handshape names, though distinct in Chinese characters, might become identical in Pinyin because they are

homophones, e.g. /同 (tong)/  and /童 (tong)/ 

⁴ Handshape pictures are from Lee (2003) and handshape examples in drawing are from Smith and Ting (1979 or 1984).

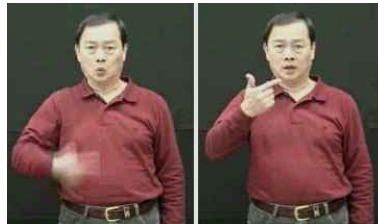
(38) Handshape /六 (liu)/



(39) SIX and FAST contain the same handshape /六 (liu)/



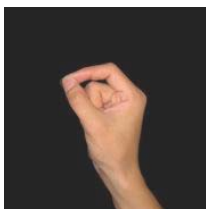
a. SIX



b. FAST

RICE contains two handshapes, /𠄎 (lyu)/ and /一 (yi)/; the former also appears in LYU, a surname, and the latter in NEW YEAR.

(40) Handshapes /𠄎 (lyu)/ and /一 (yi)/



a. /𠄎 (lyu)/



b. /一 (yi)/

(41) RICE, LYU, and NEW YEAR



a. RICE (right hand with /一 (yi)/ and left hand with /𠄎 (lyu)/)



b. LYU (a surname) (both hands with /𠄎 (lyu)/)



c. NEW YEAR (both hands with /一 (yi)/)

Regarding handshapes, TSL has some *marginal phonemes* that only appear in a single morpheme, for example:

(42) Handshapes /語 (yu)/ and /飛機 (feiji)/



a. /語 (yu)/



b. /飛機 (feiji)/

Handshapes /語 (yu)/ only appears in SPEECH (written as 語 and /飛機 (feiji)/ only appears in AIRPLANE (written as 飛機).

3.1.2. Other phonemic parameters in TSL

In addition to handshape contrast, there are also contrasts in location, path movement, local movement, hand orientation, and non-manual features.

Phonemic contrast in location

PLEASE vs. YES is a pair of signs that contrast in location. They both use the handshape /胡 (hu)/ (43a), with the palm parallel to the center plane of the body. The index finger of the hand in PLEASE makes contact on the forehead (43b), while in YES, contact is on the chin (43c).

(43) Phonemic contrast in location: PLEASE vs. YES



a. /胡 (hu)/



b. PLEASE



c. YES

Phonemic contrast in path movement

COLOR vs. SKY is a pair of signs that contrast in path movement. Both signs move

across in front of the chest with the handshape /ㄇ (qi)/ (44a), with the palm facing outward, but COLOR moves across horizontally in a straight line (44b), and SKY in a convex-arc path (44c)

(44) Phonemic contrast in path movement: COLOR vs. SKY



a. /ㄇ (qi)/



b. COLOR



c. SKY

Phonemic contrast in local movement

MALE vs. THANK is a pair of signs that contrast in local movement. Both signs use the handshape /男 (nan) (45a)/, but in MALE, the hand rotates back and forth at the wrist (45b), while in THANKS, the thumb repeatedly bends (45c).

(45) Contrast in local movement: MALE vs. THANK



a. /男 (nan)/



b. MALE



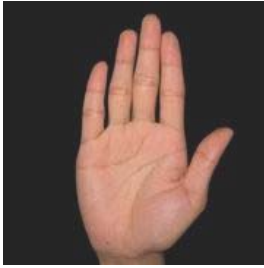
c. THANK

Phonemic contrast in hand orientation

NOW vs. CALM-DOWN is a pair of signs that contrast in hand orientation. They both use the handshape /手 (shou)/ (46a) on both hands, and both start with the hands palm-downward and involve downward movements, but in NOW, the fingertips of both hands point forward away from the body(46b), while in CALM DOWN they point

towards each other (46c)

(46) Contrast in hand orientation: NOW vs. CALM-DOWN



a. /𠄎 (shou)/



b. NOW



c. CALM DOWN

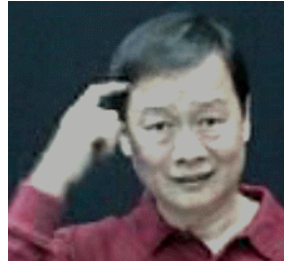
Phonemic contrast in nonmanual features

BRAIN vs. UNDERSTOOD is a pair of signs that contrast in nonmanual features. They both involve the handshape /— (yi)/, with the index tip contacting the temple, but with BRAIN no facial expression is made, while in UNDERSTOOD, the mouth is rounded and sucks in air, and the head moves backward at the same time.

(47) Contrast in nonmanual features: BRAIN vs. UNDERSTOOD



a. /一 (yi)/



b. BRAIN



c. UNDERSTOOD

3.2. Allophonic variation

Some handshape variants seem to be predictable from their phonetic environment (i.e. their articulatory context) and thus should not be analyzed as phonemic. To describe such allophonic forms, we describe hand configuration using the labels *T* (thumb), *I* (index), *M* (middle), *R* (ring), and *P* (pinky), and *spread*, *closed*, *extended*, *bent* (finger straight but bent at first joint, i.e. knuckle), or *curved* (finger bent at all joints, but not totally closed).

3.2.1. Allophonic variation in extended fingers due to hand orientation

The extended fingers of handshapes like /一 (yi)/ and /六 (liu)/ become bent in a small set of environments involving hand orientation.

(48) Finger bending triggered by pointing fingertips downward

| Phonemic Handshape | Allophonic change | Signs |
|--------------------|-------------------|-------------------------|
| /一 (yi)/ | I bent | DEEP, CASSETTE-TAPE |
| /六 (liu)/ | I bent | DOWN, WEST, SOUTH, TIME |

(49) Finger bending triggered by pointing fingertips inward toward the body

| Phonemic Handshape | Allophonic change | Signs |
|--------------------|-------------------|---------------------------|
| /一 (yi)/ | I bent | I, YESTERDAY, EYE, MONDAY |
| /六 (liu)/ | I bent | FATHER, SATURDAY |

3.2.2. Allophonic variation due to contact

Above we described the handshapes [手 (*shou*)] and [胡 (*hu*)] as if they were phonemically contrastive, but they in fact seem to be predictable allophones. The basic form seems to be /手 (*shou*)/, since it is easier to describe the context in which [胡 (*hu*)] appears: with contact or near contact to another body part anywhere along the thumb side of the hand.

(50) Thumb bending in the articulation of /手 (*shou*)/

| Phonemic Handshape | Allophonic change | Context | Signs |
|---------------------|---------------------------------|---------------------------|--------------------------|
| /手 (<i>shou</i>)/ | T bent (i.e. [胡 (<i>hu</i>)]) | Outer side of T contacted | DOOR, START, SKATE, LAKE |
| /手 (<i>shou</i>)/ | T bent (i.e. [胡 (<i>hu</i>)]) | Outer side of I contacted | NONSENSE, PLEASE, YES |

3.2.3. Handshape variation due to iconicity

Handshape variation due to iconicity does seem to happen. For example, as pointed out by Lee (2003), the three handshapes [瓜 (*gua*)], [果 (*guo*)], and [同 (*tong*)] listed in Smith and Ting (1979, 1984), which differ only in the degree of flexion of the fingers, are not contrastive with each other in the usual way. Instead, they only contrast when used as iconic classifiers for differently sized and shaped objects.

(51) Handshapes 瓜 (*gua*), 果 (*guo*), and 同 (*tong*) listed in Smith & Ting (1984)



a. 瓜 (*gua*)



b. 果 (*guo*)



c. 同 (*tong*)

Such phenomena are reminiscent of sound-symbolic phonetic modifications in spoken languages, such as English “high” [hai⁵⁵] vs. “low” [low¹¹], or “big” [bi::g].

3.3. Feature cooccurrence restrictions (handshape constraints)

Just as in spoken languages, there are phonetically motivated restrictions on feature combinations within segments, such as *[+nasal, -voice] (see Archangeli and Pulleyblank 1994), so there are constraints on combinations of finger articulations within a handshape, as shown by Ann (1993, 1996, 2006) using data in Smith and Ting (1979, 1984).

As can be seen from the table in (52), the number of signs for each finger differs quite drastically, with thumb and index finger being the most common in one-finger-handshape signs.

(52) Number of signs in TSL with one-finger handshapes with the indicated postures

| Finger | Extended | Curved | Bent |
|---------------|-----------------|---------------|-------------|
| T | 101 | 6 | 101 |
| I | 196 | 28 | 196 |
| M | 0 | 0 | 4 |
| R | 0 | 0 | 3 |
| P | 20 | 5 | 20 |

It is also clear, as shown in (53), that the combination of thumb and index (TI) and the combination of index and middle finger (IM) are the most common combinations in two-finger-handshape signs.

(53) Number of signs in TSL with two-finger handshapes with the indicated postures

| Fingers | Extended | Curved | Bent |
|----------------|-----------------|---------------|-------------|
| TI | 54 | 25 | 17 |
| T M | 0 | 0 | 0 |
| T R | 0 | 0 | 0 |
| T P | 32 | 0 | 32 |
| IM | 67 | 19 | 67 |
| I R | 0 | 0 | 0 |
| I P | 1 | 0 | 1 |
| MR | 0 | 0 | 0 |
| M P | 0 | 0 | 0 |
| RP | 0 | 0 | 0 |

While such constraints appear to be primarily articulatory, a “deeper” sort of

constraint is revealed by the much smaller inventory of handshapes allowed for the *weak hand* of two-handed signs (i.e. the nondominant hand of the signer). In fact, in most such signs, the weak hand handshape comes from a set of just two handshapes: the totally closed fist /拳 (*quan*)/ (as in the sign for the surname LIN) or the flat open hand /手 (*shou*)/ (as in the sign for TIME). Interestingly, these handshapes seem to be the simplest possible handshapes according to Ann's articulatory model (Ann 1993, 1996, 2006).

(54) /拳 (*quan*)/ and /手 (*shou*)/



a. /拳 (*quan*)/



b. /手 (*shou*)/

(55) LIN and TIME



a. LIN (surname)



b. TIME

Apparent examples of native, monomorphemic signs with more complex weak hands include LEAF (weak hand /六 (*liu*)/), which, interestingly, is iconic. The signing of LEAF involves the index finger of one hand rotating from the wrist up and down between the curved thumb and the curved index of the other hand, i.e. handshape /六 (*liu*)/ (tracing out the shape of the leaf).

(56) LEAF



LEAF

However, phonology can also trump iconicity, as in a language change noted by Lee (2003): the complex handshape described by Smith and Ting (1979) for the sign GINGER has since been replaced by a much simpler handshape.

(57) Handshape change over time



a. handshape in GINGER
(Smith & Ting 1979)



b. handshape in GINGER
(Lee 2003)

Moreover, Lee, Tsay, and Myers (2001) show that character signs, which attempt to imitate the shape of Chinese characters, obey basically the same physiologically motivated constraints as native signs.

3.4. Alternations

TSL morphemes may change form depending on the phonological context. We are still collecting data, but some major generalizations stand out:

- (i) Assimilation is the most common type of phonological process.
- (ii) Handshape almost always spreads from right to left, while orientation and location almost always spreads from left to right.
- (iii) The weak hand is indeed “weak”, being subject to total assimilation or deletion.
- (iv) Is there any lexical (as opposed to postlexical) phonology?

3.4.1. Assimilation

Both total handshape assimilation and partial handshape assimilation are found in TSL.

Total handshape assimilation

One example of total handshape assimilation is I NO, meaning “I didn't.” In citation, I is signed with handshape /— (yi)/ pointing to the chest, and NO is signed with handshape /同 (tong)/ (open hand) changing into handshape. /萬 (wan)/ (closed hand with bent fingers)

(58) I NO



a. I (in citation)



b. NO (/同 (tong)/ → /萬 (wan)/)

In I NO meaning “I didn’t”, the handshape /一 (yi)/ in I is assimilated to /同 (tong)/ triggered by the /同 (tong)/ sign in NO. So, instead of pointing to the chest with the index finger, the handshape /同 (tong)/ replaces the index finger in I and points to the chest with the open hand. The following table lists more examples that involve total handshape assimilation.

(59) Examples for total handshape assimilation (targets are boxed; “+” represents a word-internal morpheme boundary; and “>” represents a morpheme-internal handshape change)

| Example | Gloss | Trigger handshape | Target handshape (original) | Target handshape (change) | Direction |
|--------------------|-------------|-------------------|-----------------------------|---------------------------|---------------|
| I NO | I didn't | /萬(>)/同/ | /一/ | /萬/ | Right to Left |
| ENOUGH NO | not enough | /萬(>)/同/ | /錢/ | /萬/ | Right to left |
| I NOT-BE | it's not me | /六/ | /一/ | /六/ | Right to left |
| WHITE (+) COLOR(B) | white | /七/ | /一/ | /七/ | Right to left |
| OUT + COUNTRY | foreign | /同/ | /手/ | /同/ | Right to left |
| NO PROBLEM | no problem | (/萬>)/同/ | /手/ | /同/ | Left to right |

(60) An autosegmental representation of I NO



Partial handshape assimilation

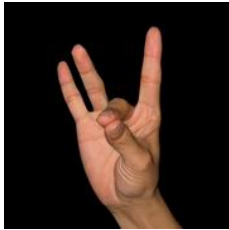
Examples of partial handshape assimilation are given below.

(63) Examples of partial handshape assimilation (a superscript “>” indicates a modification of a standard phonemic handshape)

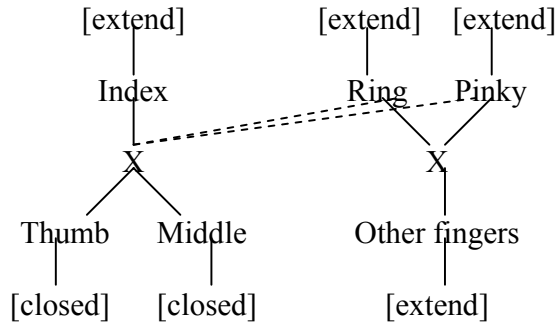
| Example (target highlighted) | Gloss | Trigger handshape | Target handshape (original) | Target handshape (change) | Direction |
|------------------------------------|-------------|--|---|--|---------------|
| HE HAVE | he has | /手/ TIMRP extended | /—/ I extended; TMRP closed; TM contact | /借/ IRP extended; TM closed; TM contact | Right to left |
| LOOK NO | didn't look | /萬(>/同/) T contacts IM; TIMRP bent | /錢/ TI curved contact; MRP extended | [[^] 萬] TI curved contact; MRP bent | Left to right |

In the example HE HAVE, the handshape in HE is /— (yi)/ (i.e. with the index finger pointing to a person) and the handshape in HAVE is /手 (shou)/ (i.e. with an open palm). After partial assimilation, the HE in HE HAVE becomes a partially open palm with the index finger still pointing out as in the handshape /借 (jie)/.

(64) /借/



(65) An autosegmental representation of HE HAVE:



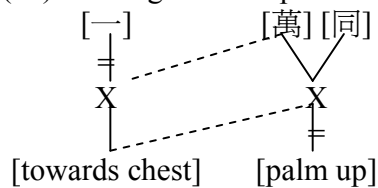
In contrast to handshape assimilation (total or partial), orientation always seems to spread from left to right, as given in (66).

(66) Examples of orientation assimilation

| Example (target highlighted) | Gloss | Trigger orientation | Target orientation (original) | Target orientation (change) | Direction |
|------------------------------|------------|---------------------|-------------------------------|-----------------------------|---------------|
| I NO | I didn't | towards chest | palm up | towards chest | Left to right |
| NO PROBLEM | no problem | towards chest | palm up | towards chest | Left to right |

An autosegmental representation of I NO with palm orientation change is given below.

(67) Autosegmental representation of I NO (with palm orientation change)



3.4.2. The phonology of the weak hand

When a two-handed sign appears before or after a one-handed sign, the one-handed sign is often articulated with the nondominant hand totally assimilating the features of the weak hand of the two-handed sign.

(68) Right-to-left assimilation of the weak hand in one-handed/two-handed sign sequences

| Example | Gloss |
|----------------|------------|
| FEMALE^FRIEND | girlfriend |
| YESTERDAY^YEAR | last year |

(69) Left-to-right assimilation of the weak hand in two-handed/one-handed sign sequences

| Example | Gloss |
|---------------|---------------|
| TRAIN^PLACE | train station |
| SCHOOL^LEADER | principal |
| MARRY^MALE | husband |
| NAME^WHAT | what name? |

Some two-handed signs have an alternate form without the weak hand. In most of these, both hands have identical features (e.g. PRACTICE, HAPPY). This means that the alternation could be analyzed as either deletion or as insertion + cross-hand assimilation.

In two-handed signs with nonidentical hands that allow an alternation like this (e.g. ASK, TELL, HIT, GIVE), the “droppable” hand always has the handshape /男 (nan)/, and it seems to serve as an incorporated object in the verb. Thus the alternation here seems to be morphological, not phonological (cf. ASK (one person) in (7a) in section 2.2.1).

3.4.3. Lexical vs. postlexical phonology

None of the above alternations seem to require analysis as a lexical rule: the same basic phenomena can occur both across word boundaries and within words, and allophonic handshapes may be created.

So far, preliminary findings suggest that the best potential candidates for lexical alternations are those occurring within compounds (see also Smith 1982). However, their special characteristics may be due the interplay between prosodic structure and morphology, rather than directly between the alternations and morphology.

3.5. Word-internal prosodic structure

The analysis of word-internal structure is quite controversial in sign phonology. Competing claims hold that signs are best analyzed as segment-sized whole units (e.g. Stokoe, Casterline, & Croneberg 1965; Channon 2002), as sequential strings of segment-sized units (e.g. Liddell & Johnson 1985; Sandler 1989), as syllables containing moras (e.g. Perlmutter 1992), or as hierarchical structures similar but distinct from spoken language prosody (e.g. Uyechi 1996). Here we describe some relevant TSL data using the sonority-based position-movement (PM) notation of Perlmutter (1992).

Segments in spoken languages can be ranked by sonority (energy), from the minimum in a voiceless stop like /p/ to the maximum in a low vowel like /a/, and this allows for a definition of a *syllable*: a sonority profile with a single peak. In signs, fully motionless portions are less sonorous (energetic) than portions where the hand doesn't change position but there is local movement (including handshape change), which are in turn are less sonorous than portions where the hand has path movement with or without local movement.

We represent this four-way sonority scale as $P < P^+ < M < M^+$ (where “P” = position = no path movement, prototypically with a hold at a specified location; “M” = movement along a path; “+” = presence of local movement). A sign syllable is then a sonority profile with a single peak, e.g. PM, MP, PMP, P^+ (Tsay 2007).

3.5.1. Syllables and morphemes

Virtually all monomorphemic signs in TSL are monosyllabic by the above definition. The only nonsyllabic signs seem to be clitics, namely numbers like ONE, TWO, THREE, which also often appear within words (e.g. NEW YEAR, cited above).

(70) Examples of monosyllabic signs

| Sequence type | Signs |
|-------------------|-------------------------|
| P ⁺ | MALE, THANK, DOG, CHILD |
| M | SKI, CITY, EXPENSIVE |
| M ⁺ | SWIM, WALK |
| MP | HAVE, SIT, NOW, GOOD |
| M ⁺ P | SOUND |
| PM | COMMEMORATE, JUMP |
| PM ⁺ | DREAM |
| PMP | STOP, GROW UP |
| PM ⁺ P | THING |

Just as noted by Perlmutter (1992) for American Sign Language, TSL syllable structure obeys constraints against adjacent segments that are too close in sonority. Thus there are no syllables with the structures *MP⁺, *P⁺M, *P⁺MP⁺, etc.

As noted above, movement can include handshape change, specifically what is sometimes called *handshape contour* (see Liddell and Johnson 1989, Liddell 1990, Corina 1993, Brentari 1996): the change involves a fixed set of fingers that all change posture the same way, always from open to closed or the reverse; the other fingers do not change posture, and must remain all closed or all open. Thus one handshape in a contour is predictable from the other.

(71) Examples of monosyllabic signs involving handshape contour (note that the set of active fingers is the same across the whole sign)

| Sequence type | Signs | Handshape change |
|------------------|--------|---|
| P ⁺ | SMART | /𠄎 (lyu)/ TI closed > /六 (liu)/ TI open |
| M ⁺ | FISH | /手 (shou)/ TIMRP open > /九 (jiu)/ TIMRP curved |
| M ⁺ P | BEAN | /𠄎 (lyu)/ TI closed > /六 (liu)/ TI open |
| PM ⁺ | FORGET | /拳 (quan)/ TIMRP closed > /手 (shou)/ TIMRP open |

By contrast, *handshape cluster* is handshape change in which the handshapes at the beginning and end of the sign do not have any strict relationship with each other. Such signs almost always contain more than one morpheme.

(72) Examples of polymorphemic signs involving handshape cluster (note that the set of active fingers changes from the beginning to the end of the sign)

| Signs | Gloss | Handshape change |
|-------------|-----------|-----------------------------|
| MONTH^ONE | one month | /ㄩ (lyu)/TI > /一 (yi)/I |
| READ^PERSON | student | /五 (wu)/TIMRP > /民 (min)/TP |
| THINK^GREAT | clever | /一 (yi)/I > /男 (nan)/T |

Note that the difference between handshape contour and handshape cluster supports the claims that (i) sign morphemes are naturally monosyllabic; (ii) handshape contour defines a single syllable; (iii) specifying a syllable does not require specification of a sequence of features. Conclusion (iii) supports arguments that sign “syllables” are really more like spoken language segments, like affricates.

Note also that the necessity for local movement on single-handshape signs without path movement provides further support for the claim that a handshape is itself *not* a sign, but merely an element of a full sign. That is, handshapes represent phonological content that must be licensed within phonological structure (prosody).

There are a small number of apparently monomorphemic signs that have more than one syllable. Interestingly, all but one of them have the same handshape in both syllables, suggesting the existence of a morpheme-internal “handshape harmony” constraint.

(73) Examples of monomorphemic signs with more than one syllable

| Sequence type | Cross-syllable feature change | Signs |
|---------------|--|-------------------------------------|
| MPMP | No change: reduplication | WORK, PHYSICAL EDUCATION, NOW, HELP |
| MPMP | Location (movement, handshape, orientation unchanged) | ALTHOUGH, FROG, BUTTONS |
| MPMP | Location and orientation (movement, handshape unchanged) | PAPAYA, ROOM |
| PMPMP | Location, orientation, movement (handshape unchanged) | TABLE |
| MPMP | Handshape and orientation (movement, location unchanged) | MOSQUITO |

There is as yet no evidence for an onset-rime distinction in sign “syllables”.

3.5.2. Syllables and compounding

As Goldsmith (1990) and others have noted, in spoken language lexical phonology, “level 1” morphology is associated with phonology that creates forms consistent with monomorphemic prosodic constraints, while “level 2” morphology violates such constraints. For example, level 1 suffixes in English shift stress, while level 2 suffixes do not (e.g. *origin* ~ *original* both obey monomorphemic stress patterns, while *telephoning* does not).

This would seem to predict that “level 1” compounding should create outputs that are more like monomorphemic forms, i.e. monosyllabic. We have tried to explore this hypothesis by looking at the relationship between diagnostics of lexical level like transparency and frequency, and the number of syllables. Note some interesting contrasts, such as “geography” vs. “prepare”.

(74) Semantics and number of syllables in compounds

| Compound | Gloss | Number of syllables |
|----------------|--------------|---------------------|
| EXAMINE^HELP | take care of | 2 |
| MONEY^SUBTRACT | discount | 2 |
| CITY^LEADER | mayor | 2 |
| CALCULATE^GOOD | worthy | 2 |
| SOIL^WAY | geography | 2 |
| MARRY^MALE | husband | 1 |
| WHO^NOT | unfamiliar | 1 |
| BEFOREHAND^WAY | prepare | 1 |
| ENOUGH^NOT | not enough | 1 |
| FATHER^MOTHER | parents | 1 |

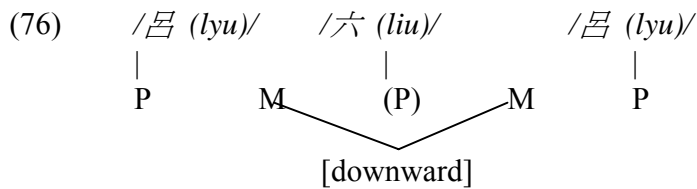
3.5.3. Syllables and iconicity

A fascinating example of abstract phonology trumping iconicity has been pointed out by Lee (2003). In Smith and Ting (1979), the sign for MOON is described as very iconic:

(75) MOON (Smith and Ting, 1979)

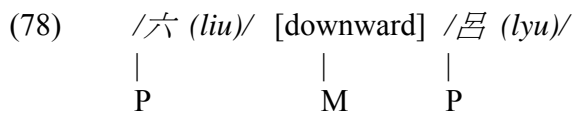
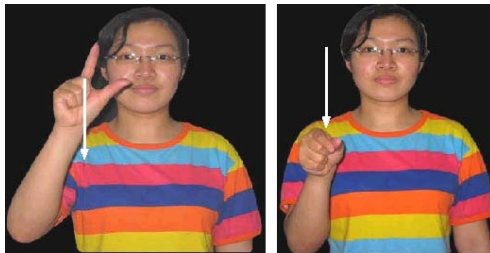


The problem is that this would then be a morpheme containing three handshapes but only one path movement, violating syllable structure:



Lee (2003) discovered that signers (whether young, old, native, or nonnative) do not use this iconic form in everyday conversation, but instead use a monosyllabic form:

(77) MOON (monosyllabic form) Lee (2003)



4. Conclusions

This paper has given a brief sketch of the morphology and phonology of Taiwan Sign Language. Like spoken languages and other sign languages that have been described,

TSL has both inflection, primarily agreement and aspect marked on the verb, and derivation, including both category-changing affixation and compounding. Morphological properties cross-linguistically typical of sign languages (though not necessarily typical of spoken languages) include the apparent lack of tense marking, agreement for both subject and object, and parallel (simultaneous) compounding; more unusual features include agreement for gender and number. TSL phonology follows mostly typical patterns as well, with an inventory of handshapes and other phonemic elements that overlaps largely, though not completely, with those of other sign languages. Alternations and constraints on handshapes and prosodic structure are also typical, as is the ambiguous role of iconicity in sign phonology: signs tend to mimic real-world referents, yet often differ from them in order to obey phonological constraints.

The tendency for the morphology and phonology of sign languages to be very similar may follow from their relative youth, since there has been less time for them to deviate from some kind of default (Aronoff et al. 2000). However, further data collection and deeper analyses may reveal unique properties of TSL at a more subtle level.

























































References

- Anderson, Stephen. R. 1992. *A Morphous Morphology*. Cambridge University Press.
- Ann, Jean. 1992. Physiological constraints in Taiwan Sign Language handshape-change. *Nordic Journal of Linguistics* 15 (2): 143-158.
- Ann, Jean. 1993. *A linguistic investigation of the relationship between physiology and handshape*. Ph.D. Dissertation. University of Arizona.
- Ann, Jean. 1996. On the relation between ease of articulation and frequency of occurrence of handshapes in two sign languages. *Lingua*, 98, 19-41.
- Ann, Jean. 2006. *Frequency of Occurrence and Ease of Articulation of Sign Language Handshapes: The Taiwanese Example*. Gallaudet University Press.
- Archangeli, Diana and Douglas Pulleyblank. 1994. *Grounded Phonology*. MIT Press.
- Aronoff, Mark, Irit Meir & Wendy Sandler. 2000. Universal and particular aspects of sign language morphology. *University of Maryland Working Papers in Linguistics*, 10:1-33.
- Brentari, Diane. 1996. Trilled movement: Phonetic realization and formal representation. *Lingua* 98: 43-71.
- Brentari, Diane. 1998. *A Prosodic Model of Sign Language Phonology*. Cambridge, Massachusetts: The MIT Press.































- Chang, Jung-hsing, Shiou-fen Su, James H-Y. Tai. 2005. Classifier Predicates Reanalyzed with Special Reference to Taiwan Sign Language. *Language and Linguistics* 6.2.247-278.
- Channon, Rachel Elizabeth. 2002. *Signs are single segments: Phonological representations and temporal sequencing in ASL and other sign languages*. University of Maryland PhD thesis.
- Corina, David P. 1990. Handshape assimilations in hierarchical phonological representation. *Sign Language Research: Theoretical Issues*, ed. by Ceil Lucas, 27-49. Washington, DC: Gallaudet University Press.
- Corina, David P. 1993. To branch or not to branch: Underspecification in ASL handshape contours. *Current Issues in ASL Phonology, vol. 3: Phonetics and phonology*, ed. by Geoffrey Coulter, 63-95. New York: Academic Press.
- Corina, David P. and Wendy Sandler. 1993. On the nature of phonological structure in sign language. *Phonology* 10: 165-207.
- Goldsmith, J. A. 1990. *Autosegmental and Metrical Phonology*. Blackwell.
- Gussenhoven, Carlos, and Haike Jacobs. 1998. *Understanding Phonology*. Arnold Publishers.
- Hockett, C.F. 1960. The origin of speech. *Scientific American*, 203, 88-96.
- Lee, Hsin-hsien. 2003. *Analyzing handshape changes in Taiwan Sign Language*. MA thesis, National Chung Cheng University, Taiwan.
- Lee, H.-H., Tsay, J., & Myers, J. 2001. Handshape articulation in Taiwan Sign Language and Signed Chinese. National Chung Cheng University ms. Presented at the Conference on Sign Linguistics, Deaf Education and Deaf Culture in Asia, Chinese University of Hong Kong, December.
- Liddell, Scott K. 1990. Structures for Representing Handshape and Local Movement at the Phonemic Level. In *Theoretical Issues in Sign Language Research*. Vol. 1: Linguistics, ed. Fischer, S. D. and Siple, P. 37-65. University of Chicago Press.
- Liddell, S. K. 2003. *Grammar, Gesture, and Meaning in American Sign Language*. Cambridge: Cambridge University Press.
- Liddell, Scott K. and Johnson, Robert E. 1985. American Sign Language: The Phonological Base. In *Linguistics of American Sign Language: an Introduction*. 2nd edition, ed. Valli, C and Lucas, C. 1992. 249-289. Washington: Gallaudet University Press.
- Liddell, Scott K., and Johnson, Robert E. 1986. American Sign Language compound formation processes, lexicalization, and phonological remnants. *Natural Language and Linguistic Theory* 4: 445-513.
- Liddell, Scott K., and Johnson, Robert E. 1989. American Sign Language: The phonological base. *Sign Language Studies* 64: 195-278.
- MacLaughlin. 1997. "The Structure of Determiner Phrases: Evidence from American Sign Language." Doctoral Dissertation, Boston University, Boston, MA.
- Myers, James, Hsin-hsien Lee, and Jane Tsay. 2005. Phonological production in Taiwan

- Sign Language. *Language & Linguistics* 6.2: 319-359.
- Padden, Carol A. and Perlmutter, David M. 1987. "American Sign Language and the architecture of phonological theory." *Natural Language and Linguistic Theory* 5(3):335-375.
- Perlmutter, D. M. 1992. "Sonority and syllable structure in American Sign Language." *Linguistic Inquiry* 23:407-442.
- Sandler, Wendy. 1989. *Phonological representation of the sign: linearity and nonlinearity in American Sign Language*. Dordrecht: Foris.
- Sandler, Wendy. 1990. Temporal aspects and ASL phonology. *Theoretical Issues in Sign Language Research*, ed. by Susan D. Fischer and Patricia Siple, 7-35. Chicago: University of Chicago Press.
- Sandler, Wendy. 1993. Linearization of phonological tiers in ASL. In Coulter, Geoffrey R (ed.) *Phonetics and Phonology, vol 3: Current Issues in ASL Phonology*, pp. 103-130. Academic Press.
- Sandler, Wendy, and Diane Lillo-Martin. 2006. *Sign Language and Linguistic Universals*. New York: Cambridge University Press.
- Smith, Wayne H. 1982. The nature of compounding in Taiwan Sign Language. Unpublished Indiana University ms, revised 1998.
- Smith, Wayne and Ting Li-Feng. 1979. Shou Neng Sheng Qiao [Your Hands Can Become a Bridge], Vol. 1. Taipei: Deaf Sign Language Research Association of the Republic of China.
- Smith, Wayne and Ting Li-Feng. 1984. Shou Neng Sheng Qiao [Your Hands Can Become a Bridge], Vol. 2. Taipei: Deaf Sign Language Research Association of the Republic of China.
- Smith, Wayne H. 1989. *The morphological characteristics of verbs in Taiwan Sign Language*. PhD dissertation, Indiana University.
- Stokoe, William C., Dorothy C. Casterline and Carl G. Croneberg. 1965. *A Dictionary of American Sign Language on Linguistic Principles*. Silver Spring: Linstok Press.
- Tsay, Jane. 2007. "The Syllable in Taiwan Sign Language." *Paper presented at International Symposium on Language, Culture, and Cognition (ISLCC)*. March 9-10, 2007. National Taiwan University, Taipei, Taiwan, R.O.C.
- Uyechi, Linda. 1996. *The Geometry of Visual Phonology*. California: CSLI Publications.
- Wilbur, R. B. 1994. Eyeblinks and ASL phrase structure. *Sign Language Studies*, 84, 221-240.
- Wilbur, R, B. 1999. Stress in ASL: Empirical Evidence and Linguistic Issues. *Language and Speech*, 42 (2-3), 229-250.
- Wu, Pei Lan. 2007. *The Formation of Noun-Verb Pairs in Taiwan Sign Language*. MA Thesis, National Chung Cheng University, Taiwan.































Appendix 1 TSL handshapes in Smith and Ting (1984)

| | | | | | |
|---|--|---|--|--|--|
|  〇 |  十 |  方 |  姊 |  副 |  龍 |
|  一 |  廿 |  欠 |  虎 |  棕 |  薑 |
|  二 |  卅 |  句 |  果 |  童 |  蟲 |
|  三 |  四十 |  兄 |  胡 |  菜 |  臂 |
|  四 |  八十 |  民 |  很 |  筆 |  難 |
|  五 |  百 |  瓜 |  飛機 |  博 |  WC |
|  六 |  千 |  同 |  隻 |  像 | |
|  七 |  萬 |  守 |  拳 |  語 | |
|  八 |  女 |  男 |  借 |  鴨 | |
|  九 |  手 |  呂 |  紳 |  錢 | |

Appendix 2 TSL handshapes in Chang, Su, and Tai (2005)

| | | | | | |
|---|---|---|---|--|---|
|  |  |  |  |  |  |
| 零 LING | 一 YI | 二 ER | 三 SAN | 四 SI | 五 WU |
|  |  |  |  |  |  |
| 六 LIU | 七 QI | 八 BA | 九 JIOU | 十 SHI | 二十 ER-SHI |
|  |  |  |  |  |  |
| 三十 SAN-SHI | 四十 SI-SHI | 五十 WU-SHI | 六十 LIU-SHI | 七十 QI-SHI | 八十 BA-SHI |
|  |  |  |  |  |  |
| (K) (K) | WC WC | 千 QIAN | 女 NY | 手 SHOU | 方 FANG |
|  |  |  |  |  |  |
| 兄 XIONG | (奶奶) (GRANDMA) | (高) (GAO) | (布袋戲) (BUDAIXI) | 同 TONG | 守 SHOU |

TSAY & MYERS: THE MORPHOLOGY AND PHONOLOGY OF TSL

| | | | | | |
|---|---|---|---|--|---|
|  |  |  |  |  |  |
| 呂 LY | 男 NAN | 姐 JIE | 果 GUO | 很 HEN | 胡 HU |
|  |  |  |  |  |  |
| 借 JIE | 拳 QUAN | 隻 ZHI | 紳 SHEN | 博 BO | 棕 ZONG |
|  |  |  |  |  |  |
| 童 TONG | 筆 BI | 菜 CAI | (爺) (IE) | (矮) (AI) | 萬 UAN |
|  |  |  |  |  |  |
| 像 XIAN | 語 YU | (細) (XI) | 飛機 FEI-JI | 錢 QIAN | 鴨 IA |
|  |  |  |  |  |  |
| 龍 LONG | 薑 JIANG | 蟲 CHONG | 雞 JI | (鵝) (E) | 難 NAN |

Note: Handshapes in parentheses are those that are not listed in Smith and Ting (1984).

台灣手語的構詞與音韻

蔡素娟、麥傑

語言學研究所

國立中正大學

摘要

本文將近幾年對台灣手語的構詞和音韻的研究做一系列詳盡的介紹。台灣手語的構詞和口語一樣也可區分為語法屈折變化構詞和語詞衍生變化構詞。語法屈折變化構詞包括動詞類屈折變化和名詞類屈折變化；語詞衍生變化構詞包括加綴法、序列性複合詞和同時性複合詞。語法屈折變化構詞主要探討台灣手語的呼應方式和動貌標記。呼應方式包括語法關係、性別、和數的呼應；動貌系統包括完成貌、進行貌、延伸貌等標記。另外，有關台灣手語的音韻系統的介紹包括音素成份、同位手形變異、音韻徵性共現限制、音韻轉換和詞彙內部的韻律結構等方面。本文關於台灣手語的語料與分析可以作為未來進行跨語言比較的基礎。

Lexical Variation and Change in Taiwan Sign Language

Yijun Chen and James H-Y. Tai

Institute of Linguistics

National Chung Cheng University

Abstract. This paper gives a preliminary report of lexical variation and change in Taiwan Sign Language (TSL). Chao's (1988; 1999; 2001) textbooks and TSL online dictionary (Tsay et al. 2008) are used as two data sources. We adopted four steps to compare and analyze lexical variants noted in these two sources. First, all variants in Chao's textbooks are analyzed with respect to five phonological parameters (handshape, movement, location, orientation, and handedness) to see whether the variants are phonologically related or not. Second, the variants noted in the two data sources are compared to identify the changes with respect to five phonological parameters. Third, the changes among most frequent 1000 signs are analyzed to obtain heuristics for future variation study. Finally, the formation mechanisms of new lexical signs which contribute to variation are also identified.

1. Introduction

Languages vary in patterned ways through time and space. Language variation and language change are closely related in that change results in variation and in turn variation causes further change. Language variation and change in spoken languages have been the focus of historical linguistics and sociolinguistics. However, there has been only little research in variation and change in sign languages. This is partly because sign language started to be treated as a natural language only in early 1960's by Stokoe and his associates (Stokoe et al. 1965) and partly because sign language researchers in earlier decades have focused on the demonstration of sign language as natural language. Frishberg (1976) first examined some historical changes in American Sign Language

(ASL) by comparing two ASL dictionaries, Long (1918) and Stokoe et al. (1965). The study has shown that there is a general tendency for signs to change in the direction of arbitrariness. Lexical formation has become limited to hands alone instead of using body movement or facial expressions as part of the lexicon formation. Individual parameters of signs have the tendency toward symmetry, locational displacement, and assimilation. Understanding of lexical change is not only desirable but also necessary for variation study since the processes resulting in historical change are still operative today (Lucas, Bayley, and Valli 2001). Lexical change study helps variation analysis determine what kind of variation to be investigated.

Systematic study of variation and change in Taiwan Sign language (TSL) has been so far lacking. As a starting point, this paper observes how TSL lexical change has led to lexical variation. TSL historical changes are identified by comparing the drawings and descriptions of signs given by Chao (1988; 1999; 2001) with videos and descriptions demonstrated on TSL online dictionary (Tsay et al. 2008). In this paper, we try to determine whether the variation involves separate variants or phonologically related variants. As language users of different dialects are constantly in contact with each other, through the span of time some dialectal variants might be used cross different areas and no longer be regarded as dialectal variants. Thus, dialectal variants and lexical variants are compared between two data sources to detect the change processes. We use most frequent 1000 sign items for the comparison to identify changing processes. By doing so, we establish some heuristic guidelines for the future study of variation in TSL. Furthermore, the changing processes identified are compared with those identified by Frishberg (1976) in ASL. We also briefly touch upon the formation of new lexical signs.

This paper is organized as follows: section 2 describes the historical background of TSL, section 3 reviews the previous studies on lexical variation and change in signed languages, section 4 describes the method of comparison, section 5 presents the results, and section 6 concludes the paper.

2. Taiwan Sign Language

TSL is used in daily conversation among deaf population in Taiwan. The history of TSL dates back to the establishment of deaf schools during Japanese occupation of Taiwan from 1895 to 1945. School setting is important to the development of signed

languages because most deaf children are born to hearing parents who do not have the knowledge of signed languages. The only sign language community for those children to acquire sign language is when they enter deaf schools where sign language is used for communication. In deaf schools, the students are either those who happen to be born to deaf parents and thus are exposed to native signing at home or those who have already learned to use sign language. Before the Japanese occupation, deaf people were isolated by their families and not formally educated. Thus, there was no chance for a sign language to develop (Ann 1998).

Two schools for the deaf were established in Tainan and Taipei in 1915 and 1917 respectively during the occupation. (Smith 2005). Most teachers who taught at Tainan school for Deaf came from Osaka, whereas many teachers at Taipei school for Deaf came from Tokyo. Those teachers used their own dialects of Japanese Sign Language (JSL) when they were teaching. There was much communication between these two schools. The signs used in Taiwan during the Japanese occupation were basically no different from those used in Japan with dialectal differences in Tainan and Taipei areas. In 1956, Taichung school for the deaf was established as a branch of Tainan school. The instructional language used in Taichung school was the same as that in Tainan school (Smith and Ting 1979).

In 1945, Taiwan was ceded to China, and Japanese instructors returned back to Japan. But the Taiwanese teachers at the deaf schools continued under the new administration. In 1949, when the Chinese communists took over China, more than two millions of refugees from the mainland arrived in Taiwan. Chinese Sign Language (CSL) was then introduced to Taiwan. Some CSL vocabularies were used in Taipei school for the deaf by a China deaf teacher. Besides, Nantong dialect of CSL was the language used in Private Chiyng Elementary School for the Deaf and Mute, which was established by a deaf Mainlander, in Kaohsiung in the 1950s (Smith 2005). Although there are three different sources for TSL vocabularies and four schools for deaf in four different areas in Taiwan, only two dialectal varieties have been documented, that is, Tainan variety and Taipei variety (Smith and Ting 1979; Chao 1988; Smith 2005).

3. Lexical variation and change in signed languages

Signed languages are produced with two identical articulators, two hands. 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). Two-handed signs could be produced with one hand with a table, chair arm, or the signer's thigh substituted for the non-dominant hand. One-handed sign could also be produced with two hands in symmetry in handshape and movement.

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 analogous to phonemes or distinctive features in spoken languages. Spoken phonemes are produced linearly, but sign parameters are produced simultaneously. Like spoken phonemes, each sign parameter is subject to variation.

3.1. 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 two variants for PINAPPLE¹ in TSL. 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 one open hand, palm facing downward, serving as the pineapple. The other hand slices back and forth on top of it, acting as if slicing. These two variants do not share any parameter and should be treated as separate lexical variants. In contrast, phonologically related variants have to do with signs that denote the same referent or concept but are related phonologically. They usually differ in only one parameter, usually the handshape (ibid. 180). Take TSL sign AIRPLANE for example, AIRPLANE could be either produced by extending thumb, middle finger, and pinky or by extending thumb, index, and pinky. There is also an example regarding location variation: TSL sign I could be produced with 1 handshape either at the location of nose or the chest. Other TSL

¹ Following the convention, lexical items in sign languages are spelled out in capital letters throughout the paper.

examples of phonological related variants are movement variation (e.g. SNAKE) and palm orientation variation (e.g. LOTTERY).

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, CSL, JSL and Hong Kong Sign Language (HKSL) make use of character signs based on Chinese logographic writing system (Ann 1998; 2001). However, the same character can be signed differently in different sign languages and even in different dialects in one sign language. TSL character signs are constructed in different manners. First, the fingers of both hands are used to imitate the shape of a Chinese character, e.g., 中 and 王. Second, the character is traced in the air with fingers, e.g., 人 and 千. Third, tracing and handshape are both used, e.g. 丁 and 于. Fourth, both the mouth and the handshape are used to represent the whole or part of a character, e.g. 品 and 回. Character signs are commonly used for the names of persons and places in TSL. They therefore contribute to lexical variants in TSL

3.2. Lexical change

It is a daunting task to conduct a systematic and conclusive study on lexical change in signed languages. The history of signed languages is not long and there are seldom records or videotapes of earlier signs available. Frishberg (1975) compares the

descriptions and formation of ASL signs recorded in sign language manual edited by Long (1918) with that reported in Stokoe et al. (1965). The comparison was made based on the assumption that these sources are the standard language for their respective times because they were used in instruction or reference texts. The results show several changes: first, ASL signs change away from imitative origins to more arbitrary shapes. Second, individual parameters show the tendency toward symmetry, locational displacement, and assimilation. These changes are motivated by the principles as ease of articulation and ease of perception. Third, lexicon content has changed to be articulated by hands alone rather than being articulated along with facial expression or body movement. Facial expressions and body movement can be treated on a par with intonation in spoken languages with the function of marking sentential information such as affirmation². Finally, signs are made of simpler forms.

Four forces behind lexical changes in sign languages are identified and discussed briefly below. They are symmetry, displacement, assimilation, and deletion.

Symmetry refers to the situation in which both hands are signed with the same handshape if both hands are acting in unison or one hand acts on the other hand. Symmetry thus involves both handshape and movement. The ASL sign *DEPEND* is cited by Long as resting the right index finger on the edge of the left open hand with palm facing inside. But in nowadays ASL, both hands extend index fingers. Symmetry also includes two-handed signs which previously were one-handed, such as *ANGRY*. The handshape and movement of the adding hand are identical to those in the original one-handed form.

Displacement pertains to location parameter of a sign which undergoes change in location. : Head displacement and body displacement are the two major types. They refer to signs made in contact with the face and below the neck respectively. Head displacement changes the specific location on the face from the center to the perimeter while body displacement centralizes the location along the line of bilateral symmetry and moves up toward the hollow of the throat. ASL sign *PICKLE* is an example of head displacement, it used to be signed at a corner of the mouth but now is signed lower on the chin. The example of body displacement is *FEEL*, it has moved from a location over the

² For more information on facial expression, please see Liddel (1980).

heart to the center of the chest.

Displacement also correlates with a change in the number of hands. Some two-handed signs made in contact with the face have become one-handed such as PHOTOGRAPH. However, some one-handed signs made below the neck have become two-handed, such as ANGRY. The adding hand is symmetrical to the first hand in both movement and handshape, following the symmetry condition. Frishberg (*ibid.*) proposes a prediction that signs on the face become one-handed and signs off the face become two-handed. Displacement to the perimeter and reduction of hands from two to one on the face enable the signer to open the face for paralinguistic information. By doing so, addressees can easily read these kind of information.

The tendency of assimilation is toward smoothing of movement or transitions between parts of signs by assimilating handshape or movement. For instance, previously ASL compound HOME was made of two signs: EAT (O-hand at the mouth) and SLEEP (flat hand on the cheek). In ASL today, the handshape of SLEEP has assimilated to that of EAT. Furthermore, the location of EAT has partly assimilated toward the location of SLEEP. Therefore, the citation form of HOME today is an O-handshape touching two distinct places on the cheek (Klima and Bellugi 1979:29).

During the course of historical development, a part of compound signs can be deleted for simplification. BIRD in ASL is a good example. The sign BIRD originally is originally a compound sign with first part signing for 'beak' and the second part signing for 'wings'. The contemporary sign BIRD in ASL only has the 'beak' part. (Frishberg 1975: 709).

4. Data sources and method for comparison

So far there is no study on lexical variation in TSL. Lexical variants in TSL are only noted in two textbooks and one online dictionary. The two textbooks are Shou Neng Sheng Qiao [Your Hands Can Become a Bridge] (Smith and Ting 1979; Smith and Ting 1984) and Zi Ran Shou Yu Jiao Xue [Taiwan Natural Sign Language] (Chao 1988; 1999; 2001). Smith and Ting's textbook gives A or B variants for some signs without noting which dialectal area they are used, that is, either Taian area in the south or Taipei area in the north. Chao's textbook distinguishes dialectal variants from variants which cannot be associated with dialectal areas... For the purpose of this study, we want to make a

distinction between dialectal variation and non-dialectal variation. We therefore chose Chao's data for this study. Among the 3342 TSL lexical entries in Chao's textbook, 107 entries are noted with dialectal variation and another 52 entries with non-dialectal variation. The online dictionary of TSL constructed at National Chung Cheng University (Tsay et al. 2008) contains the most frequent 1000 lexical items noting southern variants with S and northern variants with N as well as A and B variants which are not associated with dialectal differences.³ We therefore use Chao's textbook and the online dictionary by Tsay et al. as two data bases for the comparison. The signs in these two data bases are more or less representing standard forms which textbook and dictionary compilers would like to include. Therefore, by comparing the drawings and descriptions of signs given by Chao with videos and descriptions demonstrated on TSL online dictionary, we hope to get a few glimpses of language change in TSL.

We take four steps for the comparison. First, both variants of dialectal variation and non-dialectal variation in Chao's work are analyzed with respect to the five parameters in sign language phonology in order to see whether or not their variations are phonologically related. The five parameters: handshake, location, movement, orientation, and handedness.

Second, with the advancement in technology and communication, deaf people no longer are so isolated as in the past. Dialects change with language users constantly in contact with each other through TV and other means of telecommunication. Some dialectal variants might have been adopted across different areas and thus no longer regarded as dialectal variants. Some variants may be chosen over their respective other variants and appear to be the only form. Thus, both dialectal variants and non-dialectal variants in the two sources are compared to observe the changes.

Third, the changes among most frequent 1000 signs are analyzed with respect to the five parameters to obtain the heuristic guidelines for variation study in the future.

Finally, the formation mechanism of new lexical signs is described. The data are collected by pictures naming.

³ The actual lexicon entries are 1008, including 176 sign synonyms, for instance GIRL and FEMALE.

5. Variation and change in Taiwan Sign Language

5.1. Separate variants versus phonologically related variants

Among Chao's 3342 TSL lexical entries, there are 107 signs noted with dialectal variation and 52 signs with non-dialectal variation. The question is whether the variation involves separate variants or phonologically related variants.

As mentioned in section 3.1, following (Lucas, Bayley, and Valli 2001), we can make a distinction between separate lexical variants and phonologically related variants. 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. In contrast, phonological related variants refer to signs that denote the same referent or concept but differ only in one phonological parameter.⁴ By this criterion, among 107 dialectal variation documented by Chao, only 22 signs are phonologically related but 85 signs are separate variants. Table 1 presents the results. It can be noticed that phonologically related variants tend to vary in handshape first and then movement.

Table 1. Dialectal variation in TSL

| | |
|---------------------------------|-----|
| Dialectal variation | 107 |
| Phonologically related variants | 22 |
| Difference in handshape | 10 |
| Difference in location | 2 |
| Difference in movement | 6 |
| Difference in orientation | 2 |
| Difference in handedness | 2 |

With respect to 52 non-dialectal variants, there are only 12 variants are phonologically related but 40 variants are separate variants. Most phonologically related variants of non-dialectal variation differ in handshape and location. The results are summarized in table 2 below.

⁴ In reality, there are variants which differ more than one parameter. Yet for the present purpose, we follow Lucas, Bayley, and Valli (2001) in treating them as separate variants.

Table 2 Non-dialectal variation in TSL

| Non-dialectal variation | | 52 |
|---------------------------------|---|----|
| Phonologically related variants | | 12 |
| Difference in handshape | 5 | |
| Difference in location | 5 | |
| Difference in movement | 1 | |
| Difference in orientation | 0 | |
| Difference in handedness | 1 | |

Table 1 and table 2 above have shown that most variation is manifested in separate variants. Since all the parameters are different in separate variants, it is possible that separate variants were formed with totally different motivations to begin with. Notice that handshape plays the most important role in both dialectal variation and non-dialectal variation. As a matter of fact, Lucas, Bayley, and Valli (2001) have also observed that handshape is the most prominent parameter for the variation in ASL.

5.2. Change in TSL

TSL lexical change is observed by comparing the drawings and descriptions of signs given by Chao with videos and descriptions documented on TSL online dictionary by Tsay et. al..

5.2.1. Dialectal variation versus non-dialectal variation

As mentioned earlier, there are 107 signs with dialectal variation and 52 signs with non-dialectal variation in Chao's textbook. Dialectal variation is compared first between Chao's textbook and TSL online dictionary. The purpose of this comparison is to understand whether dialectal variation change through time.

Table 3. Comparison between Chao's textbook and TSL online dictionary

| Chao | | TSL online dictionary | |
|--------------------------------|-----|------------------------------------|----|
| Signs with dialectal variation | 107 | Signs with dialectal variation | 51 |
| | | Signs with non-dialectal variation | 22 |
| | | Signs with only one variant left | 34 |
| | | Northern variant | 28 |
| | | Southern variant | 6 |

Out of 107 signs with dialectal variation in Chao's data, near half of them, namely 51 signs, remain dialectal variation in the TSL online dictionary. 22 signs appear to be non-dialectal variation and the rest 34 signs have only one variant left, which means either northern dialect variation or southern dialect variation is no longer in use. There are 28 northern variants are kept but only 6 southern variants are kept. The result shows that northern variants tend to be chosen over southern variants: This result is not surprising in that the north has been dominant politically as well as economically since 1949 when the government of Republic of China moved to Taipei from mainland China.

5.2.2. The most frequent 1000 lexical items

TSL signs which are collected in the online dictionary are the most frequent 1000 lexical items. There are totally 1008 lexical entries in the dictionary. After excluding the double counted 176 sign synonyms and 189 signs not collected in Chao's textbook, only 643 lexical items are compared. Out of 643 lexical items, 537 signs show no difference between Chao's textbook and TSL online dictionary. Among the 106 items which show differences, five of them involve adding one more sign due to the influence of Chinese. We therefore compare the rest of 101 items in five parameters as shown below in table 4.

Table 4. Change in 1000 lexical items

| | |
|---------------------------|-----|
| Difference in handshape | 19 |
| Difference in location | 34 |
| Difference in movement | 36 |
| Difference in orientation | 6 |
| Difference in handedness | 6 |
| total | 101 |

Table 4 shows that movement and location are more prominent than other three parameters. Changes in movement exhibit three subtypes: movement repeated, movement reduced, and different movement. Of the 36 signs with movement change, 16 are one-handed signs and 20 two-handed signs. In two-handed signs, movement change occurs in the dominant hand except for two signs in the non-dominant hand. Of 16 one-handed signs, 9 involve repeated movement, 4 reduced movement, and 3 totally different movement. Of 20 two-handed signs, 10 signs involve repeated movement, 8 signs reduced movement, and 2 signs different movement. Thus, we can see that in both one-handed and two-handed signs, repeated movement is more frequent than other two types of changes. However, we have yet to have more data to understand the choice between repeated and reduced movement. We hasten to point out here that movement in sign languages is often obscured in two-dimensional illustrations in paper textbooks. As our comparison is made between Chao's paper textbook and TSL online dictionary, from which we can better observe movement in signs, our analysis here can only be very crude and tentative. We need to collect data from native signers from different generations to further check our present analysis.

With respect to the 34 signs which change location, change can be made either in face area or body area. For signs made in face area, the location tends to change toward a lower place. For example, in Chao's textbook the sign SEE is made in front of the signer's eye in, but in TSL online dictionary it is made lower than the signer's eye. Similarly, the sign YOUNG is signed in front of forehead in Chao's textbook but is signed in front of the face in TSL online dictionary. There are totally five signs which have lowered the location in face area. For signs made in body area, the location has a tendency to become more centralized. For instance, ONE is signed on the side of the body in Chao's data but is signed in front of the body in TSL online dictionary. There are totally 23 signs the location of which has become centralized.

The change in location we have observed here is slight different from that reported in Frishberg's study. Location change in body area in TSL, with centralization toward the line of bilateral symmetry, is similar to the change in ASL. But location change in face area in TSL is different from the change in ASL. ASL signs tend to change from the center to the perimeter, whereas TSL signs tend to lower the location, regardless their earlier location in the center of the face or in the perimeter of the face.

Lowering the location is not only found in TSL. Other variation studies also demonstrate this variation, for example ASL location variation (Lucas, Bayley, and Valli 2001) and Australian Sign Language (Auslan) location variation (Schembri, Johnston, and Goswell 2006). In these two studies, signs which are produced at forehead or temple may have the variants that are produced at locations below the forehead or temple. The variation in location in face area definitely could be characterized as change in progress. TSL also undergoes this kind of changing.

We now turn to 19 signs which change the parameter of handshape. 7 signs are made by single hand and 12 signs are made by two hands. Those 12 two-handed signs are not symmetrical signs, that is, the handshape of two hands are not the same. Most handshape change is found in dominant hand, except one sign PHOTOGRAPH. Non-dominant hands still remain the same handshape as earlier forms. TSL doesn't seem to have undergone the change toward symmetry as in ASL.

As to the parameter of handedness, 6 signs are observed to have changed the handedness. All these signs are made by one hand in Chao's textbook but are signed by two hands in TSL online dictionary. Although there is a hand adding in the formation of the sign, it is not necessary for both hands to be made in the same handshape to conform to the symmetry condition as in ASL.

5.3. Innovation in TSL

With the rapid change of technology and living environment, language users have to form new lexicons to denote new objects and concepts. In both spoken and signed languages, before the new lexicons have become conventionalized, it is not unusual to observe that there are more than one way to express new objects and concepts. This also holds true for TSL. TSL signs can be constructed based on different iconic devices, including virtual depiction, substitutive depiction, presentable actions, and presentable actions (Wu 2007).

In addition, as mentioned in section 3.1, character signs and fingerspelling are also used to form new lexical signs in TSL. Character signs are based on the Chinese writing system and fingerspelling is derived from the alphabet. Fingerspelling systems vary from language to language, and so do character signs. Both character signs and fingerspelling are used in TSL. The fingerspelling used in TSL is the same as that in ASL. Examples are

M for ‘MacDonald’s’, W for ‘Watsons’, and USB for ‘USB’.

Loan translation is another mechanism for TSL signers to form new lexicons. Loan translation refers to the cases in which signers directly translate Chinese expressions into TSL character by character. For example, high speed rail in Chinese is termed as Gao Tie, written as 高鐵. One way to denote high speed rail is to translate Gao and Tie into HIGH and IRON respectively. Loan translation could be combined with a TSL sign such as kiwi. Kiwi in Chinese is termed as Qi Yi Guo, written as 奇異果. One way to denote kiwi in TSL is to translate Qi (奇) into STRANGE and then sign FRUIT. It has been observed that when translating Chinese characters into TSL, variation occurs in choosing TSL signs. For instance, the character Sui of Sui Shen Die ‘flash’, written as 隨身碟, could be translated either as WHATEVER, written as 隨便, or FOLLOW, written as 跟隨. Another example is Ji Hui ‘opportunity’, written as 機會. Hui (會) is observed to be translated either MEETING, written as 開會, or CAN, written as 會. The variants of some new lexical signs in TSL are presented in the following table.

Table 5. Variants of new lexical signs in TSL

| sign | Variants |
|-------------------------|--|
| CREDIT CARD | 1. imitating the movement of using a credit card 2. BELIEVE + USE + KA (卡) |
| HIGH SPEED RAIL | 1. imitating the shape of the front part of the car 2. HIGH + IRON |
| LOTTERY | 1. imitating the balls rolling (the handshape of both hands are ZERO) 2. imitating the balls rolling (the handshape of right and left hands are SIX and ZERO) 3. COLOR + imitating the balls rolling |
| MRT | 1. moving hands with handshape TWENTY forward repeatedly 2. imitating the mark of MRT |
| MOUSE (for computer) | 1. imitating the gesture of using a mouse 2. imitating the gesture of using a mouse + MOUSE |

6. Conclusion

This paper aims to give a preliminary description of lexical variation and change in TSL. We have noted that patterns of variation in TSL are similar to those in ASL, yet

patterns of change in TSL are quite different from those in ASL. We have made a distinction between dialectal and non-dialectal variation. In both kinds of variation, we found that in TSL separate variants are more productive than phonologically related variants as in ASL. This may be due to the fact that lexical items in sign language can be formed with totally different iconic motivations. Furthermore, handshape is the most prominent parameter for the variation in both ASL and TSL. As to lexical change, movement and location are more prominent than other parameters. TSL tend to develop repeated movement of signs through the course of time. Location change occurs in face or body area. Unlike ASL, change in movement symmetry is not observed in TSL. The location tends to change toward a lower place for signs made in face area while more centralized for signs made in body area. In this respect, TSL is similar to ASL in centralization in body area. However, it is different from ASL in lowering down the face location rather than shifting to the perimeter.

Language change takes a long period of time and not all linguistic features including phonological parameters change at the same time. It is observed in this study that movement and location are more subject to change than other three parameters. This observation provides us with a good start to further investigate under what kinds of condition, contextual or social, movement and location changes.

The method employed in this study is real time approach. However, the time span between Chao's textbook and TSL online dictionary is not long enough for a relatively complete and productive change. To remedy this defect, observing variation across different age groups, that is, the apparent-time approach as adopted in Labov's works, would be another way to understand variation and change in sign languages.

References

- Ann, Jean. 1998. Contact between a sign language and a written language: character signs in Taiwan Sign Language. *Pinky Extension and Eye Gaze: Language Use in Deaf Communities*, ed. by Ceil Lucas, 59-99. Washington, DC: Gallaudet University Press.
- Ann, Jean. 2001. Bilingualism and language contact. *The Sociolinguistics of Sign Language*, ed. by Ceil Lucas, 33-60. Cambridge: Cambridge University Press.
- Battison, Robbin. 1978. *Lexical Borrowing in American Sign Language*. Silver Spring, MD: Linstok Press.
- Chao, James Chien-min. 1988. *Zi Ran Shou Yu Jiao Xue* [Taiwan Natural Sign Language], Vol. 1. Taipei: Chinese Deaf Association.
- Chao, James Chien-min. 1999. *Zi Ran Shou Yu Jiao Xue* [Taiwan Natural Sign Language], Vol. 2. Taipei: Chinese Deaf Association.
- Chao, James Chien-min. 2001. *Zi Ran Shou Yu Jiao Xue* [Taiwan Natural Sign Language], Vol. 3. Taipei: Chinese Deaf Association.
- Frishberg, Nancy. 1975. Arbitrariness and iconicity: historical change in American Sign Language. *Language* 51: 696-719.
- Liddell, Scott K. 1980. *American Sign Language Syntax*. The Hague: Mouton.
- Long, Schuyler J. 1918. *The Sign Language: A Manual of Signs*. Iowa City: Athens Press.
- Lucas, Ceil. 2007. Variation and modality. *Sociolinguistic Variation: Theories, methods, and applications*, ed. by Robert Bayley and Ceil Lucas, 145-161. Cambridge: Cambridge University Press.
- Lucas, Ceil, Robert Bayley and Clayton Valli. 2001. *Sociolinguistic Variation in American Sign Language*. Washington, DC: Gallaudet University Press.
- Lucas, Ceil and Clayton Valli. 1992. *Language Contact in the American Deaf Community*. San Diego, CA: Academic Press.
- Schembri, Adam, Trevor Johnston, and Della Goswell. 2006. NAME dropping: Location variation in Australian Sign Language. *Multilingualism and Sign Languages: From the Great Plains to Australia*, ed. by Ceil Lucas, 121-156. Washington, DC: Gallaudet University Press.

- Smith, Wayne H. 2005. Taiwan Sign Language research: an historical overview. *Language and Linguistics* 6.2: 187-215.
- Smith, Wayne H. and Li-fen Ting. 1979. Shou Neng Sheng Qiao [Your Hands Can Become a Bridge], Vol. 1. Taipei: Deaf Sign Language Research Association of the Republic of China.
- Smith, Wayne H. and Li-fen Ting. 1984. Shou Neng Sheng Qiao [Your Hands Can Become a Bridge], Vol. 2. Taipei: Deaf Sign Language Research Association of the Republic of China.
- Stokoe, William C., Dorothy C. Casterline, and Carl G. Croneberg. 1965. *A Dictionary of American Sign Language on Linguistic Principles*. Silver Spring: Linstok Press.
- Tsay, Jane, James H.-Y. Tai, Hsien Lee, Yijun Chen and Chia-Hsiung Liu. 2008. *Taiwan Sign Language Online Dictionary*. Institute of Linguistics, National Chung Cheng University, Taiwan. <http://tsl.ccu.edu.tw/htmltext/browser.htm>.
- Wu, Pei-lan. 2007. Taiwan Shouyu Mingdong Tongxingci Gouci Celue Zhi Tanta [The formation of Noun-Verb pairs in Taiwan Sign Language]. M.A. thesis, National Chung Cheng University.

台灣手語的詞彙變異與變遷

陳怡君、戴浩一

語言學研究所
國立中正大學

摘要

本文利用《自然手語教學》(趙建民 1988; 1999; 2001)與《台灣手語線上辭典》(蔡素娟等 2008)所標記的詞彙變異，探測台灣手語詞彙的變異與變遷。本文首先分析《自然手語教學》中，標記變異的詞彙，分析這些詞彙在手語音韻參數的差異。這些參數為手形、動作、位置、掌心或指尖之方向、與單手或雙手，目的在於觀察詞彙變異是否具有音韻上的關連性。本文接著利用手語音韻參數比對手語詞彙在《自然手語教學》與《台灣手語線上辭典》的差異，藉此瞭解詞彙演變的過程。同時也比對 1000 個手語高頻詞在這兩種手語文獻中的差異，以作為後續變異研究的基礎。最後，本文也初步探討台灣手語新詞彙的構詞策略與變異形成的關係。

Lexical Comparison of Signs from Taiwan, Chinese, Japanese, and American Sign Languages: Taking Iconicity into Account¹

Shiou-fen Su and James H-Y. Tai

Institute of Linguistics

National Chung Cheng University

Abstract. Iconicity should be taken into account for the comparison of lexical similarity in sign languages, but it should be excluded for the study of their historical relatedness. Woodward (1978, 1991, 1993) modified Swadesh list by excluding body part signs and pronouns for historical comparison. In addition to body part signs and pronouns, signs with similar iconic motivation are also excluded in this study for historical comparison. The preliminary result shows that Taiwan Sign Language (TSL) and Japanese Sign Language (JSL) can be considered as languages of the same family, while TSL and Chinese Sign Language (CSL) can not. The similarity between TSL and CSL are due to language contact. TSL and American Sign Language (ASL) are least similar. Signs with iconic motivation are prevalent and universal in sign languages. Lexical comparison of sign languages can also be conducted with respect to various types of iconic devices even for historically unrelated languages such as TSL and ASL.

1. Introduction

This paper adopts the methodology of comparative lexicostatistics to posit hypotheses on possible historical relationships between sign languages. The methodology involves a quantitative study of cognates among the vocabularies of the languages under study. Cognates are defined as those vocabularies that are homogeneous enough to be considered as having similar linguistic derivation or roots. Spoken languages use a small set of contrastive phonological elements to compose their lexical items. In the same vein, sign languages use a small inventory of handshapes, movements, locations, and orientations as contrastive elements to compose their lexical items. Handshapes, movements, locations, and orientations are referred to as parameters which can be used to

¹ This paper was presented in First International Conference of Comparative Study of East Asian Sign Languages held by The Taiwan Institute for the Humanities (台灣人文研究中心) and Institute of Linguistics of Chung Cheng University on Sept. 16-17, 2006. We have benefited from comments and suggestions from Susan Fischer, Diana Chiu, Gladys Tang, Qun-hu Gong, and other participants in the audience. We are solely responsible for the mistakes and infelicities herein.

compare the vocabularies across sign languages to determine the degree of similarity. Linguists have adopted Swadesh's basic 200-word list or modified versions for their lexicostatistical research instead of longer lists for lexical comparison across different spoken languages. Woodward (1978, 1991, 1993), however, has modified the Swadesh's list into a core 100-word list for lexicostatistical research in sign languages.

The purpose of this paper is two-fold: (1) to use the core 100-word list developed by Woodward to compare three East Asian sign languages, Taiwan Sign Language (TSL), Japanese Sign Language (JSL), and Chinese Sign Language (CSL) with American Sign Language (ASL) as a control group; (2) to suggest a comparative method to tease apart the historical relation from accidental iconic similarity. TSL is a sign language naturally developed and used by about 30,000 hearing-impaired people in Taiwan Deaf community. TSL has its roots in JSL from 1915 to 1945 and in CSL from 1949 (Smith 1989, Chao, Chu & Liu 1988, and among others). It also has been in contact with spoken Mandarin Chinese and written Chinese, the dominant language used in Taiwan. Therefore, it is necessary for TSL to be compared with JSL to find out to what extent they still share a historical link due to early deaf education in Taiwan. By comparing TSL with CSL, we can detect how much TSL has been historically and linguistically influenced by the dominant Chinese language. The purpose of our comparison between TSL and ASL is to find out the degree of lexical similarity due to iconic motivations between these two historically unrelated sign languages.

According to Greenberg (1953, 1957), there are four possible sources for 'form-meaning similarities/resemblances' among languages: *genetic relationship, borrowing, chance, and symbolism*.² The first two sources involve historical factors, whereas the latter two do not. Greenberg's term 'symbolism' refers to a situation in which 'a pair of words happens to share the same motivation, whether iconic or indexic.' In sign languages, iconic and indexic motivations are prevalent. Even unrelated languages, such as TSL and ASL, can share similar signs because they employ the same or similar iconic devices (Su 2004, Wu 2007). Therefore, to study lexical comparison among sign languages, we need to take iconicity into account.

The organization of this paper is as follows. Section 2 provides a brief summary of historical background of TSL. Section 3 introduces iconic devices and contact signing in sign language. Section 4 reviews previous studies on the lexical comparison among sign languages and propose a different framework of analysis. Section 5 presents result of the proposed analysis, raising some questions for further research in the future. Section 6 concludes the paper.

2. Historical background of Taiwan sign language

There are at least three sources of the vocabulary of TSL (Smith 1989, 2005, Chao,

² For the comparison of sign languages, we term 'form-meaning similarity/resemblance', not original 'sound-meaning similarity/resemblance' by Greenberg.

Chu & Liu 1988, and among others). The first and major source is JSL. Taiwan was under the Japanese colonial occupation from 1895 to 1945. As a part of modernization of Taiwan in education, National Tainan School for the Deaf (國立台南啓聰學校) was established in 1915 and Taipei Municipal School for the Deaf (台北市立啓聰學校) in 1917. As a result, Osaka dialect of JSL was brought into National Tainan School for the Deaf from teachers at the Osaka Prefectural School for the Deaf (大阪府立聾學校), while Tokyo dialect was brought to Taipei Municipal School for the Deaf from teachers at the Tokyo School for the Blind and Mute (東京盲啞學校).³ The dialect developed in National Tainan School for the Deaf has been treated as Southern dialect (南部方言) and the one developed in Taipei Municipal School for the Deaf as Northern dialect (北部方言). World War II ended in 1945, with Taiwan ceded to China from Japan. Shortly after World War II, the National Taichung School for the Deaf (國立台中啓聰學校) was established in the middle part of the island as a branch of the National Tainan School for the Deaf and Southern dialect came into use in there, too. While there are differences in vocabularies between Southern dialect and Northern dialect, these two dialects are mutually intelligible. According to Smith and Ting (1979) and Smith (1989, 1990), JSL, TSL, and Korean Sign Language belong to a single language family, i.e. the Japanese Sign Language Family because the deaf education in both Taiwan and Korea was established by Japanese during their occupation of both countries before World War II ended in 1945.

The second source of TSL vocabulary is CSL (Smith 1989, 2005). In 1949 when communist Chinese came to power, many deaf Chinese and former teachers at schools for the deaf in Mainland China followed Nationalist Party headed by Chiang Kai-shek (蔣介石) to Taiwan, and they brought CSL to Taiwan. The most influential teachers among them are Junou Lu (陸君歐) and Sinong Jiang (姜思農). They are teachers trained at the Nantong School for the Deaf and Mute (南通聾啞學校) in Mainland China, and they established the Private Chinese School for the Deaf and Mute (私立中華聾啞學校) in Keelung (基隆), located at northern part of Taiwan. The school first moved to Taichung (台中), and again moved to Hsinchu (新竹) 10 years later. Although it stopped accepting

³ Teachers at Taipei school for the deaf are not exclusively from Tokyo. One of them is from Nagoya (名古屋) and another one is from Osaka. But the Tokyo dialect of JSL has been dominant at the school in Taipei. The first and deaf principal at the present Taipei School for the Blind and the Mute (1946-1951), Wen-sheng Lin (林文勝), educated at the Tokyo school for the Blind and the Mute, reinforced a possible link between the Tokyo dialect of JSL and the sign system used in the northern part of Taiwan (Smith 1989). On the other hand, principal Katsukuma Hamazaki (濱崎勝熊), from the Department of Training at the Tokyo School for the Deaf, was an advocate of deaf education using sign communication, and he might have brought Tokyo dialect of JSL to the sign system used in Tainan (Committee on Research and Compilation of the Sign Language Books Division 1999, cited from Sasaki 2003).

new students, the influence of CSL started spreading from the north to the middle part of Taiwan. Finally, the Private Chi-Ying School for the Deaf (私立啓英啓聰學校) was established by Sinong Jiang and three other teachers in Kaohsiung (高雄), located at southern part of Taiwan, and the influence of CSL spread further to the south.

The third source of TSL vocabulary should be the original home sign system utilized before the establishment of deaf schools in 1915 and 1917. Unfortunately, we don't have any information about the manual communication before that time.

In addition to the three sources mentioned above, there are social factors that would influence the development of sign language in general. In the case of TSL, we can identify three factors. One factor is contact with Mandarin, both spoken and written system, and with other unrelated sign languages such as ASL, should influence TSL. Another factor is due to the change of deaf education policy in different periods of time. Both Signed Chinese and oralism have been the education policy for the deaf in Taiwan for more than three decades. Signed Chinese in Taiwan is an artificial language that encodes TSL signs with Mandarin grammar, not with TSL grammar, and it is usually referred to as 'Grammatical Sign Language (文法手語)'. TSL is referred to as 'Natural Sign Language (自然手語)' and it is used by most hearing-impaired people to communicate among themselves. Still another factor is that the Ministry of Education (教育部) has designed and promoted a new set of TSL vocabulary that encode signs character by character. This character encoding mechanism is now mostly utilized to form new words.

Based on the discussion above, we know that lexicon of TSL is composed of home signs, borrowed signs from both JSL and CSL, and character signs. To what extent TSL has been influenced by JSL and CSL in lexicon is a main inquiry of this paper.

3. Iconic devices and contact signing

Besides historical relationship and language contact, iconic devices also attributes to similarities among sign languages, whether they are historically related or not. Signs with same iconic motivation can appear to be similar between historically related languages as well as between unrelated languages. Therefore, it is important to tease apart similarities due to iconic motivation from historical affinity and borrowing. In contrast with iconic motivation, "contact signing" termed by Lucas and Valli (1992) will make originally similar signs de-similar because different written systems will influence the parameters in different degrees. We will review iconic devices in sign language first, and then the contact signing.

3.1. Iconic devices

Iconic devices in ASL were studied by Mandel (1977) and more recently by Taub (2001). Sutton-Spence and Woll (1999) adopted Mandel's framework to identify the iconic motivation of British Sign Language Lexicon and reorganized them into four

categories parallel to Mandel's original types. They are *substitutive depiction*, *virtual depiction*, *presentable action*, and *presentable objects*. For the purpose of this paper, we follow the categorization of Sutton-Spence and Woll (1999) and illustrate them one by one below.⁴

3.1.1. Substitutive depiction

In this kind of representation, handshapes and hand-forearm configurations are utilized to depict schematic images of the referents.⁵ A good example of TSL for this iconic device is the sign SCISSORS. Handshape /ER/ 'two' (signifier), with index and middle finger extended resembling the image of a physical pair of scissors, is used as the iconic base of the signified (Fig 1). JSL, CSL, even ASL utilize this same representation for the concept 'scissors'. Historical relation of sign languages would be skewed, if we include this kind of signs in the counting of degree of historical relatedness.



Fig. 1. The word SCISSORS and handshape /ER/ 'two' in TSL.

3.1.2. Virtual depiction

Another major device for iconic shape representation is to trace the shape of the referent in signing space. For example, in TSL, LIGHTNING is represented by tracing a zigzag shape with index fingers of both hands (Fig. 2). Similarly, TSL "TABLE" is represented by tracing the shape of an office desk with both hands drawing the square surface and the feet (Fig. 3). In this device, the hand movement doesn't depict the movement of the referent over time but only traces the shape of the referent in signing space.⁶ If we compare HOUSE in ASL and TSL (Fig 4 and Fig 5), we can see they both

⁴ Tai (2004) synthesized and simplified both authors' analyses to identify iconic devices in TSL. Su (2004) proposed a framework based on the three-way distinction of icon, index, and symbol proposed by Peirce (1955 [1902]) as one dimension and on phonological parameters of sign language as the other dimension.

⁵ Mandel (1977) referred to this device as 'substitutive depiction'; Taub (2001) treated it as 'shape-to-shape iconicity'; and Su (2004) regarded it as 'imagic handshape'.

⁶ Mandel referred to it as 'atemporal movement'. This device was regarded as 'virtual depiction' by Mandel (1977), as 'path-for-shape iconicity' by Taub (2001), and as 'imagic movement' by Su (2004).

use the same handshape to imitate the roof of a house, but in ASL the sign is formed with virtual depiction, while in TSL substitutive depiction is used.

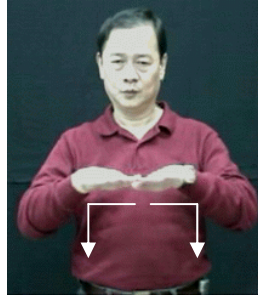


Fig. 2. LIGHTNING in TSL Fig. 3. TABLE in TSL



Fig. 4. HOUSE in ASL⁷ Fig. 5. HOUSE in TSL

3.1.3. Presentable action

Another major iconic device for forming lexical items in sign languages is to imitate actions performed by humans or animals. For example, RUN and FLY in TSL, are represented by directly miming the running of human being and the flying of bird, respectively. In many cases, the imitated action can also mean the object used to perform the action.⁸ For instance, sign BASEBALL in both TSL and ASL is represented by directly miming the action of holding the bat and then hitting the baseball (Fig 6 and Fig 7).

⁷ This picture and the following pictures in ASL are from Tennant and Brown 1998.

⁸ See Wu (2007) for a detailed documentation of noun-verb pairs in TSL. While ASL often employs repetition of the same handshape with smaller movement to refer to noun as distinguished from the verb using only one single larger movement, TSL rarely uses such a morphological mechanism for the distinction.

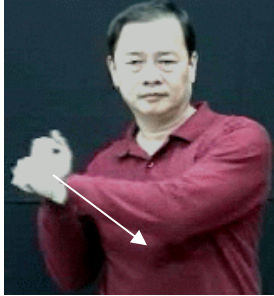


Fig. 6. BASEBALL in TSL



Fig. 7. BASEBALL in ASL

3.1.4. Presentable object

In addition to the handshape parameter, the iconicity of sign vocabulary can be manifested by the parameter of location. Almost all signed languages name body parts (e.g. ear, nose, head, etc.) by pointing to their location on the signer's face. For example, TSL sign NOSE is formed by pointing to the nose, the word HEAD (Fig 8) is formed by brushing the head, and the word EAR (Fig 9) is formed by pinching the ear. In addition to the naming of the body parts, the parameter of location can also be used to refer to the objects associated with the location. For example, ASL and TSL sign EARRING have the similar forms, with handshape /F/ on ear(s) (Fig. 10 and Fig. 11).



Fig. 8. HEAD in TSL



Fig. 9. EAR in TSL



Fig. 10. EARRING in TSL



Fig. 11. EARRING in ASL

3.1.5. Lexical items motivated by more than one iconic device

The iconic devices discussed above are usually not utilized alone. For example, lexical item PING PONG in TSL (Fig 12) is motivated by both *substitutive depiction* and *presentable action*. The handshape /LING/ ‘zero’ of the non-dominant hand represents the shape of the ball and handshape /SHOU/ ‘hand’ of the dominant hand represents the shape of the paddle. Then the dominant handshape /SHOU/ hits the non-dominant handshape /LING/. Both handshapes are examples of the substitutive depiction, and the movement of the dominant hand is an example of the presentable action.

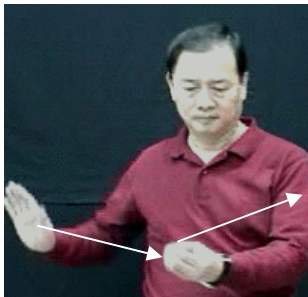


Fig. 12. PING PONG in TSL

From the examples illustrated above, we know that if signs of two languages are encoded with the same iconic motivation, their chance to be similar in forms will be higher no matter if these two languages are historically related or not. Comparing lexical items to examine the historical relationship between sign languages requires excluding those signs to avoid over-estimation of their historical relatedness.

3.2. Contact signing

3.2.1. Types of contact signing

As deaf people always constitute a small minority of population in a society, sign languages cannot avoid contact with the dominant languages, in both spoken and written forms. As a result, three types of signing have developed from contact: character signs, initialization, and finger-spelling. We refer to these three types of signing as ‘contact-signing’, the term first used by Lucas and Valli (1992), to distinguish them from borrowing or loan signs. For they have resulted from the written system, rather than borrowed from modality-different spoken languages or modality-identical signed languages. Character signs, initialization, and finger-spelling are developed because of contact with different written systems.

TSL is in contact with Mandarin Chinese and Chinese writing system, just as ASL is in contact with English and alphabet spelling system. We found a lot of TSL words formed by combining Chinese character signs and TSL signs. For example, CANCER (癌症) in TSL combines Chinese character sign ‘品’, standing for ‘癌’, and the TSL sign SICK together (Fig 13). This device is very different from the finger-spelling system or

initialization in ASL. For example, NO in ASL is signed with finger-spelling N handshape and O handshape (Fig 14) in a ‘compounding-like’ manner. An example of initialization in ASL is the sign LANGUAGE, in which the L handshape takes place of the original F handshape of the sign SENTENCE (Fig 15 and Fig 16). According to Battison (1978), color terms such as YELLOW, BLUE, GREEN, PURPLE, PINK and weekdays except SUNDAY are all initialized signs in ASL.



Fig. 13. TSL sign CANCER = character sign ‘品’ + sign SICK

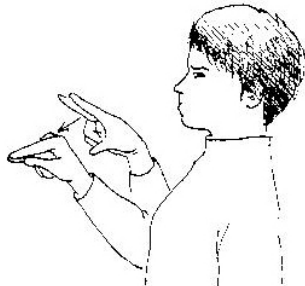


Fig. 14. NO in ASL



Fig. 15. SENTENCE in ASL



Fig. 16. LANGUAGE in ASL

What is worthy of noticing is that the finger-spelling system and initialization are also used abundantly in CSL in Mainland China, where the PINYIN spelling system is used along with the Chinese character writing system. The PINYIN spelling system is based on the alphabet and fits well with initialization and finger-spelling. Thus, for example, BLACK (Fig. 17), spelled as ‘hei’, is initialized with H handshape, and BECAUSE, spelled as ‘yinwei’, is initialized and kind of finger-spelled with Y handshape and W handshape. In contrast to the abundance of finger-spellings and initializations in CSL, they are rare in TSL. The only sign we have found so far is BEER, produced with B handshape and E handshape.

It is also worthy of noting that since the character writing system adopted in Mainland China is a simplified version of the more traditional system used in Taiwan, the character signs in CSL are often different from those in TSL. For example, the character ‘乾’ (dry) in Taiwan is simplified as ‘干’ in Mainland China. Only ‘干’ is borrowed to develop a character sign in CSL, with the index finger of one hand extended and putting

on the index finger and the middle finger extended of another hand, forming the character image ‘干’ (Fig 18).



Fig. 17. BLACK in CSL⁹

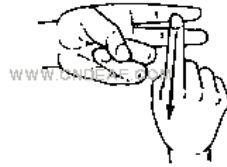


Fig. 18. DRY (干) in CSL

How about JSL? Contact signing in JSL includes finger-spelling, initialization, and character signs. For example, AFRICA, pronounced as ‘afurika’ in Japanese, is finger-spelled with A handshape and RI handshape (Fig. 19) in JSL. Sign BAY, pronounced as ‘wan’, is initialized with WA handshape (i.e. W handshape in ASL)(Fig. 20). Sign FIELD (田) in both TSL and JSL is produced by two WA handshape crossing together, representing the image of the character (Fig 21).



Fig. 19. AFRICA in JSL¹⁰



Fig. 20. BAY in JSL

⁹ This picture and the following pictures in CSL are from www.cn deaf.com.

¹⁰ This picture and the following pictures in JSL are from Japanese-JSL Dictionary edited by Nihon syuwa kenkyuudyo (日本手話研究所/ Japan Institute for Sign Language Studies) under the supervision of Akihiko Yonekawa (米川明彦) and published by Zen-nihon rooa renmee (全日本聾啞聯盟/ Japanese Federation of the Deaf) in 1997.



Fig. 21. FIELD ‘田’ in TSL and JSL

In contrast with the higher chance to be similar in signs with iconic motivation between two sign languages, signs developed from contact signing tend to be de-similar. For example DOCTOR in TSL and ASL. Originally, sign DOCTOR in both TSL and ASL is represented by miming the action of a doctor examining the pulse of a patient, a sign with presentable action (Fig 22 and Fig 23). There is a variant with initialized D handshape in ASL. Thus, the initialization has rendered the original sign in ASL less-similar to that in TSL (Fig. 22 and Fig. 24).

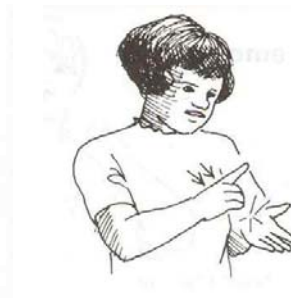
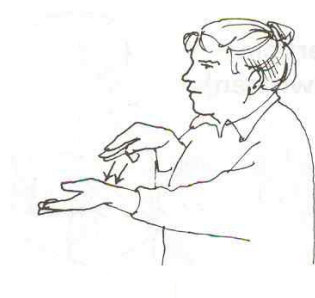


Fig. 22. DOCTOR in TSL Fig. 23. DOCTOR-a in ASL Fig. 24. DOCTOR-b in ASL

We have seen that historical relationship, language contact, and iconic motivation all contribute to the similarity and difference of vocabulary among TSL, JSL, CSL and ASL. When we conduct the study of lexical comparison between sign languages to find out their historical relationship, we should take into consideration all the other contributing factors to make any conclusion.

4. Previous studies on lexical comparison of sign languages

In this section, we review several previous studies on the comparison of lexical items among sign languages for the construction of our own method.

4.1. Woodward (1978, 1991, 1993, 1996, 2000)

James Woodward is one of the pioneers in the comparative study of sign languages. He applied Swadesh 200 word list but modified it into core 100 word list for the

comparison of lexical items in sign languages. He claimed that ‘[U]se of the original 200 Swadesh list for sign language research may result in slight overestimation of the relationship of closely related sign languages, moderate overestimation of the relationships of loosely related sign languages, and great overestimation of the relationship of historically unrelated sign languages’ (Woodward 1993: 94). He took off signs employing pointing from the original 200 Swadesh list to avoid overestimation of historical relatedness. These are signs referring to body parts and pronouns by pointing.

Almost all sign languages name body parts (e.g. heart, tooth, brain, etc.) by simply pointing to them (Fig 25).



Fig. 25. (a) HEART in JSL, TSL (b) TOOTH in ASL, TSL (c) BRAIN in CSL, TSL

Pronouns in sign languages are derived from directly pointing at the spatial location of their referents. Thus, the signer can point to anyone around with the index finger extended to mean ‘I’, ‘you’ or ‘he/she’ (Fig 26). The signer can also represent a male person with the thumb of the non-dominant hand and then direct toward it with the index finger of the dominant hand extended to mean 'he' (Fig 27).



Fig. 26. HE in TSL, JSL, CSL and ASL



Fig. 27. HE-b in TSL

It is not hard to see that the form-meaning resemblance in the representation of body parts and pronouns across different sign languages are due to shared motivation in symbolism. It would be a misleading to treat them as potential cognates. Woodward is right in taking out these concepts from the list for lexical comparison among sign

languages.

4.2. Currie, Meier, and Walters (2002)

Currie, Meier, and Walters (2002) used a word list taken from Bickford (1991) plus several lexical items drawn from conversation with deaf consultants to compare four sign languages: Mexican Sign Language (LSM), French Sign Language (LSF), Spanish Sign Language (LSE), and unrelated JSL as a control group. LSM is compared with LSF since they share a historical link through deaf education. LSM is compared with LSE to examine how much the two languages are culturally, historically, and linguistically influenced by the dominant Spanish-speaking cultures of Mexico and Spain. All the data were collected from deaf consultants, not from dictionaries or any written source. As with Woodward’s modified list, Bickford (1991) excluded body part signs and personal pronouns from the Swadesh 200 word list.

In this study they initiated the concept of ‘similarly-articulated signs’ as an attempt to identify potential cognates in sign languages. ‘Similarly-articulated signs are signs that share at least two of the three main parameters of handshape, movement, and place of articulation, as well as the same approximate meaning. [A]nd a subset of similarly-articulated signs includes those signs that are articulated similarly or identically on all three major parameters’ (Currie, Meier, and Walters 2002:227). They divided the identified similarly-articulated signs from the result of comparison into three categories: borrowed pairs, shared symbolism, and coincidence based on Greenberg’s classification of lexical resemblance among languages (1953, 1957). The result is showed on Table 1.

Table 1. Summary of similarly-articulated signs for the three cross-linguistic studies (Currie, Meier, and Walters 2002:229)

| Pair-wise comparison | Total sign pairs | Borrowed signs | Shared symbolism | Coincidence | Similarly-articulated signs |
|----------------------|------------------|----------------|------------------|-------------|-----------------------------|
| LSM-LSF | 112 | 12 | 31 | 0 | 43 (38%) |
| LSM-LSE | 89 | 0 | 29 | 0 | 29 (33%) |
| LSM-JSL | 166 | 0 | 39 | 0 | 39 (23%) |

Note that in table 1, similarly-articulated signs include both borrowed signs and signs of shared symbolism. They drew three conclusions based on their analyses. First, LSM shares more lexical items with historically related LSF and with culturally related LSE than with historically unrelated JSL. Second, LSM only borrowed items from LSF, but not from LSE or JSL, because of the use of LSF signs in the educational setting in Mexico City. Third, there will be a possible baseline percentage of similarly-articulated signs between two historically unrelated sign languages due to shared symbolism. What does the conclusion tell us? Excluding body part signs and pronouns is not enough to avoid the overestimation of relationship among sign languages. Visual-gestural modality of sign languages provides signers with capacity for iconic representations and promotes

particularly high level of similarities between related and unrelated sign languages. We should not count signs with shared motivations for lexical comparison to determine historical relation among sign languages.

4.3. McKee and Kennedy (2000)

McKee and Kennedy (2000) used Woodward's modified Swadesh list to compare the forms of 100 key concepts in three historically related languages: New Zealand Sign Language (NZSL), Australian Sign Language (Auslan), and British Sign Language (BSL). They also included unrelated ASL to be compared as a control group. They divided the comparison results of these 100 correspondence forms into four categories: identical, related, different, and not found. For them, the 'similarly-articulated' signs are signs that share at least three of the four main parameters of handshape, movement, place of articulation, and orientation. The criteria they adopted are stricter than those of Currie, Meier, and Walters (2002). Their result showed that NZSL shares 87.8% of similarly-articulated signs with Auslan, 84.9% with BSL and both are higher than 81%. The percentage of similarly-articulated signs between NZSL and ASL is 26.5, below 36%. According to Gudschinsky's (1956) criteria, Auslan, NZSL, and BSL are dialects of one language and ASL is a separate language.

In addition, they claimed that Swadesh list, containing only high-frequency concepts, leads to a misleading result regarding the degree of similarity among sign languages. To solve the problem, they chose to conduct a second comparison based on a new list of 199 signs that were randomly selected from a NZSL dictionary. The new comparison showed that the similarity rates dropped significantly, from 87.8% to 65.5% between NZSL and Auslan, from 84.9% to 62.5 between NZSL and BSL. This new result made them to conclude that NZSL, Auslan, and BSL are languages belonging to the same language family, not the dialects of a language. From these two significantly different results, we can see that the selection of an appropriate word list to compare is rather important to reach a more valid conclusion about the relationship among sign languages. Perhaps, this significant difference between 100 basic vocabularies and 199 randomly selected ones is due to the fact that core vocabulary consists of signs with higher chance of shared symbolism. It can be seen that the comparison of sign languages should not compare the core vocabulary without taking iconic motivations into consideration because even two historically unrelated sign languages share a possible baseline percentage of similarly-articulated signs due to shared symbolism.

4.4. Sasaki (2003)

Sasaki's (2003) research is closely related to the present research. He compared the lexical items between TSL and JSL using three different lists. The first list is the modified 100 Swadesh list, the second is the 199-word list randomly selected by McKee and Kennedy (2000). The third list is all 752 sign entries in Smith and Ting (1979). To distinguish the phonological identicalness, distinctness, and similarity of the signs in

SU & TAI: LEXICAL COMPARISON OF SIGNS

question, he used four parameters: handshape, palm orientation, movement, and location, the same as McKee and Kennedy (2000). In addition, the number of hands involved in the production of a sign in question is used as a fifth parameter. Signs in question of these two languages with only one difference in one of the five parameters were identified as similarly-articulated. The results of using these three lists are summarized in Table 2 below.

Table 2. Summary of three analyses (Sasaki 2003: 42)

| | Identical | Similarly-Articulated | Distinct | Semantic mismatch | Missing data |
|---------------------------|-----------------------------|-----------------------|-----------------------|---------------------|-----------------------|
| Analysis 1 (100 items) | 33 items (42.3 %) | 16 items (20.5 %) | 29 items (37.2 %) | 7 items (7 %) | 15 items (15 %) |
| | 49 items (62.8 %) | | | | |
| Analysis 2 (199 items) | 37 items (38.5 %) | 20 items (20.8 %) | 39 items (40.6 %) | 5 items (2.5 %) | 98 items (49.2 %) |
| | 57 items (59.4 %) | | | | |
| Analysis 3 (752 items) | 214 items (36.6 %) | 103 items (17.6 %) | 268 items (45.8 %) | 32 items (4.3 %) | 135 items (18.0 %) |
| | 317 items (54.2 %) | | | | |

The result shows that the rate of the probable shared vocabulary between JSL and TSL is not as high as that among historically related sign languages such as Auslan, BSL, and NZSL and is higher than that among historically unrelated sign languages such as JSL and Mexican Sign Language (LSM). Sasaki (2003: 43) suggested that TSL is not a direct descendant of JSL, but rather some of the TSL vocabulary was replaced by corresponding JSL signs during the deaf education from 1915 to 1945. The result also shows that a slight drop on the rate of similarity as the number of items to compare increases. Sasaki (2003) didn't treat it as a significant difference. He concluded that although there is difference, there is still an overall tendency, in which around 40 percent is treated as phonologically identical, around 20 percent as phonologically similarly-articulated, and around 40 percent is regarded as phonologically distinct. It is almost consistent among three comparisons.

However, the same problems raised by Sasaki himself (2003: 35-36) on McKee and Kennedy (2000)'s method of the randomly selected 199 signs occur in his selecting Smith and Ting's 752 word list. First of all, this list included more country signs (ENGLAND, GERMANY, FRANCE, SPAIN, KOREA, INDIA, RUSSIA, etc). The problem still existed that deaf signers tend to use country signs that are actually used in each country in order to show some respect for the deaf culture and people from each country. Second, several signs related to religion were compared, that is, BUDDHISM, CHRISTIANITY, JESUS CHRIST, and CATHOLICISM. The original purpose of the Swadesh list was to include culture-free core lexical items and to exclude lexical items that highly rely on a

specific culture. These signs were not culture-free signs and many of them may not be available in sign languages in non-Christian countries, in particular, in Asian countries. Lastly, the list also included more body part signs (HEAD, MOUTH, FACE, EYE, NOSE, etc.), number signs (ZERO, ONE, TWO, etc.) and personal pronouns (i.e., I, YOU, HE, SHE, etc.). As has been pointed out earlier, these signs should be excluded.

If we take iconicity into account, the slight drop on the rate of similarity as the number of items to compare increases can be attributed to the higher chance of shared symbolism of the comparison from the core vocabulary. That is, when comparison includes items not belonging to the core vocabulary, the chance for shared symbolism will decrease, and then the similarity rate decreases, too. To support this hypothesis, we count the rate of possible shared symbolism based on the iconic devices discussed in section 3.1, and the result is summarized in Table 3. The rate of shared symbolism drops from 57.1% of core vocabulary to 31.6% of randomly selected vocabulary and to 39.7% when items to compare increase and they include items not in the core vocabulary.

Table 3. The rate of shared symbolism (TSL vs. JSL)

| | Identical | Similarly-articulated |
|------------------------|---------------------------------|-----------------------|
| Analysis 1 (100 items) | 20/33 items (60.6 %) | 8/16 items (50 %) |
| | 28/49 items (57.1 %) | |
| Analysis 2 (199 items) | 14/37 items (37.8 %) | 4/20 items (20.0 %) |
| | 18/57 items (31.6 %) | |
| Analysis 3 (752 items) | 90/214 items (42 %) | 36/103 items (34.9 %) |
| | 126/317 items (39.7 %) | |

Sasaki (2003) himself also posed several problems on his study in the conclusion. First, the definition of ‘similarly-articulated signs’ is so strict that it might have eliminated probable pairs of similar signs, such as the pair of OLDER SISTER and YOUNG SISTER, and so on. Second, using sign language dictionaries to do the comparison has its limitation. The static two-dimensional illustrations in a paper dictionary convey limited information about movement, location, orientation than illustrations in a digitalized browser. Third, the comparison can extend to Korean Sign Language (KSL), since JSL was also brought to Korea during the long period of Japanese occupation. Fourth, TSL may have been influenced by CSL since 1949 (Smith 1989). Fifth, as observed earlier, some signs can be formed on the basis of Chinese characters, which are still used in Japan, but to a lesser degree in Korea. Finally, since these Asian countries also share some cultural characteristics. It is reasonable to assume that some degree of cultural commonality may have affected their sign language. .

4.5. Xu (2006)

Xu (2006) compared signs of the same 100 key concepts between TSL and CSL and proposed a new model for the comparison. Similar to McKee and Kennedy (2000), she

also had the categories for identical, similar and different signs. She used the term ‘similar’ instead of term ‘related’ used by McKee and Kennedy (2000)’ to avoid confusion with ‘related’ historically. She proposed a model, schematized in Fig 28 below, which uses a flowchart to map the paths for determining if two non-identical signs for a concept are similar or different in these two sign languages. In this model, she took iconic motivation into account when she compared a pair of non-identical signs between TSL and CSL. The procedure consists of three steps. First, if both signs are iconic signs with same iconic motivation, only signs with zero shared parameters are categorized as ‘different’ (Pattern D). Second, if both signs are iconic signs with different iconic motivation, only signs with three parameters shared are categorized as ‘similar’ (Pattern B). Third, if signs of both or either one language are not iconic signs, only signs with three parameters shared are categorized as ‘similar’ (Pattern C). These three steps are shown in the flowchart in Fig.28 and described in more detail in Table 4 below.

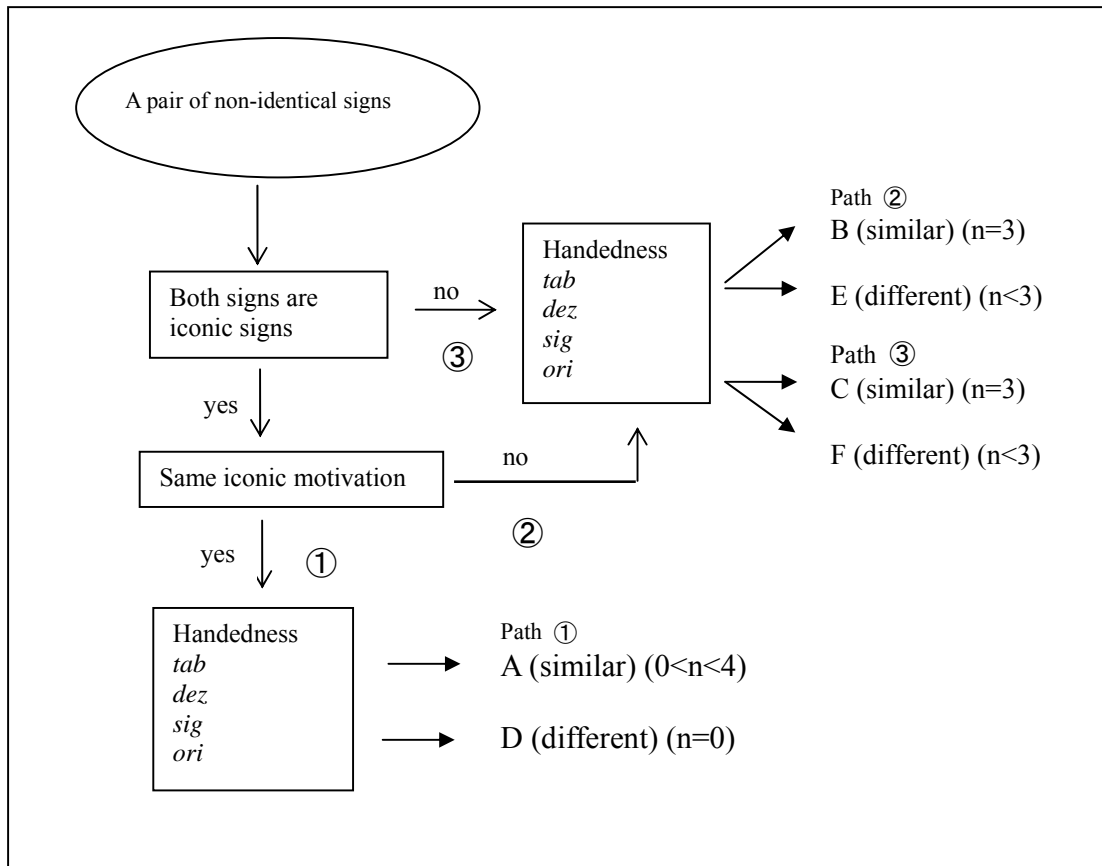


Fig. 28. Xu's lexical comparison model (p.88) (revised a little bit)

SU & TAI: LEXICAL COMPARISON OF SIGNS

Table 4. Three paths and six patterns in Xu's model (p.91)

| PATH | SIMILAR | DIFFERENT |
|---|--|---|
| <p>Path ①</p> <p>a. Both are iconic signs</p> <p>b. Same iconic motivation</p> <p>c. Number of parameters that are the same (n)*</p> <p>d. Handedness</p> <ol style="list-style-type: none"> 1. Both one-handed signs 2. Both double-handed signs 3. Both two-handed signs 4. One is single-handed and the other two-handed sign 5. One is single-handed and the other is double-handed 6. One is double-handed and the other is two-handed | <p>Pattern A</p> <p>yes</p> <p>yes</p> <p>0 < n < 4 (n=1,2, 3)</p> | <p>Pattern D</p> <p>yes</p> <p>yes</p> <p>n = 0</p> |
| <p>Path ②</p> <p>a. Both are iconic signs</p> <p>b. Same iconic motivation</p> <p>c. Number of parameters that are the same (n)*</p> <p>d. Handedness</p> <ol style="list-style-type: none"> 1. Both are one-handed signs 2. Both are double-handed signs 3. Both are two-handed signs 4. One is one-handed and the other double-handed signs 5. One is one-handed and the other two-handed signs 6. One is double-handed and the other two-handed signs | <p>Pattern B</p> <p>yes</p> <p>no</p> <p>n = 3 (n=1,2, 3)</p> | <p>Pattern E</p> <p>yes</p> <p>no</p> <p>n < 3 (n=0,1,2)</p> |
| <p>Path ③</p> <p>a. Both are iconic signs</p> <p>b. Same iconic motivation</p> <p>c. Number of parameters that are the same (n)*</p> <p>d. Handedness</p> <ol style="list-style-type: none"> 1. Both are one-handed signs 2. Both are double-handed signs 3. Both are two-handed signs 4. One is one-handed and the other double-handed signs 5. One is one-handed and the other two-handed signs 6. One is double-handed and the other two-handed signs | <p>Pattern C</p> <p>no (0 or 1 sign is iconic)</p> <p>(not applicable)</p> <p>n = 3</p> | <p>Pattern F</p> <p>no (0 or 1 sign is iconic)</p> <p>(not applicable)</p> <p>n < 3 (n=0,1,2)</p> |

Table 5 below summarizes the result of Xu’s comparison. With 11 pairs of compound signs excluded from the comparison, Xu identified 11 identical signs, 22 similar signs, and 56 different signs. All 22 similar signs belong to Pattern A, with no cases of Pattern B or C. Patterns D, E, and F were all found in different signs. Although the percentage of identical and similar signs was 37.1%, higher than 36%, she didn’t want to treat CSL and TSL as different languages of one same family. Instead, she suggested the likelihood that CSL and TSL are unrelated languages. In addition, she questioned whether the identical and similar signs in CSL and TSL might be used to infer genetic relationship, or whether these signs have resulted primarily from borrowing.

Table 5. TSL vs. CSL (Xu’s result)

| | Identical | Similar (Pattern A) | | Different | Compound |
|---------------------------|----------------------|------------------------------|---------------------------------|----------------------|--------------------|
| Analysis 1 (100 items) | 11 items (12.3 %) | 9 items (n=3) (10.1 %) | 13 items (0<n<4) (14.6 %) | 56 items (62.9 %) | 11 items (11 %) |
| | 33 items (37.1 %) | | | | |

5. The present study

In the present study, we compare lexical items of TSL, JSL, CSL, and ASL to see to what extent TSL is related to JSL and CSL. In the subsections below, we give our data sources, the preliminary results of comparison, the problems, and suggestion for a new list to compare in the future.

5.1. Data sources

For the comparison of these four sign languages, we used TSL Browser, ASL Browser, Japanese-JSL Dictionary, and Chinese-CSL Dictionary. For signs that these data bases do not provide, we searched for other sources, such as American Sign Language Dictionary (Costello 1998), The American Sign Language Handshape Dictionary (Tennant and Brown 1998).¹¹

¹¹ TSL Browser is constructed by Jane Tsay and James H.-Y Tai at Chung Cheng University, and ASL Browser is posted at Michigan State University. Japanese-JSL Dictionary is edited by Nihon syuwa kenkyuudyo (日本手話研究所/ Japan Institute for Sign Language Studies) under the supervision of Akihiko Yonekawa (米川明彦), and is published by Zen-nihon rooa renmee (全日本聾啞聯盟/ Japanese Federation of the Deaf) in 1997. Chinese-CSL Dictionary is edited by China Deaf Association (中國聾人協會) and published by Hua Xia Publisher (華夏出版社) in 1990 (volume 1) and 1994 (volume 2).

5.2. Preliminary results

5.2.1. Contact signing in modified Swadesh list of TSL, JSL, CSL, and ASL

Items in modified Swadesh list should be those that are resistant to borrowing because they are core vocabularies of languages. However, almost all sign languages are in contact with their dominant spoken languages. Contact signing, which includes character signs, initialization, and finger-spelling, will occur in sign language lexicon.¹² Table 6 shows some contact signing forms collected by our study. Being in contact with Chinese writing system, TSL's traditional characters, CSL's simplified characters, and JSL's Kanzi '漢字' writing system, provide TSL, CSL, and JSL to develop their respective character signs. Different from characters, the spelling system of English provides ASL to develop the system of 'initialization' and 'finger-spelling.' We found that CSL uses character signs, initialization and finger-spelling, while TSL uses character signs only. Initialization and finger-spelling in CSL can be attributed to the promotion of Hanyu Pinyin (漢語拼音) system, a Chinese spelling system in Mainland China.

Table 6. Contact signing in TSL, JSL, CSL, and ASL

| | TSL | JSL | CSL | ASL |
|-----------------|-----------------------|-----------|---|--|
| Character signs | DAY '日', BLOOD '血' | STONE '石' | DRY '干' | |
| Initialization | | | BLACK 'Hei' DAY 'Bai' DUST 'Huei' YELLOW 'Huang', WHITE 'Bai', STONE 'Shi' | GREEN 'G' YELLOW 'Y', WATER 'W', LIVE 'L' LAUGH 'L', KILL 'K', IF 'I', |
| Finger-spelling | | | BECAUSE 'Yin^Wei' IF 'Ru^Guo', GREEN 'L^U' | |

It appears that related sign languages can develop different character signs. It holds true between TSL and JSL as well as between TSL and CSL. In addition, the result of the initialization process may cause the loss of iconicity of signs because original handshapes with iconic motivation are replaced by arbitrary alphabet handshapes. Frishberg (1975), Klima and Bellugi (1979), and recently Su (2004) all observed that contact signing contributes to language change from iconicity to arbitrary. The comparison of lexicon in sign languages should take into account the influence of contact signing on language change, in addition to the study of historical relations.

¹² But how frequently they are produced requires further study in the future.

5.2.2. The similarity among TSL, JSL, CSL, and ASL

First of all, we utilize Woodward’s modified Swadesh list to compare languages of TSL, JSL, CSL, and ASL. For each concept, we compare as many variants of signs in question as possible. For example, the concept ‘house’ has at least two variants in TSL, one is the same as JSL, and the other is the same as CSL (Fig 29 and Fig 30). If we only choose one variant to be compared, how can we determine which variant is the right one? Therefore, the concept of ‘house’ is treated as ‘identical’ in TSL and JSL as well as in TSL and CSL.



Fig. 29. HOUSE-a in TSL and JSL



Fig. 30. HOUSE-b in TSL and CSL

Following the strict criteria of McKee and Kennedy (2000) and Sasaki (2003), that is, signs in question with only one of the four parameters different is categorized as ‘similar’, we got the result below.

Table 7. Summary of the comparison

| | TSL-JSL | TSL-CSL | TSL-ASL |
|---------------|------------|------------|------------|
| Identical | 53% | 31% | 12% |
| Similar (n=3) | 19% | 23% | 15% |
| Different | 28% | 46% | 73% |
| Total | 100% | 100% | 100% |

Note: ‘n’ means the number of the same parameters

When we compare this new result with Sasaki (2003) on the comparison of TSL and JSL, and Xu (2006) on TSL and CSL, a significant increase of similarity rate is observed. This increase of similarity might be due to our comparing as many variants as possible.

Next, if we follow the model of Xu (2006), which take iconicity into account for the comparison, signs which have the same iconic motivation and have at least one same parameter should be included as ‘similar’. The new result is obtained in Table 8.

SU & TAI: LEXICAL COMPARISON OF SIGNS

Table 8. Summary of the comparison

| | TSL-JSL | TSL-CSL | TSL-ASL |
|---|---------|---------|---------|
| Identical | 53% | 31% | 12% |
| Similar (n=3) | 19% | 23% | 15% |
| Similar (0<n<4), same iconic motivation | 2% | 4% | 4% |
| Different | 26% | 42% | 69% |
| Total | 100% | 100% | 100% |

According to Gudschinsky's (1956) criteria, we can conclude TSL and JSL belong to the same language family because they share 36% to 81% of their core vocabulary, so do TSL and CSL.

Table 9.

| | TSL-JSL | TSL-CSL | TSL-ASL |
|---------------------|------------|------------|------------|
| Identical & similar | 74% | 58% | 31% |
| | 36%<N<81% | 36%<N<81% | <36% |

5.3. The problems

5.3.1. 100 modified Swadesh list

The modified Swadesh list is a good start for comparing the lexical items of sign languages to establish their historical relatedness. However, there are problems. First, the size of 100 items to compare is too small. Second, different sign languages exhibit similar iconic motivation even in this 100 modified Swadesh list. Third, the more iconic motivations are available for a sign, the more variants it has. Although we can compare as many variants as possible, the problem is that comparing all variants is a time-consuming task and there is no dictionaries composed of all variants. When a new variant is collected and compared, the similarity rate among languages will be changed.

5.3.2. The problem of Xu's (2006) model

Woodward's modified Swadesh list excludes body part signs and pronouns for the comparison in order to avoid overestimation. Yet taking iconicity into account for the similarity as in Xu's model will result in overestimation. In addition to signs with only one different parameter, signs with at least one same parameter will be categorized as 'similar' if they are signs with the same iconic motivation. Greenberg (1953, 1957) posed four explanations for the similarity of representation among different languages. One of them is shared symbolism not due to historical factors. Xu's model will therefore yield a much higher degree of similarity because of the iconic motivations which exist independent of the historical relatedness. . Let's utilize MOON and BLACK to illustrate.



Fig. 31. MOON in TSL



Fig. 32. MOON in CSL



Fig. 33. MOON in ASL



Fig. 34. BLACK in TSL



Fig. 35. BLACK in CSL



Fig. 36. BLACK in ASL

Table 10.

| Items | MOON | BLACK |
|---------|---|---|
| TSL-CSL | Both are signs with virtual depiction, (0<n<4): similar | Both are signs of presentable object, differ in handshape (n=3): similar |
| TSL-ASL | virtual depiction vs. substitutive depiction, (n<3): different. | Both are signs of presentable object, differ in handshape, location and orientation (0<n<4): similar |

MOON in TSL is a sign with iconic motivation ‘virtual depiction’, while MOON in ASL is a sign with iconic motivation ‘substitutive depiction’. They are categorized as ‘different’ because they don’t share any parameter. BLACK in TSL and ASL are signs with very different forms. In TSL, it is formed with handshape /SHOU/ ‘hand’ brushing the hair, while in ASL, it is formed with handshape /YI/ ‘one’ brushing the eyebrows. However, these two forms will be categorized as ‘similar’ according to Xu’s model, because both are signs with iconic motivation ‘presentable object’ and they share one same parameter ‘movement’ (0<n<4).

As far as the strict criteria are concerned, the degree of difference of MOON and BLACK between TSL and ASL is the same. Both should be categorized as ‘different’ because they are not different with only one parameter. In this case, applying Xu’s model

SU & TAI: LEXICAL COMPARISON OF SIGNS

to account for these items would overestimate the similarity between sign languages. It appears that to determine their genetic relationship, signs with iconic motivation should not be included for historical comparison, especially signs with the same iconic motivation. Signs in different languages can be similar because they share similar iconic motivation and not because they are historically related.

If we exclude signs with iconic motivation, we obtain different relation among these languages. Only TSL and JSL belong to the same language family (60% similarly-articulated signs), and TSL, CSL, and ASL are different languages belong to different language family, as Table 11 illustrates.

Table 11.

| | TSL-JSL | TSL-CSL | TSL-ASL |
|---------------|-------------|-----------|-----------|
| Identical | 27/61= 44% | 12/54=22% | 2/67=3% |
| Similar (n=3) | 10/61= 16% | 6/54=11% | 3/67=4% |
| Different | 24/61= 40% | 36/54=67% | 62/67=93% |
| | 36%<60%<81% | 33%<36% | 7%<36% |

Still, we are faced with two problems. One is that sample size is too small (61, 54, and 67 items). The other is each given pair of languages for comparison could involve different sets of concepts.

5.4. Enlargement of sample size

The reason why Woodward (1993) took out signs of body parts and pronouns from Swadesh’s list is because they are signs with same iconic motivation across different sign languages. However, signs of body parts and pronouns constitute only one part of signs with iconic motivation. Following his idea, we should take out of all signs with iconic motivation: substitutive depiction, virtual depiction, presentable object, and presentable action. Then the size of basic vocabulary adopted for comparison would be very minimal indeed.

McKee and Kennedy (2000) randomly selected 199 signs from NZSL dictionary and compared with the signs for corresponding concepts in other three sign languages. Sasaki (2003) utilized the same list to compare TSL and JSL. In addition, he compared both languages with the 752 entries in Smith and Ting (1979). But they are still problematic. First, they didn’t rule out the chance of identical and similar signs purely due to the same iconic motivation. Second, given abundant variant signs, we cannot for sure determine which form is the right corresponding sign in other languages.

The second problem can be partially solved by adopting the same method of collecting data across different sign languages. One way is to adopt the method of Bates et al’s (2003) timed picture naming. It is a cross-linguistic project that investigates universal and language-specific contributions to naming behavior across seven spoken languages (English, German, Spanish, Italian, Bulgarian, Hungarian, and Mandarin

Chinese). The materials are all pictures including 520 items of Noun and 275 items of Verb. It uses an eliciting method called 'picture naming'. That is, when informant sees one picture in question, he/she should produce the word for that concept as soon as possible. The method can be applied in lexical comparison of signed languages and the result can be compared not only for historical relation but also for iconic similarity.

6. Final remarks

The central issue we raise in this paper is whether to take iconicity into account for the comparison of sign languages. Our position is that comparison for historical relatedness should not take signs with iconic motivation into account. But, the lexical comparison of sign languages can be conducted in two different directions: for historical relation or for iconic similarity. As Frishberg (1975), Klima and Bellugi (1979) and Su (2004) have pointed out signs have changed in the direction from iconic to arbitrary. The lexical comparison of signs between two presumably related languages can reconstruct the proto-signs in terms of four parameters: handshape, location, movement, and orientation. Yet, language contact with spoken and written languages renders signs with iconic motivation to become less iconic because of initialization, fingerspelling and character signs. Finally, taking iconicity into consideration is not only desirable but also necessary in order to establish the historical relationship between two sign languages. Iconicity indeed plays an important role not only in linguistic structures of sign languages but also in the comparison of different sign languages for historical relatedness.

References

- Bates, E., S. D'amico, T. Jacobsen, A. Székely, E. Andonova, A. Devescovi, D. Herron, C. C. Lu, T. Pechmann, C. Pléh, N. Wicha, K. Federmeier, I. Gerdjikova, G. Gutierrez, D. Hung, J. Hsu, G. Iyer, K. Kohnert, T. Mehotcheva, A. Orozco-Figueroa, A. Tzeng, and O. Tzeng. 2003. Time picture naming in seven languages. *Psychonomic Bulletin & Review* 10(2), 344-380.
- Battison, Robin. 1978. *Lexical Borrowing in American Sign Language*. Silver Spring, Md.: Linstok Press.
- Bickford, J. A. 1991. Lexical variation in Mexican Sign Language. *Sign Language Studies* 72, 241-272.
- Costello, Elaine. (ed.) 1998. *Webster's American Sign Language Dictionary*. New York: Random House.
- Chao, C.-M., H.-H. Chu, and C.C. Liu. 1988. *Taiwan National Sign Language*. Taipei, Taiwan: Deaf Sign Language Research Association of the Republic of China.
- Currie, Anne-Marie P. Guerra, Richard P. Meier, and Keith Walters. 2002. A crosslinguistic examination of the lexicons of four signed languages. In Richard P. Meier, Kearsy Cormier, and David Quinto-Pozos (eds.), *Modality and Structure in Signed and Spoken Languages*, pp. 224-236. Cambridge University Press.
- Frishberg, Nancy. 1975. Arbitrariness and iconicity: historical change in American Sign Language. *Language* 51 (3), 696-719.
- Greenberg, Joseph H. 1953. Historical linguistics and unwritten languages. In A.L. Kroeber (ed.), *Anthropology Today: An Encyclopedic Inventory*, pp. 265-286. Chicago and London: The University of Chicago Press.
- Greenberg, Joseph H. 1957. *Essays in Linguistics*. Viking Fund Publications in Anthropology, No. 24. New York: Wenner-Gren Foundation for Anthropological Research. Reprinted in 1963, Chicago and London: The University of Chicago Press.
- Gudschinsky, S. 1956. The ABCs of Lexicostatistics (Glottochronology). *Word* 12, 175-210.
- Klima, E., and U. Bellugi. 1979. *The Signs of Language*. Cambridge, Mass: Harvard University Press.
- Lucas, C., and C. Valli. 1992. *Language Contact in the American Deaf Community*. San Diego: Academic Press.
- Mandel, Mark. 1977. Iconic devices in American Sign Language. In Lynn A. Friedman (ed.), *On the Other Hand*, pp. 57-107. London: Academic Press.
- McKee, David and Graeme Kennedy. 2000. Lexical comparison of signs from American , Australian, British, and New Zealand Sign Languages. In Emmorey Karen and Harlan Lane (eds.), *Sign Language Revisited: An Anthology to Honor Ursula Bellugi and Edward Klima*, pp. 49-76. New Jersey, London: Lawrence Erlbaum Associates, Publishers.
- Sasaki, Daisuke. 2003. *Comparing the lexicon of sign languages in East Asia: A*

SU & TAI: LEXICAL COMPARISON OF SIGNS

- preliminary study focusing on the influence of Japanese Sign Language on Taiwan Sign Language*. Qualifying Paper.
- Smith, Wayne H. 1989. *The Morphological Characteristics of Verbs in Taiwan Sign Language*. Ph.D. Dissertation, Indiana University.
- Smith, Wayne H. 1990. Evidence for auxiliaries in Taiwan Sign Language. In Fischer, Susan D and Siple, Patricia (eds.), *Theoretical Issues in Sign Language Research- volume 1: Linguistics*, pp. 211-228. Chicago: the University of Chicago Press.
- Smith, Wayne H. 2005. Taiwan Sign Language research: an historical overview. *Language and Linguistics* 6(2), 187-215.
- Smith, W. H., and L.-F. Ting. 1979. *Shou Neng Sheng Chyau: Sign Language Manual, vol. I (Your Hands can Become a Bridge)*. Taipei, Taiwan: Deaf Sign Language Research Association of the Republic of China.
- Su, Shiou-fen. 2004. *Iconicity in Taiwan Sign Language*. MA Thesis, National Chung Cheng University, Taiwan.
- Sutton-Spence, Rachel and Bencie Woll. 1999. *The Linguistics of British Sign Language: An Introduction*. Cambridge: Cambridge University Press.
- Taub, Sarah. F. 2001. *Language from the body: iconicity and Metaphor in ASL*. Cambridge: Cambridge University Press.
- Tennant, R., & Gluszak Brown, M. 1998. *The American Sign Language Handshape Dictionary*. Washington, DC: Gallaudet University Press.
- Woodward, J. 1978. All in the family: Kinship lexicalization across sign languages. *Sign Language Studies* 19, 121-138.
- Woodward, J. 1991. Sign language varieties in Costa Rica. *Sign Language Studies* 73, 329-346.
- Woodward, James. 1993. The relationship of sign language varieties in India, Pakistan, and Nepal. *Sign Language Studies* 78, 15-22.
- Woodward, J. 1996. Modern Standard Thai Sign Language: Influence from American Sign Language and its relationship to original Thai Sign Language varieties. *Sign Language Studies* 92, 227-252.
- Woodward, J. 2000. Sign language and sign language families in Thailand and Viet Nam. In: Karen Emmorey and Harlan Lane (eds.), *The Signs of Language Revisited: An Anthology to Honor Ursula Bellugi and Edward Klima*, pp. 23-47. Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.
- Wu, Pei Lan. 2007. *The Formation of Noun-Verb Pairs in Taiwan Sign Language*. MA Thesis, National Chung Cheng University, Taiwan.
- Xu, Wang. 2006. *A comparison of Chinese and Taiwan Sign Languages: Towards a new model for Sign Language Comparison*. MA Thesis, Ohio State University.

台灣手語、中國手語、日本手語、和美國手語的詞彙比較：象似性再探

蘇秀芬、戴浩一
語言學研究所
國立中正大學

摘要

和口語一樣，手語是一個自然語言，不同地區的手語有各自的歷史演變過程。因歷史、教育政策等因素，台灣手語的詞彙源自日本手語，但也收納了中國手語的部分詞彙。本文以詞彙統計學的方法，將台灣手語和日本手語、中國手語及無歷史淵源的美國手語的核心詞彙做比較，試圖找出其歷史淵源的語言學證據。但研究發現手語的視覺空間性，廣泛的詞彙象似性易高估各個手語的歷史同源關係。本文認為手語的詞彙比較應分兩方面進行，象似性詞彙的比較可找出不同手語所共用的象似機制，非象似性詞彙的比較可找出各語言的歷史同源關係。比較結果發現台灣手語和日本手語的詞彙相似性最高，屬同一語言家族，和中國手語的相似性其次，和美國手語的相似性最低。無論有無歷史同源關係，這四個手語都運用類似的象似機制形成詞彙。

漢語對於台灣手語地名造詞的影響*

張榮興、柯綉玲
語言學研究所
國立中正大學

摘要

本文主要探討台灣手語地名之造詞策略。根據本文的研究，很多台灣手語的地名乃透過不同的方式由漢語地名借用而來。綜觀其借用的方式，包括：(一)完全依漢語地名之漢字直譯而來；(二)依漢語地名之部份漢字直譯而來；(三)完全依漢語地名之漢字字形打出來；(四)依漢語地名之漢字部份字形打出來；(五)綜合漢字字形和字義將漢語地名之漢字打出來。本文中所討論的台灣手語地名的形成策略解釋了台灣手語如何將漢語融入本身的語言系統，同時也說明了台灣手語擴充詞彙的幾個重要方法。

關鍵詞：台灣手語、地名、外來詞直譯、漢語、漢字、語言接觸

1. 引言

台灣手語一般可區分為台灣自然手語和文法手語兩種，前者為台灣聾人日常生活所使用的溝通工具，而後者為教育部以漢語文法為基礎所制訂出來的手語系統。台灣自然手語（以下簡稱為台灣手語）又可區分為南部台灣手語和北部台灣手語，兩者主要差別在於少數某些詞彙的打法不同。在語法方面，兩者沒有顯著的不同（Chang, Su & Tai 2005; Smith 1989; Tai 2005）。

以手語為基礎的造詞研究數量極為有限，而以台灣手語為主的造詞研究，數量更是有限，而這些研究往往以介紹台灣手語詞彙為主，如史文漢、丁立芬（2002）、趙玉平（1997, 1999）、趙建民（2001, 2007）等，強調手語教學的目的，對詞彙背後的認知基礎及造詞策略往往沒有具體的解釋與說明。¹為了彌補這方面的不足，本文以台灣手語地名為例，並從認知的角度來探討台灣手語的造詞策略，希望將台灣手語地

* 感謝國立中正大學台灣人文研究中心(96-R-9-2)及國科會(NSC 94-2411-H-194-022)的補助，也感謝顧玉山先生提供語料諮詢。

¹ 游順釗(1991:177-283)曾在 1985 年調查 232 個大陸地名，並提供這些地名的手勢圖示，然而對這些地名的形成方式及所應用的策略也沒有加以解釋。

名的造詞策略及其背後的認知機制有系統地加以呈現出來。

跟其他手語一樣(如英國手語)，一個台灣手語地名可能有二到三種打法。當地居民與非當地居民常常對同一個地點有不同的稱呼² (Sutton-Spence & Woll 1999: 233)，舉基隆為例，北部台灣手語的打法是將手形/民/置於嘴角邊，小指指尖接觸口邊，再重複往下劃，以表示海港的地方(趙健民 2001:138)，而南部台灣手語則打出港+雨(趙健民 2001:155)或雨+港來表示基隆(顧玉山提供)³。

台灣手語之地名有不同的命名方式，有些地名的形成乃依照其所在的地理位置而定，舉彰化、嘉義、台南和屏東為例，我們先將一個人的臉比喻為台灣全島，並依這些地區在台灣實際地理的相對位置將彰化置於臉頰旁，嘉義置於耳下，台南置於嘴巴下，而屏東置於下巴下(蘇秀芬 2004: 18; 趙健民 2001: 138, 140)。彰化的打法為右手手形/錢/掌心朝下，在右臉頰邊往下彈開，嘉義的打法為右手拇指和食指捏住置於耳根，再將右手五指彎曲向下，台南的打法為右手手形/手/掌心朝下置於嘴巴下重複往下動，而屏東的打法為右手握拳置於顎下，並往下彈開成五指彎曲。然而有些地名則採用代喻策略，即以當地最具特色的事物為命名的依據，例如基隆以雨加港來表達，陽明山以溫泉來表達，而宜蘭則以鳴笛來表示。此外，也有以當地著名陸標為依據者，例如西門町以三角鐘來代表。

由於和漢語的接觸頻繁，台灣手語的地名最普遍的造詞方式是以漢語的地名為基礎所發展而成的，一般以漢字的字形、漢字的意義，或漢字的字形和字義兩者共同組合而成。⁴所謂漢字的字形指的是台灣手語依照漢字的外形打出來，而漢字的意義則是指以外來詞直譯的方式將漢字直譯成跟台灣手語相對應的詞彙。此外，有些地名則是融合了這兩種策略所發展而來的。⁵以下我們將依漢字的字形、漢字的意義、以及漢字字形和字義的組合這三個方面來說明台灣手語地名的造詞策略。

本文接下來的討論順序如下：第二單元先介紹一些跟本文有關的語言學概念，第三單元討論以漢字字形為基礎的台灣手語地名，第四單元討論以漢字意義為基礎的台灣手語地名，第五單元討論漢字字形部件和字義組合而成的地名，第六單元為本文的結論。

² Sutton-Spence & Woll (1999: 233) 提到有些英國手語的地名只有當地的人知道，跟非當地人交談，往往用指拼手語 (fingerspelling) 來表達。

³ 不管是以海港或以多雨來表示基隆都是使用代喻的策略，因為都是用跟某當地相關的東西來代表某地。英國手語地名也有許多應用代喻方式所形成的地名，如巴黎用艾菲爾鐵塔 (the Eiffel tower) 來表示。

⁴ 西方的手語跟英語接觸頻繁，所以手語中融入了很多英語外來詞。有關與英語接觸衍生出來的手語詞彙相關討論，請參考 Padden (1998), Brentari & Padden (2001) 及 Johnston & Schembri (2007) 的討論。

⁵ 除了本節所討論的造詞策略外，台灣手語的地名如新營和員林有可能是取自聾朋友的手語名字，若有位聾朋友住員林，他的手語名字也可能被用來指員林這個地方(顧玉山提供)。

2. 理論背景

在分析台灣手語地名詞彙之前，我們將先介紹幾個相關的語言學概念。首先是語言中形、音、義三者的關係，根據 Taylor (2002) 的分析，一個語言的表達形式 (linguistic expression) 可以從形、音、義三個方面來加以說明，例如漢語的「月」包含了這個字的形、發音、以及它所代表的概念。Taylor (2002) 進一步將語音視為一種音韻結構 (phonological structure)，而將概念視為一種語意結構 (semantic structure)，兩個結構彼此相連結。對 Taylor 來說，tree 這個英文字的形式是一種符號關係 (symbolic relation)，是音韻結構和語意結構連結的另一道橋樑，因此除了聽到 tree 的發音可以聯想到它的意義之外，看到 tree 這個字也可以跟意義相連結。

以文字為基礎的符號關係又可進一步從兩方面來說明：一種是直接紀錄語言發音的文字，我們稱之為表音文字系統 (如英文、德文、法文等)，而另一種是直接紀錄語言的意義，我們稱之為表意文字系統 (例如漢語之日、月、山、水、火等)。除了表意文字之外 (即象形文字)，漢語的文字系統往往結合了表音和表意兩個策略 (例如梅、枝、昭等)。

此外，形式和意義之間的關係可分成三種：象似性 (iconic) 符號、指示性 (indexical) 符號和象徵性 (symbolic) 符號。象似性符號指的是形式和意義之間有極高的相似性，例如看到一個人的相片 (形式)，就想到其本人 (意義)。指示性符號指的是形式和意義之間有著自然的連結關係，例如用箭頭符號 (形式) 來指引目的地的方向 (意義)。而象徵性符號指的是形式和意義之間沒有自然的連結關係，例如以符號 \$ 表示美金，符號 \$ 和美金之間並沒有自然的連結關係，其關係是約定俗成的。

部份與整體是形式和意義之間的另一種關係，而此關係又可進一步分成兩種：一種是以部分表整體 (synecdoche)，就是用某物的其中一部份來代表某物，例如用「新面孔」和「助手」來指稱某人 (面孔和手都是身體的一部分，但都用來指稱某一個人)；另一種是代喻 (metonymy) (有時翻成轉喻)，就是用跟某物相關的東西來代表某物體，例如用皇冠來表示國王，皇冠雖不是國王身體的一部分，但卻與國王息息相關，所以皇冠可以用來指稱國王。

另外，根據 Mandel (1977) 的研究，手語詞彙的形成策略主要有四種，分別為實物直指 (presentable object)、動作模擬 (presentable action)、外形描繪 (virtual depiction)、以及形體取代 (substitutive depiction)。⁶實物直指指的是用手指指出所想表達的事物，動作模擬指的是運用身體動作模擬出所想表達與這個動作有關的事物，外形描繪指的是用手描繪出所想表達事物的輪廓，而形體取代指的是用跟事物外型相似的手形來代表所想表達的事物。

介紹完這些理論背景之後，接下來我們將結合形、音、義及部份和整體的認知概念，並配合 Mandel 所提出的造詞策略來分析台灣手語地名的造詞方式。

⁶ Taub (2001) 對這些造詞策略有不同的稱呼。

3. 以漢字字形為基礎的台灣手語地名

以漢字字形為基礎的地名指的是台灣手語依照漢字的外形打出來⁷，有些漢字的筆劃較簡單，因此可以將整個漢字的外形都呈現出來，但也有一些漢字的筆劃非常複雜，因此只能先將這個漢字的部首加以刪減，然後以留下的某個部首來代表整個漢字，即應用了所謂的「部分代表整體」之認知機制。

用台灣手語將漢字的外形加以呈現出來，所使用的策略有形體取代和形體取代+字形描繪兩種。實物直指及動作模擬兩種策略沒有被採用，其原因是漢字是一種文字符號，並非隨時隨地都出現在溝通的場合中，因此不適用於實物直指的表達方式，又因漢字是一種靜態的符號，本身沒有動作，因此不適用於動作模擬的表現方式。

以形體取代的策略來呈現漢字可分成全部取代和刪減後取代兩種。而全部取代又可分為雙手使用相同手形、雙手使用不同手形，以及用手語手形加上身體器官來取代全部的字形三種。雙手使用相同手形來取代整個漢字的例子有：台北的「北」（如圖 1）⁸，其打法是將左右手相同手形/六/掌心朝內，重覆相碰，以及王田的「田」（如圖 2），其打法是將左右手相同手形/三/相疊成/田/字形。雙手使用不同的手形來取代整個漢字的例子有：丰原(豐原)的「丰」⁹，田中的「中」、佳里的「佳」和「里」、仁德的「仁」、知本的「本」、龍井的「井」、潮州的「州」。¹⁰使用手語手形再加上身體器官來取代整個漢字的例子有吉安的「吉」，其打法是將手形/二/放在額頭以代表「士」的字形，而嘴巴則用來取代「口」的字形。

⁷ 台灣手語以漢字為基礎的造詞方式如同西方手語使用指拼手語(fingerspelling)(Johnston & Schembri 2007)。Sutton-Spence (1994)及 Brennan (2001)對於為何需要指拼手語提供了以下的解釋：(一)當沒有跟英語相對應的手語詞彙時；(二)介紹新的概念；(三)方便性和節省時間；(四)當作協助理解、解釋的工具；(五)語符轉換的策略以便表達英文片語；(六)用來表示英文縮寫。

⁸ Ann (1998)對台灣手語如何將漢字呈現出來的音韻結構有深入的討論。

⁹ 台灣手語的地名有時會用簡體字來取代繁體字，如丰原的「丰」。可能的原因是簡體字筆劃較少，易於用形體取代的策略來呈現。

¹⁰ 因為一個地名往往包含了兩個或兩個以上的漢字，而不同的漢字用台灣手語來表達時所用的策略可能不同，為了便於討論，我們依不同的策略將地名分開討論。



圖 1.「北」



圖 2.「田」

從以上的討論中，我們可以發現台灣手語常用地名的其中一個字來代表整個地名，如台北以「北」來表示，而丰原則以「丰」來表示。但若可能造成混淆，則會將所有的漢字都表達出來，例如北港的「北」和台北地名打法相同，這個時候北港除了打北之外還會加上港，以避免產生混淆。

除了全部取代外，形體取代還包括刪減後取代的策略。所謂刪減後取代指的是刪減掉漢字的某個偏旁後，然後使用手形來取代這個漢字剩餘的字形。使用這個策略的例子有木柵的「柵」(如圖 3)，即刪減掉「木」之後，只打出「冊」的字形(右手手形/一/在左手手形/四/手背上畫一劃)以表示木柵這個地方。



圖 3.「柵」(「冊」)

除了以形體取代來表達地名之外，台灣手語也常使用形體取代+外形描繪之綜合策略來表達地名。所謂形體取代+外形描繪之綜合策略指的是先用手形來取代漢字的部份筆劃後，再加上以寫空書的方式描繪出其他的筆劃，例如善化的「化」(如圖 4)，即先用一隻手的手形來取代「亻」的偏旁後，再用另一隻手以寫空書的方式實際描繪出「匕」的字形(右手手形/一/在左手手形/六/旁畫匕形)。其他類似的例子有墾丁的「丁」(右手手形/一/置左手手形/一/畫丅狀)(如圖 5)、玉里的「玉」及草屯的「屯」。



圖 4.「化」



圖 5.「丁」

從以上的討論，我們可以將以漢字字形為基礎的台灣手語地名歸納為表 1：

表 1. 以字形為基礎的台灣手語地名造詞策略

| 字形策略 | | | 例子 |
|-----------|-------|---------|------|
| 形體 取代 | 全部取代 | 雙手相同手形 | 王「田」 |
| | | 雙手不同手形 | 田「中」 |
| | | 手形加身體器官 | 「吉」安 |
| | 刪減後取代 | | 木「柵」 |
| 形體取代+外形描繪 | | | 善「化」 |

4. 以漢字意義為基礎的台灣手語地名

台灣手語有很多的地名是採用外來詞(即漢語)直譯的方法，即將漢字的意義直接翻譯成台灣手語相對應的詞彙。¹¹外來詞直譯可分成以下四種：全字直譯、刪減後字形直譯、增加字形後直譯、和替換字形後直譯。在本文四十三個使用外來詞直譯的地名中，採全字直譯者共三十一個。刪減後直譯者共七個，增加字形後直譯者共三個，替換字形後直譯者共兩個，採非全字直譯共十二個，即 27.9%的地名使用非全字直譯的策略。

第一種全字直譯是將漢語的地名依其漢字所代表的意義直接翻譯成台灣手語意義相對應的詞彙，值得注意的是漢語中的地名一般由兩個字組合而成，如雲林(如圖 6)和金門(如圖 7)。台灣手語表達雲林這個地名乃依序分別打出與「雲」和「林」相對應的台灣手語詞彙，「雲」的打法為左右手手形/五/掌心上下相對，手指搖動，由左向右移；「林」的打法為左手手形/拳/，右手手形/二/在手腕處相交叉並做圓狀的摩擦。而表達金門這個地名乃依序分別打出與「金」和「門」相對應的台灣手語

¹¹ 外來詞直譯的例子極為普遍，例如將英文的 Iceland 直譯成「冰島」，或將 hot dog 直譯成「熱狗」。

詞彙，「金」的打法為右手手形/像/在左/兄/上重複摩擦；「門」的打法為左右手手形/胡/掌心朝外並相併。這類例子還包含了綠島、台東、馬祖、竹南、大甲、沙鹿、鳳山、池上、鹿野、楊梅、大溪、龍潭、信義、斗六、虎尾、梅山、學甲、麻豆、安定、永康、左鎮、仁德、七股、橋頭、林邊、恆春、龜山島、沖繩島(打法請參考附錄 2 表 1)。但龜山島和沖繩島分別取其「龜」、「島」和「繩」、「島」進行直譯。



a. 「雲」
b. 「林」
圖 6. 雲林



a. 「金」
b. 「門」
圖 7. 金門

有些漢字屬於多義詞，即一個詞含有兩個或兩個以上的意義，因此在進行全字形翻譯時會有不同的表達方式。舉例來說，因南投的「投」可看成與「投票」或「投降」中的「投」相關，所以台灣手語可取「投票」或「投降」來表達「投」。關山的「關」可理解為「關係」或「關門」，因此台灣手語可取「關係」或「關門」來表達「關」(南投和關山的打法請參考附錄 2 表 1)。

第二種刪減字形後直譯是先刪減漢字的某個部件，再將留下來的部分直譯成相對應的手語詞彙。採用此策略的原因可能為原來的漢字無相對應的台灣手語，故先刪減某個部份後再進行直譯，例如鶯歌之「鶯」(如圖 8a)，即刪減掉部件「火」及「一」後，「鶯」只取其「鳥」的部份進行直譯，其打法為右手手形/像/手指頭向前，

在口前重複合攏，表示鳥嘴，左手手形/手/在身體旁邊做飛行狀。¹²此外，茄萣的「茄」（如圖 9 a）和「萣」（如圖 9b）刪減掉偏旁「艹」後，「茄」和「萣」分別只取其漢字的「加」和「定」部份，然後再將漢字「加」和「定」直譯成台灣手語詞彙「加」和「定」。「加」的打法為右手手形/拳/翻轉立於掌心朝右的左手手形/拳/上，而「定」的打法是左右手手形/方/相扣，再重複打開。使用此策略的例子還有：永靖的「靖」取其「立」、桃源的「源」取其「原」、石岡的「岡」取其「山」、萬巒的「巒」取其「山」、以及中壢的「壢」取其「歷」等(有關刪減字形後直譯的例子之打法請參考附錄 2 表 2)。



a. 「鶯」(「鳥」) b. 「歌」

圖 8. 鶯歌



a. 「茄」(「加」) b. 「萣」(「定」)

圖 9. 茄萣

第三種增加字形後直譯的策略指的是增加漢字的偏旁後，再將增加偏旁後的漢字直譯成台灣手語詞彙。採用此策略的原因可能是原來的漢字在手語無對應者，故先增加偏旁再進行直譯，例如八卦山的「卦」（如圖 10b），即先將漢字「卦」增加偏旁「扌」使之成為「掛」，然後再將漢字「掛」直譯成與它相對應之台灣手語（「掛」的打法為左右手手形/十/相勾，並上下放）。此外，盧山的「廬」（如圖 11a）則是將漢字「廬」增加部首「火」使之成為「爐」，再將漢字「爐」直譯成相對應的台灣手

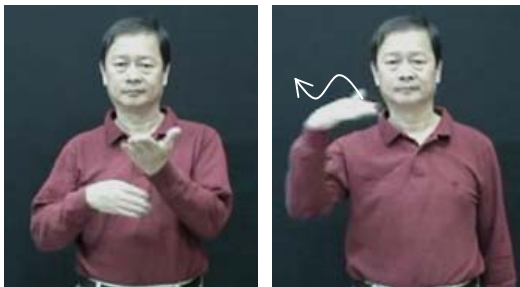
¹² 「鳥」為「雞」加「飛」的複合詞，有時也可只打出「雞」的手勢代表「鳥」。

語(「爐」的打法為左手手形/手/手心向上，右手手形/手/在左/手/下做撥狀)。其它類似的例子還有羅東的「羅」，即先將漢字「羅」增加部首「金」或「艹」成爲「鑼」或「蘿」的「蘿」，再將漢字「鑼」或「蘿」的「蘿」直譯成台灣手語「鑼」或「蘿」(打法請參考附錄 2 表 3)。



a. 「八」 b. 「卦」(「掛」) c. 「山」

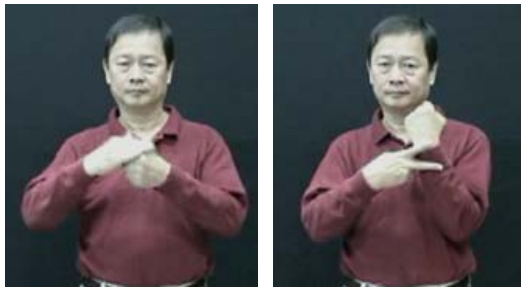
圖 10. 八卦山



a. 「廬」(「爐」) b. 「山」

圖 11. 廬山

第四種替換字形後直譯指的是替換漢字的偏旁後，將替換後的整個漢字直譯成與台灣手語意義相對應的詞彙，例如埔里和埔心的「埔」(如圖 12a)就是先將「埔」的偏旁「土」換成偏旁「衤」使之成爲「補」，然後再將漢字「補」直譯成意義相對應之台灣手語(「補」的打法爲右手手形/手/由右指向左/零/，掌心朝內)。此外，竹崎的「崎」(如圖 13b)是將「崎」的偏旁「山」換成偏旁「馬」使之成爲「騎」，然後再將漢字「騎」直譯成意義相對應之台灣手語(其打法爲右手手形/二/掌心朝內，放在左手手形/男/的姆指上，做騎馬狀)(埔里和竹崎的打法請參考附錄 2 表 4)。



a. 「埔」(「補」) b. 「里」
圖 12. 埔里



a. 「竹」 b. 「崎」(「騎」)
圖 13. 竹崎

從以上的討論，我們可以將台灣手語地名依外來詞直譯策略歸納為表 2：

表 2. 台灣手語地名外來詞直譯策略

| 字義策略 | | 例子 |
|-------|---------|--------|
| 外來詞直譯 | 全字直譯 | 「雲」「林」 |
| | 刪減字形後直譯 | 「鶯」歌→鳥 |
| | 增加字形後直譯 | 「廬」山→爐 |
| | 替換字形後直譯 | 「埔」里→補 |

5. 漢字字形部件和字義組合而成的地名

台灣手語在表達包含兩個漢字的地名時，其中一個漢字可能採用字形取代策略，而另一個漢字可能採用外來詞直譯策略¹³，例如官田的「官」即採用外來詞直譯策略，而「田」則是採用字形之形體取代策略(「官」的打法為左右手手形/五/掌心

¹³ 並非所有的漢語地名都會打成兩個字的台灣手語，有些兩個漢字的地名可以用一個台灣手語相對應的詞彙，例如彌陀、觀音、太保等。

朝下，姆指頂胸，餘四指上下晃動，「田」的打法為左右手手形/三/相疊成/田/字形)，如圖 14 所示。此外，仁德的「仁」即採用字形之形體取代策略，而「德」則採用外來詞直譯策略(「仁」的打法為右手手形/二/放在左/六/旁，「德」的打法為右手手形/守/觸鼻)，如圖 15 所示。



a. 「官」 b. 「田」
圖 14. 官田



a. 「仁」 b. 「德」
圖 15. 仁德

台灣手語除了將不同策略的兩個字組合起來表達地名之外，有時一個漢字也可能包含不同的策略，即將一個漢字拆解成兩個部份，一部份採字形之形體取代策略，而另一部份則採外來詞直譯策略，然後將兩個成份加以組合起來成爲一個單位的詞，例如太魯閣的「魯」(如圖 16b)就是將漢字的「魯」分解成「魚」和「日」，前者採用外來詞直譯策略，而後者採用形體取代策略，然後將雙手不同的手形疊起以表示「魯」(「魯」爲左右手掌心朝內，右/手/置於左/拳/上，重複彎動)。此外，陽明山的「明」(如圖 17b)是將「明」拆解爲部件「日」和部件「月」，前者採用形體取代策略，而後者採用外來詞直譯策略，其打法爲左手手形/拳/掌心朝內，代表「日」，而右手手形/呂/置於左/拳/旁，畫新月狀，代表「月」。有時形和義的組合不是同時性的，而是以時間的線性序列方式加以呈現，例如太麻里的「太」(如圖 16a)是先打出「大」，然後再以寫空書的方式打上一點，其打法爲左右手手形/六/拉開，

表示「大」，然後右手手形/一/打出一點以表示「太」字(有關太魯閣、陽明山、太麻里各字的打法請參考附錄 3 表 2)。

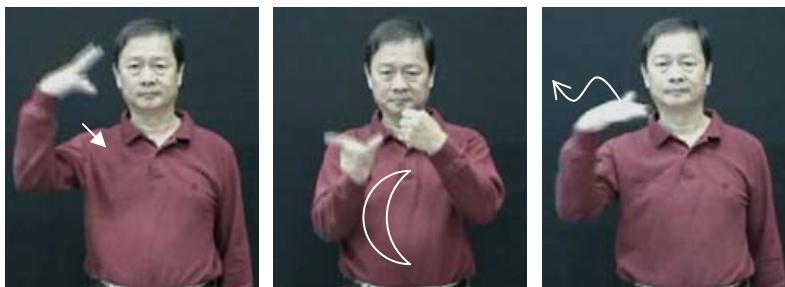


a. 「太」

b. 「魯」

c. 「閣」(「門」)

圖 16. 太魯閣



a. 「陽」

b. 「明」

c. 「山」

圖 17. 陽明山

6. 結論

本研究以近代認知語言學的觀點將一個語言的表達形式分成形、音、義三個不同的結構，認為字形是聯結音韻結構和語意結構的一種符號關係，並指出台灣手語如何以語意結構或符號關係為基礎來創造詞彙。此外，本研究也結合了以部分表整體和代喻的認知概念來分析台灣手語的地名，對台灣手語詞彙提供了有系統的分析架構。

研究結果發現台灣手語的地名除了以當地的特徵為造詞的基礎之外(如基隆)，大部分的地名都是以漢字字形或意義為基礎所發展來的。一個包含了兩個字的漢語地名發展成台灣手語地名時，有幾個不同的組合方式：可能兩字都採取漢字字形策略(如王田)，也有可能兩字都採用外來詞直譯策略(如雲林)，但也有可能其中一個字採漢字字形策略，而另一個字採外來詞直譯策略(如官田)。

台灣手語地名融入很多漢字，正如西方手語往往融入很多拼音字母。以漢字字形為基礎的台灣手語地名可分成全部字形取代和刪減後字形取代，正如西方手語將

某一地名的拼音全拼出來或只拼出部分的字母。以漢字意義為基礎的台灣手語可分成全字直譯和變化字形後直譯，正如英國手語將 Newcastle 全字直譯為 NEW CASTLE 或將 Swansea 直譯成 SWAN SEA，而將 Washington 刪減後直譯為 WASH 或將 Manchester 變換字形後直譯為 MAN CHEST 或將 Axminster 直譯成 AXE。此外，台灣手語所使用的字形和字義的綜合策略就如同英國手語將 New York 打成 NEW-y-或將 New Zealand 打成 NEW-z-，其中 New 以直譯的方式打出，而-y-和-z-是以指拼法加以呈現出來(Sutton-Spence & Woll 1999: 234)。

雖然台灣手語和西方的手語各屬於不同的語系，使用書寫的文化系統也極不相同，但有趣的是彼此在地名的造詞策略上有諸多的相似性，這個結果對手語之間共性與特性的比較有很重要的意義。

引用書目

- 史文漢、丁立芬，2002，《手能生橋第一冊》，台北：中華民國聾人協會編印。
- 游順釗，1991，《視覺語言學》，台北：大安出版社。
- 趙玉平，1997，《手語大師II 台灣手語完全學習手冊之複形篇》，台北市：現代經典文化。
- 趙玉平，1999，《手語大師IV 台灣手語完全學習手冊之專業篇》，台北市：現代經典文化。
- 趙健民，2001，《自然手語教學》，臺北：中華民國啓聰協會。
- 趙健民，2007，《簡明台灣自然手語典》，臺北：中華民國啓聰協會。
- 蘇秀芬，2004，《臺灣手語象似性之探討》，國立中正大學語言學研究碩士論文。
- Ann, Jean. 1998. Contact between a Sign Language and a Written Language: Character Signs in Taiwan Sign Language. *Pinky Extension and Eye Gaze: Llanguage Use in Deaf Communities*, ed. by Lucas, Ceil, 59-99. Washington, DC: Gallaudet University Press.
- Brennan, Mary. 2001. Making Borrowings Work in British Sign Language. *Foreign Vocabulary In Sign Language: a Cross-linguistic Investigation of Word Formation*, ed. Diane Brentari, 49-85. Mahwah, N.J.: Lawrence Erlbaum Associates.
- Brentari Diane, & Carol A. Padden. 2001. Native and Foreign Vocabulary in American Sign Language: A Lexion with Multiple Origins. *Foreign Vocabulary in Sign Language: a Cross-linguistic Investigation of Word Formation*, ed. Diane Brentari, 87-119. Mahwah, N.J.: Lawrence Erlbaum Associates.

- Chang, Jung-hsing, Shiou-fen Su, & James H-Y. Tai. 2005. Classifier Predicates Reanalyzed with Special Reference to Taiwan Sign Language. *Language and Linguistics* 6.2:247-278.
- Johnston, Trevor, & Adam Schembri. 2007. *Lexicon: the Structure of Auslaine Vocabulary. Australian Sign Language: An Introduction to Sign Language Linguistics*. Cambridge: Cambridge University Press.
- Mandel, Mark. 1977. Iconic Devices in ASL. In *On the Other Hand*, ed. Friedman, L., 57-108. New York: Academic Press.
- Padden, C. 1998. The ASL Lexicon. *Sign Language and Linguistics* 1.1:39-60.
- Smith, Wayne H. 1989. *The Morphological Characteristics of Verbs in Taiwan Sign Language*. Indiana University Ph.D. dissertation.
- Sutton-Spence, R. 1994. *The Role of the Manual Alphabet and Fingerspelling in British Sign Language*. University of Bristol Ph.D. dissertation.
- Sutton-Spence, Rachel, & Bencie Woll. 1999. *The Linguistics of British Sign Language: An introduction*. Cambridge, UK: Cambridge University Press.
- Tai, James H.-Y. 2005. Modality Effects: Iconicity in Taiwan Sign Language. In *POLA FOREVER: Festschrift in Celebration of Professor William S-Y. Wang's Seventieth Birthday*, ed. Dah-an Ho and Ovid J. L. Tzeng, 19-36. Taipei: Institute of Linguistics, Academia Sinica.
- Taub, Sarah F. 2001. *Language from the Body: Iconicity and Metaphor in ASL*. Cambridge, UK: Cambridge University Press.
- Taylor, John R. 2002. *Cognitive Grammar*. Oxford: Oxford University Press.

附錄 1：以漢字字形為基礎的台灣手語地名

表 1. 形體取代^形體取代 (^=詞素連結)

| 地名詞彙 | | 使用手形 | 詞彙描述 |
|------|---|-----------|-------------------|
| 王田 | 王 | 三(左)、一(右) | 右/一/觸左/三/。 |
| | 田 | 三(左)、三(右) | 左右/三/相疊成/田/字形。 |
| 田中 | 田 | 三(左)、三(右) | 左右/三/相疊成/田/字形。 |
| | 中 | 像(左)、一(右) | 右/一/放在左/像/上。 |
| 佳里 | 佳 | 六(左)、四(右) | 右/四/放在左/六/旁。 |
| | 里 | 拳(左)、二(右) | 左手臂掌心朝後，右/二/觸左手腕。 |

表 2. 形體取代_x^全字直譯_y

| 地名詞彙 | | 使用手形 | 詞彙描述 |
|-------------------------------|---|-----------|-------------------------|
| 官 _y 田 _x | 官 | 五(左)、五(右) | 左右/五/掌心朝下，姆指頂胸，餘四指上下晃動。 |
| | 田 | 三(左)、三(右) | 左右/三/相疊成/田/字形。 |
| 仁 _x 德 _y | 仁 | 六(左)、二(右) | 右/二/放在左/六/旁。 |
| | 德 | 守(右) | 右/守/觸鼻。 |
| 知 _y 本 _x | 知 | 拳(右) | 右/拳/輕拍右胸。 |
| | 本 | 三(左)、一(右) | 右/一/放在左/三/上。 |
| 龍 _y 井 _x | 龍 | 龍(右) | 右/龍/在臉前做舞龍狀。 |
| | 井 | 二(左)、二(右) | 右/二/觸左/二/。 |
| 潮 _y 州 _x | 潮 | 手(左)、手(右) | 左右/手/從腰往上移至胸前。 |
| | 州 | 三(左)、三(右) | 左右/三/相插。 |
| 吉 _x 安 _y | 吉 | 二(右) | 右/二/放在額頭上。 |
| | 安 | 手(左)、手(右) | 左右/手/掌心朝下相疊，再往兩側拉開。 |
| 木 _y 柵 _x | 木 | 拳(左)、拳(右) | 左右/拳/在手腕處相交叉並做圓狀的摩擦。 |
| | 柵 | 四(左)、一(右) | 右/一/在左/四/手背上一畫。 |

表 3. (形體取代+外形描繪)_x^全字直譯_y

| 地名詞彙 | | 使用手形 | 詞彙描述 |
|-------------------------------|---|-----------|----------------|
| 善 _y 化 _x | 善 | 拳(右) | 右/拳/觸鼻。 |
| | 化 | 六(左)、一(右) | 右/一/在左/六/旁畫匕形。 |
| 墾 _y 丁 _x | 墾 | 手(左)、同(右) | 右/同/往左/手做挖狀。/ |
| | 丁 | 一(左)、一(右) | 右/一/置左/一/，畫丁狀。 |

張榮興&柯綉玲：台灣手語地名

| | | | |
|--|---|-----------|---------------------|
| 草 _y 屯 _x | 草 | 菜(左)、菜(右) | 左右/菜/掌心朝內，在胸前重複往上升。 |
| | 屯 | 句(左)、一(右) | 右/一/置左/句/，畫L狀。 |
| (形體取代+外形描繪) ^x 形體取代 _y | | | |
| 玉 _x 里 _y | 玉 | 三(左)、一(右) | 右/一/在左/三/加一點。 |
| | 里 | 拳(左)、二(右) | 左手臂掌心朝後，右/二/觸左手腕。 |

表 4.

| 地名詞彙 | 使用手形 | 詞彙描述 |
|------|-----------|-------------------------|
| 台 北 | 六(左)、六(右) | 左右/六/掌心朝內，重覆相碰。 |
| 丰 原 | 錢(左)、一(右) | 右/一/在左/錢/手指上重複往下畫出/丰/字。 |

附錄 2：以漢字意義為基礎的台灣手語地名

表 1. 外來詞直譯：全字直譯^全字直譯(「；」表示同一隻變換不同手形)

| 地名詞彙 | | 使用手形 | 詞彙描述 |
|------|---|-----------|-----------------------------|
| 雲林 | 雲 | 五(左)、五(右) | 左右/五/掌心上下相對，手指搖動，由左向右移。 |
| | 林 | 拳(左)、二(右) | 左/拳/右/二/在手腕處相交叉並做圓狀的摩擦。 |
| 金門 | 金 | 兄(左)、像(右) | 右/像/在左/兄/上重複摩擦。 |
| | 門 | 胡(左)、胡(右) | 左右/胡/掌心朝外，相併。 |
| 綠島 | 綠 | 十(右) | 右/十/在口前(口要張開)曲動。 |
| | 島 | 拳(左)、五(右) | 右/五/手心向上，圍繞在左/拳/，手指上下動。 |
| 台東 | 台 | 拳(右) | 右/拳/在口前轉動。 |
| | 東 | 六(左)、六(右) | 左右/六/往右上角升。 |
| 馬祖 | 馬 | 拳(左)、拳(右) | 左右/拳/相疊，在胸前做騎馬狀。 |
| | 祖 | 六(右)；男(右) | 右/六/觸右頰，變成右/男/往上移動兩次。 |
| 竹南 | 竹 | 借(左)、借(右) | 左/借/的食指放於右/借/的掌心內，中指姆指重複彈開。 |
| | 南 | 六(左)、六(右) | 左右/六/姆指相觸往下降。 |
| 大甲 | 大 | 六(左)、六(右) | 左右/六/拉開。 |
| | 甲 | 男(左)、一(右) | 右/一/觸左/男/。 |
| 沙鹿 | 沙 | 萬(左)、萬(右) | 左右/萬/姆指由小姆指起在各手指尖重複摩擦。 |
| | 鹿 | 守(左)、守(右) | 左右/守/掌心朝外，觸太陽穴。 |
| 鳳山 | 鳳 | 零(左)、零(右) | 左右/零/分別放在頭上及下巴並同時開成/五/。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 |
| 池上 | 池 | 五(右) | 右/五/掌心朝上，在左手臂和身體間做/水/的手語。 |
| | 上 | 六(右) | 右/六/掌心朝外往上一伸。 |
| 鹿野 | 鹿 | 守(左)、守(右) | 左右/守/掌心朝外，觸太陽穴。 |
| | 野 | 二(左)、二(右) | 左右/二/(或/七/)放左右臉頰，同時往外一劃。 |
| 楊梅 | 楊 | 卅(左)、卅(右) | 左右/卅/相併再拉開。 |

張榮興&柯綉玲：台灣手語地名

| | | | |
|----|---|-----------|-------------------------------|
| | 梅 | 棕(右) | 右/棕/心向內先觸口的左邊，再觸口的右邊。 |
| 大溪 | 大 | 六(左)、六(右) | 左右/六/拉開。 |
| | 溪 | 五(右) | 右/五/掌心朝上，由手肘處，順著手臂往右做流水狀。 |
| 龍潭 | 龍 | 龍(右) | 右/龍/在臉前做舞龍狀。 |
| | 潭 | 五(右) | 右/五/掌心朝上，在左手臂和身體間做/水/的手語。 |
| 信義 | 信 | 棕(左)、棕(右) | 右/五/側放在左/五/上。 |
| | 義 | 拳(右) | 右/拳/掌心朝外，手肘放在左手手背上，用力轉成掌心向內。 |
| 斗六 | 斗 | 欠(右)；六(右) | 右/欠/變右/六/。 |
| | 六 | 六(右) | 右/六/。 |
| 虎尾 | 虎 | 虎(右) | 右/虎/在下巴下，掌心向，翻轉成掌心向外，放在口前。 |
| | 尾 | 一(右) | 右/一/在左手手肘處搖動。 |
| 梅山 | 梅 | 棕(右) | 右/棕/掌心向內先觸口的左邊，再觸口的右邊。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 |
| 學甲 | 學 | 錢(右) | 右/錢/在左手手腕處相交叉由外向胸前來回移動。 |
| | 甲 | 男(左)、一(右) | 右/一/觸左/男/。 |
| 麻豆 | 麻 | 十(右) | 右/十/來回觸臉頰。 |
| | 豆 | 呂(右) | 右/呂/掌心向內，在口前重複打開。 |
| 安定 | 安 | 手(左)、手(右) | 左右/手/掌心朝下相疊，再往兩側拉開。 |
| | 定 | 方(左)、方(右) | 左右/方/相扣，再重複打開。 |
| 永康 | 永 | 呂(左)、呂(右) | 左右/呂/相觸，再向左右拉開。 |
| | 康 | 拳(左)、拳(右) | 左右/拳/掌心朝下，在身前用力往外一放。 |
| 左鎮 | 左 | 手(右) | 右/手/拍左手臂。 |
| | 鎮 | 九(右) | 左手掌心朝下，橫放身前，右/九/由手肘處平畫 90°圓形。 |
| 七股 | 七 | 七(右) | 右/七/。 |
| | 股 | 紳(左)、手(右) | 左/紳/掌心朝上，右/手/觸左手掌心。 |
| 橋頭 | 橋 | 七(左)、七(右) | 左右/七/ (或/二/) 掌心相對在胸前向下畫橋狀。 |

| | | | | |
|-----|---|-----------|-------------------------|------------------|
| | 頭 | 手(右) | 右/手/輕拍頭部。 | |
| 林邊 | 林 | 拳(左)、二(右) | 左/拳/右/二/在手腕處相交叉並做圓狀的摩擦。 | |
| | 邊 | 手(右) | 右/手/從左手肘處重複往腕處畫。 | |
| 恆春 | 恆 | 呂(左)、呂(右) | 左右/呂/相觸，再向左右拉開。 | |
| | 春 | 手(左)、手(右) | 左右/手/重複向內擺動。 | |
| 龜山島 | 龜 | 方(左)、副(右) | 左/方/放在右/副/上，右/副/姆指動。 | |
| | 島 | 拳(左)、五(右) | 右/五/手心向上，圍繞在左/拳/，手指上下動。 | |
| 沖繩島 | 繩 | 筆(左)、筆(右) | 左右/筆/指尖相對，向左右拉轉開。 | |
| | 島 | 拳(左)、五(右) | 右/五/手心向上，圍繞在左/拳/，手指上下動。 | |
| 南投 | 南 | 六(左)、六(右) | 左右/六/姆指相觸往下降。 | |
| | 投 | 投票 | 紳(左)、九(右) | 右/九/放入左/紳/中。 |
| | | 投降 | 手(左)、手(右) | 左右/手/掌心朝外，放於肩膀上。 |
| 關山 | 關 | 關係 | 錢(左)、錢(右) | 左右/錢/相扣，左右擺動。 |
| | | 關門 | 胡(左)、胡(右) | 左右/胡/掌心向內，再兩手合併。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 | |

表 2. 外來詞直譯：刪減後直譯_x^全字直譯_y

| 地名詞彙 | | 使用手形 | 詞彙描述 |
|---------------------------------------|---|-----------|-----------------------------------|
| 鶯 _x 歌 _y | 鳥 | 手(左)、像(右) | 右/像/手指頭向前，在口前重複合攏，左/手/在身體兩邊做/飛/狀。 |
| | 歌 | 方(右) | 右/方/從口前向右前方成波浪形送出。 |
| 茄 _x 荳 _x | 加 | 拳(左)、拳(右) | 右/拳/翻轉立於掌心朝右的左/拳/上。 |
| | 定 | 方(左)、方(右) | 左右/方/相扣，再重複打開。 |
| 永 _y 靖 _x | 永 | 呂(左)、呂(右) | 左右/呂/相觸，再向左右拉開。 |
| | 立 | 手(左)、二(右) | 右/二/直立於左/手/掌心。 |
| 桃 _y 源 _x | 桃 | 九(左)、九(右) | 左右/九/相合，在胸前重複左右搖動。 |
| | 原 | 六(左)、六(右) | 左右/六/由肩處向前合成/呂/。 |
| 石 _y 岡 _x | 石 | 方(右) | 右/方/掌心朝，掌根觸上牙。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 |
| 萬 _y 巒 _x | 萬 | 萬(右) | 右/萬/。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 |
| 刪減後直譯 _x ^形體取代 _y | | | |

| | | | |
|-------------------------------|---|-----------|------------------|
| 中 _y 壢 _x | 中 | 像(左)、一(右) | 右/一/放在左/像/上。 |
| | 歷 | 民(左)、民(右) | 左右/民/掌心相對，往上下拉開。 |

表 3. 外來詞直譯：增加後直譯_x^全字直譯_y

| 地名詞彙 | | 使用手形 | 詞彙描述 |
|---|---|-----------|-----------------------------|
| 八 _y 卦 _x 山 _y | 八 | 八(右) | 右/八/。 |
| | 掛 | 十(左)、十(右) | 左右/十/相勾，並上下放。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 |
| 盧 _x 山 _y | 爐 | 手(左)、手(右) | 左/手/手心向上，右/手/在左/手/下做搨狀。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 |
| 羅 _x 東 _y | 羅 | 蘿蔔 | 右/二/輪流敲至左手手背。 |
| | | 敲鑼 | 左右/呂/掌心相對，做敲鑼狀。 |
| | 東 | 六(左)、六(右) | 左右/六/往右上角升。 |
| 外來詞直譯：替代後直譯 _x ^全字直譯 _y | | | |
| 竹 _y 崎 _x | 竹 | 借(左)、借(右) | 左/借/的食指放於右/借/的掌心內，中指姆指重複彈開。 |
| | 騎 | 男(左)、二(右) | 右/二/掌心朝內，放在左/男/的姆指上，做騎馬狀。 |
| 替代後直譯 _x ^形體取代 _y | | | |
| 埔 _x 里 _y | 補 | 零(左)、手(右) | 右/手/由右指向左/零/ (掌心朝內)。 |
| | 里 | 拳(左)、二(右) | 左手臂掌心朝後，右/二/觸左手腕。 |

附錄 3. 綜合字形部件和字義的台灣手語地名

表 1. 綜合字形部件和字義：以一個漢字為單位（運用綜合漢字字形部件和字義的漢字用「」標記出來，用以區分地名中非使用此策略的漢字。）

| 地名詞彙 | | 使用手形 | 詞彙描述 |
|-------|---|--------------------------|----------------------------|
| 太「魯」閣 | 太 | 六(左)、六(右) → 六(左)、一(右) | 左右/六/拉開，右/一/加一點。 |
| | 魯 | 拳(左)、手(右) | 左右手掌心朝內，右/手/置於左/拳/上，重複彎動。 |
| | 門 | 胡(左)、胡(右) | 左右/胡/掌心朝外，相併。 |
| 陽「明」山 | 陽 | 零(右) | 右/零/高放打開。 |
| | 明 | 拳(左)、呂(右) | 左/拳/掌心朝內，右/呂/置於左/拳/旁，畫新月狀。 |
| | 山 | 手(右) | 右/手/掌心朝下，做山狀。 |
| 「太」麻里 | 太 | 六(左)、六(右) → 六(左)、一(右) | 左右/六/拉開，右/一/加一點。 |
| | 麻 | 十(右) | 右/十/來回觸臉頰。 |
| | 里 | 拳(左)、二(右) | 左手臂掌心朝後，右/二/觸左手腕。 |

張榮興&柯綉玲：台灣手語地名

The Influence of Chinese on the Formation of Place Names in Taiwan Sign Language

Jung-hsing Chang and Xiu-ling Ke

*Institute of Linguistics
National Chung Cheng University*

Abstract: This paper discusses the formation of place-name signs in Taiwan Sign Language (TSL). It has been found that a great number of TSL place names are borrowed from Chinese and are based on different sources. The place names in TSL may be based (a) on exact loan translations of the Chinese place names, (b) on partial loan translations of the Chinese place names, (c) on the exact shape of the Chinese written word, (d) on the shape of partial Chinese written word, and (e) on the mixture of the loan translation and the written word. The different sign-formation processes discussed in this research have shown how Chinese are blended into TSL, at the same time providing an account for some of the important ways that TSL adds to its lexicon.

Key words: Taiwan Sign Language, place-name signs, loan translation, Chinese, Chinese characters, language contact