A COMPARISON OF CHINESE AND TAIWAN SIGN LANGUAGES:
TOWARDS A NEW MODEL FOR
SIGN LANGUAGE COMPARISON

A Thesis

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By

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ABSTRACT

It is commonly believed that sign language is a universal language. However, linguists researching sign languages have demonstrated that deaf people from different communities have their own languages. This research is aimed at creating a synchronic lexical comparison of Taiwan Sign Language (TSL) and Chinese Sign Language (CSL).

The corpus is a combination of two video databases, one for each of the sign languages. The CSL database is part of the project, "Chinese Deaf People and Linguistic Research on Chinese Sign Language", generously provided by Professor Gong Qunhu from Fudan University, Shanghai. The TSL database, "A Study of Taiwan Sign Language: Phonology, Morphology, Syntax and Digital Graphic Dictionary", is provided courtesy of Professor James H-Y Tai at the National Chung Cheng University, Taiwan. The modified Swadesh 100-word list is adopted for the comparison.

Two previous studies on language sign comparison, Woodward (1993a) and McKee and Kennedy (2000) are examined in this study. It is found that while Woodward's (1993a) modification of Swadesh list is useful, his approach of comparison is not explicit. It is also found that McKee and Kennedy's approach has problems, particularly with respect to the fifth criteria "other" (in addition to the four phonological
parameters of handshape, location, movement, and orientation). However, McKee and Kennedy's methodology has its merits, and can be adopted, although with modifications, for synchronic comparisons across sign language.

In developing a new model for lexical comparison based on McKee and Kennedy's approach, it is found that iconicity and iconic motivation play an important role in the comparison of signs. It is also found that since our understanding of the relationship between sign phonology and morphology is limited at this stage, it is hard to make comparisons between a morphologically simple sign and a morphologically complex sign or between two morphologically complex signs.

A new model which only applies to comparisons of morphological simple signs is thus proposed in this study. This new model includes iconicity, iconic motivation, handedness, and four phonological parameters—handshape (dez), location (tab), movement (sig), and orientation (ori). This new model makes use of a flowchart, and develops three paths and six patterns of similar and different signs.

With 11 pairs of signs involving compound signs exclude from the comparison in this study, the result of the lexical comparison of the remaining 89 pairs of CSL and TSL signs using the new model are: 11 identical signs, 11 similar signs, and 56 different signs. The paucity of identical and similar signs suggests the likelihood that CSL and TSL are unrelated languages. Since research into CSL and TSL is still in its infancy, there is a great deal of linguistic research and challenges in the future.
Dedicated to my mother and father
ACKNOWLEDGMENTS

I wish to thank my advisor, Marjorie K.M. Chan. Without her intellectual guidance, encouragement and enthusiasm, this thesis would not have been possible. I also thank her for patience and diligence in improving my drafts and correcting my errors.

I thank James H-Y Tai for providing the Taiwan Sign Language video database, which is part of the project, “A Study of Taiwan Sign Language: Phonology, Morphology, Syntax and Digital Graphic Dictionary” at the National Chung Cheng University, Taiwan. I am grateful to him for stimulating discussion and for his assistance in identifying areas for improvement.

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CHAPTER 1

INTRODUCTION

China today has a large population with hearing or speech impairments, as shown in recent statistics from the report prepared by China Disabled Persons’ Federation (2003). In 2003, there were 20.57 million people in China with hearing or speech impairments. Of that population, two million were deaf children under the age of fourteen, with close to half of them (around 0.8 million) under the age of seven. These two million children constituted roughly one-tenth of one percent of the 1.294 billion Chinese in China in 2003.

Despite the high statistics given in the 2003 report, they are most likely an underestimate because many Chinese are still unwilling to admit to suffering from major hearing impairments or deafness. Deafness is often viewed negatively in Chinese society, and deaf people are often stigmatized, looked down upon, or otherwise stereotyped as stupid, incompetent, or socially inferior. Compared to the West, China has produced comparatively little research on deafness, deaf education, and sign language.

There is a general misconception which holds that sign language is a universal language and deaf people around the world would have no difficulty in understanding each other. However, linguists researching on sign language have demonstrated that deaf

This thesis is a study on a small video corpus of signs in Chinese Sign Language (CSL) and Taiwan Sign Language (TSL) that serves as the basis for developing a model for comparing the signs across sign language. The CSL database is part of the project, "Chinese Deaf People and Linguistic Research on Chinese Sign Language", generously provided by Professor Gong Qunhu from Fudan University, Shanghai. The CSL database is part of Professor Gong’s Swadesh list of 200 words in different varieties of CSL, that he and his students videorecorded in different parts of China. The CSL corpus for the current study is a subset of the Swadesh list, namely, 100 words from the Swadesh list that was modified by Woodward (1993a) for sign language comparison, referred to here as the “modified Swadesh list” (for further details, see section 1.3). The TSL database for this study is a corresponding set of 100 words that are in the modified Swadesh list, and is a subset of a larger database, “A Study of Taiwan Sign Language: Phonology, Morphology, Syntax and Digital Graphic Dictionary.” The TSL corpus in this study is kindly provided by Professor James H-Y Tai at the National Chung Cheng University, Taiwan. This TSL corpus represents a naturally-occurring variety of TSL used by deaf communities in Taiwan, while the CSL corpus draws from the Shanghai variety of Chinese Sign Language, a natural sign language that is used on the Chinese mainland.
There has not been a significant amount of research done on Chinese Sign Language in Western scholarship. Bellugi and Klima (1979) compared Chinese Sign Language with American Sign Language (cf. Bellugi and Klima 1979: 147-163). Callaway (2000), although touching on topics concerning Chinese Sign Language from a linguistic perspective, is more focused on the deaf community and on the education of deaf children in China. There has been relatively more research done by Chinese linguists themselves. Zhao (1999), for example, discussed the history and features of Chinese Sign Language, while Song (2000) discussed the history of the Chinese deaf community. However, they deal very little with the linguistic aspects of CSL. More recent studies of CSL include Lytle et al. (2005/6). Since very little has been written on CSL, in English or in Chinese, some brief historical background will be given in section 1.4 on CSL, in particular, the Shanghai variety, which is the most commonly-used variety in China and is also the variety in the corpus for this study. Hence, unless stated otherwise, it is this Shanghai variety of CSL that is referred in this thesis.

The second sign language here is Taiwan Sign Language, which has received greater attention in the literature. The West began researching on TSL during the 1980s when Wayne Smith contributed to an extensive and intensive linguistic study of TSL. Recently, Myers and Tai (2005) have brought more attention to TSL in the western academic community. This attention has taken the form not only of linguistic research, but also of historical and social survey as well. In conjunction with CSL, a brief introductory history of TSL will also be presented in section 1.4.
Given the paucity of linguistic studies on CSL, there have not been any detailed comparisons of CSL and TSL. One of the few cross-linguistic studies was conducted by Japanese linguist Sasaki (2001) on Japanese Sign Language (JSL), TSL, and CSL. Some related work done has also be conducted by Taiwanese and western linguists (e.g., Smith, 1976).

As part of the linguistic study of CSL and TSL in this thesis, I will also be introducing the database, terminology, and theoretical framework for conducting the comparative study. Adopted for the phonological part of this study are the three traditional parameters, from Stokoe (1960) known as tab (abbreviation for tabula (location)), dez (abbreviation for designator (handshap)), and sig (abbreviation for signation (movement)). A fourth criterion is added, namely, ori (abbreviation for orientation (palm orientation)). In addition, also considered as the basis for comparison is handedness, to be elaborated later in Chapter 2. The above forms the basic framework for studying sign phonology in this thesis. One approach to the comparison across sign languages, for purpose of studying genetic relationships, is reviewed in Chapter 3, with components extracted from it for the current synchronic, comparative study. Another dimension in this thesis is the incorporation of iconicity in the comparison across sign languages. This important dimension is introduced in Chapter 4, forming the basis for the new model proposed in that chapter for the comparison of signs across sign languages. The new model is then applied to the comparison of the signs in the CSL and TSL corpus in Chapter 5. Future research and other issues are discussed in the concluding chapter in Chapter 6.
The remainder of this chapter proceeds as follows. Section 1.1 introduces more terminology used in this thesis, section 1.2 gives the conventions used in the figure, section 1.3 presents Woodward’s (1993a) modified Swadesh list of 100 words for sign language comparison, and section 1.4 is a historical background on CSL and TSL.

1.1 Terminology

A number of terms are used in this study. Some frequently-used terms are introduced below. Those specifically coined here will be noted. While many of the terms will be defined within the thesis itself, the terminology introduced in the section, given in alphabetical order, is for convenience of reference.

Dez. This term is an abbreviation for designator, coined by Stokoe (1960). It denotes handshape/hand configuration in current literature of sign language research and is used interchangeably with “handshape.”

Handedness. This term is coined for referring to whether a sign uses only one hand (one-handed), two hands in unison (double-handed) or two hands separately (two-handed).

Iconicity. This term refers to the relationship between a human being’s mental models of image and referent, models that are partially motivated by experiences common to all humans and partially by experiences in particular cultures and societies (Taub 2001: 19-20).
Natural sign language. This term refers to sign language naturally developed by deaf people rather than sign language patterned after the syntax of spoken language, e.g. signed English or signed Chinese.

Ori. This term is an abbreviation for orientation that is coined in this study. The term refers to the orientations of the palm (or palms, in the case of two- or double-handed signs) relative to the speaker.

Parameter. This is a term referring to phonological properties of signs. In the model proposed here, the four parameters are: location in space (tab), shape of the hands (handshape, dez), movement through space (sig), and orientation of the palm (ori).

Sig. This term is an abbreviation for signation, coined by Stokoe (1960). It refers to the movement of the hands themselves, and/or their movement in space in relation to the signer. The term is used interchangeably with “movement.”

Tab. This term is an abbreviation for tabula, coined by Stokoe (1960). It refers to the location of the hand(s) in signing in space relative to the speaker. The term is used interchangeably with “location.”
1.2 Conventions Used in Figures

The figures in this study are video captures. Each sign will be noted in terms of \textit{tab}, \textit{dez}, \textit{sig} and \textit{ori}. The lines and curves in the pictures approximate the path of the movement of the hand(s) in space, and the arrow(s) show the direction of that movement. When two pictures of a sign is displayed, the beginning point of a sign is shown in the first picture, and the ending point in the second picture.

Following the conventions used in American Sign Language (ASL), words in small capital letter represent glosses in English for the sign in CSL and TSL. The glosses are the root forms of the words.

When a sign is a compound sign, consisting of two (or more) signs, the compound sign will be graphically divided according to its morphological components, and the parameters will be listed as “1” for the first component and “2” for the second component, for example, \textit{tabl} and \textit{tab2}. Morphologically complex signs will always have two sets of parameters listed, while signs with two pictures but only one set of parameters are simply showing the beginning and ending points for the sign (that is, the two pictures depict “internal movement”). The only exception in using two sets of parameters is \textit{bird} in TSL (e.g., Figure 2.10 in Chapter 2). Although it is a morphologically simple sign, the two hands have different handshapes, locations and movements. Therefore, for clarity’s sake, two sets of parameters are used.
1.3 The Modified Swadesh 100-word List for Sign Language Comparison

The Swadesh 200-word list was first developed for use in comparison of languages for identification of cognate words across spoken languages for historical research. Woodward (1993a) suggested that the use of the original Swadesh list in sign language comparisons may result in overestimation of the relation of different sign languages. This is because a number of items in the list, such as body parts and pronouns, are represented simply by pointing in many sign languages. The comparisons of these signs might result in false potential cognates. Woodward thus modified the 200-word original list, making it a 100-word list for comparing sign languages (Table 1.1).
Table 1.1: Modified Swadesh 100-Word List for Sign Language Comparison
(Woodward 1993a)

<table>
<thead>
<tr>
<th>1. all</th>
<th>26. grass</th>
<th>51. other</th>
<th>76. warm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. animal</td>
<td>27. green</td>
<td>52. person</td>
<td>77. water</td>
</tr>
<tr>
<td>3. bad</td>
<td>28. heavy</td>
<td>53. play</td>
<td>78. wet</td>
</tr>
<tr>
<td>4. because</td>
<td>29. how</td>
<td>54. rain</td>
<td>79. what</td>
</tr>
<tr>
<td>5. bird</td>
<td>30. hunt</td>
<td>55. red</td>
<td>80. when</td>
</tr>
<tr>
<td>6. black</td>
<td>31. husband</td>
<td>56. correct</td>
<td>81. where</td>
</tr>
<tr>
<td>7. blood</td>
<td>32. ice</td>
<td>57. river</td>
<td>82. white</td>
</tr>
<tr>
<td>8. child</td>
<td>33. if</td>
<td>58. rope</td>
<td>83. who</td>
</tr>
<tr>
<td>9. count</td>
<td>34. kill</td>
<td>59. salt</td>
<td>84. wide</td>
</tr>
<tr>
<td>10. day</td>
<td>35. laugh</td>
<td>60. sea</td>
<td>85. wife</td>
</tr>
<tr>
<td>11. die</td>
<td>36. leaf</td>
<td>61. sharp</td>
<td>86. wind</td>
</tr>
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<td>12. dirty</td>
<td>37. lie</td>
<td>62. short</td>
<td>87. with</td>
</tr>
<tr>
<td>13. dog</td>
<td>38. live</td>
<td>63. sing</td>
<td>88. woman</td>
</tr>
<tr>
<td>14. dry</td>
<td>39. long</td>
<td>64. sit</td>
<td>89. wood</td>
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<td>15. dull</td>
<td>40. louse</td>
<td>65. smooth</td>
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<td>16. dust</td>
<td>41. man</td>
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<td>42. meat</td>
<td>67. snow</td>
<td>92. yellow</td>
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<td>18. egg</td>
<td>43. mother</td>
<td>68. stand</td>
<td>93. full</td>
</tr>
<tr>
<td>19. grease</td>
<td>44. mountain</td>
<td>69. star</td>
<td>94. moon</td>
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<tr>
<td>20. father</td>
<td>45. name</td>
<td>70. stone</td>
<td>95. brother</td>
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<td>21. feather</td>
<td>46. narrow</td>
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<td>22. fire</td>
<td>47. new</td>
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<td>97. dance</td>
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<td>23. fish</td>
<td>48. night</td>
<td>73. thin</td>
<td>98. pig</td>
</tr>
<tr>
<td>24. flower</td>
<td>49. not</td>
<td>74. tree</td>
<td>99. sister</td>
</tr>
<tr>
<td>25. good</td>
<td>50. old</td>
<td>75. vomit</td>
<td>100. work</td>
</tr>
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1.4 Historical Background of CSL and TSL

Both CSL and TSL have complex histories, but that for CSL has not been well-documented. As a result, CSL history is still largely unknown, whereas TSL has been better documented. Still unclear is the extent of language contact between CSL and TSL.

Concerning the history of Chinese Sign Language, most existing research focuses on deaf education and pedagogy rather than on the linguistic development of the language. The earliest references are to Rev. Charles Rogers Mills and his wife, Annette
Thompson Mills, two Americans who went to China and established Chefoo School for the Deaf in 1887, the first such documented school in China (Lytle et al. 2005/6: 459). Since that time, an oral approach to teaching has continued to be the dominant approach promoted by Chinese governments and by educators in China (Yang 2002, cited in Lytle et al. 2005/6: 459). There is currently no documentation on whether American Sign Language might have played a part in the development of CSL.

Half a century later, the Wushan School for the Deaf in Hangzhou became the first school for the deaf founded by deaf Chinese people in 1931 (Dai and Song 1999, cited in Lytle et al. 2005/6). As with many early schools for the deaf, the school presented a strong academic curriculum comparable to that provided to hearing children. By 1949, when the Chinese Civil War came to an end and the People’s Republic of China was established under the leadership of Mao Zedong, 42 schools for the deaf were known to exist in China. Many of these were private institutions that had been started by deaf people and many hired deaf teachers. About 2,400 students attended schools for the deaf in China at that time (Piao, 1992, cited in Lytle et al., 2005/6). The approach taken by early Christian schools, and a popular adoption of the French manual alphabet, influenced many of the early deaf teaching institutions in China.

Lytle et al. (2005/6) note the establishment of a government-led China Deaf Welfare Organization in Beijing in 1953 to address the needs of the deaf population. Shortly thereafter, in 1955, Zu Zhengang became the first deaf Chinese person to matriculate at Gallaudet College, where he received a B.A. degree in sociology, having
studied under a scholarship provided by Yale University. Zu returned to China in 1956 and taught at the Shanghai Technical School for Deaf Youth and the Shanghai Number 1 School for the Deaf (Yang 2002, cited in Lytle et al. 2005/6).

Piao (1992, cited in Lytle et al., 2005/6: 459) observed that by 1965, China had “266 schools for Deaf and/or blind, with more than 23,000 students and 4,000 teachers and staff.” However, the arrival of the Cultural Revolution in 1966 disrupted education across China, forcing schools to close and ending teacher education and research. Over the next ten years only three more schools for the deaf would be established (Lytle et al., 2005/6).

Lytle et al. (2005/6) noted that it was not until 1988 that China’s first college for students with disabilities was established in Changchun, Jilin Province. Many deaf students study there today, but they can only major in art-related subjects. Upon graduation, a few of them have gone on to prominent positions. Since 1988, three more special education colleges have been established, but all have limited curricula for deaf students that focus on art and computer graphics, showing a continuing trend of not providing complete educational opportunities to deaf Chinese.

The sign language used in schools for the deaf in China today can best be described as Signed Chinese or Sign Supported Chinese (Callaway 1999, 2000; Wu et al. 1999, cited in Lytle et al. 2005/6). Signed Chinese uses the same word order as spoken Chinese. During class, Signed Chinese is often produced simultaneously with spoken Chinese. This method is frequently referred to in China as “bilingual education.” Recently, a growing number of deaf and hearing people have asserted that “Signed
Chinese” is a more accurate description of the signing promoted by educators, due to its differences from naturally-occurring forms of Chinese Sign Languages (Wu et al. 1999; Zhang & Shen 2000, cited in Lytle et al. 2005/6).

Research on CSL is founded upon the work of Dai Mu. A deaf person himself, he is widely considered the founding father of deaf education and research in modern China. Thanks in large part to Dai Mu’s early contributions, interest in sign language research and in CSL is growing in China. This is shown by a national CSL conference held in December 2002 in Shaoxing, Zhejiang Province, and attended by more than 100 people, many of whom were deaf. Recently, one former teacher of the deaf has established a CSL research lab at Fudan University in Shanghai, with new research also being conducted elsewhere in China, in Nanjing, Dalian, and Shaoxing (Lytle et al., 2005/6).

Having briefly discussed the history of CSL, mainly on education, it is easy to see that the linguistic research on CSL is at its infancy. The research on Taiwan Sign Language, however, has been much more extensive. We will now briefly turn to a look at its history.¹

Smith (2005) traced the history of Taiwan Sign Language back nearly 100 years to the time of the establishment of the first formal schools for the deaf on the island of Taiwan (Smith 2005). The first two formal schools were both established during the time of the Japanese occupation of Taiwan (1895-1945). These schools would become the focal points for the propagation of the two primary varieties of TSL. The southern variety is seated in the Tainan School, which was established in 1915 in the southern city of Tainan. The other variety is based in the Taipei area, where a school for the deaf was first
founded in 1917. Over the intervening years the language has undergone changes that have been influenced not only by Japanese Sign Language, but also by Chinese Sign Language, Hong Kong Sign Language, and American Sign Language. Throughout the course of these changes the language has maintained strong similarity to the sign languages of Japan and Korea; however, as a result of other influences and internal changes, TSL has developed some characteristics of its own.

According to Smith (2005), there is little evidence of any sign languages that may have existed prior to the occupation of Taiwan by Japan. Although there is some evidence that residual elements of native sign languages persist in modern TSL—particularly in place names—the language known today as TSL is composed primarily from Japanese signs. From the time of the founding of the two main schools until the final expulsion of Japan from Taiwan in 1945, there were few major differences within Taiwan Sign Language. The primary discrepancies came from the fact that the Taipei school teachers mostly used the Tokyo variant of JSL, while the Tainan teachers tended to use the Osaka variety of JSL. Despite this, there were few significant differences in TSL from one region to another (Smith 2005: 188).

Smith (2005: 139) further noted that after the turnover of Taiwan to the Republic of China at the end of World War Two, things were poised to change drastically for TSL, as all the Japanese teachers were sent back to their homeland. However, the presence of native Taiwanese speakers of JSL in both the Taipei and Tainan schools led to a continued uniformity for the next four years.

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1 The history of Taiwan Sign Language in this section is based on Smith (2005).
All that changed in 1949 when floods of refugees entered Taiwan from mainland China. Mainland Chinese teachers began to teach elements of CSL in the Taiwanese schools where they were hired. Of particular note is the introduction of CSL-styled fingerspelling, and the requirement that students in the schools relearn sign language to conform more closely with CSL standards. Over the intervening years there were further developments as deaf students from Hong Kong began to come to Taiwan to study, and as the need for teachers of Mandarin fluent in CSL and TSL arose. Finally, in more recent years, there have been a fair number of signs adopted from other languages, such as ASL, used primarily for pedagogical and philological purposes (Smith 2005: 189). This series of developments, built upon a foundation of relatively standard Tokyo and Osaka varieties of JSL have led to the form of TSL that is used today by approximately 30,000 deaf persons in Taiwan. Today, TSL continues to change and develop as it interacts with other sign languages, including CSL.

CSL and TSL share an interesting place in the study of sign languages. Because both are relatively new languages, and because research into both is still scant, there does not yet exist any detailed, systematic comparative study of CSL and TSL. While TSL is overwhelmingly influenced by JSL, we do not yet have an understanding of the sources and development of CSL, a naturally-occurring form that has been heavily influenced by the wide variation within China, as well as by the government-led use of ‘Signed Chinese’ in deaf education, especially for the better educated CSL signers.
CHAPTER 2

INTRODUCTION TO SIGN LANGUAGE
PHONOLOGY AND MORPHOLOGY

This chapter is a brief introduction to the phonology and morphology of sign language with examples from CSL and TSL. The chapter begins with an introduction to Stokoe's (1960) system on American Sign Language in section 2.1, and will examine three phonological parameters, namely, tab (location), dez (handshape), and sig (movement), using examples from CSL. Included in that section is a fourth parameter, orientation, which is observed by Stokoe (1960) and formally introduced by Battison (1973, cited in Wilbur 1980; also see Battison et al. 1975, cited in Wilbur 1980). How orientation applies to CSL and TSL signs will be demonstrated. The description of the four parameters is then followed by a study of some phonological processes, discussed in section 2.2, based on Valli et al. (2005), with examples from our corpus. Section 2.3

\[2\text{ Over the years since the 1980s, sign language phonology has adopted phonological models in the non-linear framework that is used for the analysis of the phonological systems of spoken language. Non-linear phonological studies of ASL, where the greatest amount of research has been conducted, include Corina and Sandler (1993), Sandler (1989, 1999), Brentari (1995), Sandler and Lillo-Martin (2006), and others. Sandler and Lillo-Martin (2006), for example, provide a very informative unit on sign phonology, including some of the pioneering studies, such as Liddell and Johnson (1989). This thesis uses the basic phonological parameters established by Stokoe (1960). Future research will explore the non-linear approach to sign phonology of CSL and TSL.} \]
presents a discussion of handedness, an important issue for the current study. The chapter ends with Section 2.4, a brief study of morphology focusing on compound signs. The introduction to sign phonology and morphology in this chapter will form the foundation for developing a model in Chapter 4 for the comparison of the lexicon of sign languages. The model is developed using CSL and TSL as the two sign languages chosen for comparison.

2.1 Phonological Parameters (Stokoe (1960) and Battison (1973))

William C. Stokoe, a pioneer in the study of American Sign Language, proposed in 1960 to analyze ASL using three parameters, which he termed *tabula*, abbreviated as *tab* (location); *designator*, abbreviated as *dez* (handshape); and *signation*, abbreviated as *sig* (movement). Stokoe’s system challenged the conventional belief at the time that signs language could not be analyzed in the same way as spoken language. His methodology revolutionized the field and paved the way for future research in sign language. An important extension of Stokoe’s system was made by Battison (1973, cited in Wilbur 1980) in his inclusion of orientation—that is, the orientation of the palm—as a fourth parameter. A more detailed description of these four parameters will be provided in the following two subsections. These four parameters form the core of the current model.

2.1.1 Stokoe’s Phonological Parameters (*Tab, Dez, Sig*)

William C. Stokoe (1960) analyzed sign formation in ASL and devised the first system for describing the signs in that sign language. Stokoe named his system *cherology,*
which is analogous to the word “phonology” used in analyzing spoken language. This system consists of three parameters, or *cheremes* (from the Greek word *cheir*, for hand). His three parameters are: the location of the sign (*tabula* or *tab*), the handshape for forming the sign (*designator* or *dez*), and the movement of the body part forming the sign (*signation* or *sig*). Stokoe proposed that the three parameters are, by themselves, meaningless elements, but can combine simultaneously to form signs in sign language in ways similar to the combining of phonemes to form meaningful units in spoken language.³ In Stokoe’s system, there are twelve *tabs*, nineteen *dezes*, and twenty-four *sigs* (Valli et al. 2005).

The three parameters, *tab*, *dez*, and *sig*, can be applied to CSL signs by analyzing the CSL sign, *GREEN*, which is produced using one hand (Figure 2.1). From the figure, one can see that the *tab* is the “’” in front of the signer (that is, the unmarked location for signing). The *dez* is the index and middle finger extended from the closed fist and then separated. The *sig* is the index and middle fingers moving up and down alternatively.

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³ Stokoe’s early studies on ASL were conducted in the American Structuralist tradition; hence, the analogous model in spoken language was phonemics, and not generative phonology, with distinctive features and so forth. One crucial difference between phonemes and Stokoe’s *cheremes* is that the former are linearly-ordered sequential units, while the latter are simultaneous units. Hence, two major changes in recent work on sign phonology that treat the phonological structure of sign language analogous to that of spoken language is the addition of sequentiality and the adoption of the non-linear framework of autosegmental phonology—including syllable structure, feature geometry, prosodic structure, and so forth—with adjustments to study the structure of another linguistic modality, that of sign language.
GREEN (CSL)

*tab:* in front of signer
*dez:* index and middle fingers extended from closed fist and separated
*sig:* index and middle fingers move up and down alternatively

Figure 2.1: CSL sign GREEN

There may be more than one *sig* in a sign, appearing either simultaneously or sequentially. In both the signs BLACK (Figure 2.2) and BIRD (Figure 2.3), there are two *sigs*. In the case of BLACK, the two *sigs* are simultaneous, namely, contact with the *tab* and movement on it. In the case of the sign BIRD, there are two sequential *sigs*: the index fingers of one hand repeatedly tap the thumb, and then the open, flat hands flap up and down.

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4 To meet the Institutional Review Board (IRB)’s exemption requirements, the faces of the signers in this thesis are partly obstructed to hide their identity.

5 The CSL sign BIRD is a compound sign. The issue of compounding will be discussed in section 2.5.
**BLACK (CSL)**

| tab:  | forehead |
| dez:  | index finger extended from closed fist |
| sig:  | dez moving to contact with tab and moving back and forth slantwise from temple to the center of the forehead |

Figure 2.2: CSL sign BLACK

---

**BIRD (= BEAK^BIRD-FLY) (CSL)**

<table>
<thead>
<tr>
<th>BEAK</th>
<th>BIRD-FLY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>tab1:</strong></td>
<td>in front of mouth</td>
</tr>
<tr>
<td><strong>dez1:</strong></td>
<td>thumb and index finger extended from closed fist</td>
</tr>
<tr>
<td><strong>sig1:</strong></td>
<td>index fingers and thumb touching and releasing</td>
</tr>
<tr>
<td><strong>tab2:</strong></td>
<td>both sides of torso</td>
</tr>
<tr>
<td><strong>dez2:</strong></td>
<td>open flat hands with fingers together</td>
</tr>
<tr>
<td><strong>sig2:</strong></td>
<td>dez'es flapping up and down at wrist</td>
</tr>
</tbody>
</table>

Figure 2.3: CSL compound sign BIRD
2.1.2 Battison's Phonological Parameter for Orientation

A fourth parameter that is added to Stokoe's system is orientation, which refers to the orientation of the palm. Not formally proposed by Stokoe in his research, it was later added to the Stokoe system by Robbin Battison (1973, cited in Wilbur 1980). The parameter, orientation, which is needed for ASL, is also needed in other sign languages. For example, in CSL, the signs SIT and LIE-ON-BACK (Figures 2.4 and 2.5) are identical except for the orientation of the palm: the sign SIT has the palm facing left, while the sign LIE-ON-BACK has the palm facing upward.\(^6\) For this study, orientation is important both because it serves to contrast two signs in a language and because the minimal pair, SIT and LIE-ON-BACK, is also part of the current CSL and TSL corpus.

<table>
<thead>
<tr>
<th>SIT (CSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>tab</strong>: open flat left hand</td>
</tr>
<tr>
<td><strong>dez</strong>: thumb and little finger extended from fist</td>
</tr>
<tr>
<td><strong>sig</strong>: dez moving to contact with tab</td>
</tr>
<tr>
<td><strong>ori</strong>: palm facing leftward</td>
</tr>
</tbody>
</table>

Figure 2.4: CSL sign SIT

---

\(^6\) Because the CSL sign LIE-ON-BACK is missing from the video database, the minimal pair, SIT and LIE-ON-BACK in Figures 2.4 and 2.5, is obtained from the online *Chinese Sign Language* (2005).
LIE-ON-BACK (CSL)

- tab: open flat left hand
- dez: thumb and little finger extended from fist
- sig: dez moving to contact with tab
- ori: palm facing upward

Figure 2.5: CSL sign LIE-ON-BACK

2.2 Phonological Processes

The parameters introduced in section 2.1 provide the basic phonological structure. In addition, since Stokoe’s seminal work in the 1960s, scholars researching on sign phonology have treated signs in ways closer to spoken language phonology, including sequentiality of segments. While Stokoe viewed the signs in ASL as being simultaneous units rather than sequential units that are present in spoken language, more recently, sequentiality of segments have been incorporated into frameworks such as the Movement-Hold model of Liddell and Johnson’s (1989, cited in Valli et al. (2005) and in Sandler and Lillo-Martin (2006)). In Liddell and Johnson’s model, for example, signs
consist of hold segments and movement segments that are produced sequentially. The current study adopts the position that the components of signs may be sequential as well as simultaneous.

Having discussed the phonological structure of signs in section 2.1, and the sequentiality of components within a sign, we will next discuss ways in which sign structure may vary due to phonological processes. When the components of a sign interact with each other, they may transpose their ordering, or adjacent components may influence each other. Some phonological processes presented in Valli et al. (2005) include movement epenthesis, hold deletion, metathesis and assimilation. Two of these, from Liddell and Johnson’s Movement-Hold model, is presented here, namely, movement epenthesis and hold deletion, to illustrate phonological processes.

2.2.1 Movement Epenthesis

Movement epenthesis refers to when a movement segment is added between the last segment of one sign and the first segment of the next sign when signs occur in sequence (Valli et al. 2005).

Movement epenthesis is illustrated in the compound, THINK\$SAME, meaning ‘it’s like, for example.’ The compound sign is composed of the signs, THINK and SAME. A movement segment is added between the final hold of THINK and the first movement of

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7 See also Sandler and Lillo-Martin (2006) for more recent developments in sign phonology since Liddell and Johnson’s model.

8 The issue of compound sign will be discussed in section 2.5. The phonological process also applies to compound signs.
SAME. We can see from this example that movement epenthesis takes place word-internally, between two signs that form the compound (Valli et al. 2005: 59).9

An example in CSL of movement epenthesis is shown in sign WIFE (Figure 2.6). This is a compound sign consisting of the sign FEMALE followed by the sign MARRIAGE (WIFE = FEMALE^MARRIAGE). In combining the two signs to mean ‘wife,’ the right hand must move from the ear to the space in front of the signer in order to create the sign for ‘wife.’ This necessary movement from the ear to the front of the signer shows internal motion within a sign.

<table>
<thead>
<tr>
<th>WIFE (= FEMALE^MARRIAGE) (CSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMALE</td>
</tr>
<tr>
<td>tab1: right ear</td>
</tr>
<tr>
<td>dez1: closed fist with thumb extended</td>
</tr>
<tr>
<td>sig1: dez moving to contact with tab</td>
</tr>
<tr>
<td>ori1: palm facing outward towards signer</td>
</tr>
<tr>
<td>MARRIAGE</td>
</tr>
<tr>
<td>tab2: in front of signer</td>
</tr>
<tr>
<td>dez2: closed fists with thumbs extended</td>
</tr>
<tr>
<td>sig2: thumbs flexing downward simultaneously</td>
</tr>
<tr>
<td>ori2: palm facing towards signer</td>
</tr>
</tbody>
</table>

Figure 2.6: Movement epenthesis in the CSL sign WIFE (= FEMALE^MARRIAGE). (Note the change in location of the right hand from FEMALE to MARRIAGE.)

9 Note that there are alternative analyses to Liddell and Johnson's hold deletion and movement epenthesis (cf. Sandler and Lillo-Martin 2006).
2.2.2 Hold Deletion

Hold deletion refers to the elimination of hold between movements when signs occur in sequence. Hold deletion is illustrated in the sequence of signs for the compound sign, LOOK^STRONG (Valli et al. 2005: 59). The structure of the sign LOOK is M H (that is, Movement – Hold), and the structure of the sign STRONG is H M H (Hold – Movement – Hold). When the two signs occur in sequence, the last hold of the sign LOOK and the first hold of the sign for STRONG are eliminated, and movement is added between the two signs, such that the resulting structure is M M M H (Movement – Movement – Movement – Hold). We can see from this example that the hold deletion takes place word-internally, between two signs that form a compound.

An example of hold deletion in CSL is shown in the compound sign for HUSBAND (Figure 2.7). This is a compound sign consisting of the sign MALE followed by the sign MARRIAGE (HUSBAND = MALE^MARRIAGE). The structure of the sign MALE is H M H (Hold – Movement – Hold), and the structure of the sign MARRIAGE is H M H (Hold – Movement – Hold). In combining the two signs to mean ‘husband,’ the last hold of the sign MALE is eliminated, so the resulting structure is Hold – Movement – Hold – Movement – Hold.
2.3 Handedness

This section discusses handedness, a concept that is crucial for an adequate description of sign phonology. Battison (2005 [1978]: 197-198) posits six types of signs, of which the first five types pertain to handedness, and will be addressed here.¹⁰ These five sign types can be grouped into two categories with respect to one-handed signs versus two-handed signs. There are two types of one-handed signs described as follows: (1) one hand moves without contact, and (2) one hand contacts the body in any place except the opposite hand. There are three types of two-handed signs, described briefly as follows: (1) both hands move in identical motor acts; (2) both handshapes are identical.
but only one hand is moves and is active; and (3) only one hand moves, the active, or dominant hand, while the handshape of the passive (non-moving, non-dominant) hand is restricted to one of a limited set of the possible handshapes.

Deuchar (1984: 55) categorizes two-handed signs somewhat differently from Battison:

“There are two-handed signs, of two types: (1) where both hands move and (2) where the left or non-dominant hand remains stationary, and the dominant hand acts upon it. In type (1) both hands are considered to form a double dez; and in type (2) the stationary, non-dominant hand is considered to be the tab while the other is dez.”

Deuchar’s distinction between double-handed and two-handed is exhibited in CSL. For example, the sign ALL (Figure 2.8) is a double-handed sign; the two hands perform identical motor acts, moving symmetrically (in mirror-image fashion).

---

10 The sixth type of signs proposed by Battison pertains to cases involving compounds, namely, signs that are combinations of the two or more of the other five types of signs.
The sign **STAND** (Figure 2.9) is a two-handed sign in which the left hand is a stationary hand or non-dominant hand, and the right hand acts upon it.
A two-handed sign without a dominant hand is found in the TSL corpus but not in the CSL corpus. The case is TSL sign BIRD (Figure 2.10). This is a two-handed sign with different \textit{dez}es and does not contain a dominant hand versus a non-dominant hand. As can be seen from Figure 2.10, both the left hand and right hand are equally important; hence, this sign is neither a double-\textit{dez} sign nor is it a standard two-handed sign with a dominant hand and a non-dominant hand.\footnote{Note that in addition to identifying the types of handedness, Battison (2005 [1978]: 199-200) also proposes two conditions, the Symmetry Condition and Dominance Condition. The Symmetry Condition applies to the signs where both hands move; it specifies that the handshapes and movements for both hands must be identical, and that the orientations and movements of both hands must be identical or polar opposites (mirror images). The Dominance Condition—which applies to two-handed signs in which the handshapes are not identical—specifies that the non-dominant hand must remain static while the dominant hand produces the sign. Hence, two-handed signs, such as BIRD in TSL, would violate Battison’s Dominance Condition.} It is not clear at this point if CSL also has that kind of two-handed signs.
BIRD (TSL)

\( \text{tab1: in front of mouth} \)
\( \text{dez1: closed fist with index finger and thumb extended} \)
\( \text{sig1: thumb and index finger opening and closing twice} \)
\( \text{ori1: palm facing away from signer} \)

\( \text{tab2: left side of torso} \)
\( \text{dez2: open flat hand with fingers together} \)
\( \text{sig2: dezes flapping up and down twice at wrist} \)
\( \text{ori2: palm facing downward} \)

Figure 2.10: TSL sign BIRD

From the discussion above, it can be seen that a distinction needs to be made between two-handed signs and double-handed signs. Hence, it is proposed here that a three-way distinction be made concerning types of signs based on handedness in the articulation of simple (i.e., non-compound) signs: (1) one-handed signs; (2) two-handed signs, involving a dominant (active) hand and a non-dominant (passive) hand; and (3) double-handed signs, in which the two hands act in unison. Note that this three-way distinction does not take into consideration the exceptional case of TSL BIRD.
2.4 Morphology: The Case of Compounding

The study of the morphology of a sign language is an important part of a systematic study of a sign language's lexicon. In this thesis, only a brief introduction to compounding is presented in order to describe some cases of compound signs in the corpus. As in spoken language where compound words are formed when two words are joined to form a new word, compound signs are formed when two signs join to form a new sign. The combination of two signs creates a new meaning. In order to discuss the special issues involving compound signs, we first need to define compound signs, distinguishing these compositionally-complex lexical units from units that form phrases. For guidance we can turn to Bellugi and Klima (1979: 206):

“there are several criteria for determining whether composites are functioning as single lexical units in ASL rather than as two signs in phrasal relation: (1) unlike a sign in a phrase, a member of a compound cannot serve as a constituent in a syntactic construction; (2) like a single sign, a compound is an indivisible unit and cannot be interrupted by other signs; and (3) like a single sign, a compound (as a unit) can undergo certain grammatical operations that cannot extend over phrases.”

“in sum, that compound signs – but not entire two-sign phrases – can undergo the same grammatical processes as individual signs is an unambiguous indicator that the parts of a compound are indeed bound together, not only semantically but also structurally, as a single lexical unit.”

In CSL, an example of a compound sign is HUSBAND (Figure 2.11).

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12 See, for example, Valli et al.’s detailed presentation of the morphology of sign languages, dealing with both inflectional and derivational morphology of ASL.
HUSBAND (=MALE^MARRIAGE) (CSL)

<table>
<thead>
<tr>
<th>MALE</th>
<th>MARRIAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>tab1</em>: space next to ear</td>
<td><em>tab2</em>: in front of signer</td>
</tr>
<tr>
<td><em>dez1</em>: open flat hand with fingers together</td>
<td><em>dez2</em>: closed fist with thumbs extended</td>
</tr>
<tr>
<td><em>sig1</em>: dez moving from back to front</td>
<td><em>sig2</em>: thumbs flexing downward</td>
</tr>
<tr>
<td><em>ori1</em>: palm facing towards signer</td>
<td><em>simultaneously</em></td>
</tr>
<tr>
<td></td>
<td><em>ori2</em>: palm facing towards signer</td>
</tr>
</tbody>
</table>

Figure 2.11: CSL compound sign HUSBAND (=MALE^MARRIAGE)

The sign HUSBAND is a compound sign that is composed of two signs, the sign MALE and the sign MARRIAGE (HUSBAND = MALE^MARRIAGE). The two signs form a lexical unit. As with compounding in spoken language, this word-formation process is a very productive one in CSL and TSL for the creation of new words in the lexicon.

2.5 Summary

The linguistic study of sign language is a relatively new field, with most research conducted on ASL since Stokoe’s seminal studies in the 1960s. The identification of phonological criteria for analysis of sign language in this study is based largely on
Stokoe’s (1960) study of the three parameters—*tab* (location), (handshape), and *sig* (movement)—supplemented research conducted by Battison’s (1973, cited in Wilbur 1980) who added a fourth parameter, orientation. The three “traditional” parameters, together with the fourth parameter of orientation, are needed for contrastive purposes in distinguishing the meaning of one sign from that of another, including in CSL and TSL.

This chapter also examined some phonological processes, and provided examples from our corpus. Further sign phonology research would be needed for a more detailed study of the various kinds of phonological processes that are present in CSL and TSL. Moreover, different theoretical models would also provide different analyses of what constitute phonological processes and what might be treated as phonetic phenomena. One important concept that is discussed in this chapter is handedness, which deals with whether a sign is one-handed, two-handed (having a dominant and non-dominant hand), or double-handed (in which the hands act in unison). In addition, the TSL corpus contains one sign—that for *bird*—that does not fit any of the three types of signs. Nonetheless, the three-way distinction is maintained for this study, as it suffices to categorize almost all of the signs in CSL and TSL corpus. More research is needed to determine the extent to which TSL and/or CSL (or other sign languages) shows phenomena similar to the TSL *bird* example, and whether a fourth distinction is needed with respect to handedness.

The chapter also dealt briefly with morphology in CSL and TSL, focusing on compounding, with examples of compound signs in this chapter being *husband* and *wife*.

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13 In addition to the criteria outlined in Bellugi and Klima (1979), note that compound signs, as opposed to signs in phrases, can be analyzed as being subject to the Lexical Integrity Hypothesis (Jackendoff 1972), analogous to compounds in spoken language.
While most of the lexical items in the current CSL and TSL corpus are morphologically simple signs, there is, nonetheless, about 10% in each corpus that are compound signs. Hence, compounding is discussed in this chapter in order to better describe the internal organization of the components that make up compound signs in CSL and TSL corpus.
CHAPTER 3

CROSS-LINGUISTIC LEXICAL COMPARISONS

Linguistic studies of sign languages have primarily been synchronic, such as the investigation of the linguistic structures of a given sign language.\textsuperscript{14} Cross-linguistic, synchronous studies also exist, such as Deuchar's (1984) comparison of ASL and British Sign Language (BSL), and so forth. Alternatively, the linguistic structure of signs in another sign language might be the source for gaining a better understanding of deaf signers' intuition of the phonotactics of their own sign language, as in the case of a relatively early study by Bellugi and Klima (1979), which used signs in the Hong Kong variety of Chinese Sign Language (CSL) as stimuli in a psycholinguistic experiment on ASL signers.\textsuperscript{15} There are also spoken-sign language, cross-modality comparative studies, such as Sandler and Lillo-Martin (2006), which delve into a formal exploration into

\textsuperscript{14} See, for example, references cited in Chapter 2 and sources therein.

\textsuperscript{15} Bellugi and Klima (1979: 150) tested the extent of internal constraints of ASL by comparing it with the signs of the Hong Kong variety of CSL to determine whether there are structural differences that might distinguish the signs of those two sign languages. Two questions that they posed were the following: "First, is it possible, on the basis of analysis and the intuitions of deaf signers, to identify gestures in another sign language which are excluded as ASL sign forms? Second, presented with sign forms that occurring in their own language, can naive untutored deaf signers make judgments that would separate those that are possible forms in their language from those that are impossible forms?" Note that they selected CSL because both the values of the sign parameters in that sign language and the combinations of the values were "alien" to ASL. (In other words, the likelihood is that ASL and CSL (or, at least the Hong Kong variety that Bellugi and Klima observed) are likely to be from totally different language families.)
linguistic universals that pertain to spoken and sign language, using mainly ASL (because it has been the subject of the most intensive theoretical research and over the longest time period), but extending also to other sign languages that have undergone rigorous theoretical research.

Historical linguistic research on sign languages, by contrast, has been much more limited. A seminal study on ASL is Frishberg's (1975) article that charted some cases of historical changes in ASL. Sign language research comparable to historical reconstructions that use the comparative method, for example, appears to be rare or non-existent.16 This is partly due to the lack of detailed descriptions of many sign languages, including CSL and TSL. Furthermore, as Chapter 1 reveals, there is scant knowledge of the history and origins of such sign languages as CSL and its subvarieties. The fact that sign language is typically not learned at birth further complicates a study of historical changes analogous to sound change and other rule-governed, structurally-conditioned, linguistic changes in the spoken language.

In what appears to be the scarcity, if not absence, of historical, comparative approach to sign language analogous to investigations of proto-languages and different branches of genetically-related spoken languages, one direction of historical linguistic research on sign language, albeit controversial, is the use of lexicostatistics to determine genetic relationships among sign languages (e.g., Woodward 1993a, 1993b, 2000; McKee and Kennedy 2000). A brief introduction to lexicostatistics, which makes use of a

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16 Some comprehensive introductory works on historical and comparative linguistics include Hock (1991), Crowley (1992), and Hock and Joseph (1996).
word list of basic vocabulary items for finding possible cognates, is given in section 3.1. While that approach is for historical purposes of determining genetic relationship between, or among, languages, that same wordlist can also be used in a synchronic study of shared vocabulary items, with no necessary claims of a common historical origin.

The remainder of this chapter deals with the lexicostatistical approach and the criteria that were adopted for the study of a modified word list for determining shared vocabulary items across languages. After section 3.1 introducing lexicostatistics; section 3.2 presents James Woodward's modified Swadesh list of 100 words and his application of lexicostatistics to sign language comparisons; section 3.3 introduces the criteria used by David Mc Kee and Graeme Kennedy for the classification of lexical items in the modified Swadesh list and analysis of several sign languages using the lexicostatistical approach; and section 3.4 discusses some issues in lexical comparisons in sign language.

3.1 Lexicostatistics

Lexicostatistics is used to subgroup languages when there is little research data. Lexicostatistics is the process of comparing the vocabularies of languages and determining the degree of similarity between them. This method relies on two initial assumptions, which will be discussed in turn.

The first assumption is that languages will have a *core vocabulary*, or *basic vocabulary*; that is, the part of the lexicon that is very stable and particularly resistant to change. The core, or basic vocabulary should be least susceptible to borrowing; In other
words, the claim is that there is a universal core vocabulary that includes such items as "pronouns, numerals, body parts, geographical features, basic actions, and basic states" (Crowley 1992: 168-169). This core vocabulary is, moreover, common to all languages and behaves similarly in all languages in terms of its resistance to change. This is an important assumption, because it forms the basis for classifying identical lexical items across languages as *cognates*, words that have developed from a common ancestor.

The second assumption asserts that the core vocabularies of languages undergo change at a relatively constant rate, and that this rate is similar for all languages. These standard lexicostatistical guidelines for genetic relationships of languages are based on the results of historical linguistic studies in 13 languages for which there are written records going back more than 1000 years (Crowley 1992, Gudschinsky 1956, Lehmann 1992).

Given the importance of a core vocabulary for determining genetic relationships and subgrouping within language families, a wordlist of what constitutes the core vocabulary for languages is crucial to this approach. As Crowley 1992: 170) notes, scholars argued over the kinds of words that belong to such a word list and the number of words in that list. Proposals included 100 words, 200 words, and 1000 words. Ultimately, most lexicostatisticians operated with 200-wordlists, as 100 was felt to be too short and 1000 too long. Of the 200-word lists, the most popular was the *Swadesh list*, named after an American list, Morris Swadesh, who drew up the list. (He had actually drawn up both a 100-word list and a 200-word list.)
After a comparison is conducted, the accepted standards for lexicostatistical comparison are as follows: dialects of the same language should have an 81% to 100% rate of cognates, while languages belonging to the same language family should have a 36% to 81% rate of cognates. These percentages have been adopted as the standard measuring tools for lexicostatistical studies.

3.2 Woodward’s (1993a) Modified Swadesh List and Lexicostatistical Analysis

James Woodward has researched extensively on sign languages (see, for example, references in Woodward 1993a), with particular interest in the determining the genetic relationships among sign languages in East Asia and Southeast Asia. Studying sign languages as opposed to spoken languages using the lexicostatistical approach, and recognizing that there are some inherent problems in simply using the Swadesh list, Woodward (1993a: 94) notes:

“Use of the original 200-word Swadesh list in sign language research may result in slight overestimation of the relation of closely related sign languages, moderate overestimation of the relationship of loosely related sign languages, and great overestimation of the relation of historically unrelated sign languages. These overestimations are due to the fact that the original 200 word Swadesh list contains many items, such as body parts and pronouns, that are represented indexically in sign languages.”

To solve these problems, Woodward prepared a special list of 100 words that were derived from the original 200-word Swadesh list by removing most of the potentially indexic signs. This special list is the modified Swadesh list that is presented in Chapter 1 of this thesis and is the list for the lexical items in the CSL and TSL corpus.

Using the modified Swadesh list, Woodward (1993a) compares cognates in the basic vocabulary of South Asian and East Asian sign language varieties to determine the
possible linguistic relationships of South Asian sign languages and East Asian sign languages. By comparing cognates among Delhi, Bombay, Karachi, Calcutta, Kathmandu, Bangalore, Shanghai and Hong Kong, Woodward (1993a: 101) concludes that Hong Kong and Shanghai Sign Languages belong to the same sign language family; Delhi, Bombay, Karachi, Calcutta, and Kathmandu Sign Languages belong to another sign language family; while East Asian sign language varieties and South Asian sign language varieties belong to two distinct language families. His research does not, however, really delve into East Asian sign languages such as TSL, CSL or JSL.

Woodward (1993a) is one of the earliest researchers to examine these relationships; subsequently, he used the same method to test for the relationships between sign language varieties in India, Pakistan, and Nepal (1993b); the sign language varieties in Thailand (1996) and Vietnam (1997); and the genetic relationship between Thailand Sign Language and Vietnamese Sign Language (2000).

While Woodward has drawn conclusions on subgroupings based on the modified Swadesh list, he has not been very specific about his criteria for how to compare for cognates. As an illustration of his approach, we will examine the methods he used in his (1993a) analysis of the East Asian and South Asian languages.

In the comparison of morphologically simple signs such as ‘female or woman’, he examines their “formational or phonological similarities” (Woodward 1993a: 103). According to his analysis, the signs for female/woman\textsuperscript{17} are identical in all five cities—Delhi, Bombay, Karachi, Calcutta, and Kathmandu (Figure 3.1)—and are therefore

\textsuperscript{17} While Woodward (1993a) uses single quotes in his article for signs, these are given here using the convention of small capital letters for consistency in this thesis. The descriptions of the four parameters in
grouped as cognates. Similarly, the signs for FEMALE/WOMAN in both Hong Kong and Shanghai (Figure 3.2) are identical, and are therefore classified as cognates. When comparing across regions, because one group of cognates bears no phonological resemblance to the other group, the signs for FEMALE/WOMAN in sign language varieties in South Asia are classified as non-cognate to the sign language varieties in East Asia. Similarly, the sign for FEMALE/WOMAN in Bangalore (Figure 3.3) bears no phonological resemblance to signs in any of the other cities examined; as a result, the Bangalore sign for FEMALE/WOMAN is classified as non-cognate to the signs in the other seven cities (cf. Woodward 1993a: 103).

<table>
<thead>
<tr>
<th>FEMALE (Delhi, Bombay, Karachi, Calcutta, and Kathmandu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>tab: nose</td>
</tr>
<tr>
<td>dez: index finger extended from closed fist</td>
</tr>
<tr>
<td>sig: dez moving to contact with tab</td>
</tr>
</tbody>
</table>

Figure 3.1: Sign FEMALE/WOMAN used in Delhi, Bombay, Karachi, Calcutta, and Kathmandu (Woodward 1993a: 102)

the figures in this chapter are provided by this author based on the descriptions in the publications. This applies includes the analysis of compounds.
FEMALE (Hong Kong and Shanghai)

tab: ear
dez: index finger and thumb extended and bent from closed fist
sig: dez moving to contact with tab

Figure 3.2: Sign FEMALE/WOMAN used in Hong Kong and Shanghai (Woodward 1993a: 102)

FEMALE (Bangalore)

tab: cheek
dez: fingers together and bent, thumb not extended
sig: dez moving to contact with tab, then moving clockwise in circular motion, relative to the tab

Figure 3.3: Sign FEMALE/WOMAN used in Bangalore (Woodward 1993a: 103)
The comparison of signs for FEMALE/WOMAN is a simple case as it only involves the comparisons among "identical" signs and "different" signs rather than signs that are "similar." Although Woodward does not specify what he means by "phonological resemblance," we can surmise from the pictures of the signs provided, together with his analysis, that his criteria most likely included phonological parameters of *tab*, *dez*, and *sig*. However, because the signs for FEMALE/WOMAN in each major group have different handshapes and are articulated at different locations, they ought to be classified into three separate, non-cognate groups.

The comparisons become more complicated when one considers the sign MOTHER, which is a morphologically-complex sign involving both "phonological and morphological similarities." As Woodward (1993a: 103) observes, the signs for MOTHER in Delhi and Bombay (Figure 3.4) bear both phonological and morphological resemblances; that is, both are compound signs literally meaning 'female parent' and consist of the sign for FEMALE and the sign for PARENT. As a result, he classifies the signs in these two cities as cognates.
MOTHER (=FEMALE^PARENT) (Delhi and Bombay)

<table>
<thead>
<tr>
<th>FEMALE</th>
<th>PARENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>tab1: nose</td>
<td>tab 2: chin</td>
</tr>
<tr>
<td>dez1: index finger extended from fist</td>
<td>dez 2: thumb extended from closed fist</td>
</tr>
<tr>
<td>sig1: dez moving to contact with tab</td>
<td>sig 2: dez moving to contact with tab</td>
</tr>
</tbody>
</table>

Figure 3.4: Compound sign MOTHER used in Delhi and Bombay (Woodward 1993a: 103)

The sign for MOTHER in Kathmandu (Figure 3.5) also a compound sign with the same meaning of 'female parent' is, hence, morphologically identical to the signs in Delhi and Bombay; however, phonologically, it is different. The second morpheme of the sign is different in _tab, dez, and sig_. In Delhi and Bombay, the thumb touches the chin, in Kathmandu, the index finger touches the side of the face near the chin, as shown in Figure 3.5.
**Figure 3.5: Compound sign for mother used in Kathmandu (Woodward 1993a: 104)**

Although neither *tab* nor *dez* in the sign for *parent* in the Kathmandu compound sign for *mother* is identical to the *tab* and *dez* in the sign for *parent* in Delhi and Bombay, Woodward still classifies the signs for *mother* in these three sign language varieties as cognates, arguing that the sign for *parent* in Kathmandu is phonologically assimilated into the handshape and location of the sign for *female*, while such assimilation does not occur in the signs for *mother* in Delhi and Bombay. Through Woodward’s analysis, we see that his comparison is not solely based on phonological criteria such as *tab*, *dez*, and *sig*; rather, he combines phonological similarities with morphological similarities, and two signs could be classified as cognates on the condition...
that morphological similarities outweigh the phonological differences, or in the case that historical evidence favors a genetic relationship. This approach of classifying cognates could be further seen in his classification of the signs for MOTHER in Calcutta, Karachi, Hong Kong and Shanghai.

Phonologically, the sign for MOTHER in Karachi (Figure 3.6) is different from signs in Delhi and Bombay, and also from the sign in Kathmandu, in that none of the three criteria, \textit{tab}, \textit{dez}, and \textit{sig}, are met. Morphologically, the sign for MOTHER in Karachi, as Woodward claims, is related to the signs in Delhi, Bombay, and Kathmandu in that it is also a compound, but meanwhile it varies from them due to a combination of literal meaning of ‘female veiling/respect/greeting’ instead of ‘female parent.’ Woodward (1993a: 105), however, classifies the Karachi sign for MOTHER as cognate with Delhi, Bombay, and Kathmandu based on the following evidence:

“Interestingly, the sign for ‘parent’ in Delhi, Bombay, and Kathmandu has (with a slight change in orientation) undergone a shift in meaning and has become the sign for ‘father’ in Karachi. Once the meaning of the sign for ‘parent’ shifted to ‘father’ in Karachi signing, it was no longer possible to continue to use the same sign in the compound for ‘mother’. This would have resulted in a compound like ‘female father’ for ‘mother’. Another more suitable second part of the compound had to be added. Thus, Karachi now has a compound of ‘female+ veiling (or respect or greeting)’ to indicate ‘mother’. It is thus possible to posit an earlier form of ‘mother’ involving the compound of the signs for ‘female’ and for ‘parent’ in Karachi signing…”

For Woodward the historical conjectures of a possible earlier form wins over the phonological and morphological variance, and those conjectures play an essential role in deciding the genetic relationship of the signs for MOTHER between Karachi and the other three cities discussed earlier.
When Woodward examines the Calcutta sign for MOTHER, instead of comparing it with all the corresponding signs in Delhi, Bombay, Kathmandu, and Karachi, he chooses to compare it only with the Karachi sign, which he claims to be the “most useful” (1993a: 105). He argues that the first parts of the Calcutta and Karachi signs for MOTHER are phonologically and morphologically identical, and the second part of the Karachi sign VEILING/RESPECT/GREETING (Figure 3.6) with the four fingers except thumb extended and placed on the forehead, is probably deleted in the Calcutta sign(Figure 3.7). This deletion, as Woodward explains, results in an upward movement in the Calcutta sign. Based on his argument, he classifies Calcutta and Karachi signs for MOTHER as cognates; and once this pair of cognates is established, he classifies the signs for MOTHER in all the five cities as cognates. It is questionable whether he can use an isolated case of possible deletion to argue for cognates when other historical evidence in support of the analysis is absent. The upward movement could have developed completely independently, or could be a relic from a different proto-sign.
### MOTHER (FEMALE^VEILING/RESPECT/GREETING)(Karachi)

<table>
<thead>
<tr>
<th>FEMALE</th>
<th>VEILING/RESPECT/GREETING</th>
</tr>
</thead>
<tbody>
<tr>
<td>tab1: nose</td>
<td>tab 2: forehead</td>
</tr>
<tr>
<td>dez1: index finger extended from fist, and bent</td>
<td>deb 2: four fingers except thumb extended, may or may not spread</td>
</tr>
<tr>
<td>sig1: dez moving to contact with tab</td>
<td>sig 2: dez moving to contact with tab</td>
</tr>
</tbody>
</table>

Figure 3.6: Compound sign MOTHER used in Karachi (Woodward 1993a: 104)

### MOTHER (Calcutta)

| tab: nose                           |
| dez: index finger extended from fist |
| sig: dez moving to upper right in contact with tab |

Figure 3.7: Sign for MOTHER used in Calcutta (Woodward 1993a: 104)
Although the Hong Kong and Shanghai signs for MOTHER (Figure 3.8) have the same *dez* as those in the sign language varieties in South Asia, Woodward classifies them as non-cognates with the signs in Delhi, Bombay, Kathmandu, Karachi, and Calcutta, because the two groups are morphologically different and have developed independently. Their phonological similarities are, therefore, assumed to be coincidental.

**MOTHER (Shanghai and Hong Kong)**

*tab*: lips
*dez*: index finger extended from fist
*sig*: dez moving to contact with tab

Figure 3.8: Sign MOTHER used in Hong Kong and Shanghai (Woodward 1993a:104)

The criteria Woodward adopts to classify morphologically simple and morphological complex signs into cognate and non-cognate groups are phonological and morphological. The phonological system contains *tab, dez, and sig* (location, handshape
and movement); orientation of the hands and other "phonemic" parameters do not seem to be consistently included in this method of analysis. Furthermore, similar signs are not decided in some consistent way. Still unclear is how two signs are treated when they morphologically simple but phonologically complicated, such as when two signs are formed in such a way that each involves more than one *tab* or *sig* component.

3.3 McKee and Kennedy’s (2000) Criteria and Lexicostatistical Analysis

This section will examine McKee and Kennedy’s (2000) approach, their criteria, and what can be learned from their analytical method for the current study.

McKee and Kennedy used Woodward’s modified Swadesh list of 100 words to compare New Zealand Sign Language, Auslan (Australian Sign Language), British Sign Language and American Sign Language so as to establish the genetic relationships among them. For determining potential cognates, they classified the results of their lexical comparison into three categories: identical, completely different, and related-but-different. Signs that are related-but-different (shortened to simply “related” in their tables) are those with a difference in any one of the parameters of handshape, location, movement, or orientation of the palm (that is, the four parameters of *dez*, *tab*, *sig*, and *ori*). From there, defined as cognates are those signs that are either identical or related-but-different (differing only in one parameter), whereas non-cognates are those signs that are completely different.
Besides the four manual parameters of handshape, location, movement, and orientation of the palm, McKee and Kennedy also added a fifth parameter, "other," which includes the use of the non-dominant hand as the base hand as well as cases of compound signs.

As noted above, McKee and Kennedy combine identical signs with related-but-different signs, those that differ only in one parameter. This combination leads to a higher degree of commonality among British Sign Language (BSL), Australian Sign Language (Auslan), New Zealand Sign Language (NZSL) and American Sign Language (ASL), as shown in Table 3.1:

<table>
<thead>
<tr>
<th></th>
<th>BSL</th>
<th>Auslan</th>
<th>NZSL</th>
<th>ASL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSL</td>
<td>-</td>
<td>87(77+10)</td>
<td>79 (69+10)</td>
<td>31(25+6)</td>
</tr>
<tr>
<td>Auslan</td>
<td>87(77+10)</td>
<td>-</td>
<td>87(77+10)</td>
<td>32(24+8)</td>
</tr>
<tr>
<td>NZSL</td>
<td>79 (69+10)</td>
<td>87(77+10)</td>
<td>-</td>
<td>26(23+3)</td>
</tr>
<tr>
<td>ASL</td>
<td>31(25+6)</td>
<td>32(24+8)</td>
<td>26(23+3)</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3.1: Related Words Among BSL, Auslan, NZSL, and ASL [total common words (identical words + related but different)]

As we can see in Table 3.1, the degree of commonality between BSL and Auslan is increased by 10%, ending up at 87%. The degree of commonality between BSL and NZSL is increased by 10%, ending up at 79%. The degree of commonality between Auslan and NZSL is also increased by 10%, ending up at 87%. The degree of commonality between BSL and ASL is increased by 6%, ending up at 31%. The degree of commonality between Auslan and ASL is increased by 8%, ending up at 32%. The
degree of commonality between NZSL and ASL is increased by 3%, ending up at 26%.

According to standard lexicostatistical guidelines for sub-groupings (Crowley 1992, Gudschinsky 1956, Lehmann 1992), dialects of the same language should have an 81% to 100% rate of cognates. Therefore, BSL, Auslan and NZSL are dialects of the same language family, while ASL belongs to a different language family.

McKee and Kennedy’s methodology is useful in having an objective, measurable basis for analyzing the genetic relatedness of two or more sign languages. To illustrate, both the ASL and BSL signs for BLOOD (Figure 3.9 and 3.10)\textsuperscript{18} have a similar handshape, location, and direction of movement, but in orientation of the palm. McKee and Kennedy thus classify them as related-but-different signs. By this analysis, the signs would be treated as cognates.

\textsuperscript{18} Note that the descriptions of the BSL signs in the figures in this chapter are based on Brien (1992), with the annotation of the four parameters provided by this author, as in the case of other figures here. The sign BLOOD is analyzed in the figures here as compound signs in ASL and BSL. In the case of the BSL sign, the two signs in the compound sign are left unspecified in the figure.
**BLOOD (= RED^BLEED) (ASL)**

<table>
<thead>
<tr>
<th>RED</th>
<th>BLEED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>tab1</strong>: lip</td>
<td><strong>tab2</strong>: non-dominant flat hand</td>
</tr>
<tr>
<td><strong>dez1</strong>: index finger extended from fist</td>
<td><strong>dez2</strong>: open flat hand with fingers spread</td>
</tr>
<tr>
<td><strong>sig1</strong>: dez moving to contact with tab</td>
<td><strong>sig2</strong>: dez1 moving down and away from</td>
</tr>
<tr>
<td><strong>ori1</strong>: palm facing towards signer</td>
<td>signer while changing to dez2</td>
</tr>
<tr>
<td></td>
<td><strong>ori2</strong>: palm facing towards signer</td>
</tr>
</tbody>
</table>

Figure 3.9: ASL Sign BLOOD (Proctor, 1995:65, item 255)

**BLOOD (BSL)**

<table>
<thead>
<tr>
<th>RED</th>
<th>BLEED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>tab1</strong>: lip</td>
<td><strong>tab2</strong>: non-dominant flat hand</td>
</tr>
<tr>
<td><strong>dez1</strong>: index finger extended from fist</td>
<td><strong>dez2</strong>: open flat hand with fingers spread</td>
</tr>
<tr>
<td><strong>sig1</strong>: dez moving to contact with tab</td>
<td><strong>sig2</strong>: dez1 moving down and away from</td>
</tr>
<tr>
<td><strong>ori1</strong>: palm facing towards signer</td>
<td>signer while changing to dez2</td>
</tr>
<tr>
<td></td>
<td><strong>ori2</strong>: palm facing downward</td>
</tr>
</tbody>
</table>

Figure 3.10: BSL sign BLOOD (Brien, 1992:323, item 522)

52
Despite the overall rigoroussness in methodology, there are some potential problems. Five problems will be discussed below.

First of all, the fifth parameter, “other,” is very broadly defined. It includes not only “two handed” signs, but also “compound” signs as well, two types of signs that do not form a natural class.

Secondly, McKee and Kennedy show inconsistency in counting differences in the “other” category for determining the relationship of two signs. In some cases, they encounter a sign where the only difference noted is “other,” with an annotation describing a difference in handedness. This type of sign would be analyzed as “related but different” based on this ‘one’ difference. Conversely, they sometimes encounter certain signs that differ in *tab*, *dez*, or *sig*, as well as a morphological “other” aspect. These signs are sometimes annotated such that the difference in the “other” category is marginalized, and such signs would be identified as cognates on the basis that they only differ in one phonological parameter. Thus, we can see that the category “other” is inherently problematic, in relying on annotation to designate its relative weight in a given comparison. Two examples are given below to illustrate specific instances of this ambiguity involving their fifth parameter of “other.”

The first example of this ambiguity pertains to the sign *dance*. McKee and Kennedy argue that there are two differences between *dance* in ASL (Figure 3.11) and *dance* in BSL (Figure 3.12), namely, orientation and weak-hand (non-dominant hand). As we can see from Figures 3.11 and 3.12, ASL uses the left hand as the base hand, with the right hand moving on it, whereas in BSL, *dance* is a double-handed sign. However, because both signs are morphologically simple, the difference in handedness does not
seem to interfere with the signs' relatedness as cognates. It is evident that the "fifth parameter" is one that requires annotation when it is considered, as some signs may seem to be different, but are actually similar, or vice-versa. In the case of DANCE in ASL and BSL, McKee and Kennedy diverge from their own strict methodology in identifying these signs as cognates.
DANCE (ASL)

*tab*: non-dominant hand
*dez*: index finger and middle finger extended from closed fist
*sig*: dez moving back and forth from left to right above tab
*ori*: palm facing towards signer

Figure 3.11: ASL sign BLOOD (Proctor 1995: 138, item 548)

DANCE (BSL)

*tab*: in front of signer
*dez*: index fingers and middle fingers extended from closed fist
*sig*: hands bent down at the wrists and moving to the left before bending down again at the wrists
*ori*: palm facing towards signer

Figure 3.12: BSL sign DANCE (Brien 1992: 447, item 803)
A second example illustrates a converse problem. The case involves SEA in ASL (Figure 3.13) and BSL (Figure 3.14). McKee and Kennedy note in their appendix that the difference between the two signs is that the ASL sign is a compound and two-handed, whereas the BSL sign is neither a compound nor two-handed. As we can see from Figure 3.13, the ASL signer begins with the right hand at the lip in a certain handshape, and then moves the right hand down to the side of the body, parallel with the left. The two hands then move in unison away from the chest, both in a new handshape. In BSL, as shown in Figure 3.14, the hands make a motion reminiscent of the second movement in ASL.

However, the BSL sign not only lacks the first component of the ASL sign, but also is one handed, and moves in a different direction, in a slightly different manner. The difference in direction of movement was parenthetically noted by McKee and Kennedy. The difference in handedness may have been implied, but it not explicitly noted in their appendix. Hence, it seems that the definition of these two signs as cognates must rely on historical factors, or some other evidence as to the origin of the two signs, since the signs’ actual forms are too different to be unambiguously categorized based on McKee and Kennedy’s method of classification. It can be seen that the reliance on appendices is a weakness in their methodology of analysis. In this case, two signs that are fairly different are identified as cognate because of a single difference in the “other” category, without paying heed to the actual differences subsumed under “other.”
### SEA (=WATER^WAVE) (ASL)

<table>
<thead>
<tr>
<th>WATER</th>
<th>WAVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>tab1: lip</td>
<td>tab2: in front of signer</td>
</tr>
<tr>
<td>dez1: thumb and little finger touching, all other fingers extended</td>
<td>dez2: open flat hands with fingers spread</td>
</tr>
<tr>
<td>sig1: dez moving to contact with tab</td>
<td>sig2: dezes moving away from the signer, while making small up and down undulating movements at the wrists throughout</td>
</tr>
<tr>
<td>ori1: palm facing left</td>
<td>ori2: palm facing downward</td>
</tr>
</tbody>
</table>

Figure 3.13: ASL sign SEA (Proctor 1995: 473, item 1887)

### SEA (BSL)

- tab: in front of signer
- dez: open flat hand with fingers spread
- sig: dez moving to the right, while making small up and down twisting movements at the wrists throughout
- ori: palm facing downward

Figure 3.14: BSL sign SEA (Brien 1995: 573, item 1045)
Returning to issues of problems in the McKee-Kennedy methodology, the third problem to be raised pertains to movement. Movement, it can be argued, is not a single concept, but is actually is another broad term that encompasses a variety of possible subtleties of motion along a number of planes. This is observed by Stokoe (1978) and by Bellugi and Klima (1979). In BSL, movement has, in fact, been further analyzed by Brennan (1992: 23) into finer distinctions:

“Some signs involve movements along one of three axes: vertical directional movements involve the contrast up, down, and up and down; movements along the bilateral axis involve the contrasts right, left and side to side and movements along the horizontal depth axis involve the contrasts towards the signer, away from the signer and to and fro…”

Aside from those major distinctions, there are also a number of minor distinctions that can be identified within the major sets.

To further complicate the concept of movement, there is an additional major category identified by Brennan as “manner”. This “manner” of movement is closely tied to the major distinctions of movement along planes, but deals not with the overall trajectory of the hands but, rather, with the actual subtleties of movement of the fingers, palms, wrists, and so forth (cf. Brennan 1992: 24-25).

Finally, Brennan identifies other subtexts of movement that, in her opinion, straddle a hazy middle ground between movement in space and manner of movement. These subtexts include circular motion (which generally involves a change of direction in space, as well as manner of articulation), and contact between the hands (which is generally a result of, or at least is concurrent with, manner and movement). To be considered also is whether there is a distinction to be found between contact and interaction, as suggested by Brennan. Furthermore, one might point to repetition of
motion as a qualifier, for there are signs to be found in which repetition is clearly an important factor. And, as if all those considerations did not complicate matters enough, Brennan (1992: 24-25) makes the point that aside from simultaneity, there may well be other temporal factors that come into play which have not yet been isolated.

<table>
<thead>
<tr>
<th>FIRE (ASL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>tab:</strong> in front of signer</td>
</tr>
<tr>
<td><strong>dez:</strong> open flat hands with fingers spread</td>
</tr>
<tr>
<td><strong>sig:</strong> dezes moving up and down several times simultaneously</td>
</tr>
<tr>
<td><strong>ori:</strong> palm facing towards the signer</td>
</tr>
</tbody>
</table>

Figure 3.15: ASL sign FIRE (Proctor 1995: 208, item 825)
FIRE (BSL)

*tab:* in front of signer
*dez:* open flat hands with fingers spread
*sig:* dezes moving up and down several times alternately, with the fingers wiggling throughout
*ori:* palm facing towards each other, perpendicular to plane of chest

Figure 3.16: BSL sign FIRE (Brien 1992: 577, item 1060)

The fourth problem with McKee and Kennedy's methodology arises from their speculation that handshape and direction of movement are the most significant factors when considering the relatedness of two signs. However, this speculation is based on their *a priori* decision as to which signs are considered to be related-but-different. Indeed, the designation of relatedness was decided first, followed then by observations of handshape and direction of movement, along with “orientation of the palm [and]...other factors.” Therefore, it seems that because the designation of relatedness is made before observing the degree and areas of similarity, there are many signs that, although preemptively excluded from consideration, may very well qualify as related-but-different. The problem created by this situation in identifying cognates is that two signs with two
categories of differences—say, movement of the fingers and dominant hand—could have been categorized as different despite similarities in movement, orientation, and handshape. Conversely, two signs that are similar in some categories, but which have significantly different handshapes, may be identified as related-but-different, or even treated as cognates. The various aspects of signs ought to bear different weights when considering potential cognates. The sign for DANCE, which differs in two relatively minor categories such as manner of movement and dominant handedness, but which is the same in major categories, such as direction of movement, orientation of the palm, and handshape, is a very likely candidate for relatedness. Similarly, signs that are similar in minor categories, but different in a major category, should be evaluated as less likely candidates for relatedness. McKee and Kennedy's system of undifferentiated weight for parameters of signs needs to be reconsidered.

The fifth and final problem with the McKee-Kennedy method involves some signs that they have been identified as completely different, and yet seem to be so similar that they should be at least considered potential cognates. Two of such signs are STAR and WORK. First, consider the sign STAR in ASL and BSL (Figures 3.17 and 3.18). There is a difference in position, a very small difference in orientation, and a difference in the manner of movement (simultaneity). This tripartite difference suffices to preclude any relationship being seen between the sign in the two sign languages. However, such a conclusion seems counter-intuitive. Whether iconic, or purely historical in nature, there is a definite need to conduct further research on whether these two signs have a common origin. The change in location is relatively minor, from the front of the face to the sides of the head. The change in orientation is likewise very minute—only a slight shift in the
angle of the wrist—so that there is a perceptible downward orientation of the palm.

Finally, movement is not one of direction, and even the manner (of movement) is nearly identical. The only difference is whether the motion is simultaneous or not. Being that the handshape and overall movements are very similar, while the other phonological elements are also very closely related, it is puzzling that these two signs would be treated as completely different without further scrutiny.

---

**STAR (ASL)**

tab: in front of the face
dez: index fingers extended from closed fists
sig: dezies syncopating towards and away from signer in direction of index fingertips
ori: palm facing away from signer and slightly downward

Figure 3.17: ASL sign STAR (Proctor1995: 511, item 2039)
STAR (BSL)

tab: either side of the face
dez: index fingers extended from closed fists
sig: dezses syncopating towards and away from signer in direction of index fingertips
ori: palm facing away from the signer

Figure 3.18: BSL sign STAR (Brien1992: 293, item 449)

The second example is work in ASL (Figure 3.19) and BSL (Figure 3.20). ASL uses closed fists while BSL uses open fists. Perhaps because of the difference in handshape, there is also a difference in orientation in both signs. However, the manner of movement and temporal relationship of the signs is identical. Thus, one would have to look into the historical origins of the signs.
WORK (ASL)
tag: non-dominant closed fist
dez: closed fist
sig: dez lowered to cause right wrist to impact back of left hand twice
ori: palm facing downward and away from signer

Figure 3.19: ASL sign WORK (Proctor1995: 604, item 2412)

WORK (BSL)
tag: non-dominant open flat hand with fingers together
dez: open flat hand with fingers together
sig: dez tapping the tab twice
ori: palm facing towards signer

Figure 3.20: BSL sign WORK (Brien1992: 674, item 1345)
In sum, McKee and Kennedy attempt to establish a systematic method for a lexical comparison across sign languages using the four phonological parameters of handshape, location, movement, and orientation. However, their method encounters problems in cases involving their ambiguously-defined "other" category. The result is that the same "other" category could be used to override what are actual structural differences in the "other" category in order to allow signs with phonological differences to meet the criteria for relatedness; that same "other" category is also used to prevent signs from meeting criteria for relatedness based on structural differences observed in that category.

3.4 Issues in Lexical Comparisons Across Sign Languages

The modified Swadesh list and the studies conducted by Woodward (1993a) and McKee and Kennedy (2000) discussed in this chapter are for determining subgroupings of sign languages based on genetic relationships. McKee and Kennedy (2000: 51) are well aware that the lexicostatistical technique is not unproblematic, as evidenced by their reference to studies on Japan, conducted by Osugi, Supalla and Webb (1998), and on Thailand and Costa Rica by Woodward (1991). Furthermore, McKee and Kennedy (2000: 54) also note their awareness of the controversial nature of the lexicostatistical method and cite Dixon’s (1997) criticism of that method:
“Dixon (1997, p. 36) argued that it is not legitimate to assume that there is a distinction between a so-called core vocabulary that behaves differently from noncore vocabulary; or that the lexicon of all languages is replaced at a constant rate; or even that genetic relations can be derived from lexical studies alone.”

Their response to the criticism of the lexicostatistical method is stated immediately after the above quote concerning their study of ASL and the other three sign languages that they knew were historically related (viz., Auslan, BSL, and NZSL) to each other but not to ASL (p. 54):

“In the present study, the method was used not to model the process of language change but to provide baseline data on the extent to which the four languages shared their lexicons.”

In other words, in emphasizing their interest in investigating the extent to which the sign languages have vocabulary in common, McKee and Kennedy’s focus is actually very synchronically-oriented. This is further evidenced by their discussion of such issues as mutual intelligibility and the practical use that can derive from such knowledge (p. 58):

“ASL has less mutual intelligibility with any of the other three sign languages than they do with each other. This is consistent with the fact that ASL is a separate language from Auslan, BSL, and NZS. ... Establishing the degree of similarity between NZSL, BSL, and Auslan has implications for the use of sign language in professional services and the education of Deaf people in New Zealand. ...”

It is in a similar spirit that the CSL and TSL corpus, consisting of signs from the modified Swadesh list, is used in this thesis. The lexical comparison of CSL and TSL is kept manageable by using a corpus based on a wordlist that is already in use elsewhere in the field (Woodward 1993a, McKee and Kennedy 2000), rather than arbitrarily and randomly selected for the current study. Adopted, with some modifications, for the model to be outlined in Chapter 4 is the basic methodology that McKee and Kennedy used for
determining their three categories, namely, identical, related-but-different, and completely different. In a classification that does not assume genetic relationship (in the case of ASL versus the other three sign languages in their study, for example), a more appropriate three-way categorization is: identical, similar (rather than related, which implies genetic relatedness), and different. McKee and Kennedy’s overall objective and quantifiable approach in their selection of the four phonological parameters provides the foundation for the current model’s use of those four parameters, plus additional criteria, and components that will be introduced in Chapter 4.
CHAPTER 4

TOWARDS A NEW MODEL

Signs have an iconic quality. Iconicity in sign language is a central theme in this chapter, as it forms a major component in the new model proposed here for lexical comparisons across sign languages. For an understanding of iconicity, we begin with Taub’s (2001) definitions of iconicity in section 4.1, together with her discussion of iconic motivation and iconic devices. The idea of iconic motivation and six of Taub’s iconic devices will be shown to be applicable to a comparison of CSL and TSL using the modified Swadesh list. The chapter will then touch briefly on the issue of handedness as it relates to comparison of signs before proposing the new model, which combines iconicity and iconic motivation, handedness, and the four phonological parameters with the methodology in McKee and Kennedy (2000). Examples that apply the model are also presented.

4.1 Iconicity And Iconic Motivation

It has been common practice to downplay the importance of iconicity in sign languages, and some linguists have challenged its presence entirely. As Taub (2001: 37)
explains, in trying to prove that sign languages (ASL, etc.) are true languages, sign linguists during the early period, at least, have felt the need to argue strongly against recognizing iconicity’s presence and importance in sign language.

The earliest attitude toward signed-language iconicity was that sign languages do not have true linguistic structure but only iconicity; as a kind of pantomime. Stokoe argued that ASL does have formal linguistic patterning analogous to spoken languages, and has shown that ASL is a true language. In doing so, minimizing and dismissing of iconicity in sign language became a tradition. Taub (2001:37) observes, “even now, talking about iconicity to Deaf people and sign linguists can be a touchy matter—as if admitting that signed languages do have a lot of iconicity is tantamount to agreeing that they are not languages.”

Several studies conducted in the 1970’s show that iconicity was susceptible to change over time, and that even “iconic” signs could not be interpreted intuitively by non-signers (cf. Hoemann 1975, Frishberg 1979, Klima and Bellugi 1979). Taub (2001:38) recognizes the intent of such studies, suggesting that, “[i]t was of course important to demonstrate that signed languages have linguistic systems as well as iconicity, but the devaluation of iconicity exceeded what was strictly necessary.”

In describing iconicity, Taub (2001) makes an effort to define it not as a universal quality that can be understood intuitively, but rather as an aspect of signs that is informed by human understanding of the world around them. Taub (2001:19-20) states, “[i]conicity is not an objective relationship between image and referent; rather, it is a relationship
between our mental models of image and referent. These models are partially motivated by our embodied experiences common to all humans and partially by our experiences in particular cultures and societies.”

With an understanding of iconicity as a conveyance of a concept motivated by a signer’s mental concept of image and referent, the groundwork is laid for establishing the place of iconicity in sign language. Taub suggests that iconicity’s importance stems from its fundamental relationship to signs, due to its involvement in the creation of signs. Taub (2001:44) outlines a model for describing the creation of iconic signs, saying, “To create an iconic item, 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.”

It is noteworthy that although the meaning of a sign and the associated visual image do not determine the sign’s form, given a certain sign associated with visual images across different sign languages, the forms of this sign in different sign languages might not be the same. Instead, they may bear different types of physical resemblance to the referent’s image. Therefore, as Taub (2001: 8) notes, the nature of these forms “is neither arbitrary nor predictable but rather motivated.” Instead, they are selected initially by different motivations. To illustrate, we will analyze and compare two pairs of signs in CSL and TSL—namely, WORM and TREE—to gain a better understanding of how the different motivations enter into the selection of a referent’s images.

WORM is signed using two different signs in CSL and TSL (Figure 4.1 and 4.2), differences that involve handshape, orientation, and movement. Nonetheless, the two
signs seem to be based on a common iconic motivation. The concept of a small worm-like insect is conveyed in an identical manner in both languages, showing an undulating movement of the hand with a single finger extended.

![Image](image_url)

**WORM (CSL)**

*tab:* in front of the signer  
*dez:* index finger extended from closed fist  
*sig:* dez moving away from the signer with index finger wiggling throughout  
*ori:* palm facing leftward

Figure 4.1: CSL sign WORM
WORM (TSL)

$tab$: in front of the signer
$dez$: little finger extended from closed fist
$sig$: dez moving from right to left with little finger wiggling throughout
$ori$: palm facing towards the signer

Figure 4.2: TSL sign WORM

Tree shows how two iconic signs can have been founded on different motivations. The sign in CSL (Figure 4.3) illustrates the trunk, while the sign in TSL (Figure 4.4) shows the tree as a whole unit. In this case we can see how a concept is represented in two languages with iconic signs but that, due to the differences in perception of the original creators, different motivations have led to forming of different signs in two sign languages.
TREE (CSL)

*tab*: in front of the signer
*dez*: thumbs and index fingers extended from closed fist
*sig*: dezes moving upward
*ori*: palm facing downward

Figure 4.3: CSL sign TREE

TREE (TSL)

*tab*: left hand
*dez*: open flat hand with fingers together
*sig*: dez wiggling back and forth at wrist
*ori*: palm facing leftward

Figure 4.4: TSL sign TREE
As we have seen from analyzing and comparing the signs for WORM and TREE in CSL and TSL, we should now know that there are many different possible iconic representations of a single visual image. One can, for example, observe from a different perspective, represent different parts of the image, or preserve different levels of detail (Taub 2001). Taub (2001: 67-90) develops a series of sign language features that can be used to create iconic representations of different concepts based on her observation and analysis of ASL. These features, totaling ten, are called “iconicity devices.” We will now take a closer at these devices.

4.2 Iconic Devices in Sign Languages

Taub develops ten iconic devices: (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. The importance of iconic devices is explained by Taub (2001: 67):

“ASL’s iconic devices draw on our perception of hands, arms, and fingers as having overall shapes, locations, and movement; on our ability to ‘see’ the path that a moving object traces out in space; on our knowledge that the signer’s body is a human body, like other human bodies in shape and function; on our additional knowledge that animal bodies often resemble human bodies in shape and function; on our ability to recognize the body
movements that go along with particular activities; on our perception that body gestures take place over time and in space; and on our knowledge of the movements of signing itself.”

Among these devices, six of them—are particularly relevant and useful to our comparison of CSL and TSL in this study.\footnote{This full set of iconic devices will be relevant for a comprehensive study of the signs in CSL and TSL. As noted in Chapter 3 concerning the rationale for modifying the Swadesh list, omitted from the modified Swadesh list are precisely these indexical signs that fall into the category of iconic devices that are physical entities representing themselves, namely the first of Taub’s ten iconic devices.}

Therefore, we will take a closer look at the six iconic devices and apply them to our CSL and TSL corpus. In the following subsections, those six iconic devices will be studied in turn with examples from CSL and TSL: (1) articulators represents shape of referent; (2) movement of articulator represents movement of referent; (3) a special set of patterns, representation of body parts; (4) shape of articulators’ path represents shape of referent; (5) locations in signing space represent locations in mental spaces, and (6) size of articulation represents size of referent.

4.2.1 Shape of Articulators Represents Shape of Referent

Signs that make use of this iconic device focus on the shapes of images and encode them into shapes of articulators. This device can also be represented as “shape-for-shape” iconicity (Taub 2001: 69). Taub gives the ASL sign for TREE as an example. This sign uses the non-dominant hand and forearm to represent the ground, the dominant forearm to represent a tree trunk, and the spread dominant hand to represent the branches (Taub 2001). This device can also be found in CSL and TSL corpus. The CSL sign
STAND in CSL (Figure 4.5) is an example to illustrate this iconic device. As we can see from Figure 4.5, the dominant handshape represents a person’s two legs, and the non-dominant hand represents the ground.

<table>
<thead>
<tr>
<th>STAND (CSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>tab: left palm</td>
</tr>
<tr>
<td>dez: index and middle fingers extended from closed fist</td>
</tr>
<tr>
<td>sig: tips of index and middle fingers moving to contact with tab</td>
</tr>
<tr>
<td>ori: palm facing signer</td>
</tr>
</tbody>
</table>

Figure 4.5: An example of “shape of articulators represents shape of referent” (CSL sign STAND)

4.2.2 Movement of Articulators Represents Movement of Referent

Signs that make use of this iconic device focus on the movement of images and encode them into movements of articulators. Taub (2001: 70) observes that this form of iconicity often appears together with shape-for-shape iconicity, in that “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 device could also be found in our CSL and TSL data. The sign for WORM in
TSL (Figure 4.6) is an example to illustrate this iconic device. As shown in Figure 4.6, we can see that the little finger is used to represent the shape of worm, and its wiggling movement represents the image of a worm inching along.

<table>
<thead>
<tr>
<th>WORM (TSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>tab:</strong>  in front of the signer</td>
</tr>
<tr>
<td><strong>dez:</strong>  little finger extended from closed fist</td>
</tr>
<tr>
<td><strong>sig:</strong>  dez moving from right to left with little finger wiggling throughout</td>
</tr>
<tr>
<td><strong>ori:</strong>  palm facing towards the signer</td>
</tr>
</tbody>
</table>

Figure 4.6: An example of “Movement of articulators represents movement of referent” (TSL sign WORM)

### 4.2.3 A Special Set of Patterns: Representation of Body Parts

The importance of body parts is implicitly recognized in Taub’s creation of a separate category for patterns involving parts of the body. The patterns may be based on shape similarity alone (hence, cases of shape-for-shape iconicity), or on similarity of function between articulator and referent. In the case of patterns on form similarity, Taub (2001: 72) subdivides that pattern into three types:

“the signer’s articulators can represent human body parts of the same type (e.g., hands representing hands), animal body parts that correspond to the signer’s articulators on the basis of an overall mapping between the two
body types (e.g., hands representing forepaws), and human or animal body parts that do not correspond to the signer’s articulators (e.g., hands representing human feet)."

The first type can be illustrated by the ASL sign for nose. An example of the second type is that of hands representing forepaws. Sometimes, when an animal’s body parts look different from the corresponding human body parts—or have no corresponding human body parts—ASL signers will combine two kinds of shape-for-shape iconicity to represent these body parts. One kind of shape-for-shape iconicity uses hands to represent the shape of the animal’s body part, and the other kind uses the signer’s body where the hands are placed to represent the animal’s body part (Taub 2001: 74). This can be illustrated by the TSL sign cat (Figure 4.7).

**Figure 4.7:** An example of “representation of body parts” (TSL sign cat)
Figure 4.7 shows two kinds of shape-for-shape iconicity. The signer’s fingers are extended with the tips of index fingers touching the tips of thumbs; this handshape represents a cat’s whiskers. The signer’s cheeks correspond to a cat’s cheeks, and two hands are placed at the signer’s cheeks where the whiskers are on a cat.

The third and final type of the form-similarity patterns, which involves human or animal body parts do not correspond to the signer’s articulators, can be illustrated by the CSL sign STAND (Figure 4.5), given earlier in the chapter. In this example, the hands represent two legs.

4.2.4 Shape of Articulator’s Path Represents Shape of Referent

The iconic device in this section refers to the signer tracing out the referent’s shape in space. Taub (2001: 77) proposes this device based on “our general cognitive ability to look at a moving object and perceive the shape of its path as a whole.”

An example of this path-for-shape device is the sign for MOUNTAIN in TSL (Figure 4.8). As we can see from Figure 4.8, the signer uses his hand to trace the undulation of peaks and valleys in a mountain range.
Figure 4.8: An example of "shape of articulator's path represents shape of referent" (TSL sign for MOUNTAIN)

4.2.5 Locations in Signing Space Represent Locations in Mental Space

This iconic device refers to locations in signing space corresponding to locations in some mental space, either real or imagined. Taub (2001: 81) notes that the ASL sign for I-GIVE-(TO)-YOU changes location of the hands depending on the addressee's relative height to the signer: the shorter the addressee is, the lower the location of the sign's endpoint is.

The CSL sign MOON (Figure 4.9) is an illustration of this device. We can see from the figure that the sign for MOON is above the head of the signer, which corresponds where the moon is in real world. We can also see that the hands trace the shape of the moon, which is the path-for-shape iconicity device analyzed in section 4.2.4.
MOON(CSL)

*tab:* above signer’s head
*dez:* closed fists with index fingers and thumbs extended, with tips of index fingers touching tips of thumbs
*sig:* dezes mirroring outward arcs, concaving down, beginning with hands touching at meat of thumbs and knuckles of index fingers (tracing out a crescent)
*ori:* palm facing away from signer

Figure 4.9: An example of “locations in signing space represent locations in mental space” (CSL sign MOON)

### 4.2.6 Size of Articulation Represents Size of Referent

Taub (2001: 83) notes that the size of the shape in both shape-for-shape and path-for-shape iconicity can be proportionally accurate; that is, “the relative sizes of each part of the shape correspond well to the relative sizes of parts of the referent image.”

Taub further divides the creation process of the size of the referent into two aspects: representing *relative sizes* and *absolute sizes*. The absolute size of the image can be represented in different ways. Three strategies are proposed and discussed by Taub (2001: 83). The first two strategies depend on contextual information; the first strategy makes use of body parts to talk about the sizes of body-part-related things (e.g., bracelet),
while the second sets up a scene to help represent the sizes of the referents in the scene. The third strategy is to indicate explicitly the sizes of the referents by using signs that describe the size of an object, such as signs for BIG, SMALL, etc.

With respect to the aspect of the creation process involving relative sizes, an example from TSL is the sign for MOUNTAIN (Figure 4.8), depicting the relative size of the referent. The peaks and valleys of a range of mountains are schematized and encoded, with the sign’s path depicting the relative sizes of mountains.

Another example is the sign for LONG in TSL (Figure 4.10). We can see that the sign for LONG can show the relative size (or dimension here) of the referent, such as a long necklace, a long rope, etc., by varying the length of the distance between the hands. Longer objects can be demonstrated by further lengthening that distance between the hands.
LONG (TSL)

- **tab**: in front of the signer
- **dez**: closed fist with index fingers extended and curved to touch tips of thumbs
- **sig**: dezes beginning with tips of index fingers touching, then moving away from each other along a horizontal axis
- **ori**: palm facing towards each other

Figure 4.10: An example of “size of articulation represents size of referent” (TSL sign for LONG)

### 4.3 Iconicity And Sign Language Comparison

Iconicity plays an important role in sign languages. It is through iconic motivation, for instance, that one can discern the different bases for the formation of many signs in a sign language. The sign for **WORM** in CSL (Figures 4.1) and the corresponding one in TSL (Figure 4.2) are more similar than the signs for **TREE** in CSL and TSL (Figures 4.3 and 4.4). The same iconic motivation drives the signs **WORM** in CSL and TSL, in the wiggling of the fingers representing the wiggling of the worm’s body. In the case of **TREE**, different motivations are at play. The differences in these two pairs of examples can be readily accounted for through the analysis of their differences in iconic motivation. An
adequate description of a sign language should take into consideration the role of iconicity in that linguistic system, both for a better understanding of that sign language and for purpose of comparisons across sign languages.

In McKee and Kennedy’s (2000) lexical comparison, signs that are treated as completely different may, in fact, share some distinct commonalities. One case mentioned in Chapter 3 is the signs for Star in ASL and BSL (Figures 3.17 and 3.18); another is Work in those two sign languages (Figure 3.19 and 3.20). In each case, the signs in the pair are motivated by the same image and perspective. While McKee and Kennedy treat these pairs as completely different, intuitively, one would expect signs with the same iconicity motivation to be considered more similar than those that are truly totally different in all aspects. In other words, McKee and Kennedy treat these iconically-motivated signs across sign languages as completely different rather than part-way between identical and different. These signs across sign languages should be treated as similar; and, in fact, an analysis that does take iconic motivation into consideration would treat such signs as similar. It is precisely the latter approach that is adopted in the model here.

4.4 Issues Involving Handedness

In section 4.3, the importance of iconicity is presented as it forms a crucial component in the lexical comparison model that is proposed here. Another component is handedness. For lexical comparisons between sign languages, the simplest cases for comparison are those where the signs in both sign languages have the same handedness.
In such cases, one is comparing a one-handed sign in one sign language with a one-handed sign in the other sign language, as in the case of worm in CSL and TSL. By the same token, a double-handed sign in one sign language is easily compared with a double-handed sign in the other sign language, as can be illustrated by star in ASL and BSL. A similar case holds for comparing two-handed signs, as illustrated by work in ASL and BSL.

Difficulty arises, however, when comparisons are made between signs that do not share in handedness, such as comparing a one-handed sign with a two-handed sign, as in the case of fish in CSL and TSL (Figures 4.11 and 4.12).

FISH(CSL)

- **tab:** in front of signer
- **dez:** open flat hand
- **sig:** dez moving away from signe, undulating throughout while in contact with non-dominant
- **ori:** palm facing leftward

Figure 4.11: CSL sign FISH
FISH(TSL)
\begin{itemize}
  \item \textit{tab}: in front of the signer
  \item \textit{dez}: open flat hand
  \item \textit{sig}: dez moving from left to right, undulating slightly
  \item \textit{ori}: palm facing towards signer
\end{itemize}

Figure 4.12: TSL sign FISH

It should be noted that McKee and Kennedy (2000) do not have a uniform way to treat cases such as the ‘fish’ example here.\textsuperscript{20} A model for lexical comparison should, therefore, be able to provide the mechanisms for deciding how such signs should be compared. The current model will take these issues of handedness into consideration.

4.5 A New Model for Comparing Non-identical Signs Across Sign Languages

The new model proposed here incorporates iconicity and handedness, in addition to the four parameters (\textit{tab}, \textit{dez}, \textit{sig} and \textit{ori}). Two sign languages are compared at any given time in the model. Modifying McKee and Kennedy’s (2000) categorization for a

\textsuperscript{20} McKee and Kennedy (2000) are not consistent in how they handle such cases.
synchronic lexical comparison between two sign languages, the three categories in this model are: *identical*, *similar*, and *different*. *Identical* signs are those that are articulated in exactly the same way across the sign languages under comparison. Such signs are the shared lexical items. The focus of the study, then, are pairs of signs that are not *identical*. It should also be noted that the basic model proposed here is for the analysis of signs that are morphologically simply, thereby excluding compound signs.\(^{21}\) These non-identical signs may be classified as *similar* or *different*, depending on a set of criteria. The model, schematized in Figure 4.13 using a flowchart, maps the paths for determining if two non-identical signs for a word are *similar* or *different* in these sign languages. For the remainder of our discussion, the focus is on the comparison of pairs of non-identical signs.

\(^{21}\) Analysis of compound signs will be part of the next stage in the development of the model.
A pair of non-identical signs

Both signs are iconic signs

- no
  - 3
    - Path
      - Pattern B (similar signs)
    - Pattern E (different signs)

- yes
  - 1
    - Same iconic motivation
      - yes
        - Handedness
          - tab
          - dez
          - sig
          - ori
        - Path
          - Pattern A (similar signs)
          - Pattern D (different signs)
      - no
        - 2
          - Path
            - Pattern C (similar signs)
            - Pattern F (different signs)

Figure 4.13: A new lexical comparison model

To illustrate, two non-identical signs are first considered in terms of their iconic nature. The two signs would be grouped based on whether or not it is the case that both are iconic signs. Therefore, signs fall into two groups: in the first group, the two signs are both iconic; in the second group, either one or both signs are non-iconic. For the group in which one of the signs is non-iconic, they follow Path 3. If both signs are iconic, they undergo scrutiny to determine if they have the same iconic motivation. Those that do are signs that follow Path 1; those that do not follow Path 2.
Under Paths 1, 2, and 3, before examining the phonological parameters of two signs, we first consider their handedness. If both signs are one-handed signs or double-handed signs, they are further evaluated based on the four parameters, *tab*, *dez*, *sig*, and orientation. If both signs are two-handed signs, the dominant hand in each of the two signs is evaluated with respect to the four parameters. If one sign is a one-handed sign and the other is a double-handed sign, the one hand in the one-handed sign is compared with only one hand of the double-handed sign based on four parameters. (Since the two hands in a double-handed sign move identically, only one of them is used for comparing with a one-handed sign. If one sign is a one-handed sign and the other a two-handed sign, the one hand in the one-handed sign is compared with the dominant hand in the two-handed sign, with respect to the four parameters. (If the two-handed sign does not have a dominant hand, the hand in the one-handed sign is compared with both hands of the two-handed sign with respect to the four parameters.) If one sign is a double-handed sign and the other two-handed sign, one hand in the double-handed sign is compared with the dominant hand of the two-handed sign with respect to the four parameters. (If there is no dominant hand in the two-handed sign, one hand in the double-handed sign is compared with both hands of the two-handed sign with respect to the four parameters.)

In Path 1, two signs are *similar* if at least one of the four parameters is the same; or, more precisely, two signs are *similar* if one, two, or three parameters are the same (Pattern A). (Note that if all four parameters are the same, then these signs are, in fact, *identical* and are not treated in the model.) If none of the parameters are the same, the two signs are analyzed as *different* (Pattern D).
In Paths 2, two signs are *similar* if three of the four parameters are same (Pattern B). If there are fewer than three parameters out of four that are the same, the two signs are treated as *different* (Pattern E).

In Path 3, two signs are *similar* if three of the four parameters are same (Pattern C). If there are fewer than three parameters out of four that are the same, the two signs are treated as *different* (Pattern F).

Table 4.1 summarizes the three paths and the six patterns.
<table>
<thead>
<tr>
<th>PATH</th>
<th>SIMILAR</th>
<th>DIFFERENT</th>
</tr>
</thead>
</table>
| Path ① | Pattern A  
   a. Both are iconic signs  
   b. Same iconic motivation  
   c. Number of parameters that are the same (n)*  
   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 | Pattern D  
   yes  
   yes  
   $0 < n < 4 \ (n=1,2,3)$ |
| Path ② | Pattern B  
   a. Both are iconic signs  
   b. Same iconic motivation  
   c. Number of parameters that are the same (n)*  
   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 | Pattern E  
   yes  
   no  
   $n = 3 \ (n=1,2,3)$ | Pattern C  
   no (0 or 1 sign is iconic)  
   (not applicable)  
   $n = 3 \ (n=1,2,3)$ |
| Path ③ | Pattern F  
   a. Both are iconic signs  
   b. Same iconic motivation  
   c. Number of parameters that are the same (n)*  
   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 | no (0 or 1 sign is iconic)  
   (not applicable)  
   $n < 3 \ (n=0,1,2)$ |

Table 4.1 Three paths and six patterns in the new model
4.6 The New Model And Two Examples (WORM and TREE)

This section will use two examples—WORM and TREE—to demonstrate how the new method for comparing non-identical signs can be applied. These two examples are chosen to illustrate the different paths that they take and the different patterns that they exhibit.

The first example is WORM in CSL and TSL (Figure 4.1 and 4.2), with the comparison schematized in Figure 4.14. The two signs are non-identical, iconic signs that have the same iconic motivation, as they both demonstrate a small creature wiggling and inching along the ground. They are also the same in handedness, being both one-handed. Their differences are in orientation (ori), movement (sig), and handshape (dez) (which is in bold in Figure 4.14). McKee and Kennedy's comparison would have treated the signs as being completely different, because they differ in three parameters: orientation, movement, handshape. However, applying the new method here, the two signs have the same iconic motivation and three differences in parameters (dez, sig, ori) out of four; they are the same only in one parameter (tab). Hence, this pair of signs fall under Pattern A and qualify as similar in the current analysis.
Figure 4.14: CSL and TSL signs WORM compared using the new method

The second example is TREE in CSL and TSL (Figures 4.3 and 4.4). The comparison is schematized in Figure 4.15. The two signs are non-identical and have different iconic motivations. The TSL sign for ‘tree’ is iconically motivated by an entire tree, whereas the CSL is iconically motivated by the trunk of a tree. They have different handedness, with CSL being double-handed and TSL two-handed, with the right hand serving as the dominant hand mimicking the body of a tree. As a result of comparing a one-handed sign with a two-handed sign, one of the hands in the CSL sign is examined
and compared with the dominant hand in the TSL sign. The two signs are articulated so differently that all four of the traditional phonological parameters are different. Based on the comparison, these two signs belong to Pattern E. They are analyzed as different signs.

Figure 4.15: CSL and TSL signs TREE compared using the new method

The flowchart schematization provides a means to display, in fairly concrete ways, the method used in this study to conduct a CSL-TSL comparative study using the 100 words in the modified Swadesh list. The strength of this model is its incorporation of
iconicity in the initial comparison of two signs. This model is intended for synchronic analyses and comparisons across sign languages that may or may not be genetically related. Distributional patterns that emerge may serve as the starting point for a deeper understanding of the role that iconicity plays in the formation of signs.
CHAPTER 5

A LEXICAL COMPARISON OF CSL AND TSL

The CSL and TSL corpus consists of signs for the 100 concepts that are given in the modified Swadesh list. In that corpus are 11 signs in the two sign languages that are compound signs in either or both sign languages. These cases are excluded from the comparison using the model for determining whether the signs in the CSL and TSL corpus are identical, similar, or different. Section 5.1 presents the results, identifying the number of identical, similar, and different signs, together with identifying the 11 concepts from the modified Swadesh list that are excluded because one or both sign language use a compound sign for those concepts. Each of the groups of signs—identical, different, and similar (in that order)—are then discussed in turn in the chapter. For completeness of coverage, section 5.2 gives a brief presentation of the cases involving identical signs. Section 5.3 discusses the cases of different signs, which fall into all three patterns in the model (Patterns D, E, and F). Discussed last are the signs for concepts in the modified Swadesh list that are similar in the two sign languages. These signs, presented in section 5.4, fall into only one pattern—namely, Pattern A—in the corpus. Although compound signs are not analyzed in the new model, a brief discussion is included here in section 5.5. Concluding remarks are presented in section 5.6.
5.1 The Results

The results of the comparison of CSL and TSL, based on the modified Swadesh list, are presented in this section. As stated in the beginning of the chapter, there are 11 cases involving compound signs. The CSL and TSL signs for the remaining 89 of the 100 concepts are analyzed as follows: 11 of the 89 signs (12.4%) \textit{identical} in the two sign languages, 22 (24.7\%) are \textit{similar}, and 56 (62.9\%) are \textit{different}. The overall distribution of the signs for the 100 concepts in the corpus is shown in Table 5.1, where those that are analyzed as \textit{identical} are displayed in italicized bold using upper-case, while those that are analyzed as \textit{similar} are in bold and italicized. Signs for concepts that are analyzed as \textit{different} are displayed in regular font. The 11 cases involving compound signs are displayed using double-strikethrough in the table.
<table>
<thead>
<tr>
<th>1. ALL</th>
<th>26. grass</th>
<th>51. other</th>
<th>76. warm</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. animal</td>
<td>27. green</td>
<td>52. person</td>
<td>77. water</td>
</tr>
<tr>
<td>3. bad</td>
<td>28. heavy</td>
<td>53. play</td>
<td>78. wet</td>
</tr>
<tr>
<td>4. because</td>
<td>29. how</td>
<td>54. rain</td>
<td>79. WHAT</td>
</tr>
<tr>
<td>5. bird</td>
<td>30. hunt</td>
<td>55. red</td>
<td>80. when</td>
</tr>
<tr>
<td>6. black</td>
<td>31. husband</td>
<td>56. correct</td>
<td>81. where</td>
</tr>
<tr>
<td>7. blood</td>
<td>32. ice</td>
<td>57. river</td>
<td>82. white</td>
</tr>
<tr>
<td>8. child</td>
<td>33. if</td>
<td>58. rope</td>
<td>83. who</td>
</tr>
<tr>
<td>9. count</td>
<td>34. kill</td>
<td>59. eat</td>
<td>84. WIDE</td>
</tr>
<tr>
<td>10. day</td>
<td>35. laugh</td>
<td>60. sea</td>
<td>85. wife</td>
</tr>
<tr>
<td>11. die</td>
<td>36. leaf</td>
<td>61. sharp</td>
<td>86. wind</td>
</tr>
<tr>
<td>12. dirty</td>
<td>37. lie</td>
<td>62. short</td>
<td>87. with</td>
</tr>
<tr>
<td>13. dog</td>
<td>38. live</td>
<td>63. sing</td>
<td>88. woman</td>
</tr>
<tr>
<td>14. dry</td>
<td>39. long</td>
<td>64. sit</td>
<td>89. wood</td>
</tr>
<tr>
<td>15. dull</td>
<td>40. louse</td>
<td>65. smooth</td>
<td>90. worm</td>
</tr>
<tr>
<td>16. dust</td>
<td>41. man</td>
<td>66. snake</td>
<td>91. year</td>
</tr>
<tr>
<td>17. earth</td>
<td>42. meat</td>
<td>67. snow</td>
<td>92. yellow</td>
</tr>
<tr>
<td>18. egg</td>
<td>43. mother</td>
<td>68. STAND</td>
<td>93. full</td>
</tr>
<tr>
<td>19. grease</td>
<td>44. mountain</td>
<td>69. star</td>
<td>94. moon</td>
</tr>
<tr>
<td>20. father</td>
<td>45. name</td>
<td>70. stone</td>
<td>95. brother</td>
</tr>
<tr>
<td>21. FEATHER</td>
<td>46. NARROW</td>
<td>71. SUN</td>
<td>96. cat</td>
</tr>
<tr>
<td>22. FIRE</td>
<td>47. new</td>
<td>72. tail</td>
<td>97. dance</td>
</tr>
<tr>
<td>23. fish</td>
<td>48. night</td>
<td>73. thin</td>
<td>98. pig</td>
</tr>
<tr>
<td>24. FLOWER</td>
<td>49. NOT</td>
<td>74. tree</td>
<td>99. sister</td>
</tr>
<tr>
<td>25. good</td>
<td>50. old</td>
<td>75. VOMIT</td>
<td>100. work</td>
</tr>
</tbody>
</table>

Table 5.1: Results of the comparison of CSL and TSL signs in the corpus. (Signs for concepts in CSL and TSL analyzed as identical are shown in bold italicized upper-case, those analyzed as similar are in bold italics, and those as different are in regular font. Signs for concepts formed with compound signs in one or both sign languages are shown using double-strikethrough.)

5.2 Identical signs

There are 11 signs in the CSL and TSL corpus that are analyzed as identical. They are: ALL, FEATHER, FIRE, FLOWER, NARROW, NOT, STAND, SUN, VOMIT, WHAT, and WIDE. In each case, the signs in the two sign languages are completely identical, and are not differentiated between CSL and TSL. An example is ALL, discussed in Chapter 2. This is
a double-handed sign, illustrated in Figure 2.8 from CSL; the sign is formed through the tracing of a heart-shaped image. While there are many interesting issues that can be explored in analyzing the eleven identical signs in the CSL and TSL corpus, such as iconic motivation, possible loanwords, and so forth, these issues will be not be pursued here, and will, instead, be left for future research. We move next to the discussion of signs in the two sign languages that are analyzed as different based on the model developed in Chapter 4.

5.3 Different signs

The signs for the remaining 78 concepts in the corpus are all non-identical signs. For 56 of the concepts, the signs in CSL and TSL are analyzed as different based on our model. These 56 signs are shown in Table 5.2.

| 3. BAD | 19. GREASE | 45. NAME | 70. STONE |
| 4. BECAUSE | 20. FATHER | 47. NEW | 74. TREE |
| 6. BLACK | 25. GOOD | 48. NIGHT | 76. WARM |
| 7. BLOOD | 26. GRASS | 50. OLD | 77. WATER |
| 8. CHILD | 27. GREEN | 52. PERSON | 82. WHITE |
| 9. COUNT | 29. HOW | 53. PLAY | 83. WHO |
| 10. DAY | 30. HUNT | 56. CORRECT | 87. WITH |
| 11. DIE | 32. ICE | 57. RIVER | 88. WOMAN |
| 12. DIRTY | 33. IF | 58. ROPE | 89. WOOD |
| 13. DOG | 36. LEAF | 60. SEA | 91. YEAR |
| 14. DRY | 40. LOUSE | 63. SING | 92. YELLOW |
| 15. DULL | 41. MAN | 64. SIT | 93. FULL |
| 16. DUST | 42. MEAT | 65. SMOOTH | 97. DANCE |
| 17. EARTH | 43. MOTHER | 67. SNOW | 98. PIG |

Table 5.2: Different signs between CSL and TSL
We will briefly examine how the three patterns (Patterns D, E, and F), discussed in Chapter 4, are used in determining which signs for which concepts in the corpus are analyzed as different. Four signs will be analyzed here, namely, the CSL and TSL signs for dance, dog, name and if. The CSL and TSL signs for dance belong to Pattern D; the two signs have the same iconic motivation but do not share identical parameters. The CSL and TSL signs for dog belong to Pattern E. In the case of Pattern E, the two signs have different iconic motivation and fewer than three (viz., zero to two) of the parameters are the same. The signs for name and if in CSL and TSL fall under Pattern F. In the case of name, the sign in TSL is iconic while that in CSL is not; and there are fewer than three parameters that are the same across the two signs. In the case of if, both the CSL and TSL signs are non-iconic; at the same time, the two signs share fewer than three identical parameters.

We turn now to study the four examples in greater detail, namely, dance, dog, name and if, which are presented in the following subsections to illustrate the three Patterns of D, E, and F.

5.3.1 CSL and TSL signs for dance: Pattern D

The CSL and TSL signs for dance (Figure 5.1 and 5.2) are both iconic signs. The two signs have the same iconic motivation, as they are both iconically motivated by people dancing. They are, moreover, both double-handed signs. Therefore, we compare both hands of the signs in CSL and TSL. The signs in the two sign languages differ with respect to all four parameters—location (tab), handshape (dez), movement (sig), and orientation (ori). Given that the two signs dance in CSL and TSL are both iconic, and
that they have the same motivation but differ in all four parameters, these two signs fall under Pattern D, and, hence, are analyzed as different signs. Figure 5.3 shows the analysis of DANCE using our new model.

DANCE(CSL)

**tab:** in front of signer

**dez:** thumbs and little fingers extended from closed fists

**sig:** dezes moving in rotation at elbows, tracing interlocking circles with hands

**ori:** palm facing towards signer

Figure 5.1: CSL sign DANCE
DANCE(TSL)

*tab*: above the shoulders  
*dez*: relaxed hand with fingers extended and separate  
*sig*: dez-es rotating at wrists  
*ori*: palm facing downward, then away from signer, then downward

Figure 5.2: TSL sign DANCE

![Diagram of DANCE(CSL and TSL)]

Figure 5.3: CSL and TSL signs for DANCE analyzed in the new model
5.3.2 CSL and TSL signs for DOG: Pattern E

The CSL and TSL signs for DOG (Figure 5.4 and 5.5) are both iconic signs. However, they have different iconic motivations. The CSL sign for DOG is iconically motivated by people chasing away a dog, while the TSL sign for DOG is iconically motivated by a dog’s ears and is signed to mimic a dog’s moving ear. They are different in handedness, as dog in CSL is a two-handed sign with a dominant hand, whereas it is a double-handed sign in TSL. Therefore, either hand in the double-handed TSL sign can be used to compare with the dominant hand in CSL sign. The two signs have the same handshape (dez); however, they differ in location (tab), movement (sig), and orientation (ori). Their different iconic motivations, in conjunction with three different parameters, qualify the signs as falling into Pattern E. As a result, the signs for DOG in CSL and TSL are analyzed as different signs. Figure 5.6 displays the analysis of DOG using the new model.

<table>
<thead>
<tr>
<th>DOG(CSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>tab:</strong> non-dominant hand</td>
</tr>
<tr>
<td><strong>dez:</strong> fingers extended and separated</td>
</tr>
<tr>
<td><strong>sig:</strong> hand flapping at wrist</td>
</tr>
<tr>
<td><strong>ori:</strong> palm facing towards signer</td>
</tr>
</tbody>
</table>

Figure 5.4: CSL sign DOG
DOG(TSL)

*tab*: forehead
*dez*: fingers extended and together with thumbs extended
*sig*: fingers flexing and relaxing in unison
*ori*: palm facing downward

Figure 5.5: TSL sign DOG

Figure 5.6: CSL and TSL signs for DOG analyzed in the new model
5.3.3 CSL and TSL signs for NAME and IF: Pattern F

Two signs are studied in this subsection, NAME and IF. These two signs are discussed in turn.

The CSL and TSL signs for NAME (Figures 5.7 and 5.8) differ in iconicity. While the CSL sign is non-iconic, the TSL sign is an iconic sign. The TSL sign is iconically motivated by the practice observed in which a name card, containing a person’s name, is pinned in front of a person’s chest: the right hand makes the shape of a name card that is pinned in front of the signer’s chest. The CSL and TSL signs for NAME are different in handedness. Whereas the TSL sign is a single-handed sign, that in CSL is a two-handed sign with a dominant hand. Therefore, we compare the hand in the single-handed TSL sign with the dominant hand in the CSL sign. The two signs are different with respect to location (tab), handshape (dez), movement (sig), and orientation (ori). Their differences with respect to iconicity and iconic motivation, and well as their difference in all four parameters result in the two signs being analyzed as belonging to Pattern F. As a result, the two signs are different signs. The two signs are analyzed in the new model in Figure 5.9.
NAME(CSL)

- **tab**: non-dominant hand
- **dez**: index finger extended from closed fist
- **sig**: index finger pulling along crease where fingers meet non-dominant hand
- **ori**: palm facing downward

Figure 5.7: CSL sign NAME

NAME(TSL)

- **tab**: chest
- **dez**: index finger and thumb extended from closed fist and curved
- **sig**: dez moving to contact with tab
- **ori**: palm facing left

Figure 5.8: TSL sign NAME
Figure 5.9: CSL and TSL signs for NAME analyzed in the new model.

We turn now to the CSL and TSL signs for IF (Figures 5.10 and 5.11). Neither of the two signs are iconic. They are same with respect to handedness, both being single-handed signs. The two signs differ in three of the four parameters: location (*tab*), handshape (*dez*), and movement (*sig*). Their non-iconic features and having three different parameters place these sign as belonging to Pattern F. The two signs for IF in CSL and TSL are therefore *different* signs.
Figure 5.10: TSL sign IF

IF(CSL)

\textit{tab: chin}
\textit{dez: fingers and thumb extended from flat hand}
\textit{sig: fingers wiggling}
\textit{ori: palm facing downward}

Figure 5.11: CSL sign IF

IF(TSL)

\textit{tab: right cheek}
\textit{dez: fingers extended from closed fist and together with thumb touching, fingers bent at first knuckles}
\textit{sig: dez making slight circular motion at point of contact with tab}
\textit{ori: palm facing downward}
Figure 5.12: CSL and TSL signs for IF analyzed in the new model

5.4 Similar Signs

There are 22 signs that are considered similar based on the new method of analysis. These 22 signs are presented in Table 5.3.
| 18. EGG | 39. LONG | 62. SHORT | 86. WIND |
| 23. FISH | 44. MOUNTAIN | 66. SNAKE | 90. WORM |
| 28. HEAVY | 51. OTHER | 69. STAR | 94. MOON |
| 34. KILL | 54. RAIN | 72. TAIL | 96. CAT |
| 35. LAUGH | 55. RED | 73. THIN |
| 37. LIE | 61. SHARP | 78. WET |

Table 5.3: Similar signs between CSL and TSL

There are 22 signs that are analyzed as similar between CSL and TSL based on the new model. However, with respect to the five parameters in McKee and Kennedy (2000), not all of the similar signs in the present corpus conform to their criteria. Only nine of them fall under their criteria. The results are presented in Table 5.4.

<table>
<thead>
<tr>
<th></th>
<th>Handshape</th>
<th>Movement</th>
<th>Location</th>
<th>Orientation</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAUGH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LIE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHORT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SNAKE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WIND</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.4: Similar signs that also conformed to McKee and Kennedy’s criteria
Under the McKee-Kennedy criteria, there are three signs in CSL and TSL that differ from each other in handshape, three in movement, two in orientation, and one in their ‘other’ category (in that CSL is one-handed while TSL is two-handed). Beyond these nine signs, there is a further sixteen that seemed to be similar but do not conform to a strict standard based on the McKee-Kennedy criteria.

An analysis of our CSL and TSL corpus reveals that there is only the case of Pattern A, and no cases involving Patterns B or C. Hence, we will examine, for purposes of illustration, two signs in the current corpus that belong to Pattern A to obtain a better understanding of the current assignment of similar to these signs. The two signs to be analyzed are CSL and TSL signs for MOUNTAIN and FISH. The CSL and TSL signs for MOUNTAIN and those for FISH belong to Pattern A, which includes two signs with the same iconic motivation and sharing fewer than four identical parameters (one to three). Our corpus does not contain signs that fall under Pattern B—signs with different iconic motivations that share three identical parameters, or Pattern C—in which either (a) one sign is iconic and the other is not and the two signs share three identical parameters; or (b) neither sign is iconic and they share three identical parameters.

### 5.4.1 CSL and TSL signs MOUNTAIN and FISH: Pattern A

The CSL and TSL signs for MOUNTAIN (Figures 5.13 and 5.14) are both iconic signs. The two signs have the same iconic motivation, as they both show the outline of the mountains. They are also identical in handedness, both being one-handed signs. Their differences can be seen in the parameters of *sig* and *tab*. In TSL, the hand moves from the left to the right side; in CSL, the hand moves from the right to the left side; but the
manner of the hand is the same, up and down. The location is also slightly different, as in CSL the sign occurs lower than in TSL. The manner of movement, also, seems to have a small degree of difference, as the CSL sign is formed in a more exaggerated manner than the TSL sign. They have the same iconic motivation; they differ in three parameters. As a result, these signs belong to Pattern A, and are, therefore, analyzed as similar signs. The analysis of the CSL and TSL signs for MOUNTAIN using the new model is displayed in Figure 5.15.

<table>
<thead>
<tr>
<th>MOUNTAIN(CSL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>tab: in front of the signer</td>
</tr>
<tr>
<td>dez: open hand with fingers together and bent</td>
</tr>
<tr>
<td>sig: dez moving from right to left in direction of fingers, making soft undulation(tracing out the outline of a mountain range)</td>
</tr>
<tr>
<td>ori: palm facing downward</td>
</tr>
</tbody>
</table>

Figure 5.13: CSL sign MOUNTAIN
Figure 5.14: TSL sign MOUNTAIN

Figure 5.15: CSL and TSL signs for MOUNTAIN analyzed in the new model
We turn now to the CSL and TSL signs for FISH (Figures 5.16 and 5.17), which are iconic signs. Moreover, both signs have the same iconic motivation, as they both sign with undulation in movement to imitate a fish swimming. The two signs differ in handedness, however; the TSL sign is one-handed sign while the CSL sign is two-handed sign with a dominant hand. Therefore, to analyze the two signs with respect to the four parameters, the dominant hand of CSL is compared with the two-handed TSL sign. The two signs are the same in tab (location) and dez (handshape). Their differences are found in sig and ori. In TSL, the hand moves from the right to the left side; in CSL, the hand moves from away from the signer; but the manner of movement of the hand is the same, undulating throughout. In being iconic signs with the same iconic motivation and sharing two parameters, the CSL signs for FISH can be classified as belonging to Pattern A. They are, therefore, similar signs. Figure 5.18 displays the analysis using the new model.

**FISH(CSL)**

*tab*: in front of signer  
*dez*: open flat hand  
*sig*: dez moving away from signer, undulating throughout while in contact with non-dominant  
*ori*: palm facing leftward

Figure 5.16: CSL sign FISH
FISH(TSL)

*tab:* in front of the signer
*dez:* open flat hand
*sig:* dez moving from left to right, undulating slightly
*ori:* palm facing towards signer

Figure 5.17: TSL sign MOUNTAIN

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Figure 5.18: CSL and TSL signs FISH analyzed in the new model
The analysis of fish in CSL and TSL raises an interesting observation. There seems to be a possible CSL preference for motion away from the body and a TSL preference for movement across the body. Besides fish, recall the CSL and TSL signs for worm (Figure 4.1 and 4.2), which exhibit parallel patterns of movement. This potential preference, observed in two pairs of signs in the current corpus, may be purely coincidental, or it may, in fact, reflect systematic differences in a subset of the lexicon of CSL and TSL signs. This is an empirical question noteworthy of further exploration in the future.

5.5 Compound Signs in CSL and TSL

The CSL and TSL signs for the 89 concepts in the Swadesh list that are analyzed in the preceding sections are morphologically-simple signs. The current development of the model cannot yet handle morphologically-complex signs such as compound signs. A future development of the model would be needed in order to compare compound signs across sign languages. There are, nonetheless, some interesting issues to explore involving compound signs in the CSL and TSL corpus in the study. One case is discussed here, namely, the sign wife.

The signs for wife in CSL and TSL (Figures 5.19 and 5.20) constitute a case of two compound signs that are phonologically different, but morphologically similar. The CSL sign for wife (Figure 5.19) is composed of the signs for female and then marriage: wife = female^marriage. Note, also, that the CSL sign for female in the compound sign marriage is different from the sign for female as a stand-alone, citation form.
In the case of the TSL sign for *wife*, first, the sequence of the signs is reversed compared to the corresponding CSL sign; first, the sign for *marriage* is formed (consisting of male and female together), and then followed by the sign for *female* (indicating the female half of marriage). Hence, the morphological structure of TSL is:

\[ \text{wife} = \text{marriage} \uparrow \text{female}. \]

At this stage of the new model, with iconicity, handedness, and phonological components in place but not yet a morphological component, it cannot yet deal with signs that are morphological complex, such as compound signs. Among issues to be taken into consideration in the development of a model that can handle compound signs is how to determine the relative weight to be placed on similarities and differences in the two components (phonological and morphological) of a compound sign, the ordering of components (such as *wife* above), and so forth.
Figure 5.19: CSL compound sign WIFE (= FEMALE^MARRIAGE)

Figure 5.20: TSL compound sign WIFE (=MARRIAGE^FEMALE)
5.6 Conclusion

The synchronic lexical comparison of CSL and TSL signs in the modified Swadesh list is conducted based on the new model developed in Chapter 4. With 11 pairs of signs involving compound signs (either one sign in the pair is a compound sign or both are compound signs) excluded from the comparison, the result of the comparison of the remaining 89 pairs is: 11 identical signs, 22 similar signs, and 56 different signs. Similar signs and different signs are also examined with respect to the six patterns in the new model. It is worth noting that similar signs so far, based on the current corpus, all belong to Pattern A, with no examples of Pattern B or Pattern C observed in this study. Patterns D, E and F are all found in this comparison of CSL and TSL.

Morphologically complex signs are not in the scope of this comparison. Signs such as MOTHER in CSL and TSL have the same meaning components (MARRIAGE and FEMALE), but the order of the components are reversed. In CSL, FEMALE is followed by MARRIAGE (MOTHER = FEMALE MARRIAGE), while in TSL, MARRIAGE is followed by FEMALE (MOTHER = MARRIAGE FEMALE). However, if each component is compared on the basis of their morphological forms—such as comparing FEMALE in CSL with FEMALE in TSL—the signs for FEMALE in the two sign languages are different from each other in terms of their phonological properties. Hence, if they are examined using the new model, they would be analyzed as different. The same holds true in the comparison of MARRIAGE in CSL and TSL in the compound.

Since it is not certain at this point how the interaction of phonology and morphology would be handled in a further development of the model to handle compound signs, it is premature at this stage to propose that the CSL and TSL signs for
WIFE are similar due to their commonality in meaning components, or to claim that they are different due to their differences in their phonological parameters. We will only be able to decide on how to compare compound signs when we have gained a deeper understanding of the relationship between sign phonology and morphology. It is after a more advanced model—building upon the current one—that takes into account both phonological and morphological features of signs that compound signs be compared cross-linguistically.
CHAPTER 6

CONCLUSION

This study attempts to make a synchronic lexical comparison of CSL and TSL in order to determine the proportion of similar and not similar signs between them. The corpus is based on Woodward’s (1993a) modified Swadesh list, a list of basic vocabulary items for finding possible cognates for historical purposes of determining genetic relationship between sign languages. Little is known about the history of CSL and the extent of its contact with TSL, ASL, and other sign languages. Hence, it is not feasible to conduct a historical linguistic study at this time. A synchronic study is conducted in this thesis, making use of video files made available to the author. Two sets of data are used: the CSL video corpus, based on the modified Swadesh list kindly provided by Professor Gong Qunhu (Fudan University), which then matched by a corresponding video corpus generously provided by Professor James H-Y. Tai (Chungcheng University). The CSL and TSL corpus is then used in this thesis as a starting point for a synchronic comparison. Future research may delve into diachronic issues when linguists have gained a better understanding of historical developments of CSL and TSL.

This thesis also examines Woodward’s (1993a) comparison across East Asian sign languages and South Asian sign languages (CSL and TSL were not compared) and
McKee and Kennedy’s (2000) comparison across ASL, BSL, Auslan and NZSL. It is shown that while Woodward (1993a) did not have an explicit set of criteria for sign language comparison, McKee and Kennedy’s approach also has problems, particularly with respect to their fifth category of “other” (in addition to the four phonological parameters of location, handshape, movement, and orientation). However, despite its shortcomings, McKee and Kennedy’s methodology has merits, and can be adopted, although with modifications, as has been done in this thesis, for synchronic comparisons across sign language.

One component that is new in McKee and Kennedy’s methodology is the inclusion of handedness to their lexical comparisons across sign languages. This study find that “single-”, “double-”, and “two-”handed signs should be differentiated to determine the hand(s) to be compared, especially when two signs involve different handedness. Hence, the three-way differentiation of handedness is incorporated into the new model.

In developing this model for lexical comparison based on McKee and Kennedy’s approach, another very important dimension is proposed for inclusion. It is found that iconicity and iconic motivation play an important role in the formation of signs in sign language. The importance of iconicity and iconic motivation is underscored in the new model by positing them as crucial factors in deciding the relationship between two non-identical signs, after which additional components are also considered, namely, the four phonological parameters of *tab* (location), *dez* (handshape), *sig* (movement), and *ori* (orientation of the palms).
Although the iconic nature of signs has been downplayed—especially during the early period of linguistic investigation into sign language—as a result of trying to prove that sign languages are "true" languages, it is the fact that some signs are motivated by human being's mental images of the referents and by society and culture, as asserted by Taub (2001), who also proposed a number of iconic devices that can account for the kinds of iconic signs observed in ASL. Whether one is analyzing the signs of an individual language or comparing signs across sign languages, it is necessary to take iconic motivation into consideration.

In taking iconicity, iconic motivation, handedness, and the four parameters into account in the building of the new model, a flowchart display is used for schematization of the new model. The model starts with comparing two non-identical signs, and end up with three paths and six patterns, in which three patterns are used for subcategorizing three types of similar signs, and three patterns are used for subcategorizing three types of different signs.

At this stage, the model only applies to morphologically-simple signs because much more is needed to be known about the sign phonology and sign morphology in CSL and TSL. Problems arise when comparing pairs of compound signs, as well as when comparing compound signs with non-compound signs. The issues involved in comparing pairs of compound signs are not only phonological and spatial, but also include morphology and morphological processes as well.

With 11 pairs of signs involving compound signs excluded from the comparison in this study, the result of the lexical comparison of the remaining 89 pairs of CSL and TSL signs using the new model are: 11 identical signs, 22 similar signs, and 56 different
Signs. Similar signs and different signs are also examined with respect to the six patterns in the new model. Furthermore, based on the current corpus, all 22 cases of similar signs belong to Pattern A, with no cases in the corpus of Pattern B or Pattern C. Whether this is an accidental gap during to a limited corpus or due to some other factors will require further research in the future. Patterns D, E and F are all found in this comparison of CSL and TSL. A further study, conducted on a larger corpus across more than two languages (for example, CSL, TSL, and JSL), may provide the answer to whether or not Pattern B and Pattern C exist. Use of a much larger corpus may also enable us to observe if there are any systematic changes in any of the four parameters (tab, dez, sig, and ori) that might form the basis for studying patterns of changes in the CSL and TSL signs over time.

In using the modified Swadesh list, one question that might be posed is whether or not 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. This question is left unanswered. The paucity of identical and similar signs (totalling 33 out of 89 signs) suggests the likelihood that CSL and TSL are unrelated languages. If so, the fruitful direction of research would be further investigation into language contact between CSL and TSL, both earlier in the twentieth century and more recent potential contacts, given greater communication between the two regions where CSL and TSL are used.

Given the importance of iconicity in sign language, another potentially fruitful direction for research is into linguistic universals and the role of iconicity in sign language. All in all, research into CSL and TSL is still in its infancy, and there is a great deal of linguistic research and challenges in the years ahead.


