



ARTICLE



<https://doi.org/10.1057/s41599-024-03049-7>

OPEN

Foreign language anxiety, enjoyment, and boredom among Chinese secondary students: a control-value theory approach

Zhiyuan Li¹✉ & Li Xing²

For decades, studies on learner emotions in foreign language learning have been predominantly focused on foreign language anxiety, and recent years have witnessed a surge in the exploration of other positive and negative emotions such as enjoyment and boredom. The current study aimed to extend this line of inquiry and explored the bidirectional relations between foreign language achievements and learner emotions through a questionnaire study among English learners ($n = 756$) in Chinese senior secondary schools, an understudied population in foreign language emotion research. Results indicated that the three emotions were significantly related to each other. Further analyses suggested that anxiety and boredom were significant predictors of achievements, and that language achievements predicated all the three emotions. The study confirms the reciprocal relationships between language achievements and emotions and provides pedagogical implications for language teaching.

¹School of Foreign Studies, Chang'an University, Xi'an, China. ²Zhixing Education Group, Shenzhen, China. ✉email: lzy@chd.edu.cn

Introduction

The process of foreign language (FL) or second language (SL) learning is influenced by many learner-internal and learner-external variables, of which learner emotions play an essential role (Dewaele and MacIntyre 2014; Horwitz et al. 1986; Li 2021). The positive psychology movement in Second Language Acquisition (SLA) has inspired research on an array of emotions which catalyse language learning. Such research has explored a wide spectrum of language learning emotions, both positive and negative, and examined their facilitative or debilitating role in language learning (Botes et al. 2020a; Derakhshan 2022; Dewaele and MacIntyre 2014; Horwitz 2017; Li et al. 2023).

Among the emotions examined in the current scholarship, three emotions, i.e., foreign language classroom anxiety (FLCA), foreign language enjoyment (FLE) and foreign language boredom (FLB), have received the most attention in language learning (Dewaele and MacIntyre 2014; Horwitz et al. 1986; Li et al. 2023; Tsang and Dewaele 2023). Previous studies have revealed the co-existence of the three emotions in FL/SL learning and further the correlational relationships among them (Alrabai 2022; Dewaele et al. 2023; Li and Wei 2023; Tsang and Dewaele 2023). Another important area of investigation in language emotion research is the relationships between emotions and language learning achievements, as inspired by the control-value theory (Pekrun et al. 2006; Pekrun and Stephens 2010). Research results tend to demonstrate that FLE and FLCA were significant predictors of learning achievements and that achievements predicted the two emotional constructs (Botes et al. 2020b; Dewaele et al. 2022; Li and Han 2022; Teimouri et al. 2019; Wang and Li 2022; Zhang 2019). Yet how FLB, together with FLCA and FLE in one single research design, predicts and is predicted by learning achievements is less studied (Li and Wei 2023; Zhao et al. 2023).

Furthermore, studies comparing the predictive effects of language emotions on achievements among various age groups tend to demonstrate differences (Dewaele and Alfawzan 2018; Tsang and Dewaele 2023). Dewaele (2021) revealed that enjoyment and anxiety predicted language proficiency among university students while for secondary school students, anxiety was the single predictor and enjoyment did not predict language achievements. This is supported by Zhang's (2022) meta-analysis which indicated that despite the consistent correlation between anxiety and language achievements among different age groups, age was found to moderate such a relationship. Such results imply that different age groups might demonstrate variations in their emotional constellations in language learning. In spite of this, the majority of emotion studies in language learning have mainly investigated students at the tertiary level, with limited attention paid to language learners at other educational levels, such as primary and secondary levels (Li and Wei 2023; Tsang and Dewaele 2023).

The subject of English, as with Chinese and math, has remained a compulsory subject in the secondary education system in China (Zhang and Bournot-Trites 2021). Given the importance of English learning in secondary education and the paucity of empirical studies on language emotions experienced by secondary school students (Li and Wei 2023; Tsang and Dewaele 2023), the present study attempts to investigate students in Chinese senior secondary schools, and further examine the bidirectional associations between foreign language emotions (i.e., FLCA, FLE, FLB) and academic achievements. Such explorations could hopefully inform practitioners engaged in FL/SL teaching, and add to the current understanding of the links between FL/SL emotions and language achievements.

Literature review

Foreign language emotions. The role of emotions in FL or SL learning has caught scholarly attention when Horwitz et al. (1986) proposed the concept of foreign language classroom anxiety (FLCA). It has, since then, dominated research on the affective dimensions of second or foreign language acquisition (Horwitz 2010; MacIntyre 2017). However, the introduction of Positive Psychology has contributed to a flourish of emotions underlying the complex process of learning a foreign or second language, such as enjoyment, boredom, shame, guilt, love, and pride (e.g., Derakhshan 2022; Dewaele and MacIntyre 2014; Li 2021; Li et al. 2023; MacIntyre et al. 2019; Teimouri 2018). Among these emotions, anxiety and enjoyment have gained most scholarly attention in emotional studies in SL/FL learning (Dewaele et al. 2023; Horwitz 2010;), and boredom, as a newly emerging emotional construct, has started to gain traction (Li 2021; Li et al. 2023; Tsang and Dewaele 2023).

Foreign language classroom anxiety (FLCA) was described by Horwitz et al. (1986) as "a distinct complex of self-perceptions, beliefs, feelings and behaviours related to classroom learning arising from the uniqueness of the language learning process" (p. 128). As argued by Horwitz (2017), using an unfamiliar and flawed new language system would naturally arouse anxious feelings, which might cause FL learners a series of physical or psychological symptoms such as sweat and nervousness. Past research tended to pinpoint the debilitating impact of anxiety on FL achievements (Horwitz 2010; Horwitz et al. 1986; Shao et al. 2013; Teimouri et al. 2019; Zhang 2019). It has also been revealed that high levels of FLCA might generate anxious feeling when learners use the language (MacIntyre et al. 2019), and that higher language levels are associated with a lower level of FLCA (Dewaele and MacIntyre 2014).

As the positive counterpart of FLCA, foreign language enjoyment (FLE) is mainly concerned with the positive emotions underlying language learning, which is featured with feelings of "enjoyment, fun, interest, and lack of boredom" during the learning process (Dewaele and MacIntyre 2014, p. 242). FLE was suggested to unlock potential in the learning of FL, facilitate learners to produce a joyful psychological atmosphere, broaden their minds, ease their anxious feelings, and contribute to learning (Dewaele and MacIntyre 2014). While most scholarly attention has been paid to the learner-internal and learner-external factors leading to varying levels of FLE, such as age, FL attitude, teacher style, and classroom environment (Dewaele et al. 2018; Li et al. 2021), the links between FLE and achievement are under-studied (Li and Wei 2023; Li et al. 2021). The few existing attempts tended to demonstrate that enjoyment was correlated with FL achievement, and that self-perceived language proficiency was predictive of enjoyment (Dewaele and Alfawzan 2018; Dewaele et al. 2018).

Foreign language boredom (FLB), an emerging construct in emotion studies, has been capturing increasing scholarly attention (Dewaele et al. 2023; Li et al. 2023). Based on interviews with 22 students and 11 English teachers, Li et al. (2023) conceptualised FLB as a negative language learning emotion featured by negative feelings towards the ongoing activity, such as disengagement, inactivity, dissatisfaction, and impatience. Through questionnaire study, they further developed and validated the language learning boredom scale. Even though it has been suggested that FLB inhibited learning outcomes (Macklem 2015), relevant research mainly concentrated on its conceptions, measurement and antecedents (e.g., Li et al. 2023; Pawlak et al. 2020). More research efforts are needed for enhanced understandings of this construct.

It has been suggested that foreign language learners experience a number of emotions simultaneously in the language classrooms (Dewaele et al. 2022; MacIntyre and Gregersen 2012), and that these emotions are correlated with each other (Alrabai 2022; Dewaele et al. 2023; Li and Wei 2023; Li et al. 2021; Tsang and Dewaele 2023). To be specific, FLCA was found to be negatively related to FLE (Dewaele and MacIntyre 2014; 2016; Li et al. 2021). Li and Wei (2023) further added FLB to the study of emotions and revealed that whereas FLE and FLCA were not significantly correlated, FLB was negatively correlated with FLE but positively connected with FLCA. Furthermore, the levels of FLCA, FLE and FLB might be different among learners at different educational levels, as revealed in previous studies (De Smet et al. 2018; Dewaele and Alfawzan 2018; Dewaele et al. 2016; Li et al. 2020). For instance, Dewaele and MacIntyre (2014) suggested that students in primary schools experienced lower levels of FLE and FLCA than their counterparts in secondary schools. Given the predominant focus on university students in language emotion research and the possible differences in terms of education level, FL/SL learners at secondary schools deserve scholarly attention (Li and Wei 2023; Tsang and Dewaele 2023). However, such efforts are limited and even less attention is paid to secondary students in China. This study seeks to explore the unique emotional constellations experienced by students in Chinese senior secondary schools and inter-relationships among the three important emotional constructs.

FL emotions and achievements: the control-value theory perspective. The control-value theory from educational psychology, proposed by Pekrun et al. (2006), focuses on achievement emotions. It proposes a three-dimensional model for achievement emotions, which consists of object focus (activities or learning outcomes), valence (positive or negative) and activation (deactivation or activation) (Pekrun and Stephens 2010). Under this model, FLCA is a negative, activating emotion related to FL learning outcomes. FLE and FLB are both activity-related, but the former is positive and activating whereas the latter negative and deactivating.

Further, the control-value theory posits the reciprocal relations between learning achievements and emotions (Pekrun et al. 2007; Pekrun and Stephens 2010). To be specific, emotions and learning achievements are mutually caused by one another. Achievement emotions, acting on students' cognitive resources and other social resources, impact their learning achievements while achievements serve as important factors of the learning environment, thereby instigating students' emotions (Pekrun et al. 2007; Pekrun and Stephens 2010).

Under this theoretical background, the predictive role of emotions on FL learning has been confirmed in past studies. As the earliest studied emotion, anxiety was deemed as "highly detrimental to the learning process" (MacIntyre 2017, p.150). Several meta-analytic studies pointed to the negative associations between FLCA and learning achievements (Botes et al. 2020a; Zhang 2019). Studies have also added FLE in this line of inquiry (e.g. Dewaele and Alfawzan 2018; Dewaele et al. 2023; Wang and Li 2022; Jiang and Dewaele 2019). For example, Dewaele and MacIntyre (2014), drawing on a sample of 1746 international language learners, found that perceived language proficiency was positively correlated with enjoyment, but negatively with anxiety.

Similarly, the links between achievements and FL emotions have also been examined. Jiang and Dewaele (2019), based on a mixed-methods study on Chinese university students, found that English test results were positively related to FLE ($r = 0.50$) and negatively to FLCA ($r = 0.40$). Further regression analysis indicated that language achievements predicted both enjoyment

and anxiety, and that the effect size of achievements was larger for FLE (47.9%) than for FLCA (35.6%). Li et al. (2020) conducted a mixed-methods study to investigate links between language proficiency and emotions among Chinese senior secondary students. Quantitative analysis showed that both FLCA and FLE predicted perceived language proficiency and test results, and the qualitative data suggested that achievements, usually reflected in test results, impacted on students' enjoyment and anxiety, which lent support to the bidirectionality of emotions and learning achievements (Botes et al. 2020b; Dewaele et al. 2022; Li and Han 2022; Pekrun and Stephens 2010).

Scholarly inquiries into the bidirectionality of foreign language emotions and achievements have been mostly concerned with two emotional constructs: enjoyment and anxiety (i.e., Jiang and Dewaele 2019; Li et al. 2020). Relatively limited attention has been paid to how boredom, an emerging emotional construct in FL/SL learning, together with FLE and FLCA, jointly predicts and is predicted by learning achievement. Li and Wei (2023) explored the joint predictive effects of anxiety, enjoyment, and boredom on language achievements among junior secondary students in China. They found that all three emotions independently predicted achievements and that when combined, FLE was the most enduring and strongest predictor of foreign language achievement. Similarly, Li and Han (2022) found that all three emotions independently predicted learning outcomes in the online setting. Slightly different from the two studies, in their international samples, Dewaele et al. (2023) found that different from enjoyment or boredom, only anxiety significantly predicted language achievements.

Despite the above studies, research into the three emotions in English language learning has been largely focused on the predictive effects of emotions on language achievements (e.g. Dewaele and Alfawzan 2018; Li and Wei 2023; Li and Han 2022; Wang and Li 2022; Zhang 2019). The reverse loop, i.e., the predictive effect of achievements on emotions is limited (Tsang and Dewaele 2023; Zhao et al. 2023). Even less attention has been paid to the examination of the bidirectional relations between language achievements and emotions. The current research seeks to fill this gap.

Further, Dewaele (2021) has suggested that the predictive effects of emotions on language achievements might differ between different student groups, as shown in his comparison between secondary and tertiary students. Similarly, Zhang (2022) suggested that different academic levels (i.e., primary, secondary and tertiary) could potentially moderate such predictive correlations. Given that existing studies on foreign language emotions have been predominantly focused on tertiary-level students (Li and Wei 2023; Tsang and Dewaele, 2023), students at secondary and primary levels have received insufficient scholarly attention. Tsang and Dewaele (2023) explored foreign language emotions among a group of primary students while Li and Wei (2023), and Ma et al. (2023) focused on junior secondary students in China. However, an equally important student group, senior secondary students, both from rural and urban areas, also deserves scholarly attention. The few limited studies concerning Chinese senior secondary students (Dewaele and Li 2022; Li et al. 2020) failed to include the emotion of boredom and did not explore the bidirectional relations between emotions and achievements. The current study, thus, attempts to fill these important lacunas.

To address the above-mentioned research gaps, the following research questions were formulated:

1. What are the profiles of FLCA, FLE and FLB among senior secondary students in China?
2. What are the effects of FLCA, FLE and FLB on FL achievements?
3. What are the effects of FL achievements on FLCA, FLE and FLB?

Methodology

The current study, informed by the control-value theory, attempted to explore the bidirectional relations between foreign language achievements and emotions. It examined the associations between the three important foreign language emotions (i.e., FLCA, FLE, FLB) and academic achievements among a group of Chinese secondary students. To this end, a quantitative research approach was adopted.

Participants and context. English language learning has been gaining momentum in China since the 1980s as with the country's opening-up policy. It has been stipulated by the government as a compulsory course from Grade Three in primary schools, through the entire six years in secondary education, to tertiary education (Zhang and Bournot-Trites 2021). In terms of secondary education, the vast majority of students have to study English as one of the main subjects for six years (three years in junior school and three in senior school). The English subject is especially important in senior secondary schools given that it is one of the three main courses (the other two being Chinese and maths), and that English achievements could, to a large extent, determine students' future choice of universities. At the end of their senior secondary education, students will take an English language test, which is part of the National College Entrance Examination (also known as "gaokao"), in order to be admitted into universities (Zhang and Bournot-Trites 2021). However, despite the pivotal role of English learning in senior secondary education, the current scholarship concerning learner emotions in language learning has been predominantly focused on students at the tertiary level, while such a large group of secondary learners are neglected. Hence, the current study focuses on senior secondary students in China.

To locate participants for the study, we adopted the convenience sampling strategy. In order to investigate students with a diversity of backgrounds such as region, school level, socio-economic status, and gender, we approached students who had recently enrolled at the university where the first author was based. These students had recently completed high school and were in the first two weeks of university life, which was the orientation stage of the campus facilities, learning environment and courses. We asked them, on a voluntary basis, to fill in the questionnaire and reflect on their experiences of English learning in senior secondary schools and their learning achievements as represented by the scores of the English subject in the College Entrance Examination, which is also referred to as NMET (National Matriculation English Test) (Liu 2010). It should be mentioned here that out of the several versions of test papers for NMET, which are different in question types, difficulty levels and contents by province, we chose Version B, which was widely used in the central regions of China, such as Shaanxi Province, Henan Province, Shanxi Province, and Anhui Province. (Chang 2022). This means that students in these provinces took the same test, which ensures uniformity in tests and learning achievements analysis. In response, we asked students who took the version B test paper to fill out the questionnaire.

A total of 780 students participated in the questionnaire study and provided complete responses. However, 16 students did not take the NMET and another 8 took the test in previous years, making their responses invalid. Accordingly, for the present study, the total sample consisted of 756 participants. A total of 539 (71.3%) participants were males and the remaining 217 (28.7%) were females. The mean age of the participants was 18.26 (SD = 0.553), ranging from 18 to 24. Among them, around 6.9% (52/756) were students of the humanities subjects in high school and the rest (704/756), occupying around 93.1% were science

students. Regarding overseas experiences, the overwhelming majority of students (around 95.6%) had not studied or travelled in overseas countries. The onset age of English learning ranged from 3 to 15, averaging 8.62 years old, which was about the age when most primary students start year 3. On average, they had studied English for around 9.4 years upon graduation from senior high school. 145 (19.2%) students came from rural areas whereas the remaining 611 (80.8%) came from urban areas. Lastly, we collected students' English scores on the 2022 NEMT; out of the full score 150, the average score was 123.27 (SD = 11.81), ranging from 78 to 146.

Instruments. The composite questionnaire began with respondents' background information, including gender, age, division of humanities or science, overseas experience, onset age of English learning, socio-economic status, and scores on the NMET. This was followed by scales measuring students' foreign language anxiety, enjoyment, and boredom. The questionnaire items were written in Chinese, the participants' native language.

Foreign language classroom anxiety. To examine anxiety, the present study adopted the shortened version of the FLCA scale, which was proposed by Dewaele and MacIntyre (2014), and later validated by Botes et al. (2022) with a sample of 370 foreign language learners. They further found that the scale was valid across age, gender, and L1 groups. The scale was also used to investigate undergraduate students' anxiety in the Chinese context (Jiang and Dewaele 2019). Responses were measured on a five-point Likert scales from "strongly disagree" to "strongly agree". In the current study, the reliability of the scale reached a Cronbach's alpha coefficient of 0.88. Further, exploratory factor analysis suggested strong construct validity of the instrument, with loadings of items ranging from 0.581 to 0.827, indicating that each item was strongly associated with the construct.

Foreign language enjoyment. The FLE scale for the present study adopted the Chinese version of the foreign language enjoyment scale (CFLES) (Li et al. 2018), which was a modified version of the Foreign Language Enjoyment scale developed by Dewaele and MacIntyre (2014). The CELES was confirmed and validated among 1,718 senior secondary school students in China (Li et al. 2018). The scale included 11 items and 3 factors, namely FLE-Private, FLE-Teacher, and FLE-Atmosphere. Responses were elicited on a five-point Likert scales from "strongly disagree" to "strongly agree". For the present study, the scale reached a satisfactory reliability level, with Cronbach's alpha value being 0.86. The factor analysis result revealed that item loadings ranged from 0.589 to 0.912, which indicated strong validity of the construct.

Foreign language boredom. An 8-item scale measuring foreign language classroom boredom was adopted for the current study, which was a subscale of the larger foreign language boredom scale (Li et al. 2023). As our research focus was on the foreign language class, we did not use the entire scale. A five-point Likert scale was used to measure classroom boredom from "strongly disagree" to "strongly agree". The scale for the present research reached a Cronbach's alpha coefficient of 0.95. This scale also demonstrated strong construct validity, with factor loadings ranging from 0.643 to 0.878.

Procedure. To collect the questionnaire data, we first approached students who were in their first two weeks of the university where the study took place. This is a more convenient and economical way to access students with a variety of socio-economic

backgrounds, and geographical locations. As these students finished their National College Entrance Examination upon high school graduation no more than three months ago, they were able to reflect on their high school learning experiences.

We asked for permission from 14 English instructors to distribute the questionnaire in class when they first met their students. At the beginning, the researchers or the English instructors explained to the students the aim of the study, the sampling criteria, and data confidentiality. Following this, they invited students who took the Version B of the NMET to participate. An item in the questionnaire was designed to double check this information. The questionnaire was distributed through <https://www.wjx.cn/>, the Chinese version of SurveyMonkey. A consent mechanism was designed to ensure voluntary participation. To achieve this, the first window of the electronic questionnaire contained an information statement, “By entering the questionnaire, I have read the information provided and agree to participate.”

Data analysis. After the questionnaires were collected, we exported the responses through the online platform. Both authors double checked the accuracy during the exportation process. Prior to data analysis, we first removed outliers and incomplete responses. The first stage of the analysis was descriptive analysis conducted by SPSS (Version 26.0), which consisted of calculations of means and standard deviations, and normality tests. Secondly, we conducted correlation analyses to see whether the three emotional constructs in the study were related to one another. Next, we did a correlation test to determine whether the three emotional constructs were linked with language achievements. Once the correlational relationship (medium to strong) was established, we ran a standard multiple regression to analyse whether foreign language emotions predicted language achievements, and whether language achievements predicted emotions. Procedures conducted in the software were carefully checked between the two authors for accuracy and reliability.

Results

Foreign language emotions among students. Before reporting results in accordance with the research questions, we conducted preliminary analyses to calculate means, standard deviations, and Cronbach’s alpha coefficients of the scales. The results showed that the skewness and kurtosis indicators for the observed variables fell within ±2, demonstrating normal distribution of the scales (Curran et al. 1996). Further, the alpha coefficients, with values well above 0.70 (Hair et al. 2019), demonstrate good internal reliability of each emotional construct (see Table 1).

Table 1 also presents other descriptive statistics of the three emotions under study, including mean scores and standard deviations on a five-Likert point scale (from “strongly disagree to strongly agree”). It is indicated that EFL students in Chinese senior secondary schools reported a moderate level of foreign language anxiety ($M = 3.37$). Compared with FLCA, they reported a lower level of boredom ($M = 2.70$), which means that

students’ perception of anxiety was higher than that of boredom. However, it seems that they quite enjoyed their English classes, with a mean value of 3.49.

To further explore possible relationships among the three emotions, we did Pearson correlation analyses and the correlation coefficients are shown in Table 2. It is suggested in the table that all the three emotions were correlated with one another, with p value less than 0.01. To be specific, anxiety was negatively related to enjoyment, but positively related to boredom. Additionally, enjoyment was negatively related to boredom, with a correlation coefficient close to 0.6. This implies that anxious high school students were more likely to feel bored in class and did not really enjoy the class, and that less enjoyment in the class was linked to heightened feelings of boredom.

Predictive effects of emotions on FL achievement. Our second research question attempts to explore whether and to what extent the three emotions, FLCA, FLE, and FLB predicts learning achievements. As shown in Table 1, with regards to foreign language achievements, as represented by the scores of the 2022 NMET, students in our sample achieved a mean score of 123.27 out of 150. The skewness and kurtosis indicators for this variable demonstrate a normal distribution (Curran et al. 1996). Pearson correlation coefficients, as indicated in Table 2, show that foreign language achievements were related to all the three emotions ($p < 0.01$). Following this, to examine possible causal links between foreign language emotions and achievements, we conducted a multiple regression analysis with the three emotions as independent variables and achievements as the dependent variable. The results, as demonstrated in Table 3, showed that FLCA ($t = -3.837, p < 0.01$) and FLB ($t = -3.863, p < 0.01$) were significant predictors of foreign language achievements. However, FLE was not identified as a significant predictor, with the p value above 0.01. This indicates that students who demonstrate higher levels of anxiety and boredom tend to obtain lower scores in examinations. But students who enjoy English language learning in high school do not necessarily achieve better than those who do not.

Predictive effects of FL achievements on emotions. Our third question examines whether and to what extent learning achievements predict the three emotions, FLCA, FLE, and FLB. So we also ran regression analyses to explore whether foreign language achievements predicted learner emotions. As is

Table 2 Correlations for the main variables.

Variable	1	2	3	4
1. FLCA	-	-0.343**	0.402**	-0.229**
2. FLE		-	-0.586**	0.187**
3. FLB			-	-0.253**
4. Achievements				-

** $p < 0.01$.

Table 1 Descriptive statistics for the main variables.

Variable	M	SD	Min	Max	Skewness	Kurtosis	Cronbach’s alpha
FLCA	3.37	0.84	1.00	5.00	-0.372	-0.219	0.88
FLE	3.49	0.62	1.00	5.00	-0.404	1.323	0.86
FLB	2.70	0.97	1.00	5.00	0.414	-0.300	0.95
Achievements	123.27	11.81	78	146	-1.025	1.236	NA

Table 3 Regression analysis with emotions as predictors of achievements.

Predictor	Adjusted R ²	Coefficient (β)	<i>p</i>	<i>t</i>	VIF
FLCA	0.080	-2.086	0.00	-3.837	1.218
FLE		0.683	0.41	0.817	1.557
FLB		-2.105	0.00	-3.863	1.637

indicated in Table 4, the language achievement was identified as a significant predictor of FLCA ($t = -6.468$, $p < 0.01$), FLE ($t = 5.240$, $p < 0.01$), and FLB ($t = -7.172$, $p < 0.01$). The result indicates that satisfactory achievements in examination lead to lower levels of anxiety and boredom, but higher levels of enjoyment.

Discussion

The present study attempted to explore foreign language emotions, including anxiety, enjoyment, and boredom among senior secondary students in China. We further examined the bidirectionality between foreign language achievements and emotions, i.e., the predictive effects of emotions on achievements and the predictive effects of achievements on emotions. Our first research question aims to investigate levels of FLCA, FLE, and FLB among students. It was found that students in Chinese senior secondary students exhibited moderate levels of foreign language anxiety and enjoyment, and a relatively low level of boredom. This result lends support to the viewpoint that positive and negative emotions co-exist in the language learning process, and that the presence of one emotion does not necessitate the absence of others (MacIntyre and Gregersen 2012). The emotional profiles in our study were similar to those in primary schools in Hong Kong (Tsang and Dewaele 2023), junior secondary schools in the Chinese mainland (Li and Wei 2023; Ma et al. 2023), and Chinese university students (Li and Han 2022). The moderate level of anxiety was also experienced by students in South Korea's secondary schools (Jeong and Kim 2010; Kang and Kim 2017), and Japanese universities (Kitano 2001). Comparatively, our study focused on senior secondary students, which serves as a necessary addition to the argument that a constellation of emotions co-exists among learners across educational stages and learning contexts. The relatively moderate levels of anxiety and enjoyment across secondary and tertiary education might be due to the exam-oriented language learning culture in China where students are constantly under the pressure of taking exams, expose themselves to teacher-centred classrooms, and follow rigid course schedules.

We have also probed into the relationships among the three emotions. Our results indicate that the three emotions were significantly related to each other. Specifically, FLE was negatively related to FLCA and FLB, and FLCA was positively linked with FLB. The highest correlational coefficient ($r = 0.586$) was found between FLCA and FLB. The negative correlation between FLCA and FLE, and the positive correlation between FLCA and FLB were also found in previous studies, which explored student populations at universities, junior secondary schools and primary schools in China (Li and Han 2022; Li and Wei 2023; Jiang and Dewaele 2019; Ma et al. 2023; Tsang and Dewaele 2023; Wei et al. 2019) as well as in other sociocultural contexts (Alrabai 2022; Dewaele and MacIntyre 2014; Dewaele et al. 2023; Zhao et al. 2023). The current study, through investigating Chinese senior secondary students, confirms the interrelationships among foreign language emotions. It is natural that boredom leads to less engagement in teaching activities and that joyful feelings relieves negative emotional dispositions (Fredrickson 2003; Li and

Table 4 Multiple regression analyses with achievements as predictors of emotions.

Dependent variable	Adjusted R ²	Coefficient (β)	<i>p</i>	<i>t</i>
FLCA	0.051	-0.016	0.00	-6.468
FLE	0.035	0.010	0.00	5.240
FLB	0.064	-0.021	0.00	-7.172

Dewaele 2021; Li and Wei 2023; Ma et al. 2023). Our results, through empirical research, demonstrates that, as with other language learning contexts, Chinese secondary students also experience a constellation of emotions in language learning, and that the presence of one does not necessarily mean the lack of another (Dewaele and MacIntyre 2014; Jiang and Dewaele 2019; Li and Wei 2023; MacIntyre and Gregersen 2012).

The second research question taps into the causal influence of foreign language emotions and achievements. Analysis results suggest that FLCA and FLB were significant predictors of foreign language achievements; however, FLE was not identified as a significant predictor of achievements. The predictive power of FLCA on achievements was well established in previous studies (e.g., Botes et al. 2020a; Dewaele and Li 2022), which was also confirmed in the present study. Similarly, the negative effect of FLB on achievements found in the present study was also confirmed in previous studies, such as those focusing on Chinese junior middle school students (Li and Wei 2023; Ma et al. 2023), university students (Li and Han 2022) and primary school students in China (Tsang and Dewaele 2023). The positive effect of FLE on language achievements was not found in our sample, which also occurred in Dewaele et al.'s (2023) study on the effect of the three emotions on achievements among a group of international FL learners. Previous studies have identified FLE as the strongest predictor for language proficiency among younger learners, such as junior secondary students (Li and Wei 2023) and primary school students (Tsang and Dewaele 2023). Yet other studies, such as Li and Han (2022) on Chinese university students, and Dewaele et al. (2022) on English learners in Turkey, seem to suggest that rather than FLE, FLCA was the single predictor of language proficiency. These mixed findings indicate that the emotion-proficiency relationship might not be linear across different student groups, but much dependent on the specific context. One possible reason for our finding seems to be the exam-oriented culture in Chinese high schools where teachers and students give high priority to scores on English exams instead of the learning process (Zhang and Bournot-Trites 2021). This excessive emphasis on exam scores and the repetitive grammar drills would exhaust students and add to their anxious feelings. In addition, the emotion-proficiency relationship could also be due to other variables that were not controlled in the study despite that we have controlled many variables such as age, L1, and achievement measurement. It is, thus, important to investigate "L2 populations with different levels of SES" in future studies in order to better understand the role of emotions (Li and Wei 2023, p.106). More studies, are thus needed to explore other learning contexts to further examine the predictive role of FLE on achievements.

Our last research question aims to explore the causal influence of language achievements on emotions. The result indicates that the language achievement was a significant predictor of the three emotions, i.e., FLCA, FLB and FLE. The predictive power of achievements on FLE and FLCA was also confirmed by previous studies on English learners in China (Li et al. 2020; Dewaele and Li 2022) and on learners studying a number of foreign languages with diverse native languages (Botes et al. 2020b). This indicates consistency in the predictive effects of achievements on FLCA

and FLE across educational stages, target languages and learning contexts. Yet the effect of achievements on FLB needs more empirical investigations and the current research adds to the scholarly understanding by showing that language achievements can exert predictive influence on FLB. The result is not surprising given that the Chinese education is featured with the exam-oriented learning culture, which places great emphasis on exam results and learning outcomes. The same is true for language learning in senior secondary school, especially the participants in our study, who needed to take the College Entrance Examination, which could, to a large extent, change their life. It is not unexpected that in this learning culture high achievers in language learning, in comparison with low achievement learners, would experience higher levels of enjoyment and feel less anxious feelings and boredom (Clément et al. 1980; Dewaele and MacIntyre 2014; Kissau 2006).

The mutual predictive relations between emotions and language achievements demonstrated in the study support the bidirectionality between foreign language emotions and achievements and further the control-value theory (Dewaele and Li 2022; Gardner 1985; Li et al. 2020; Pekrun and Stephens 2010). Much research has explored the causal relations between FLCA and FL achievement (Botes et al. 2020a; Teimouri et al. 2019). A few studies have also examined how FLE and FLB predicted FL achievements (Dewaele et al. 2023; Li and Wei 2023). However, the reciprocal relationships between the three emotions (i.e., FLCA, FLE, FLB) and language achievements is under-studied. The current study, to the best of our knowledge, is the first to examine how FLCA, FLE and FLB jointly predict achievements and how achievements can be a predictor of the three emotions. Moreover, most language emotion studies are concerned with EFL university students. Our study focuses on the less-researched student group, i.e., senior secondary students. Results regarding this population could yield new insights into FL emotions. Thus, the current study could be a necessary understanding of the bidirectional relationships between emotions and achievements posited by the control-value theory (Pekrun et al. 2006).

The study is not without limitations. Firstly, the current research was situated in the Chinese secondary education context, featured by a typical exam-oriented institutional setting and fierce competition for tertiary education admission. Even though we have demonstrated the reciprocal relations between language learning achievements and emotions, it is important for future research endeavours to explore whether and how such relationships exist in other instructional situations. Such investigations would hopefully shed light on the applicability of the control-value theory in diverse contexts. Secondly, the language emotions under study were limited to FLCA, FLE and FLB. As the control-value theory posits, a variety of emotions, both positive (e.g., excitement, pride, hope) and negative (e.g., guilt, shame), exert influence on the language learning process and outcomes (Dewaele et al. 2019; Pekrun et al. 2006; Teimouri et al. 2022). These under-studied emotions could be added to the research agenda of future studies into the relations between foreign language emotions and achievements. Given the specificity of the institutional context in our study, it is also suggested that future research could explore possible variations in the constellation of emotions felt by foreign language learners in various educational settings. Thirdly, due to practical constraints, the sample in our study fails to arrive at a balance between science and humanities students, and between both genders. It is necessary for future studies to control the variable of gender and the division of subjects in order to gain a better understanding of emotions among secondary students. Lastly, in an attempt to include participants with diverse backgrounds in terms of region, school, and socioeconomic status, we approached students upon their initial

arrival at the university, prior to the commencement of academic studies. Despite our best efforts to gain access to students who had just finished the NMET, we eventually managed to approach students who came into the university within the first two weeks in view of sampling convenience and efficiency, and prompted them to reflect on their high school language learning experiences. Nevertheless, for prospective research endeavours, an optimal approach would involve investigating students who have recently completed high school and undergone the College Entrance Examination, signifying the culmination of their secondary education.

Conclusion and implications

The current study explored foreign language anxiety, enjoyment and boredom and their connections with language achievements among a group of 798 English learners in Chinese senior secondary schools. The results indicated that students generally exhibited moderate levels of anxiety and enjoyment, and a relatively lower level of boredom, and that the three emotions were significantly related to each other. Further analyses suggested that anxiety and boredom were significant predictors of achievements, and that language achievements predicated all the three emotions.

Our findings point to the important role learner emotions play in foreign language learning. It is indicated that efforts to alleviate students' anxiety, boost enjoyment, and make the class interesting are needed for teachers aiming at productive and successful teaching activities. The significant predictive power of negative emotions (i.e., anxiety and boredom) suggests that teachers still need to attend to learners' negative feelings or actions in class. Specifically, it is recommended that teachers could design intriguing course contents, implement intriguing activities in the classroom and offer sufficient chances of interaction to ease students' boredom (Li and Wei 2023). They are also encouraged to show understanding, empathy and support in and out of class to relieve possible negative feelings of students, and to create a favourable learning environment (Dewaele and MacIntyre 2014). In addition, in many areas around the world, senior secondary students have to achieve high scores on the English exam in order to be admitted to their dream universities. This necessitates repeated mock exams in their high school curriculum. In this case, secondary school instructors, especially those in exam-oriented learning cultures, are suggested to be heedful of the possible impact of test scores on students' emotional experiences during language learning. They may take extra care to encourage low achievers in exams, who might demonstrate negative feelings and hamper their learning efforts as a result. Lastly, as argued by the positive psychologists in second language learning (Dewaele and MacIntyre 2014; MacIntyre and Gregersen 2012), language teachers also need to adopt a holistic view of student emotions and endeavour to build emotional strength and promote positivity in their teaching process.

Data availability

All data generated or analysed during this study are included in this published article in the supplementary file.

Received: 30 July 2023; Accepted: 12 April 2024;

Published online: 02 May 2024

References

- Alrabai F (2022) Modeling the relationship between classroom emotions, motivation, and learner willingness to communicate in EFL: Applying a holistic approach of positive psychology in SLA research. *J Multilingual Multicultural Dev.* <https://doi.org/10.1080/01434632.2022.2053138> ahead-of-print

- Botes E, Dewaele J-M, Greiff S (2020a) The foreign language classroom anxiety scale and academic achievement: An overview of the prevailing literature and a meta-analysis. *J Psychol Lang Learn* 21(1):26–56
- Botes E, Dewaele J-M, Greiff S (2020b) The power to improve: Effects of multilingualism and perceived proficiency on enjoyment and anxiety in foreign language learning. *Eur J Appl Linguistics* 8:1–28
- Botes E, van der Westhuizen L, Dewaele J-M et al. (2022) Validating the short-form foreign language classroom anxiety scale. *Appl Linguistics* 43(5):1006–1033
- Chang Y (2022) Aiming for language literacy, integrating teaching and testing [In Chinese]. *Shanxi Education* 1189:29–30
- Clément R, Gardner RC, Smythe PC (1980) Social and individual factors in second language acquisition. *Can J Behav Sci Revue Canadienne Des Sciences Du Comportement* 12(4):293–302
- Curran PJ, West SG, Finch JF (1996) The robustness of test statistics to non-normality and specification error in confirmatory factor analysis. *Psychol Methods* 1:16–29
- Derakhshan A (2022) Revisiting research on positive psychology in second and foreign language education: Trends and directions. *Lang Rel Res* 13(5):1–43
- De Smet A, Mettewie L, Galand B et al. (2018) Classroom anxiety and enjoyment in CLIL and non-CLIL: Does the target language matter? *Second Lang Learn Teach* 8(1):47–72
- Dewaele J-M (2021) The predictors of exam performance on Kazakh university students and secondary school pupils learning Turkish: An exploratory investigation. *ITL J Appl Linguistics* 173(1):94–119
- Dewaele J-M, Alfawzan M (2018) Does the effect of enjoyment outweigh that of anxiety in foreign language performance? *Stud Second Lang Learn Teach* 8(1):21–45
- Dewaele J-M, Botes E, Greiff S (2023) Sources and effects of foreign language enjoyment, anxiety, and boredom: A structural equation modelling approach. *Stud Second Lang Acquis* 45(2):461–479
- Dewaele J-M, Chen X, Padilla AM et al. (2019) The flowering of positive psychology in foreign language teaching and acquisition research. *Front Psychol Lang Sci* 10:2128
- Dewaele J-M, Li C (2022) Foreign language enjoyment and anxiety: Associations with general and domain-specific English achievement. *Chin J Appl Linguistics* 45:32–48
- Dewaele J-M, MacIntyre PD (2014) The two faces of Janus? Anxiety and enjoyment in the foreign language classroom. *Stud Second Lang Learn Teach* 4:237–274
- Dewaele J-M, MacIntyre PD (2016) Foreign language enjoyment and anxiety: The right and left feet of the language learner. In: Gregersen T, MacIntyre PD, Mercer S (eds) *Positive psychology in SLA*, Multilingual Matters, Bristol, p 215–236
- Dewaele J-M, MacIntyre PD, Boudreau C et al. (2016) Do girls have all the fun? Anxiety and enjoyment in the foreign language classroom. *Theory Prac Second Lang Acquis* 2(1):41–63
- Dewaele J-M, Özdemir C, Karci D et al. (2022) How distinctive is the foreign language enjoyment and foreign language classroom anxiety of Kazakh learners of Turkish? *Appl Linguistics Rev* 13(2):243–265
- Dewaele J-M, Witney J, Saito K et al. (2018) Foreign language enjoyment and anxiety: The effect of teacher and learner variables. *Lang Teach Res* 22:676–697
- Fredrickson BL (2003) The value of positive emotions: The emerging science of positive psychology is coming to understand why it's good to feel good. *Am Sci* 91(4):330–335
- Gardner R (1985) *Social psychology and second language learning: The role of attitudes and motivation*. Edward Arnold, London
- Hair JF, William CB, Babin BJ, Rolph EA (2019) *Multivariate data analysis* (8th ed.). Cengage, Boston
- Horwitz EK, Horwitz M, Cope J (1986) Foreign language classroom anxiety. *Modern Lang J* 70:125–132
- Horwitz EK (2010) Foreign and second language anxiety. *Lang Teach* 43(2):154–167
- Horwitz EK (2017) On the misreading of Horwitz, Horwitz, and Cope (1986) and the need to balance anxiety research and the experiences of anxious language learners. In: Gkonou C, Daubney M, Dewaele J-M (eds) *New insights into language anxiety: Theory, research and educational implications*. Multilingual Matters, Bristol, pp 31–47
- Jeong YK, Kim HO (2010) English reading anxiety and English learning anxiety in middle and high school English learners. *Engl Stud* 10(1):105–129
- Jiang Y, Dewaele J-M (2019) How unique is the foreign language classroom enjoyment and anxiety of Chinese EFL learners? *System* 82:13–25
- Kang JY, Kim TY (2017) Korean elementary, middle, and high school students' English learning anxiety and motivation. *Engl Lang Teach* 29(1):63–83
- Kitano K (2001) Anxiety in the college Japanese language classroom. *Modern Lang J* 85(4):549–566
- Kissau S (2006) Gender differences in second language motivation: An investigation of micro-and macro-level influences. *Can J Appl Linguistics* 9(1):73–96
- Li C (2021) A control-value theory approach to boredom in English class among university students in China. *Modern Lang J* 105:317–334
- Li C, Dewaele J-M (2021) How do classroom environment and general grit predict foreign language classroom anxiety of Chinese EFL students? *J Psychol Lang Learn* 3(2):22–34
- Li C, Dewaele J-M, Hu Y (2023) Foreign language learning boredom: Conceptualization and measurement. *App Linguistics Rev* 14(2):223–249
- Li C, Dewaele J-M, Jiang G (2020) The complex relationship between classroom emotions and EFL achievement in China. *Appl Linguistics Rev* 11(3):485–510
- Li C, Han Y (2022) The predictive effects of foreign language enjoyment, anxiety and boredom on learning outcomes in online English classrooms [in Chinese]. *Modern Foreign Lang* 45(2):207–219
- Li C, Huang J, Li B (2021) The predictive effects of classroom environment and trait emotional intelligence on foreign language enjoyment and anxiety. *System* 96:1–11
- Li C, Jiang G, Dewaele J-M (2018) Understanding Chinese high school students' foreign language enjoyment: Validation of the Chinese version of the foreign language enjoyment scale. *System* 76:183–196
- Li C, Wei L (2023) Anxiety, enjoyment, and boredom in language learning amongst junior secondary students in rural China: How do they contribute to L2 achievement? *Stud Second Lang Acquis* 45(1):93–108
- Liu Q (2010) The national educational examinations authority and its English language tests. In: Cheng L, Curtis A (eds) *English language assessment and the Chinese learner*. Routledge, London, pp 29–43
- Ma L, Liu L, Luo S et al. (2023) Exploring urban-rural differences in foreign language enjoyment, anxiety, boredom, and burnout among Chinese secondary students. *J Multilingual Multicultural Dev.* <https://doi.org/10.1080/01434632.2023.2298691> ahead-of-print
- MacIntyre PD (2017) An overview of language anxiety research and trends in its developments. In: Gkonou C, Daubney M, Dewaele J-M (eds) *New insights into language anxiety: Theory, research and educational implications*. Multilingual Matters, Bristol, pp 11–30
- MacIntyre PD, Gregersen T (2012) Emotions that facilitate language learning: The positive broadening power of the imagination. *Stud Second Lang Learn Teach* 2:193–213
- MacIntyre PD, Dewaele J-M, Macmillan N et al. (2019) The emotional underpinnings of Gardner's attitudes and motivation test battery. In: MacIntyre PD, Al-Hoorie A (eds) *Contemporary language motivation theory: 60 years since Gardner and Lambert (1959)*. Multilingual Matters, Bristol, pp 57–79
- Macklem GL (2015) *Boredom in the classroom: Addressing student motivation, self-regulation, and engagement in learning*. Springer, Manchester
- Pawlak M, Kruk M, Zawodniak J et al. (2020) Investigating factors responsible for boredom in English classes: The case of advanced learners. *System* 91:1–10
- Pekrun R, Elliot AJ, Maier MA (2006) Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *J Educ Psychol* 98(3):583–597
- Pekrun R, Stephens EJ (2010) Achievement emotions: A control-value approach. *Social Personal Psychol Compass* 4:238–255
- Pekrun R, Frenzel AC, Goetz T et al. (2007) The control-value theory of achievement emotions: An integrative approach to emotions in education. In: Schutz PA, Pekrun R (eds) *Emotions in education*. Academic Press, City, pp 13–36
- Shao K, Yu W, Ji Z (2013) An exploration of Chinese EFL students' emotional intelligence and foreign language anxiety. *Modern Lang J* 97(4):917–929
- Teimouri Y (2018) Differential roles of shame and guilt in L2 learning: How bad is bad? *Modern Lang J* 102(4):632–652
- Teimouri Y, Goetze J, Plonsky L (2019) Second language anxiety and achievement: A meta-analysis. *Stud Second Lang Acquis* 41:363–387
- Teimouri Y, Plonsky L, Tabandeh F (2022) L2 grit: Passion and perseverance for second-language learning. *Lang Teach Res* 26(5):893–918
- Tsang A, Dewaele, J-W (2023) The relationships between young FL learners' classroom emotions (anxiety, boredom, & enjoyment), engagement, and FL proficiency. *App Linguistics Rev.* <https://doi.org/10.1515/applirev-2022-0077> ahead-of-print
- Wang X, Li Y (2022) The predictive effects of foreign language enjoyment, anxiety, and boredom on general and domain-specific English achievement in online English classrooms. *Front Psychol* 13:1–12
- Wei H, Gao K, Wang W (2019) Understanding the relationship between grit and foreign language performance among middle school students: The roles of foreign language enjoyment and classroom environment. *Front Psychol* 10:1508
- Zhao X, Lan G, Zhang H (2023) The predictive effect of language achievement on multiple emotions in languages other than English: Validating a distal mediation model based on the control-value theory. *Appl Linguistics Rev.* <https://doi.org/10.1515/applirev-2023-0046> ahead-of-print
- Zhang H, Bournot-Trites M (2021) The long-term washback effects of the National Matriculation English Test on college English learning in China: Tertiary student perspectives. *Stud Educ Eval* 68:1–21

Zhang X (2019) Foreign language anxiety and foreign language performance: A met-analysis. *Modern Lang J* 103:763–781

Zhang Z (2022) Learner engagement and language learning: A narrative inquiry of a successful language learner. *Lang Learn J* 50(3):378–392

Author contributions

Zhiyuan Li: conceptualisation, data collection, analysis, writing – original draft, writing – reviewing and editing; Li Xing: data collection, analysis, writing – reviewing and editing.

Competing interests

The authors declare no competing interests.

Ethical approval

This study was conducted in accordance with the local ethical guidelines for research involving human participants and complied with the tenets of the Helsinki Declaration. The study has been ethically reviewed and approved by Chang'an University Institutional Review Board of the School of Foreign Studies. There was no number attached to the approval.

Informed consent

Informed consent was gathered from all participating students. The students were informed of their right to withdraw from the investigation at any time. A consent mechanism was designed to ensure voluntary participation. The first window of the electronic questionnaire consisted of an information statement, “By entering the questionnaire, I have read the information provided and agree to participate.”

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-024-03049-7>.

Correspondence and requests for materials should be addressed to Zhiyuan Li.

Reprints and permission information is available at <http://www.nature.com/reprints>

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2024