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Lexical Comparison of Signs from Taiwan, Chinese, Japanese, and American Sign Languages: Taking Iconicity into Account[1]

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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

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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

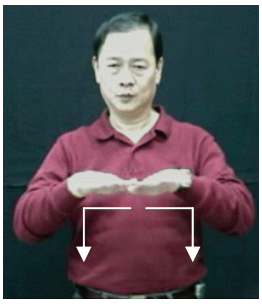


Fig. 3. TABLE in TSL



Fig. 4. HOUSE in ASL[7]



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.

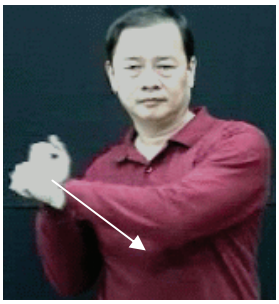


Fig. 6. BASEBALL in TSL



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.

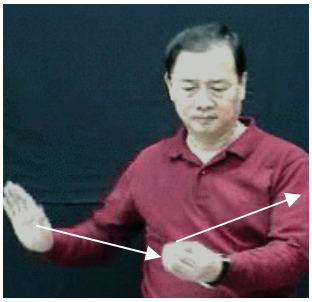


Fig. 12. PING PONG in TSL

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

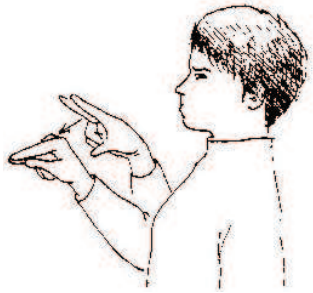


Fig. 14. NO in ASL



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 CSL[9]

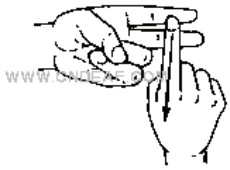


Fig. 18. DRY (干) in CSL

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 JSL[10]



Fig. 20. BAY in JSL

[9] This picture and the following pictures in CSL are from www.cndeaf.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

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.

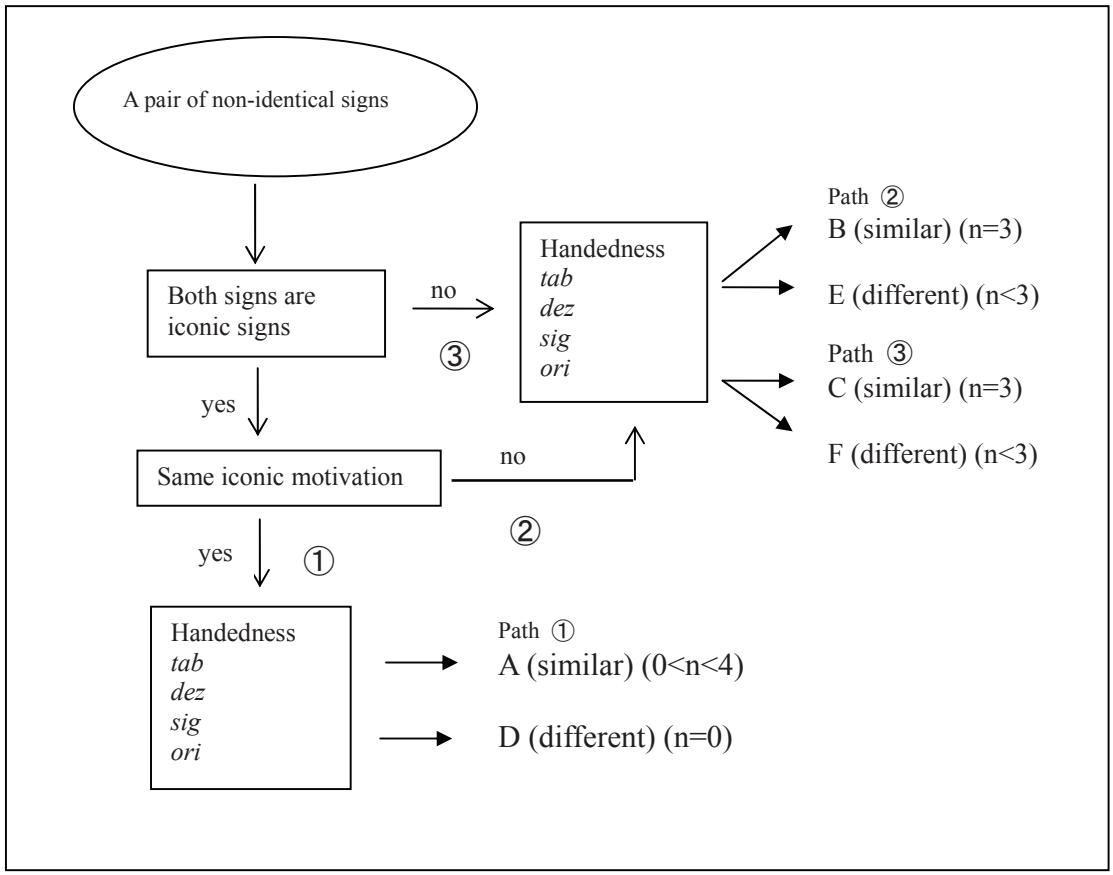


Fig. 28. Xu's lexical comparison model (p.88) (revised a little bit)

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

PATH	SIMILAR	DIFFERENT
Path ①	**Pattern A**	**Pattern D**
a. Both are iconic signs	yes	yes
b. Same iconic motivation	yes	yes
c. Number of parameters that are the same (n)*	0< n <4 (n=1,2, 3)	n = 0
d. Handedness		
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		
Path ②	**Pattern B**	**Pattern E**
a. Both are iconic signs	yes	yes
b. Same iconic motivation	no	no
c. Number of parameters that are the same (n)*	n = 3 (n=1,2, 3)	n < 3 (n=0,1,2)
d. Handedness		
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		
Path ③	**Pattern C**	**Pattern F**
a. Both are iconic signs	no *(0 or 1 sign is iconic)*	no *(0 or 1 sign is iconic)*
b. Same iconic motivation	*(not applicable)*	*(not applicable)*
c. Number of parameters that are the same (n)*	n = 3	n < 3 (n=0,1,2)
d. Handedness		
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		

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 (米川明彥), 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.

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

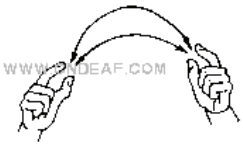


Fig. 32. MOON in CSL



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

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 comparasion of different sign languages for historical relateness.

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*

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

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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。本文認爲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。