



# The Effects of Native Language on Foreign Language Learning Emotions: A Study of Students' Second Language Anxiety Across Different Native Language Education Levels

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**Abstract.** It is universally acknowledged that the native language is the first language that humans acquire in childhood. Provided that the native language serves as the tool for developing and broadening recognition, it does play an essential role in learning foreign languages. Since the Reform and Opening up of China, many novel changes in language education have taken place, of which one of the most apparent distinctions is the importance attached to foreign language learning, as well as the consequent highlight of the status of English. From this perspective, the co-existence of native language education and foreign language learning is inevitable, progressive, and positive as well. Thus, this research investigated the effects of native language education of different extents on second language (L2) learning anxiety among junior high school and senior school students via qualitative questionnaires. Here are the findings: (1) Students can be influenced by various levels of native language education. (2) Native language transfer plays a significant role in foreign language learning, and it can cause foreign language learning anxiety. Generally, different native language education levels have effects on second language anxiety through language native language transfer.

**Keywords:** native language education, learning emotions, language learning anxiety, foreign language learning

## 1 Introduction

Native language acquisition is of tacit significance for children. For a long time, it seems that native language education shows little correlation with foreign language learning. Eager to acquire English more quickly, many Chinese choose to sacrifice the time and effort spent in native language acquisition to learn foreign languages, which results in a severe deficiency in both Chinese and foreign language acquisition<sup>[42]</sup>. Native language is a source of knowledge that learners often rely on consciously or not, which helps them complete the input process of foreign languages. How human beings learn foreign languages is influenced by it<sup>[41, 44]</sup>. From a perspective of cognition, it is “conditioned” or “formed” by the whole inherent system of knowledge and mindset that one acquires via the native language education which people have accumulated in their native language environment and under certain social conditions over a long period. Native language can affect foreign language learning consistently<sup>[25]</sup>. If mature cognitive and logical thinking skills and mindsets of native languages have not developed, it is difficult to facilitate foreign language learning and it may even hinder foreign language acquisition<sup>[24]</sup>. Foreign language learning is a complicated activity of cognition accompanied by abundant emotional experiences of learners, such as enjoyment, interest, anxiety, boredom, etc.<sup>[14]</sup>. Language learning emotions should be situated among a host of interacting factors because they continuously interact with a wide range of factors of individual differences to affect language learning<sup>[19]</sup>. Yet there are not many studies of the effects of native language education on students' foreign language learning emotions. This research aims to investigate whether there are effects of native language education on students' emotions of L2 learning, what are the effects, and how it comes into being with a quantitative questionnaire.

## 2 Literature Review

### 2.1 An Overview of Native Language Education

According to Cihai (2022)<sup>[7]</sup>, the native language is the first language acquired by children, which is usually the national or indigenous one. The functions and core of native language education have been summarized and categorized by scholars throughout several decades<sup>[25]</sup>. Children should learn their first language more efficiently and systematically. Currently, native language education in the Chinese mainland emphasizes classic reading, comprehension, and expression skills, logical thinking, appreciation and composition ability, and culture learning<sup>[13, 39, 40, 43]</sup>. A social individual has to handle the issue of gaining basic skills of receiving and transmitting information, expressing emotions, etc., to avoid being excluded from society, which shows one of the purposes of contemporary native language education for socialization<sup>[43]</sup>. The importance of native language education also lies in the development of students' thinking skills and habits. Stimulating students' innovation and creativity is for mentality advancements<sup>[44]</sup>. Currently, native language education is performed in primary school, junior high

school, and senior high school, and the levels go up as students enter the three stages [4].

Numerous studies have pointed out that as foreign language learning is becoming a vital part of modern education, traditional native language education has also been influenced. As English learning prevailed, the native language was enclosed in an unprecedented predicament as multitudinous dissents had appeared. Additionally, native language education has shown a tendency toward utilitarianism in recent years [6]. The number of Chinese turning a negative attitude towards L2 learning, especially students, has become larger. However, standpoints that there is no antagonism or mutual exclusivity between foreign language and native language learning have been accepted by people in recent years. Based on the fact that eminent translators and masters of foreign language literature are also well-educated in Chinese culture, there is a close relationship between the acquisition of the native language and foreign language learning ability [8]. Briefly, the mutual penetration and influences of native language and foreign language learning is an undeniable trend nowadays.

## 2.2 Native Language Transfer on Foreign Language Learning

Language transfer is aroused by the commonalities and differences between the target language and any other language that has been acquired or not completely acquired [28]. The process of L2 acquisition is unavoidable to be influenced by the native language, which can be divided into the “positive” and the “negative”. The former is named positive transfer, and the latter is named negative transfer. Positive transfer is conducive to foreign language acquisition, while negative migration hinders it [20, 21, 22, 23]. Native language education differs from L2 education, which is related to personality development, national and ethnic identity, spiritual construction, cultural transmission, etc. Second language education highlights practicality and application, the ability to tackle the basic needs of listening, speaking, reading, and writing [29]. Native language proficiency has a close relation to the capability to learn foreign languages. With positive transfer coming into effect, that is, a better acquisition of the native language and a potent ability to put it into practice, it will be easier and more efficient to learn foreign languages [8].

Negative transfer also exists in the process of foreign language learning. Studies have proved that the shared features of the native language can lead learners to acquire L2 with certain biases [11, 17, 36, 37]. Take Wang's (2021) [36] investigation and conclusion as an example. The differences in culture between English and Chinese have negative effects on English writing for high school students. Besides, Wang (2023) [37] investigated the mechanics of native language affecting English writing among 180 English-major students in Jiangsu Province with writing tests. It means that students with the capability of better native language composition tend to show a greater advantage in word choice, grammar, and composition structure of English writing. Thus, negative transfer is common among elementary learners [31, 34, 38]. Salient differences between the native language and L2 have a profound impact on negative transfer in English learning.

Language transfer is multi-faceted, depending on miscellaneous factors, such as phonology, vocabulary, grammar, and discourse. It is also affected by learners' age, environment, personality, etc. [10]. Native language education interacts indirectly but in an

irreplaceable way with foreign language learning with language transfer acting as the medium.

### 2.3 Anxiety: A Foreign Language Learning Emotion

Emotions, a result of psychological reactions to events, are aroused by external stimuli [16]. The beginning of an event is a stimulus, followed by thought, and ultimately leads to the simultaneous experience of a psychological response and emotion [18]. Generally, emotions can be divided into positive emotions and negative emotions. Positive emotions should co-exist with all types of emotions including the negative ones, instead of replacing them. If so, positive emotions can promote foreign language acquisition [12]. Positive emotions can be categorized into enjoyment, interest, confidence anticipation, etc., which improve psychological resilience by giving learners more tools to tackle negative emotions. It is effective for positive emotions to form and motivate an upward cycle. Negative emotions, consisting of sadness, boredom, shame, anxiety, fear, etc., refer to the psychological causes for your misery and reduction of your confidence and self-esteem.

As one of the major negative emotions, foreign language anxiety is influenced by many internal and external factors of learners [33], which can be described as “the fear of someone that is not very good at a foreign language but has to use that language”. Thus, language anxiety can be perceived as a tendency for a person to react nervously to four aspects of English learning, speaking, listening, reading, or writing in a foreign language [27]. Communication requires immediate intellectual manipulation, any foreign language activity may cause the learner to question his or her communicative competence, thus leading to silence, a sense of introspection, fear, and even panic [15]. The effect of foreign language anxiety is controversial [27, 35]. While anxiety is regarded as a negative factor hindering foreign language learning [2, 30], some studies argued that anxiety may have a facilitating effect [1, 33].

Despite there being a number of detailed studies of foreign language learning emotions, attention paid to the relationships between foreign language anxiety and native language education is fairly finite. We would like to find out whether native language education is bound to foreign language anxiety or not, what effects it has on foreign language learning and how have the influences been aroused.

## 3 Research Questions

The research questions of this study are:

1. Do different extents of native language education affect foreign language anxiety?
2. How does native language education impact students' foreign language learning anxiety?

Based on the theory of language transfer [10, 28] and relevant empirical research on foreign language anxiety [3, 9, 15, 26, 32], we made a questionnaire and proposed the following hypotheses:

1. Different levels of native language education will significantly influence foreign language anxiety.
2. Native language education impacts foreign language anxiety through the mechanism of native language transfer.

## 4 Methodology

### 4.1 Participants and Context

The present study focuses on college students from Guangdong, Guangxi, Sichuan, Beijing, Jiangsu, Heilongjiang, Shandong, Henan, Anhui, Hubei, Chongqing, Xinjiang, and Zhejiang in China. Encompassing nearly all diverse regions of China in terms of geographical settings and economic development levels, it can be argued to possess a certain degree of representativeness. The data was collected with the method of sampling survey. All participants have already taken Senior High School Entrance Examination (SHSEE) and National College Entrance Examination (NCEE). The final sample consists of 43 complete responses to the questionnaire survey (background information and anxiety of four English learning aspects). A total of 32 (76.74% of 43) students took part in the same standardized SHSEE of 2020 and NCEE of 2023. They are mainly aged 18, ranging from 18 to 25. There are 19 (44.19% of 43) students who started to learn English systematically in kindergarten, 21 (48.84% of 43) students in primary school, and 3 students (6.98% of 43) in junior high school.

All the participants have completed their primary school, junior high school, and senior high school education in both Chinese and English and are having further education of bachelor's or master's degree at present. They acquire Chinese as their native language and English as L2. After 3 years of junior high school education, students take SHSEE. The students who manage to pass the test can enter senior high schools and are available for further education in Chinese and English. 3 years later, they entered NCEE. The Chinese tests are mainly composed of reading and comprehension of literature, ancient Chinese poem dictation, writing, and composition. The English tests are mainly made up of listening and speaking, reading and comprehension, writing and composition. We released and introduced the questionnaire online. All participants were informed of the general background information of this research and completed the questionnaire voluntarily.

### 4.2 Instruments

The data of the present study were collected via a quantitative questionnaire consisting of 4 sections, which concentrated on when students begin to gain systematical L2 (English) education, their education backgrounds, approximate grades of SHSEE and NCEE, whether they got relevant language certificates of Chinese or English or not, and 4 core aspects of English learning (listening, speaking, reading and writing). Each aspect consisted of 5 items. The participants rated each question SA (Strongly Agree: 1), A (Agree: 2), N (Neutral: 3), D (Disagree: 4), or SD (Strongly Disagree: 5), according to their specific extents of anxiety at three stages of education. The added-up points

indicated the extent of participants' L2 learning anxiety. That is, the higher a participant scored, the more anxious he or she might feel about foreign language learning. The internal consistency reliability of this questionnaire is 0.956 (Cronbach's  $\alpha=0.956$ ). The results indicated that it yielded a good fit to the data for the scale (CFI=0.92>0.9, SRMR=0.06<0.08, TLI=0.92>0.9, RMSEA=0.07<0.08).

**English Listening Anxiety Scale.** The scale was adapted from Elkhafaifi (2005)<sup>[9]</sup>'s form. To suit this research better, the variables such as "Arabic" were changed to "English". Because English has so far been a compulsory subject at both primary and secondary school levels in China, it is thus more universal and representative in the context of this study. Referred to previous research, the five items are set by "I like listening to English", "When listening to English, I get confused and nervous if I come across words I don't understand", "When listening to English, I spontaneously translate it into Chinese", "English ideas and culture seem foreign to me" and "As for me, I have too much about English history and culture to understand spoken English".

**English Speaking Anxiety Scale.** The scale was adapted from Horwitz et al (1986)<sup>[15]</sup> and Botes et al (2020)<sup>[3]</sup>'s forms. To make it more suitable for this research, the following items from the two forms were extracted and modified to match the real-life experiences Chinese students may have experienced. There are five items: "I feel unsure of myself and nervous about speaking in English classes", "I start to panic when I have to speak English without preparation in my class", "As for me, it embarrasses me to volunteer answers in English class", "I always feel that the other students speak English better than I do" and "I am afraid that the other students will laugh at me when I speak English".

**English Reading Anxiety Scale.** The scale was adapted from Saito, Thomas & E. Horwitz (1999)<sup>[30]</sup>'s form. To suit this research better, the original form was modified as well. We abstracted five items from it: "When reading English, I have to translate the words one by one and connect them into complete sentences and paragraphs", "When reading English, I get confused and anxious if I come across the words I failed to figure out", "I can read English independently without any assistance and comprehend the passage", "When reading English, I get anxious and fretful if I come across grammar structures that I don't understand or haven't learned before" and "When reading English, I can understand partially rather than the overall passage, which makes me feel anxious and disheartened".

**English Writing Anxiety Scale.** The scale was adapted from Cheng et al (2023)<sup>[19]</sup>'s form. To better suit the present research, we abstracted the following items from the original form. There are five of them: "I always avoid writing in English", "I feel tense and my mind goes blank when I start to work on an English composition", "I feel confident in my ability to clearly express my ideas in English", "I think writing in English is a lot of fun" and "I don't think my English composition ability is as good as others".

**Background Questionnaire.** It consists of eight questions in total that focus on when the participants start to learn L2 (English) systematically, participants' educational backgrounds, participants' grades on four tests (SHSEE and NCEE of English and Chinese), whether the participants had obtained Chinese or English language certificates so far or not, and participants' grades of Chinese and English in SHSEE and NCEE.

### 4.3 Data Collection and Analysis

The questionnaire was translated from English to Chinese. During the translation process, we made appropriate localization based on ensuring that the original meaning of the questionnaire questions was fully conveyed, to comply with the reading habits of the questionnaire respondents who are native speakers of Chinese, and to achieve the effect of dynamic equivalence. After the translation was completed, we asked both native Chinese and native English-speaking translators to review the questionnaire to ensure the validity and reliability of the translation. It was then distributed online in a Chinese form to students from different senior high schools and universities. When distributing the questionnaire, we primarily employed two methods. First, we publicly posted it on various social platforms frequented by young people to collect feedback from random users. Second, we conducted targeted distribution to respondents who met specific criteria. This approach ensured that the sample maintained a certain level of randomness while also focusing as much as possible on our target survey population. All questionnaires were submitted anonymously to minimize respondents' concerns about privacy breaches. Since the Chinese and English test grades are also private information, respondents can choose whether to share their grades or not voluntarily. The responses with Chinese and English grades of SHSEE and NCEE were valid, for they are crucial for quantification analysis of students' native language education and foreign language learning. 43 responses in total were yielded, of which 28 responses were valid.

The data were analyzed via the SPSSAU program (Version 24.0). Reliability, validity, means, and standard deviations were computed to examine different levels of participants' L2 (English) learning anxiety. Correlation analyses were conducted to explore associations between native language education and L2 learning anxiety. To investigate the predicting effects of the measured variables on participants' L2 learning efficacy, regression analyses were performed. Each response was marked with a number, which was submitted anonymously and administrated online to protect privacy.

## 5 Results

### 5.1 Participants' Foreign Language Learning Anxiety

**In Primary and Junior High School.** Table 1 presents the means and standard deviations of ELA scales, ESA scales, ERA scales, and EWA scales of participants in primary school and junior high school. Participants' concrete foreign language learning anxiety in primary school and junior high school were shown in Table 1, which scored 2.932 on ELAS, 3.139 on ESAS, 3.067 on ERAS, and 3.091 on EWAS. The average score was 3.057, which meant that over half of the participants held a neutral attitude toward English learning when they were in primary school and junior high school.

As Table 1 shows, the four scales were scored from 2.932 to 3.139, and the average score was more than 3.000. On ELAS, ESAS, and EWAS, the standard deviations were from 1.137 to 1.179, and the average SD was 1.157, which indicated that the participants' foreign language learning anxiety was generally slight in primary school and junior high school. The standard deviation of EWAS was higher than the other three

scales. It showed that the L2 reading anxiety of participants differed from each other to a great extent.

**Table 1.** Mean and SD of the Measured Variables of Anxiety in Primary School and Junior High School(N=28).

Measure	Mean	SD
ELAS	2.932	1.179
ESAS	3.139	1.161
ERAS	3.067	1.137
EWAS	3.091	1.149
Average	3.057	1.157

**Notes.** ELAS=English Listening Anxiety Scale; ESAS=English Speaking Anxiety Scale; ERAS=English Reading Anxiety Scale; EWAS=English Writing Anxiety Scale; SD=Standard Deviation.

**In Senior High School.** Table 2 presents the means and standard deviations of ELA scales, ESA scales, ERA scales, and EWA scales of participants' foreign language learning anxiety in senior high school. The means scored 2.917 on ELAS, 3.151 on ESAS, 3.030 on ERAS, and 3.145 on EWAS. The average score was 2.930 (< 3.000). Compared to Table 1, the average score increased, which meant that the participants felt more anxious about foreign language anxiety in senior high school.

**Table 2.** Mean and SD of the Measured Variables of Anxiety in Senior High School (N=28).

Measure	Mean	SD
ELAS	2.997	1.172
ESAS	3.152	1.200
ERAS	3.068	1.126
EWAS	3.051	1.172
Average	3.067	1.168

**Notes.** ELAS=English Listening Anxiety Scale; ESAS=English Speaking Anxiety Scale; ERAS=English Reading Anxiety Scale; EWAS=English Writing Anxiety Scale; SD=Standard Deviation.

As was shown in Table 2, the four scales were scored from 2.997 to 3.152, and the average score was less than 3.000. On ELAS, ERAS, and EWAS, the standard deviations ranged from 1.126 to 1.200, and the average SD was 1.163, which indicated participants' foreign language learning anxiety had increased at the stage of senior high school. The standard deviation of ESAS was evidently over the average. There probably be greater differences among participants.

### 5.2 Predicting Effects of Chinese Proficiency on L2 (English) Learning Efficacy

**In Primary School and Junior High School.** Table 3 indicates the regression coefficient of participants' Chinese efficacy and English grades of SHSEE tests. To explore the predicting effects of Chinese levels on L2 (English) learning efficacy, Chinese Grades on SHSEE tests served as the independent variable, while English Grades on SHSEE tests served as the dependent variable in the linear regression analysis.

**Table 3.** The Regression Coefficients of Chinese Education Efficacy and English Grades of SHSEE (N=28).

	Unstandardized Coefficient		Standardized Coefficient	<i>t</i>	<i>p</i>	Co-linearity Diagnosis	
	<i>B</i>	SE	<i>Beta</i>			VIF	Tolerance
Constant	0.280	0.191	-	1.468	0.154	-	-
Chinese Grades of SHSEE Test	0.739	0.225	0.541	3.281	0.003**	1.000	1.000
<i>R</i> <sup>2</sup>				0.293			
Adjusted <i>R</i> <sup>2</sup>				0.266			
<i>F</i>				<i>F</i> (1,26) = 10.768, <i>p</i> = 0.003			
D-W				1.840			

Dependent Variable: English Grades of SHSEE Test

\* *p* < 0.05 \*\* *p* < 0.01

As is shown in Table 3, the R-squared is 0.293, which means that Chinese Grades of SHSEE can account for 29.3% of the variation in English Grades of SHSEE. The regression coefficient of the Chinese Grades on the SHSEE test is 0.739 (*t* = 3.281, *p* = 0.003 < 0.01), which means that Chinese Grades on the SHSEE have a significant positive influence relationship with English Grades on the SHSEE test.

**In Senior High School.** Table 3 presents the regression coefficient of participants' Chinese and English grades on NCEE tests. In this analysis, the Chinese Grades on the NCEE test served as the independent variable, while the English Grades on the NCEE test served as the dependent variable in the linear regression analysis.

**Table 4.** The Regression Coefficients of Chinese Education Efficacy and English Grades of SHSEE (N=28).

	Unstandardized Coefficient		Standardized Coefficient	<i>t</i>	<i>p</i>	Co-linearity Diagnosis	
	<i>B</i>	SE	<i>Beta</i>			VIF	Tolerance
Constant	0.844	0.291	-	2.903	0.007**	-	-
Chinese Grades of NCEE	-0.048	0.378	-0.025	-0.127	0.900	1.000	1.000
<i>R</i> <sup>2</sup>				0.001			

	Unstandardized Coefficient		Standardized Coefficient	<i>t</i>	<i>p</i>	Co-linearity Diagnosis	
	<i>B</i>	SE	<i>Beta</i>			VIF	Tolerance
Adjusted $R^2$				-0.038			
<i>F</i>				$F(1,26)=0.016, p=0.900$			
D-W				1.776			

Dependent Variable: English Grades of NCEE Test

\*  $p < 0.05$  \*\*  $p < 0.01$

In Table 4, it is indicated that the R square is 0.001, which means that Chinese grades on the NCEE test can account for the 0.1% change in English grades on the NCEE test. The F-test of the model found that the model did not pass the F-test ( $F=0.016, p=0.900 > 0.05$ ), which means that Chinese grades on the NCEE test do not affect English grades on the NCEE test. Thus, the effects of the independent variable on the dependent variable cannot be analyzed specifically.

### 5.3 Predicting Effects of Chinese Learning Efficacy on L2 (English) Learning Anxiety

**In Primary School and Junior High School.** Table 5 presents the regression coefficients of participants' Chinese learning efficacy and L2 (English) learning anxiety in primary school and junior high school. To explore the predicting effects of Chinese learning efficacy on L2 (English) learning anxiety, Chinese Grades on the SHSEE test served as the independent variable, while the total scores of anxiety of each participant served as the dependent variable in the linear regression analysis.

**Table 5.** The Regression Coefficients of Participants' Chinese Learning Efficacy and L2 (English) Learning Anxiety in Primary School and Junior High School (N=28).

	Unstandardized Coef-		Standardized Co-	<i>t</i>	<i>p</i>	Co-linearity Di-	
	efficient	efficient	efficient			agnosis	
	<i>B</i>	SE	<i>Beta</i>			VIF	Tolerance
Constant	4.493	54.385	-	0.083	0.935	-	-
Chinese Grades of SHSEE Test	135.646	63.338	0.401	2.142	0.043*	1.000	1.000
$R^2$				0.160			
Adjusted $R^2$				0.125			
<i>F</i>				$F(1,24)=4.587, p=0.043$			
D-W				0.343			

Independent Variable: Participants' Scores of L2 Learning Anxiety in Primary School and Junior High School

\*  $p < 0.05$  \*\*  $p < 0.01$

As is shown in Table 5, the R square of the model is 0.160, which means that Chinese learning efficacy can account for 16.0% of the variation in total scores of participants' anxiety. The regression coefficient of Chinese learning efficacy is 135.646 ( $t=2.142,$

$p=0.043<0.05$ ), which implies that it will have a significant and positive effect on participants L2 learning anxiety during their time in primary school and junior high school.

**In Senior High School.** Table 6 indicates the regression coefficients of participants' Chinese learning efficacy and L2 (English) learning anxiety. In the analysis, Chinese Grades on the NCEE test served as the independent variable to represent participants' Chinese Learning efficacy, while the total scores of anxiety of each participant served as the dependent variable.

**Table 6.** The Regression Coefficients of Participants' Chinese Learning Efficacy and L2 (English) Learning Anxiety in Senior High School (N=28).

	Unstandardized Co-efficient		Standardized Coefficient <i>Beta</i>	<i>t</i>	<i>p</i>	Co-linearity Diagnosis	
	<i>B</i>	SE				VIF	Tolerance
Constant	2.643	26.997	-	0.098	0.923	-	-
Chinese Grades of NCEE Test	75.254	35.443	0.398	2.123	0.044*	1.000	1.000
<i>R</i> <sup>2</sup>				0.158			
<i>Adjusted R</i> <sup>2</sup>				0.123			
<i>F</i>				<i>F</i> (1,24)=4.508, $p=0.044$			
D-W				1.503			

Independent Variable: Participants' Scores of L2 Learning Anxiety in Senior High School  
 \*  $p<0.05$  \*\*  $p<0.01$

As Table 6 shows, the R square is 0.158, which means that Chinese grades of the NCEE test can account for 15.8% of the variation in participants' scores of L2 learning anxiety in senior high school. It has been proved that the analysis has passed the F-test ( $F=4.508, p=0.044<0.05$ ), and the regression coefficient of Chinese grades of NCEE test is 75.254 ( $t=2.123, p=0.044<0.05$ ), which implies that there is a significant and positive relationship between Chinese grades of NCEE test and participants' L2 learning anxiety in senior high school.

## 6 Conclusion

This study investigated the effect of different levels of native language education on foreign language learning anxiety and indicates that there is a correlation between them. The correlation between students' native language and foreign language learning levels is evident at the stage of primary school and junior high school, while it is not that significant at the stage of senior high school. The effects of students' native language learning on foreign language learning anxiety are obvious at both stages, and the correlations are appropriate to each other.

The official and standardized Chinese and English SHSEE and NCEE tests can be universally recognized as proof of students' levels of native language and foreign language acquisition <sup>[5]</sup>. The two stages aim at developing students' thinking skills and habits, and promoting basic education <sup>[44]</sup>. In primary and junior high school, the knowledge students learn is easier to acquire, whereas native language education is more complicated in multi-aspects for students, and English learning becomes more demanding in vocabulary accumulation and logical thinking of grammar. Therefore, the correlation between native language education and foreign language learning is more evident than the one in senior high school. At the stage of senior high school, the correlation between native language education and foreign language learning is much weaker than the one at the stage of primary school and junior high school. Since students' logical systems have already been formed and solidified to a large extent in primary and junior high school, the frequency of native language transfer may be lower.

The findings provide implications for instructors, teachers, students, and researchers. As shown above, native language and foreign language learning are both significant parts of education. Thus, instructors, teachers, and students should pay attention to native language education meanwhile emphasizing L2 education and learning. Instructors need to optimize their curriculum planning. To assign more time to Chinese classes, especially at the stage of primary school and junior high school to enhance students' mindset and knowledge system of native language is necessary. Moreover, native language and foreign language teachers can be more cooperative to assist students in differentiated colloquial and auditory Chinese and English learning in daily classes and social activities to promote positive transfer of native language. In addition, students can spend more time on fundamental Chinese language acquisition via reading and writing, etc. It is beneficial for students to hold a positive attitude towards both Chinese learning and L2 learning to reduce anxiety.

However, there are limitations to this study. Firstly, due to objective material constraints, the sample size of this study was limited, reducing its generalizability and weakening the overall persuasiveness of the findings. Plus, all participants acquired Chinese as the native language and learned English as L2, the findings of this study need to be confirmed with more practice and further investigations in diverse contexts, groups, and regions.

Secondly, although our findings include quantitative data collected through questionnaires, they lack sufficient qualitative research, such as interviews of participants or long-term observation, with which the effects of native language education on foreign language anxiety can be investigated more concretely.

Thirdly, the participants rated their foreign language learning anxiety largely by recalling their learning experiences in primary and high schools. Thus, memory biases may influence the results. The discretion of L2 learning anxiety differs due to participants' subjective cognition, which may also cause deviations in this research.

Lastly, this study has found the effects of various levels of native language education on foreign language learning anxiety, but it has not yet conducted an in-depth investigation of the specific extent of anxiety caused by native language anxiety and its influencing factors. Future research could include the mechanisms that native language education affects foreign language learning anxiety.

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