

## Chapter 5

### Lexical comparison

One of the objectives of this thesis is to determine the lexical similarity between the three Lisu dialects, Northern, Central, and Southern. Hale (1982: 58) states that the lexicon is more reliable than any other linguistic feature in establishing the degree of relationship between two languages. Although the lexicon is critical for defining the relationship between languages, it is difficult to distinguish core lexicon from those words which are easily borrowed or replaced and those which are resistant to change. Therefore, this chapter will discuss how the cognates are determined and compared for lexical comparison between the Lisu dialects.

#### 5.1 Determining lexical similarity

The methods used to determine lexical similarity will be described in this section.

Mann (2005: 30) states:

Lexicostatistics is an approximation of the percentage of cognates shared by two or more speech dialects. Lexicostatistics does not provide an absolute measure of the relationship between speech dialects, but rather, a relative measure of the lexical relationship between dialects.

In order to carry out the lexicostatistic study, examination of the syllable structure of the target language is required. It is therefore necessary first to examine the syllable structure of Lisu dialects before beginning the lexical comparison of the dialects.

Lisu syllable structure<sup>71</sup> may be CCVC, CVC, CCV, CV, or V which always has a tone. For comparative purposes, it is often misleading to focus on minor syllables. Thus, only the major syllables of the lexical items with the same gloss are necessary for comparison between dialects. This means the minor syllables are ignored. Other omitted syllables include grammatical markers as well as derivational syllables. For example [a<sup>217</sup> ma<sup>33</sup> ŋa<sup>33</sup>] 'who is it' is formed with [a<sup>217</sup> ma<sup>33</sup>] 'who' and [ŋa<sup>33</sup>] 'is it'. The syllable [ŋa<sup>33</sup>] is an interrogative grammatical marker which is omitted in lexical comparison. Derivational morphemes are also omitted when choosing

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<sup>71</sup> It means both major syllable and minor syllable.

cognates. For example, the word [dza<sup>217</sup> du<sup>33</sup>] ‘food’ is a combination of morphemes [dza<sup>217</sup>] ‘eat’ and [du<sup>33</sup>] ‘thing’. The morpheme [dza<sup>217</sup>] ‘eat’ becomes ‘food’ when the derivational morpheme [du<sup>33</sup>] ‘thing’ is added. For purposes of lexical comparison, derivational morphemes like [du<sup>33</sup>] ‘thing’ are ignored. The tones are also left out in this comparison because the syllable cannot maintain the tones when the grammatical forms change in Lisu.

Concerning the tones of Tibeto-Burman languages, Matisoff (1973: 73) states:

In the Beginning was the Sino-Tibetan monosyllable, arrayed in its full consonantal and vocalic splendor. In addition, the syllable was without tone and devoid of pitch (Matisoff 1973: 73).

In other words, the tones are not part of the proto-Tibeto-Burman languages but are developed from the consonants. Matisoff adds:

Looking at the TB family as a whole...the better-preserved the consonantal system, the fewer the vowels and the fewer the tones; the more vestigial the consonantal system, the more proliferation of vowels and tones (Matisoff 1973: 80-81).

According to Matisoff, the larger the consonantal system the language has, the fewer the vowels and tones; the weaker the consonantal system, the more vowels and tones the language will have.

The voicing or voicelessness of the consonants has an effect on the tone of the adjacent vowel in syllable-initial position. In the syllable-final position, the voicing or voicelessness of the consonants is automatic and the redundant consequence of pre-existent tones is not its cause. For example, both –h and –ʔ are voiceless but they have opposite tonal effects in syllable-final position (Matisoff 1973: 77). The final voiceless glottal fricative –h has a depressing effect on the pitch contour of the preceding vowel, leading to falling tones. In contrast, the final voiceless glottal plosive –ʔ has a raising effect on the pitch contour of the preceding vowel, leading to rising tones (Matisoff 1973: 75).

According to Matisoff, tone develops from the effects of the sounds in languages. The voiced or voiceless opposition in root-initial position was preserved systematically even after the phonetic nature of the contrast changed in many Tibeto-Burman languages (Matisoff 1973: 79). Based on the tone development

described in Matisoff's, the tones are not counted for the lexical comparison in this study because the tone alternation is commonly found in Lisu. For example, the tone of the word 'go' alters as its grammatical forms altered. The following example shows the alternations of tone according to grammatical alternations.

**Example (4):** dʒe<sup>33</sup> 'go'  
 dʒe<sup>35</sup> '(I) must go'  
 dʒe<sup>31ʔ</sup> '(you) can go'

In example (4), the tone of the verb 'go' alters from [33] to [35], then to [31ʔ] as its grammatical forms altered. Tones in Lisu also alter when they precedes some particular tones regardless of consonants and vowels. The following example shows tone alternations according to the position in syllable.

**Example (5):** [sa<sup>21ʔ</sup> po<sup>33</sup>] 'three plants'      [sa<sup>33</sup> x<sup>w</sup>a<sup>35</sup>] 'three times'  
 [sa<sup>21ʔ</sup> xi<sup>33</sup>] 'three houses'      [sa<sup>33</sup> bi<sup>21ʔ</sup>] 'three splits'  
 [sa<sup>21ʔ</sup> bø<sup>33</sup>] 'three groups'      [sa<sup>33</sup> ph<sup>i</sup>a<sup>44</sup>] 'three plates'

According to Example (5), the tone for the word 'three' is low falling with glottal stop, [21ʔ] in front of mid level tone, [33]; but it becomes mid level tone, [33] in front of other tones such as mid rising, [35], low falling with glottal stop, [21ʔ], and high-level tone, [44]. In this study, tones are also omitted because they are not necessary to establish cognate relationships. (Mann 2011 personal communication)

Borrowed words are also not counted in this comparison. Brown (2008: 248) described since vocabulary can be borrowed from one language to another, diffusion of language features can be massive and widespread. Cultural terms are easily borrowed. For example, Thai, Lao, and Khmer have borrowed a stratum of their lexicons from Pali, the language of Buddhism. In the same way, common vocabulary is not immune from borrowing. For example, English has borrowed 'very' from French, and borrowed hundreds of basic words from Old Norse. He states:

The method is very simple. The percentages of common roots are counted using a list of 'basic' words. The theory is that basic vocabulary is resistant to borrowing, so that the percentage will give a guide to how closely languages are related (Brown 2008: 248).

Instead of counting the borrowed words, only the words which have some equivalent with the proto-language were used for this comparison.

Table 56 gives examples of cognate sets which have both major and minor syllables.

**Table 56 Examples of cognate sets with major and minor syllables**

	Site	'hand'	'mountain'	'foot'	'leaf'
N.LS	YKB	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> tʃi <sup>33</sup>	tʃhi <sup>33</sup> k <sup>w</sup> a <sup>33</sup> phæ <sup>217</sup>	si <sup>35</sup> tʃhæ <sup>217</sup>
	LBS	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> tʃi <sup>33</sup>	tʃhi <sup>33</sup> k <sup>w</sup> a <sup>33</sup> p <sup>j</sup> æ <sup>33</sup>	si <sup>35</sup> ph <sup>j</sup> æ <sup>217</sup>
	HKH	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> tʃe <sup>33</sup>	tʃhi <sup>33</sup> k <sup>w</sup> a <sup>33</sup>	si <sup>35</sup> tʃhæ <sup>217</sup>
	MLSD	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> dʒy <sup>217</sup>	tʃhi <sup>33</sup> phæ <sup>35</sup>	si <sup>35</sup> tʃhæ <sup>217</sup>
C.LS	STH	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> tʃi <sup>33</sup>	tʃhi <sup>33</sup> p <sup>j</sup> a <sup>33</sup> læ <sup>33</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>
	MCP	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> tʃi <sup>33</sup>	tʃhi <sup>33</sup> p <sup>j</sup> a <sup>33</sup> læ <sup>33</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>
	MKH	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> dʒy <sup>217</sup>	tʃhi <sup>33</sup> ph <sup>j</sup> a <sup>33</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>
	DWB	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> tʃe <sup>33</sup>	tʃhi <sup>33</sup> ph <sup>j</sup> a <sup>33</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>
S.LS	KSG	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> dʒy <sup>217</sup>	tʃhi <sup>33</sup> p <sup>j</sup> a <sup>33</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>
	TWM	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> dʒy <sup>217</sup>	tʃhi <sup>33</sup> p <sup>j</sup> a <sup>33</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>
	SDY	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> dʒy <sup>217</sup>	tʃhi <sup>33</sup> phæ <sup>35</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>
	MKT	læ <sup>217</sup> phæ <sup>35</sup>	wa <sup>217</sup> dʒy <sup>217</sup>	tʃhi <sup>33</sup> phæ <sup>35</sup>	si <sup>35</sup> ph <sup>j</sup> a <sup>217</sup>

For the first word, 'hand,' although two syllables are completely the same, only the first syllable [læ<sup>217</sup>] is the root; the second syllable [phæ<sup>35</sup>] is a bound morpheme, which has the meaning 'side of the body part'. For example, it is used in [læ<sup>217</sup> phæ<sup>35</sup> thi<sup>217</sup> phæ<sup>35</sup>] 'one side of the hand'; [læ<sup>217</sup> phæ<sup>35</sup>] 'hand', [thi<sup>217</sup>] 'one', and [phæ<sup>35</sup>] 'side'.<sup>72</sup> In the same way, it is also used in [tʃhi<sup>33</sup> phæ<sup>35</sup> thi<sup>217</sup> phæ<sup>35</sup>] 'one side of foot'; [tʃhi<sup>33</sup> phæ<sup>35</sup>] 'foot', [thi<sup>217</sup>] 'one', and [phæ<sup>35</sup>] 'side'. Thus, the root, [læ<sup>217</sup>] alone will be counted for the comparison. The word 'mountain' is also formed with the root syllables [tʃi<sup>33</sup>], [tʃe<sup>33</sup>], [dʒy<sup>217</sup>] and the non-root syllable [wa<sup>217</sup>]. The syllable [wa<sup>217</sup>] has the meaning 'snow' and is a bound morpheme; therefore, it is not counted for comparison. Thus, for the words [wa<sup>217</sup> tʃi<sup>33</sup>], [wa<sup>217</sup> tʃe<sup>33</sup>], [wa<sup>217</sup> dʒy<sup>217</sup>], only [tʃi<sup>33</sup>], [tʃe<sup>33</sup>], and [dʒy<sup>217</sup>] are counted in this comparison.

For the word 'foot', besides the roots [tʃhi<sup>33</sup>] and [tʃhi<sup>33</sup>], there are also the morphemes such as [k<sup>w</sup>a<sup>33</sup> phæ<sup>217</sup>], [k<sup>w</sup>a<sup>33</sup> p<sup>j</sup>æ<sup>33</sup>], [k<sup>w</sup>a<sup>33</sup>], [phæ<sup>35</sup>], [p<sup>j</sup>a<sup>33</sup> læ<sup>33</sup>], [ph<sup>j</sup>a<sup>33</sup>], and [p<sup>j</sup>a<sup>33</sup>]. These morphemes were eliminated for the comparison. Therefore, only the roots [tʃhi<sup>33</sup>] and [tʃhi<sup>33</sup>] are compared. (see Appendix F for the

<sup>72</sup> The word 'side' can also be said [ba<sup>217</sup>] in Lisu. For example, [læ<sup>217</sup> phæ<sup>35</sup> thi<sup>217</sup> ba<sup>217</sup>] also means 'one side of hand'.

rest of 100-wordlist with major and minor syllable forms). After omitting the non-root syllables, the roots to be compared are shown in Table 57.

**Table 57 Examples of cognate sets with root syllable forms**

	Site	'hand'	'mountain'	'foot'	'leaf'
N.LS	YKB	læ <sup>217</sup>	tʃi <sup>33</sup>	tʃhi <sup>33</sup>	tʃhæ <sup>217</sup>
	LBS	læ <sup>217</sup>	tʃi <sup>33</sup>	tʃhi <sup>33</sup>	ph <sup>h</sup> æ <sup>217</sup>
	HKH	læ <sup>217</sup>	tʃe <sup>33</sup>	tʃhi <sup>33</sup>	tʃhæ <sup>217</sup>
	MLSD	læ <sup>217</sup>	dʒy <sup>217</sup>	tʃhi <sup>33</sup>	tʃhæ <sup>217</sup>
C.LS	STH	læ <sup>217</sup>	tʃi <sup>33</sup>	tʃhi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>
	MCP	læ <sup>217</sup>	tʃi <sup>33</sup>	tʃhi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>
	MKH	læ <sup>217</sup>	dʒy <sup>217</sup>	tʃhi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>
	DWB	læ <sup>217</sup>	tʃe <sup>33</sup>	tʃhi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>
S.LS	KSG	læ <sup>217</sup>	dʒy <sup>217</sup>	tshi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>
	TWM	læ <sup>217</sup>	dʒy <sup>217</sup>	tshi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>
	SDY	læ <sup>217</sup>	dʒy <sup>217</sup>	tshi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>
	MKT	læ <sup>217</sup>	dʒy <sup>217</sup>	tshi <sup>33</sup>	ph <sup>h</sup> a <sup>217</sup>

Appendix G has cognates root syllable forms for the full 100-wordlist used in making the lexical comparison.

The following section describes the lexical comparison of the three Lisu dialects.

## 5.2 Lexical comparison

After the non-root syllables have been eliminated, the root syllables may be compared. A modified Blair type method (1990: 31-33) based on Mann (2005: 30-32) is applied to this data to determine the lexical similarity between the Lisu dialects (see Section 2.6). The criteria for determining lexical similarity based on the modified Blair type method is shown in Table 58.

**Table 58 Criteria for lexical similarity**

Category	Criteria
Category 1	a. exact matches b. vowels differing by one feature including diphthongs c. phonetically similar segments in three or more word pairs d. a correspondence with nothing in three or more word pairs
Category 2	a. phonetically similar segments in fewer than three word pairs b. vowels or diphthongs differing by two or more features
Category 3	a. non-phonetically similar consonants b. a correspondence with nothing in fewer than three word pairs
Ignore	a. reduced syllables and non-root syllables b. tone

By using the criteria shown in Table 58, the phones may be placed in the appropriate categories. Examples of the results for a selection of lexical items are shown in Table 59.

**Table 59 Examples of application of criteria for lexical similarity**

Dialects	Sites	'hand'	'mountain'	'foot'	'leaf'	Sites	'hand'	'mountain'	'foot'	'leaf'
N-N	YKB-LBS	1a, 1a	1a, 1a	1a, 1a	2a, 1a	LBS-HKH	1a, 1a	1a, 1b	1a, 1a	2a, 1a
N-N	YKB-HKH	1a, 1a	1a, 1b	1a, 1a	1a, 1a	LBS-MLSD	1a, 1a	1c, 1b	1a, 1a	1a, 1a
N-N	YKB-MLSD	1a, 1a	1c, 1b	1a, 1a	1a, 1a	HKH-MLSD	1a, 1a	1c, 1b	1a, 1a	1a, 1a
N-C	YKB-STH	1a, 1a	1a, 1a	1a, 1a	2a, 1a	HKH-STH	1a, 1a	1a, 1b	1a, 1a	2a, 1b
N-C	YKB-MCP	1a, 1a	1a, 1a	1a, 1a	2a, 1a	HKH-MCP	1a, 1a	1a, 1b	1a, 1a	2a, 1b
N-C	YKB-MKH	1a, 1a	1c, 1b	1a, 1a	2a, 1a	HKH-MKH	1a, 1a	1c, 1b	1a, 1a	2a, 1b
N-C	YKB-DWB	1a, 1a	1a, 1b	1a, 1a	2a, 1a	HKH-DWB	1a, 1a	1a, 1a	1a, 1a	2a, 1b
N-C	LBS-SHT	1a, 1a	1a, 1a	1a, 1a	1a, 1b	MLSD-STH	1a, 1a	1c, 1b	1a, 1a	2a, 1b
N-C	LBS-MCP	1a, 1a	1a, 1a	1a, 1a	1a, 1b	MLSD-MCP	1a, 1a	1c, 1b	1a, 1a	2a, 1b
N-C	LBS-MKH	1a, 1a	1c, 1b	1a, 1a	1a, 1b	MLSD-MKH	1a, 1a	1a, 1a	1a, 1a	2a, 1b
N-C	LBS-DWB	1a, 1a	1a, 1b	1a, 1a	1a, 1b	MLSD-DWB	1a, 1a	1c, 1b	1a, 1a	2a, 1b
N-S	YKB-KSG	1a, 1a	1c, 1b	1c, 1b	2a, 1a	HKH-KSG	1a, 1a	1c, 1b	1c, 1b	2a, 1b
N-S	YKB-TWM	1a, 1a	1c, 1b	1c, 1b	2a, 1a	HKH-TWM	1a, 1a	1c, 1b	1c, 1b	2a, 1b
N-S	YKB-SDY	1a, 1a	1c, 1b	1c, 1b	2a, 1a	HKH-SDY	1a, 1a	1c, 1b	1c, 1b	2a, 1b
N-S	YKB-MKT	1a, 1a	1c, 1b	1c, 1b	2a, 1a	HKH-MKT	1a, 1a	1c, 1b	1c, 1b	2a, 1b
N-S	LBS-KSG	1a, 1a	1c, 1b	1c, 1b	1a, 1b	MLSD-KSG	1a, 1a	1a, 1a	1c, 1b	2a, 1b
N-S	LBS-TWM	1a, 1a	1c, 1b	1c, 1b	1a, 1b	MLSD-TWM	1a, 1a	1a, 1a	1c, 1b	2a, 1b
N-S	LBS-SDY	1a, 1a	1c, 1b	1c, 1b	1a, 1b	MLSD-SDY	1a, 1a	1a, 1a	1c, 1b	2a, 1b
N-S	LBS-MKT	1a, 1a	1c, 1b	1c, 1b	1a, 1b	MLSD-MKT	1a, 1a	1a, 1a	1c, 1b	2a, 1b
C-C	STH-MCP	1a, 1a	1a, 1a	1a, 1a	1a, 1a	MCP-MKH	1a, 1a	1c, 1b	1c, 1b	1a, 1a
C-C	STH-MKH	1a, 1a	1c, 1b	1a, 1a	1a, 1a	MCP-DWB	1a, 1a	1a, 1b	1c, 1b	1a, 1a
C-C	STH-DWB	1a, 1a	1a, 1b	1a, 1a	1a, 1a	MKH-DWB	1a, 1a	1c, 1b	1c, 1b	1a, 1a
C-S	STH-KSG	1a, 1a	1c, 1b	1c, 1b	1a, 1a	MKH-KSG	1a, 1a	1a, 1a	1c, 1b	1a, 1a
C-S	STH-TWM	1a, 1a	1c, 1b	1c, 1b	1a, 1a	MKH-TWM	1a, 1a	1a, 1a	1c, 1b	1a, 1a
C-S	STH-SDY	1a, 1a	1c, 1b	1c, 1b	1a, 1a	MKH-SDY	1a, 1a	1a, 1a	1c, 1b	1a, 1a
C-S	STH-MKT	1a, 1a	1c, 1b	1c, 1b	1a, 1a	MKH-MKT	1a, 1a	1a, 1a	1c, 1b	1a, 1a
C-S	MCP-KSG	1a, 1a	1c, 1b	1c, 1b	1a, 1a	DWB-KSG	1a, 1a	1c, 1b	1c, 1b	1a, 1a
C-S	MCP-TWM	1a, 1a	1c, 1b	1c, 1b	1a, 1a	DWB-TWM	1a, 1a	1c, 1b	1c, 1b	1a, 1a
C-S	MCP-SDY	1a, 1a	1c, 1b	1c, 1b	1a, 1a	DWB-SDY	1a, 1a	1c, 1b	1c, 1b	1a, 1a
C-S	MCP-MKT	1a, 1a	1c, 1b	1c, 1b	1a, 1a	DWB-MKT	1a, 1a	1c, 1b	1c, 1b	1a, 1a
S-S	KSG-TWM	1a, 1a	1a, 1a	1a, 1a	1a, 1a	TWM-SDY	1a, 1a	1a, 1a	1a, 1a	1a, 1a
S-S	KSG-SDY	1a, 1a	1a, 1a	1a, 1a	1a, 1a	TWM-MKT	1a, 1a	1a, 1a	1a, 1a	1a, 1a
S-S	KSG-MKT	1a, 1a	1a, 1a	1a, 1a	1a, 1a	SDY-MKT	1a, 1a	1a, 1a	1a, 1a	1a, 1a

Using the criteria in Table 58 each lexical item is compared among all 12 sites.

There are 66 possible pairings among the 12 language varieties. The first column of Table 59 shows which dialects are being compared.

After the categories have been assigned to all the phones, a similarity matrix is applied to determine whether the words compared are lexically similar or not. This template, found in Table 60, is based on the number of phones and specifies the minimum conditions the word forms must meet in order to be considered lexically similar. The number of phones and their minimum conditions of the lexical items must meet with the criteria shown in Table 58 in order to determine lexical similarity.

**Table 60 Phone table for lexical similarity**

Number of phones	Category 1	Category 2	Category 3
1	1	0	0
2	2	0	0
3	2	1	0
4	2	1	1
5	3	1	1
6	3	2	1
7	4	2	1
8	4	2	2

In Table 60, the numbers in the column 'Number of phones' represent the numbers of phones in the compared syllables. For example, the syllable [læ] has two phones [l] and [æ]. The numbers in the columns 'Category 1', 'Category 2', and 'Category 3' represent the minimum number of the phones that the compared syllables have according to these categories. These categories correspond with the categories in Table 59. If the compared syllables have one phone, this phone must fit in Category 1. If the syllables have two phones, both of these phones must fit in Category 1. If the syllables have three phones, two of them must fit in Category 1, one in Category 2, and none for Category 3.

The results after applying the criteria to the data are shown in Table 61.



**Table 61 The result of the lexical similarity**

Dialects	Sites	'hand'	'mountain'	'foot'	'leaf'	Sites	'hand'	'mountain'	'foot'	'leaf'
N-N	YKB-LBS	1	1	1	0	LBS-HKH	1	1	1	0
N-N	YKB-HKH	1	1	1	1	LBS-MLSD	1	1	1	1
N-N	YKB-MLSD	1	1	1	1	HKH-MLSD	1	1	1	1
N-C	YKB-STH	1	1	1	0	HKH-STH	1	1	1	0
N-C	YKB-MCP	1	1	1	0	HKH-MCP	1	1	1	0
N-C	YKB-MKH	1	1	1	0	HKH-MKH	1	1	1	0
N-C	YKB-DWB	1	1	1	0	HKH-DWB	1	1	1	0
N-C	LBS-SHT	1	1	1	1	MLSD-STH	1	1	1	0
N-C	LBS-MCP	1	1	1	1	MLSD-MCP	1	1	1	0
N-C	LBS-MKH	1	1	1	1	MLSD-MKH	1	1	1	0
N-C	LBS-DWB	1	1	1	1	MLSD-DWB	1	1	1	0
N-S	YKB-KSG	1	1	1	0	HKH-KSG	1	1	1	0
N-S	YKB-TWM	1	1	1	0	HKH-TWM	1	1	1	0
N-S	YKB-SDY	1	1	1	0	HKH-SDY	1	1	1	0
N-S	YKB-MKT	1	1	1	0	HKH-MKT	1	1	1	0
N-S	LBS-KSG	1	1	1	1	MLSD-KSG	1	1	1	0
N-S	LBS-TWM	1	1	1	1	MLSD-TWM	1	1	1	0
N-S	LBS-SDY	1	1	1	1	MLSD-SDY	1	1	1	0
N-S	LBS-MKT	1	1	1	1	MLSD-MKT	1	1	1	0
C-C	STH-MCP	1	1	1	1	MCP-MKH	1	1	1	1
C-C	STH-MKH	1	1	1	1	MCP-DWB	1	1	1	1
C-C	STH-DWB	1	1	1	1	MKH-DWB	1	1	1	1
C-S	STH-KSG	1	1	1	1	MKH-KSG	1	1	1	1
C-S	STH-TWM	1	1	1	1	MKH-TWM	1	1	1	1
C-S	STH-SDY	1	1	1	1	MKH-SDY	1	1	1	1
C-S	STH-MKT	1	1	1	1	MKH-MKT	1	1	1	1
C-S	MCP-KSG	1	1	1	1	DWB-KSG	1	1	1	1
C-S	MCP-TWM	1	1	1	1	DWB-TWM	1	1	1	1
C-S	MCP-SDY	1	1	1	1	DWB-SDY	1	1	1	1
C-S	MCP-MKT	1	1	1	1	DWB-MKT	1	1	1	1
S-S	KSG-TWM	1	1	1	1	TWM-SDY	1	1	1	1
S-S	KSG-SDY	1	1	1	1	TWM-MKT	1	1	1	1
S-S	KSG-MKT	1	1	1	1	SDY-MKT	1	1	1	1

In Table 61, '1' means that the dialects compared are 'lexically similar' and '0' means that the dialects compared are 'not lexically similar'. From these comparisons, we can compute the percentage of lexical similarity for each pair of varieties and generate a matrix to organize all the lexical similarity percentages. These can be depicted in a tree diagram that depicts the lexical similarity relationship between the similar varieties. The following section presents the percentage of lexical similarity and tree diagram of the Lisu varieties.

### 5.3 Lexical similarity and the analysis results

The percentage of lexical similarity among the Lisu varieties may be seen in Table 62.

**Table 62 The percentage of lexical similarity between Lisu varieties**

Dialects	Sites	Northern Lisu				Central Lisu				Southern Lisu			
		China		Myanmar		China		Myanmar		Thailand			
		YKB	LBS	HKH	MLSD	STH	MCP	MKH	DWB	KSG	TWM	SDY	MKT
N.I.S	YKB	-	-	-	-	-	-	-	-	-	-	-	-
	LBS	-	-	-	-	-	-	-	-	-	-	-	-
	HKH	96	95	-	-	-	-	-	-	-	-	-	-
	MLSD	94	93	92	-	-	-	-	-	-	-	-	-
C.I.S	STH	94	94	88	88	-	-	-	-	-	-	-	-
	MCP	93	92	89	86	96	-	-	-	-	-	-	-
	MKH	93	94	87	86	97	95	-	-	-	-	-	-
	DWB	91	94	90	89	94	95	93	-	-	-	-	-
S.I.S	KSG	90	91	86	83	94	96	95	94	-	-	-	-
	TWM	91	90	88	84	93	94	93	95	96	-	-	-
	SDY	92	94	86	84	93	93	93	95	96	94	-	-
	MKT	91	91	84	-	92	95	92	92	97	93	97	-

According to Table 62, the highest percentage of lexical similarity is 98%, which is within the Northern Lisu dialect (YKB and LBS varieties in China), and the lowest percentage is 82%, which is between a Northern Lisu variety (MLSD) and Southern Lisu variety (MKT)<sup>73</sup>. These percentages are significantly higher than the 70% lexical similarity threshold, below which intelligibility would be marginal. However, this does not prove that there is intelligibility between these varieties, because other differences such as grammar, pronunciation, rate of speech, relative prestige, etc. all influence intelligibility.

Northern Lisu varieties show the highest lexical similarity within the same dialect and the lowest percentage with the Southern Lisu dialect.

The lexical similarity percentage of 95% or above occurred mostly between varieties within the same dialect. The Northern Lisu varieties in Myanmar those are Hokho (HKH) and Mulashide (MLSD) show the lowest similarity with other varieties and occasionally between the Central and the Southern dialects.

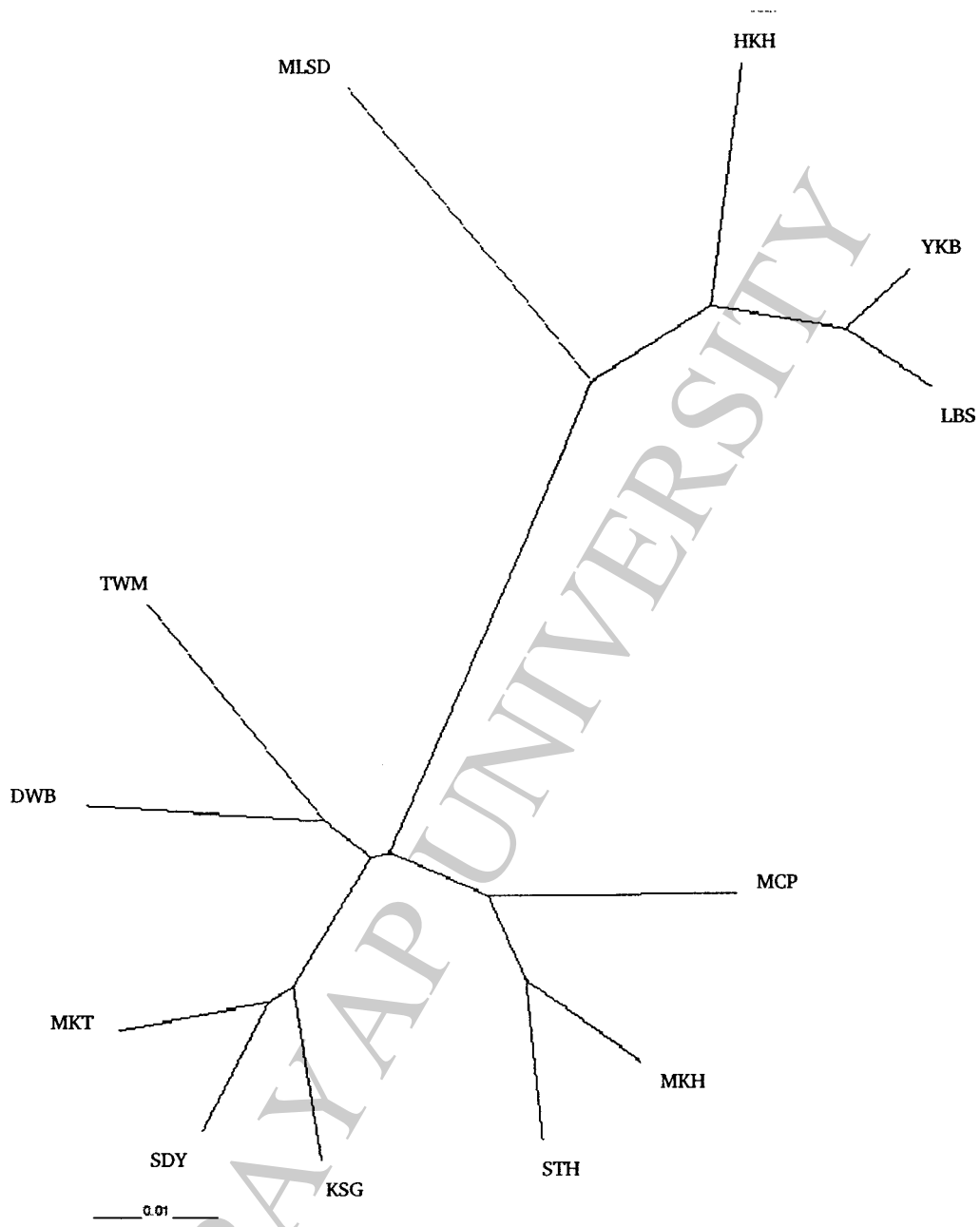
The lexical similarity percentage of 93-94% is mostly between varieties within the same dialect, and occasionally between the Central and the Southern dialects.

<sup>73</sup> Mulashide (MLSD) is the Northern Lisu dialect site from Myanmar and Mokhoto or Hongkhong (MKT) is the Southern Lisu dialect site from Thailand.

The lexical similarity percentage of 82-91% occurred between Northern Lisu and other dialects. It is found mostly between Northern and Southern dialects, and sometimes between Northern and Central dialects. Thus, this data shows that the Northern dialect has the most lexical variation with other Lisu dialects. Based on the percentage of lexical similarity, a tree diagram can be drawn to show a basic picture of the lexical relatedness of the Lisu varieties.

Figure 15 depicts the lexical relationship of the Lisu varieties for 12 sites.

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**Figure 15 Tree diagram of the Lisu varieties**

In Figure 15, the shorter the line between the varieties, the more lexical similarity they share. For example, the distance between YKB (Yikuaibi) and LBS (Labieshan) is very little because they have 98% similarity. It is reasonable to see that these two sites share very closed lexical similarity because they are from the same dialect. In contrast, the greater the distance between the varieties, the less lexical similarity

they share. For example, the distance between MLSD (Mulashide) and STH (Shitonghor) is very long. It is reasonable that these two sites share less lexical similarity because they are from different dialects.

According to Figure 15, YKB and LBS are in one cluster while this cluster is also connected with HKH and MLSD. YKB, LBS, HKH, and MLSD are also in one cluster in the wider view and all are Northern Lisu dialects. STH and MCP form a cluster, which turns to be another wider cluster when joined with MKH. They are all Central Lisu dialects. SDY and MKT form a cluster, which turns to be a wider cluster when joined with KSG. All these sites are from Southern Lisu dialects. It is unexpected that DWB, a Central Lisu dialect site and TWM, a Southern Lisu site formed a cluster even though they are from different dialects.

The Northern Lisu varieties (YKB, LBS, HKH, and MLSD) appear as a different cluster while Central (STH, MCP, MKH, and DWB) and Southern Lisu varieties (KSG, TWM, SDY, and MKT) are near and form a cluster. It is true that the lexical similarity of the Northern Lisu dialect shows more differences while the Central and Southern Lisu share more lexical similarity. Moreover, geographically Northern Lisu is more isolated than Central and Southern Lisu. One site each from Central (DWB) and Southern (TWM) Lisu dialects form a mixed cluster of Central and Southern Lisu dialects. It is not surprising that a Central and a Southern Lisu site form a closer cluster because these two dialects share closer lexical similarity according to author's observation. In general, the variation in percentage among the Lisu dialects is not great. The Northern Lisu varieties appear to form a separate cluster to the Central and Southern varieties which are in the same cluster.

## **5.4 Conclusion**

Finding the lexicostatistic results of three Lisu dialects is one of the objectives in this study. One hundred lexical items from four sites each of Northern Lisu, Central Lisu, and Southern Lisu are compared in this study. In general, the lexical similarity between the three Lisu dialects is high. It is true especially among the same dialects and sometimes between the Central and Southern Lisu dialects. The Northern Lisu dialect is the most varied lexically among the three Lisu dialects.

The highest lexical similarity is between the Northern Lisu dialect, from China, YKB (Yikuaibi) and LBS (Labieshan). The lowest lexical similarity percentage is between

MLSD (Mulashide), a Northern Lisu site from Myanmar and MKT (Hongkong), a Southern Lisu site from Thailand.

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