Influence of Thai-English Bilingual Writing System Rules to Learning Chinese Characters

Nathakarn Thaveewatanaseth* and Xin Jiang

Beijing Language and Culture University, Beijing, China

Abstract

We examined whether Thai-English bilingual writing system rules make an impact on learning Chinese characters. The 80 participants have acquired both Thai and English language. This paper was designed based on a 2×2×4 design: three factors by which the Thai-Chinese similar script to visual form, English-Chinese similar script to visual form; high and low frequency of Chinese characters and four groups of difference Chinese levels. They used an Anoto digital pen to complete the copy Chinese characters test. This digital pen has the function of recording dynamic writing stroke order information. The information that this pen recorded, had been counted through the playback technology. Under the Thai-Chinese script similar to visual form, but writing rules difference condition, Thai language writing system rules have shown negative transfer, when the Chinese character was high frequency, the degree of influence of Thai language writing rules showed fall-rise-fall fluctuations with improvement of the Chinese level, but when the Chinese character was low frequency, the degree of Thai language writing rules showed a steady state of improvement of the Chinese level; Under the English-Chinese font similar to visual form, and the same writing rules condition, English language writing system rules have shown positive transfer, the degree of influence was not inflected by high-low frequency of Chinese characters and Chinese level. Finally, teaching suggestions are put forward based on the above conclusion.

Keywords: Thai Student, Stroke Order, Transfer, Psychological Language Similarities

* Corresponding Author
e-mail: nathakarn@163.com

Introduction

Chinese character stroke order acquisition is one of the more difficult aspects in learning Chinese characters for foreign students (Wang et.al., 1994; Shi & Wan, 1998). Experimental research on Second Language Acquisition (SLA) of Chinese characters has had some progress. For example, in error analysis of Chinese characters; Shi (2000) examined the errors of foreign students with different levels of Chinese from more than 30 countries (including Thai students). The study found that writing errors were caused by the generalization of the semantic functions of component forms of Chinese. Xiao (2002) systematically investigated foreign students' errors of Chinese characters, and detected that three types of errors were the most prominent. These were a change in the Chinese character component, a loss or a gain of a Chinese character component and a change in the form and the position of a Chinese character component. Lu (2002) examined the space position of Chinese character component combinations. Wang (2003) studied how foreign students developed Chinese character position awareness. Feng (2006) and Jiang (2008) studied the effects of Chinese character component position. Another study was done on orthographic awareness by Jackson, Everson and Ke (2003). They divided Chinese character awareness development into three stages: the whole word acquisition before the component processing stage, the component awareness of the component processing stage, and the automated processing of components stage. In addition to this, in regards to writing unit representation, Chin (1973), Ke (1996) found that Chinese character strokes have a form effect. Cui (2000) discussed the effects of Chinese character stroke number and components. You (2003), Hao (2008) argued for the type of topology effect.

In Chinese character stroke order research, Shan and An (2010) studied four overseas Chinese students, using case interviews, and a camera to track them. They found that the elementary and intermediate Chinese level students made mistakes on Chinese character stroke order, both in the character-writing circle and non-character-writing circle. There were generalities and differences between them. Identification of Chinese identity is also seen as the foundation and premise for Chinese character acquisition. Huang (2010) used the Anoto digital pen to study the Chinese character stroke order of 102 foreign students in Beijing Language and Culture University. It was found that the language backgrounds of students significantly affected their Chinese character acquisition. The native language of a student could cause stroke direction output error, connection handwriting error, stroke order error among the component, and special rule error between components. Wong (2011) examined elementary school students in Thailand who studied Chinese character stroke order by using the strokes following way. She found that students in fourth, fifth and sixth grade made the most errors in stroke order rules in "from middle to sides" and "first enclosing stroke, then inner" rules. Li (2012, 2013) examined Chinese learners in a Thai school; he pointed out that

Chinese characters similar to the Thai Alphabet were easier to get wrong, and the errors were related to language proficiency.

However while progress has been made, these studies have not examined foreign students who are learning Chinese characters from a cross-linguistic perspective. Thus, they have not been able to find the answer to whether a student's L1 influences L2, and how L1 affects L2 acquisition. The Associative-Cognitive CREED Framework Theory (Ellis, 2007), Input Procession Theory (VanPatten, 2007) and Autonomous Induction Theory (Carroll, 2007) claim that SLA is affected by L1. In fact, as learners study new language knowledge, they are affected by the acquired language. This knowledge is interconnected in long-term memory and is affected by such factors as cue competition, salience, interference, overshadowing, blocking, and perceptual learning. But these factors are influenced by L1, so the transfer phenomenon is widespread in the SLA cognitive procession. The learning procedure of Chinese character stroke order for foreign students is also in this state of cognitive processing. As a result, this paper aims to examine the acquisition of Chinese character stroke order from a cross-linguistic perspective. We expect to find factors that influence Chinese character stroke order and to support the foreign students to learn Chinese characters more effectively.

Objectives

1. As the components of Chinese character are similar to both Thai and English alphabets, we aim to study whether Thai learners will write Chinese characters according to the Thai or English writing system rules.

2. We aim to examine whether the degree of cross-linguistic influence will be affected by Thai learners, Chinese levels, and Chinese characters frequency.

If we can identify corroborative indication of the above objectives, this research can provide a valuable concept to support the teaching and learning Chinese characters in SLA.

Conceptual Framework

According to cross-linguistic similarity theory (Cenoz 2001; Ringbom, 2001, 2007; Eckman, 2004), if the learner thinks that their L1 is similar to L2, there is a high probability of transfer from L1 to L2. So, when the components of a Chinese character are visually similar to one from the Thai alphabet, we expect that the learners will tend to write this component as they do in the Thai alphabet writing rule. In addition, we also consider that influence of L1 will be affected by L2 proficiency (Odlin, 1989; Odlin & Jarvis, 2004; Ellis,

2004; Jarvis & Pavlenko, 2008). For example, “kǒu” (口) a component of a Chinese character is similar to [i] (ิ) a Thai vowel. Visually they are similar in terms of closeness, continuity and linearity, but in writing; the “héng” stroke (一) direction is in the bottom of the “kǒu” component, from the left to the right rather than from the right to the left as in writing the horizontal line direction in the bottom of the [i] of Thai vowel. That is the “héng” stroke in “k ǒu” component and horizontal line in [i] vowel alphabet are similar in visual form but they are different in their writing direction rule. For a group of learners who have no Chinese knowledge, we expect the highest probability in which they will write “héng” stroke direction in “kǒu” component according to horizontal line direction in [i] vowel alphabet; they will write from right to left direction. The Thai writing system rule will show a negative transfer, but for the group with Chinese knowledge, the occurrence probability will decrease with their improved Chinese level because of the different writing system rules between Thai and Chinese. For this point, the previous research has had conflicting results, such as decreasing, increasing, parallel or fluctuating levels, so we will study this further to confirm the conclusion of this paper. Likewise, the “shí” (十) component of Chinese character is similar to the “t” of English alphabet in the term of the right angles, linearity, non-closeness and non-continuity from visual form. The writing of the “héng stroke (一) direction of the “shí” component is from left to right as writing horizontal line direction of the “t” of the English alphabet. That is the “héng” stroke in the “shí” component and the horizontal line in the “t” are similar in visual form, but also similar in their writing direction rule, so the English writing system rule will not show negative transfer. For both groups, we expect them to write the “héng” stroke direction in the “shí” component as a horizontal line, in the same direction as the “t” ,which is written from left to right, because of the same writing system rules between English and Chinese. In other words, the error of the “héng” stroke in the “kǒu” (口) component will cause more errors than the “héng” stroke in the “shí” (十) componentof Chinese character.

At the same time, we also consider the frequency factors of Chinese characters from the limited cognitive resource distribution theory. For high frequency characters, the influence of Thai writing rules on Chinese characters will decrease. On the other hand, for low frequency characters which the consume more cognitive resources, it will inhibit the ability to decrease the Thai writing rule, so the degree of influence of the Thai writing system rule will increase.

On the basis of the above information, we designed a 2×2×4 experiment for examining the influence of writing system rules of the acquired Thai and English languages for the factors of character frequency and Chinese level condition.

Research Methodology

1. Population or Samples Design

The participants in the study was comprised of 80 Thai students; 20 undergraduates in Thai universities, who were not learning Chinese language (average age of 21). Sixty Thai students who were learning Chinese in Beijing universities; divided by age into 3 groups of 20 students each. The low-level group had an average age of 21. The middle-level group had an average age of 24. The high-level group had an average age of 27. All of them had normal vision, hand and arm movement, and were all right-handed.

For the division of participants in the Chinese level, 20 participants who did not learn Chinese language in Thailand universities belonged to 0-level group, the other 60 participants had took a test to recognize Chinese characters. As recognition of Chinese characters is significantly related to Chinese character writing scores ($r = .457$, $p < .0005$), we divided the samples into 3 level groups according to their recognized Chinese character scores. The population score was determined as the low-level group among 1-33 scores; the population score was determined as the middle-level group among 34-66 scores; and the population score was determined as the high-level group among 67-100 scores.

Next, all 80 participants were tested in their writing of Thai and English. We found that everyone had acquired Thai and English writing system rules. On learning Chinese, the 0-level group had no previous contact with Chinese language but the other 3 groups were learning Chinese in Beijing's university.

2. Measurement and Data collection design

To design the research material, Chinese characters and their frequency in this study were based on the online modern Chinese character frequency corpus (www.cncorpus.org) of the "Institute of Applied Linguistics, Ministry of Education" Beijing, China. The 16 Chinese characters were divided into the Thai-Chinese similarity group and the English-Chinese similarity group. The "kǒu" (口) component of the 8 characters in Thai-Chinese similarity group are similar to [i] (ิ) of the Thai vowel alphabet, however, the "shí" (十) component of the 8 characters in the English-Chinese similarity group are similar to the "t" of the English alphabet. Both Thai-Chinese similarity team and English-Chinese similarity groups were further divided into a low-frequency group and a high-frequency group. At the same time, characters stroke numbers were also controlled in 6-16 strokes (the final results of divided groups see table 1).

Table 1 Experimental Material Divided Group

	Thai-Chinese similarity team								English-Chinese similarity team							
	high-frequency				low-frequency				high-frequency				low-frequency			
Chinese characters	圆	回	哥	答	毡	哉	兢	噩	南	华	顾	哥	哉	囤	兢	翡
Stroke numbers	10	6	10	12	9	9	14	16	9	6	10	10	9	7	14	14
Frequency (times)	878	208	840	758	3042	3356	3287	4175	347	546	836	840	3356	3419	3287	3632

These 4 teams were matched in stroke numbers, there were no significant difference between them with independent *t*-test ($p > .05$), and likewise, there were no significant difference between high-frequency team and low-frequency team ($p > .05$). But there were significant differences between high-frequency team and low-frequency team ($p < .05$).These kinds of material design are suited to our experiment, then 16 words of the experiment materials were randomly printed on digital paper.

The experimental tool used in this study was the Anoto digital pen to record the participants' handwriting information. This tool can automatically record all of the character strokes including stroke direction, stroke order and stroke combination when the participants write on digital paper. The stroke order of Chinese characters which this pen recorded was counted through playback technology.

For the experimental procedure, all participants completed the copy test of 16 Chinese characters, and wrote both the Thai and English alphabet with the Anoto digital pen in a natural writing condition; after they wrote the non-targets characters to practice, they were required to write phonetic notation to provide Chinese characters for testing their recognition of Chinese characters.

3. Analytical design

This paper was designed using a 2×2×4 method; the factors being Thai-Chinese similar script in visual form, English-Chinese similar script in visual form; high and low frequency of Chinese characters and four groups of different Chinese levels. Both cross-linguistic similarity and Chinese character frequency factors are variables within the subject, but Chinese levels factor is a subject variable.

We tested the three independent variable factors main effect, the two-way interaction and the three-way interaction. If there are significant interactions, we will further test the simple effect.

All the data was analysed using a 3-way repeated measure analyses of variance (ANOVA).

Results

The dependent variable in this study is writing the "héng" stroke direction. If one of the participants writes the "héng" stroke direction from right to left (←) or from left to right (→), he (she) will receive 1 point or 0 point. The average scores are as seen in Table 2.

Table 2 Every Team Average Scores (percentage)

	Thai-Chinese similarity team		English-Chinese similarity team	
Chinese levels	high-frequency	low-frequency	high-frequency	low-frequency
0-level	50.00%	40.00%	1.25%	1.25%
Low-level	12.50%	12.50%	1.25%	2.50%
Middle-level	26.25%	20.05%	0.00%	0.00%
High-level	22.50%	28.75%	0.00%	0.00%

The main effect of cross-linguistic similarity was highly significant (F_1 (1, 76) = 105.628, $p < .0005$; F_2 (1, 12) = 28.435, $p < .0005$), the main effect of Chinese level was significant (F_1 (3, 76) = 4.109, $p = .009$; F_2 (3, 36) = 63.188, $p < .0005$), but the main effect of Chinese character frequency has no significant (F_1 (1, 76) = .258, $p = .613$; F_2 (1, 12) = .024, $p = .879$).

For the test of interaction effect, the character frequency did not show a significant interaction with the cross-linguistic similarity (F_1 (1, 76) = 0.267, $p = .607$; F_2 (1, 12) = 0.009, $p = .927$), but character frequency was significant interaction with Chinese level, although these effects were not reliable across participants (F_1 (3, 76) = 2.092, $p = .108$; F_2 (3, 36) = 4.741, $p = .007$). The cross-linguistic similarity did show a significant interaction with Chinese level (F_1 (3, 76) = 4.486, $p = .006$; F_2 (3, 36) = 66.671, $p < .0005$).

The simple effect of cross-linguistic similarity was significant in all of Chinese levels (in 0-level group: F (3, 57) = 24.754, $p < .0005$; in low-level group: F (3, 57) = 7.728, $p < .0005$; in middle-level group: F (3, 57) = 13.921, $p < .0005$; in high-level group: F (3, 57) = 13.214, $p < .0005$). The result of paired-samples t-test was presented in Table 3 as below.

Table 3 t-test and significance value between cross-linguistic similarity and frequency of Chinese characters in four level groups

	TC high VS TC low		TC high VS EC high		TC high VS EC low		TC low VS EC high		TC low VS EC low		EC high VS EC low	
Chinese levels	*t*	sig.	*t*	sig.	*t*	sig.	*t*	sig.	*t*	sig.	*t*	sig.
0-level	1.252	.226	**5.800**	.000	**6.325**	.000	**-4.722**	.000	**5.101**	.000	1.000	.330
Low-level	-1.453	.163	**2.438**	.025	2.087	.057	**-4.046**	.001	**3.949**	.001	-1.000	.330
Middle-level	0.195	.847	**4.098**	.001	**4.098**	.001	**-4.359**	.000	**4.359**	.000	-	-
High-level	-1.097	.287	**3.327**	.004	**3.327**	.004	**-4.574**	.000	**4.524**	.000	-	-

Note. TC high = Thai-Chinese similarity and high-frequency team, TC low = Thai-Chinese similarity and low-frequency team, EC high = English-Chinese similarity and high-frequency team, EC low = English-Chinese similarity and low-frequency team.

In Table 3, the paired-sample t-test showed that in all of Chinese level groups, the scores were significantly more for Thai-Chinese similarity team than for English-Chinese similarity team. This shows that the "héng" stroke direction from right to left (←) in Thai-Chinese similarity team were significantly more than the "héng" stroke direction from right to left (←) in English-Chinese similarity team.

The simple effect of Chinese level was significant in Thai-Chinese similarity and high-frequency team (F (3, 79) = 4.354, p = .007), then Tukey-HSD-test result was presented in Table 4 as below. The scores in Thai-Chinese similarity and high-frequency team were significantly more for 0-level group than for low-level group and high-level group (all $p <$ .05). But there was no difference between 0-level group and middle-level group ($p >$ .05), this showed that the degree of influence of the horizontal line direction in Thai language writing rules had shown fall-rise-fall fluctuations with improvement of Chinese levels under the Thai-Chinese similarity and high-frequency condition. However, the simple effect of Chinese level was not significant in the Thai-Chinese similarity and low-frequency team (F (3, 79) = 1.209, p = .312), this showed that the degree of frequency of the horizontal line direction in Thai language writing rules had shown steady state with improvement of Chinese levels under Thai-Chinese similarity and low-frequency condition. For English-Chinese similarity and high-frequency team, the simple effect of Chinese level was not significant (F (3, 79) = 0.667, p = .575), this showed that the influence degree of horizontal line direction in English language writing rules had shown the steady state with improvement of Chinese levels under English-Chinese similarity and high-frequency condition. In the same similarity condition, for the low-frequency team, the simple effect of Chinese level was not significant as well (F (3, 79) = 2.111, p = .106), this also showed that the degree of influence of the horizontal line direction in English language writing rules had shown steady state with improvement of Chinese levels under the English-Chinese similarity and high-frequency condition.

Table 4 Significant value between four level groups in cross-linguistic similarity and frequency of Chinese characters

	Significant value					
Variable	0-level VS Low-level	0-level VS Middle-level	0-level VS High-level	Low-level VS Middle-level	Low-level VS High-level	Middle-level VS High-level
Thai-Chinese						
High-frequency	**.001**	.061	**.022**	.458	.978	.978
Low-frequency	.361	.361	.608	1.000	.976	.976
English-Chinese						
High-frequency	1.000	.750	.750	.750	.750	1.000
Low-frequency	.177	1.000	1.000	.177	.177	1.000

The three-way interaction was not significant between Chinese level, cross-linguistic similarity and Chinese character frequency (F (3, 76) = 1.452, p = .234).

In summary, under Thai-Chinese font similar to visual form condition the writing rule of the horizontal line direction in [i] (ิ) of Thai vowel alphabet showed a negative transfer, when the Chinese characters were high-frequency, the influence degree of the writing rule of the horizontal line direction in [i] of the Thai vowel alphabet showed fall-rise-fall fluctuations with improvement in the Chinese level, but when the Chinese character was low frequency degree of Thai language writing rules had shown the steady state with improvement of Chinese level. Under English-Chinese font similar to visual form, and the same writing rules condition, English language writing system rules have shown a positive transfer that was not inflected by high-low frequency of Chinese characters and Chinese level.

Conclusion and Discussion

The results of this cross-linguistic similarity were significant. It showed that Thai-Chinese or English-Chinese similar components in Chinese characters were distinctly written according to Thai writing rules or English rules. That is to say that the “héng” stroke writing direction in the “kǒu” (口) component and the “shí” (十) component of Chinese character was written according to the rule from right to left (←) and “héng” stroke writing direction in “shí ” (十) component of Chinese character was written according to the rule from left to right (→). However, the influence of the cross-linguistic similarity to visual form was affected by the Chinese levels of the students and character frequency.

The result of cross-linguistic similarity being the main effect shows that acquired language knowledge affects subsequent learning. The copy task used cognitive processing with reference to the dual coding in representation of knowledge (Paivio cited in Peng & Zhang 2010). They shared a propositional representation that is interrelated in long-term memory (Kosslyn cited in Peng & Zhang 2010). When the participants eyes were stimulated by Chinese characters, it generated visual sensory information (sensory register or sensory memory), containing physical elements like stimulus size, line, angle, space structure and so on. While the images were in a free-floating state, the coding representations activated the related code in their long-term memory (Robinson, 2003), and then the related code activated the dual coding in surface representation, such as the stored language knowledge (Thai, English and Chinese language) and their mental imagery of non-verbal ideas. When writing Chinese characters, 0-level participants' input information of Chinese characters activated the dual coding that relates to the rules of their acquired Thai and English writing system. Their visual code in non-verbal messages came into their short-term memory (working memory) with free-floating information being under the action of attention. At this point, this information was integrated according to the surface connection, natural reasoning, cue availability, perceptual constancy and so on. The strange Chinese characters were split into the parts similar to related Thai letters (答-口-ิ) or the parts similar to related English letter (南-十- t). Certainly, for the remaining three groups who had previous Chinese knowledge, there were Chinese writing rules in their short-term memory. The results of this paper were consistent with the related descriptions of the cognitive processing mechanism theory. The writing direction of the "héng" stroke (一) of the "kǒu" (口) component in Chinese characters is similar to the horizontal line of [i] (ิ) in Thai vowel alphabet in terms of the closeness, continuity and linearity from visual form appeared from right to left (←). However, the writing direction of the "héng" stroke (一) of "shí" (十) component in Chinese characters is similar to the horizontal line of t in the English alphabet in terms of right angles, linearity, non-closeness and non-continuity from visual from left to right (→), and the "héng" stroke writing direction from right to left in the "kǒu" component were significantly more than in the "shí" (十) component. This showed that the acquired Thai-English bilingual writing system rules influenced learning Chinese characters. Meanwhile, we confirmed the dual-coding theory and structure theory in the cognitive processing mechanism.

The result that the students' Chinese levels showed significant differences, shows that Chinese writing knowledge had a great influence on writing Chinese characters. For the 0-level participants, Chinese writing rules were not stored in long-term memory, writing characters were only affected by Thai-English bilingual writing rules. However, for the other three groups, the impact of the Chinese characters writing rules were already stored in their long-term memory and this was gradually strengthened with higher Chinese proficiency. In contrast, the negative influence of Thai writing rules stored in long-tern memory were

gradually restrained more with the Chinese higher level. However, the positive influence of English writing rules remained the same after the learners confirmed that English writing rules were in accord with Chinese character writing rules.

The result that the cross-linguistic similarities and levels of Chinese interaction effect were significant showed that the influence degree of cross-linguistic similarity was affected by language level of the students. It is worth noticing that we learned the influence of the character frequency has on cross-linguistic effects. Although the character frequency not significant it is important to notes its effects. This phenomenon was explained through the Adaptive Control of Thought model (ACT) (Anderson, 1983; Anderson & Fincham, 1994) and Competition model (McDonald, 1987) in the cognitive perspective. These theories emphasized effects of frequency under input and all related representation codes stored in long-term memory. These were automatically adjusted to their activation values, then they were more likely to be activated so that their competitive ability enhanced. With the input frequency increasing, Chinese proficiency improved. The results of this study were in accord with these theories.

Under cross-linguistic similarity and high-frequency character condition, the error scores for the 0-level group was significantly lower than the low-level and high-level groups. That showed the competitive ability of Thai writing rules was decreasing and the influence to writing Chinese characters was weakening, however, it was worth noticing that the errors of the 0-level group was not significantly different from the middle-level group. This is in accord with Jackson, Everson and Ke (2003) who divided Chinese character orthographic awareness development into 3 stages: the whole word acquisition before the component processing stage, the component awareness of the component processing stage, and the component automated processing stage. The second stage of 3 stages corresponded to the middle-level. Learners at this stage have strong consciousness of components, and the component units in Chinese characters that correspond to Thai letters. In this stage, the strong consciousness of components made the activation value of the related letters in the acquired language need readjustment. Finally the competitive ability of Thai writing rules could bounce back, so the error scores of the middle-level group rose and there was no significant difference with the 0-level group.

On the other hand, Chinese character familiarity was increased with Chinese proficiency level. In the high-level stage the competitive ability of Chinese character writing rules was further promoted. That aroused the competitive ability of Thai writing rules to be restrained, so the error scores in the high-level group were low. However, under cross-linguistic similarity and low-frequency character condition, the error scores for the 0-level group were not significantly greater than in the other three groups. That showed all four groups were unfamiliar with low-frequency Chinese characters. When writing these characters they expend their limited cognitive resources, including the cognitive resources

that were assigned to restrain an item (such as, the writing rules of Thai letters that were similar to the component in Chinese characters in this paper) would be reduced. This resulted in the probability of Thai writing rules being used increasing and then the error scores increasing with the scores from the 0-level group being the highest. Under Thai-Chinese font similar to the visual form condition, Thai language writing rules that were not in accordance with Chinese writing rules showed negative transfer. However, under English-Chinese cross-linguistic similarity condition, whether error scores of writing low-frequency or high-frequency Chinese characters was not significantly different and was in the state of a very low error level. This showed that the level of English writing rules was promoted rather than restrained after the learners validated that English writing rules were in accordance with Chinese writing rules. In this case, the writing rules of the related English letter showed positive transfer to write Chinese characters.

In conclusion, in the course of foreign students learning Chinese characters, the acquired writing knowledge could be positively and negatively affected. The degree of negative influence was affected by the students' Chinese level and the frequency of Chinese character. In general, Thai-Chinese have similar visual forms, but writing rules differ, especially when the Chinese character is high-frequency. The writing rule of the related Thai letter showed fall-rise-fall fluctuations with improvement of Chinese level, when the Chinese character was a low-frequency word, the writing rule of the related Thai letter showed the fall-rise-fall fluctuations with improvement of Chinese level, but when the Chinese character was of low frequency, a degree of Thai language writing rules showed. This finding remained at a steady state with improvement of Chinese level; under English-Chinese font similar to visual form, and the same writing rules condition, the English language writing system rules have shown a positive transfer, and its influence was not affected by high-low frequency of Chinese characters and Chinese level.

Suggestion

First, we should attach importance to cross-linguistic comparisons from teaching to learning in SLA. For example, in the most basic stroke direction writing rules for Chinese-Thai-English language, we need a thorough comparative method that is summarized in the following table 5.

Table 5 The most basic strokes direction writing rules for Chinese-Thai-English language.

	Chinese					Thai			English		
	The most stroke	Name	Direction	Writing instruction	Examples	Direction	Writing instruction	Examples	Direction	Writing instruction	Examples
1	一	横 *héng*	→	Horizontal from the right end slightly up	二	→	Horizontal from left to right	ป	→	Horizontal from left to right	τ
						*←	Horizontal with right to left	ด			
2	丨	竖 *shù*	↓	Vertical from top to down	十	↓	Vertical from top to down	ป	↓	Vertical from top to down	λ
						*↑	Vertical from down to top	ป			
3	丿	撇 *piě*	↙	From the top-right, to down-left slightly	你	↙	From the top-right, to down-left slightly	ใฅ	↙	From the top-right, to down-left slightly	y
						*↗	From the down-left, to top-right slightly				
4	丶	点 *diǎn*	↘	Dot to lower right or left, then pause	点	↘	Dot to lower right	ต	**.	Dot	i
5	乀	捺 *nà*	↘	Dot to lower right then pause	人	↘	Dot to lower right	พ	↘	Dot to lower right	w x
	𠃌	折 *zhě*	𠃌	Turns have variant forms	口	𠃌		า	𠃌		n
						ㄴ		บ	ㄴ		L
						*		บ			
						ㄣ					

Note. * = in Thai writing system rules, the writing direction is difference to Chinese, ** = in English writing system rules, the writing direction is difference to Chinese.

Table 5 showed that for the "héng" (一) stroke and the "shù" (丨) stroke in Chinese writing direction rules and English writing direction rules are one-to-one correspondence, but Thai writing direction rule is two-to-one correspondence with Chinese writing direction rules, so we have to emphasize when Thai students learn to write Chinese characters strokes, the teacher should explicitly instruct the students to differentiate their similarities and differences in class. For the "piě" (丿) stroke in Chinese, Thai and English writing direction rules are all similar; we should further confirm this for students. For the "diǎn" (丶) stroke and the "nà"

(丶) stroke in Chinese writing direction rules and Thai writing direction rules are one-to-one correspondence, but we have to notice that the *diǎn*(丶) stroke in English writing form rule is different to Chinese writing form rule, so we must be mindful to instruct students to avoid English writing form rules resulting in a negative transfer. For *zhě* (𠃌) stroke in Chinese, Thai and English writing direction rules are all similar form, but we should notice their the different writing method.

Second, we should distinguish between the positive and negative factors that affect learning target language and correct the items that easily produce negative effects upon learning the target language. Then we can pay attention to the surface similarities of the acquired language and the target language, in fact these similarities are more likely to confuse the learners and cause them to make a mistake. We advise the teacher to show such similarities to the learners in class, then the teacher can design the task of seeking the difference in similarities and the students extensively practice after class, thus they can reach a shift from declarative knowledge to procedural knowledge, through the way of explicitly teaching and implicitly learning. The teacher and students should set up an information feedback mechanism.

Finally, for the items that do not correspond with the acquired language (s), we should make full use of the existing world knowledge in the student's long-term memory, such as topology, physic, mathematics and so on, to dynamically show Chinese character writing order such as two sides enclosing (e.g., 凵, 区) and four sides enclosing (e.g., 圆, 囤).

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Authors

Ms. Nathakarn Thaveewatanaseth

Center for Studies of Chinese as a Second Language

Beijing Language and Culture University, China.

e-mail: nathakarn@163.com

Prof. Dr. Xin Jiang

Beijing Language and Culture University

Xueyuan Road, Haidian District

Beijing, 100083, China.

e-mail: jiangxin6@163.com