



(RESEARCH ARTICLE)



Academic boredom and foreign language proficiency: Elaboration strategies as the mediator

Yajun Wu ^{1,*} and Xia Kang ^{2,3}

¹ School of Humanities and Education, Foshan University, Foshan City, Guangdong Province, China.

² School of Mathematics and Big Data, Foshan University, Foshan City, Guangdong Province, China.

³ Faculty of Education, the University of Hong Kong, Hong Kong, China.

International Journal of Science and Research Archive, 2023, 08(02), 265–273

Publication history: Received on 14 February 2023; revised on 22 March 2023; accepted on 24 March 2023

Article DOI: <https://doi.org/10.30574/ijrsra.2023.8.2.0251>

Abstract

The objective of the present study was to explore the direct and indirect effects of academic boredom on foreign language (FL) proficiency in teaching English as a foreign language (EFL). As a prominent negative emotion, the detrimental effect of FL boredom on FL proficiency has been verified. However, the mediating mechanism between FL boredom and FL proficiency, especially the mediating effect of cognitive strategies, needs to be further explored. We recruited 505 Chinese EFL learners (236 female, 46.73%) from one secondary school using convenience sampling to verify the mediating role of elaboration strategies between FL boredom and FL proficiency. Structural equation modelling (SEM) and mediation analysis yielded two major findings. First, FL boredom was negatively correlated with FL proficiency. Second, after controlling for gender and age, FL boredom, mediated through elaboration strategies, influenced FL proficiency. Third, elaboration strategies partially mediated the relationship between FL boredom and proficiency. Implications and limitations are discussed.

Keywords: FL boredom; Elaboration strategies; FL proficiency; Mediating mechanism

1. Introduction

Achievement emotions are critical to educational outcomes, for they emerge in many academic scenarios (e.g., classroom, examination, and homework). However, traditional studies on academic emotions were limited to anxiety, which somewhat ignored the importance of other types of emotions (e.g., academic boredom). Through qualitative and quantitative studies, [1] found that there are many types of achievement emotions and identified that enjoyment, pride, hope, boredom, anxiety, anger, shame, and hopelessness were the most experienced emotions in the learning context. A great number of studies have been designed to explore the antecedents and consequences of achievement emotions [2,3], which had beneficial implications for both educational intervention and teaching behavior strategies. Moreover, existing studies have verified the significant correlation between achievement emotion and learning strategies [4] and the correlation between learning strategies and academic proficiency [5]. However, the possible mediating effect of learning strategies between achievement emotions and academic proficiency was seldom studied from a quantitative approach, especially in the domain of EFL education. Therefore, the present study was designed to investigate the mediating effect of elaboration strategies between FL boredom and FL proficiency in a sample of Chinese secondary EFL learners.

*Corresponding author: Yajun Wu

2. Literature review

2.1. Foreign Language Boredom

FL boredom is one of the common negative achievement emotions in the learning context [6]. The adverse effect of FL boredom on FL proficiency has been unanimously recognized by researchers [7]. The mediation between FL boredom and FL proficiency has been discussed [7–10], however, existing studies have mainly focused on the mediating effects of motivation [9] and academic engagement [7,8]. Furthermore, the known mediators partially mediate between FL boredom and FL proficiency, suggesting that more indicators need to be unearthed. From the perspective of participants, most of the existing research has been carried out in the western context [11] or the south Asian context [12], and few studies have explored Chinese secondary school students greatly influenced by the Confucian heritage culture. Echoingly, the present study endeavored to explore the possible mediating effect of elaboration strategies in the relationship between FL boredom and FL proficiency among Chinese EFL learners

2.2. Elaboration strategies

Elaboration strategy is a kind of cognitive strategy, which refers to establishing internal connections between the content being learned and previous knowledge [13]. For students, elaboration strategies mean that students conduct a complex and meaningful analysis of the learning material, which would help them to remember more information about the learning material. More specifically, those students who adopt the elaboration strategies would add new content to the information they have learned, including logical reasoning, expansion and extension of information, illustrating more examples, and supplementing more details. The researcher also found that adopting elaboration strategies in the process of foreign language learning could help EFL learners learn, master and retain new FL knowledge (e.g., grammar knowledge), which would also positively affect EFL learners' FL achievement [14].

Given the significance of elaboration strategies to academic achievement, some antecedents and consequences have been explored [15–18]. For example, in a study with Indonesian senior high school students, [15] explored the relationship between elaboration strategies, critical thinking ability, and academic achievement and found that elaboration strategies could promote both critical thinking ability and academic achievement. The relationship between achievement emotions and cognitive strategies was also explored. For example, in a study with German undergraduates, [10] found academic boredom was negatively related to the use of elaboration strategies. These empirical studies [10,15] explored the correlation between academic boredom and elaboration strategies and between elaboration strategies and academic achievement, respectively. However, to our best knowledge, no studies in the EFL domain have examined whether elaboration strategies mediate the relationship between FL boredom and FL proficiency. To fill this knowledge gap, the present study was designed to check the mediation model of “FL boredom→elaboration strategies→FL proficiency” in a sample of Chinese secondary EFL learners.

2.3. The direct and indirect effects of FL boredom on FL proficiency

Based on the control-value theory [19], the predictive effects of achievement emotions on school outcomes have been extensively studied. For instance, [20] documented that academic enjoyment and anxiety were significantly correlated with English achievement in a sample of Chinese senior high school students, showing that achievement emotions could directly affect academic achievement. Besides, the predictive effects of achievement emotions on cognitive strategies were also confirmed. [21] found that academic boredom was negatively correlated with elaboration and metacognition. In addition, as reviewed above, elaboration strategies were positively correlated with academic achievement [15]. Taken together, we made the hypothesis that achievement emotions (e.g., FL boredom) might indirectly affect academic outcomes (e.g., FL proficiency) through the possible mediator of elaboration strategies.

2.4. The present study

Based on the literature review, the present study contributes to the literature by testing the following three hypotheses.

- H1: FL boredom negatively affects the FL proficiency of Chinese secondary EFL learners.
- H2: FL boredom is negatively correlated with Chinese secondary EFL learners' use of elaboration strategies.
- H3: FL boredom could indirectly affect FL proficiency via the mediator of Chinese secondary EFL learners' use of elaboration strategies.

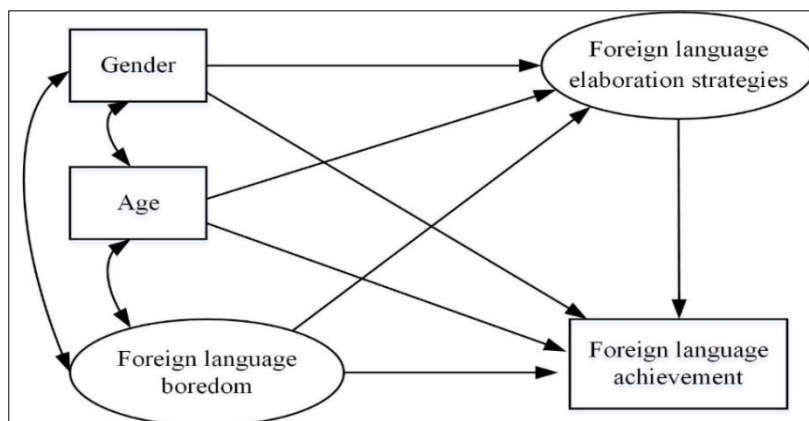


Figure 1 The proposed model

3. Methodology

3.1. Participants and procedure

The participants were five hundred and five students of seventh grade (209, accounting for 41.4%) and eighth-grade students (296, accounting for 58.6%) from a secondary school in Foshan City, Guangdong Province, China. The ages of the participants ranged from twelve to fifteen, with an average age of 13.66 ($SD = .61$). In terms of gender, there were two hundred and sixty-nine male students (53.3%) and two hundred and thirty-six female students (46.7%). Judging by socioeconomic status, most of the participants were from middle-class families.

Participants' written informed consent and their parents or legal guardians' verbal consent was first obtained. The questionnaire survey was conducted in an English class with the help of English teachers. Participants freely decided whether to participate in the questionnaire survey, and they could abort the survey at any time during the survey. English teachers helped the researchers to collect the questionnaires and check for missing items. The researchers for the present study entered the data into a spreadsheet to confirm that there were no missing data for this survey.

3.2. Measures

3.2.1. Foreign language boredom scale

The five-item foreign language boredom scale adapted from the Achievement Emotions Questionnaire [22] was utilized to measure participants' perception of boredom experiences in learning English. Participants were required to rate their agreement with the five items of the FL boredom scale on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). One example of this scale is "I get bored in learning English". The psychometric properties of this scale have been examined in previous studies [7,23]. The psychometric data of the FL boredom scale are reported in Table 1. The internal consistency of the FL boredom was good, with Cronbach's alpha equal to 0.89.

3.2.2. Foreign language elaboration strategies scale

To measure participants' use of FL elaboration strategies, five items adapted from the *goal orientation and learning strategies survey* [24] were applied (e.g., "I try to understand how the knowledge I learn in English class fit together with each other"). Participants rated the five items of the FL boredom scale on a 5-point Likert scale. This FL boredom scale demonstrated reliability and validity in previous studies [15,18]. The internal consistency of the FL boredom scale was good (Cronbach's $\alpha = 0.86$) (see Table 1).

3.2.3. Foreign language achievement

English is a compulsory course from primary school to university in the Chinese context. Chinese students held an instrumental view of English courses and believed that learning English well was an essential instrument for future success [25]. Achieving examination success remains the primary motivation for Chinese primary and secondary school students [26]. That is, the final examination scores are the primary indicators to measure a student's mastery of subject knowledge. In the present study, we collected participants' English scores in the final examination to represent their foreign language achievement.

3.2.4. Covariates

Gender and age were controlled as covariates while exploring the relationship between FL boredom, elaboration strategies, and FL achievement. First, age differences in achievement emotions [27], cognitive strategies [28], and academic achievement [29] suggested that age may affect the mediation model of “FL boredom→elaboration strategies→FL achievement”. Second, gender variance in achievement emotions, cognitive strategies, and academic achievement [30-32] indicated that age needs to be controlled while examining the proposed model (see Figure 1). Therefore, gender and age were controlled as covariates.

3.3. Data analysis

The present study was based on self-reported data, and common method bias was first conducted to evaluate the possible common method variance [33]. Then the data were analyzed in three layers to the hypotheses. First, descriptive statistics (i.e., mean, skewness, kurtosis, Cronbach’s α and factor loadings) of the studied variables (i.e., FL boredom, elaboration strategies, and achievement) were given to provide preliminary information. Second, confirmatory factor analysis (CFA) was conducted to evaluate the measurement model of the proposed structure (see Figure 1). Third, structural equation modelling (SEM) was carried out to investigate the relationship between FL boredom, elaboration strategies, and achievement. Besides, mediation analysis was conducted by using the bootstrap procedure with 5000 re-samples and 95% bias-corrected confidence intervals (BCa 95% CIs).

4. Results

4.1. Common method bias

Harman’s single-factor test was applied to evaluate the possibility of the common method variance in the present study [33,34]. Results of Harman’s single-factor test demonstrated that the single-factor model fit was poor, with $\chi^2(35) = 692.453$, $p < 0.001$, CFI = 0.752, TLI = 0.681, RMSEA = 0.193, 90% CIs [0.180, 0.206], SRMR = 0.113. Therefore, the problem of common method bias was not serious in the data of the present study.

4.2. Descriptive statistics

Descriptive statistics of the studied variables are demonstrated in Table 1. According to the standard proposed by [35], the absolute value of skewness and kurtosis is less than or equal to 2, indicating that the normality of all the studied variables was satisfactory for the maximum likelihood (ML) estimation. The mean scores of FL boredom (Mean = 1.99/5.00, $SD = 0.77$) show that the FL boredom experienced by the participants was at a low level, while the use of elaboration strategies was at a moderate level (Mean = 2.93/5.00, $SD = 0.52$).

[36] proposed that the factor loading for every item should exceed .55. The factor loadings of FL boredom and elaboration strategies ranged from 0.61 to 0.88, indicating that all factors extracted sufficient variance from these two variables. This study converted FL achievement into standardized z-scores for conducting mediation analysis.

Table 1 Descriptive statistics of the studied variables

	Mean	SD	Skewness	Kurtosis	Cronbach’s α	Factor loadings
FLboredom	1.99	0.77	0.57	0.09	0.89	0.68-0.88
Elaboration strategies	2.93	0.52	-0.21	1.03	0.86	0.61-0.80
FL achievement	0.00	0.99	-0.87	-0.09	-	-

4.3. Measurement models and latent bivariate correlations

CFA, SEM, and mediation analysis were carried out using Mplus 8.3 [37]. Model fit criteria proposed by [38, 39] were adopted, which include the comparative fit index (CFI ≥ 0.95), the Tucker-Lewis index (TLI ≥ 0.95), root mean square error of approximation (RMSEA ≤ 0.06), and standardized root mean square residual (SRMR ≤ 0.08). According to this criteria, the measurement model demonstrated an excellent fit, with $\chi^2(34) = 81.650$, $p < 0.001$, CFI = 0.982, TLI = 0.976, RMSEA = 0.053, 90% CI [0.038, 0.067], SRMR = 0.028.

Table 2 Results of correlations matrix for the studied variables

	1	2	3	4	5
1 FL boredom	-				
2 Elaboration strategies	-0.58***	-			
3 FL achievement	-0.41***	0.39***	-		
4 Gender	-0.05	0.06	0.10*	-	
5 Age	-0.04	0.03	-0.09*	-0.07	-

* $p < 0.05$; *** $p < 0.001$.

Next, gender, age, and FL achievement were added to the measurement model, and an excellent fit was also obtained: $\chi^2(58) = 112.703, p < 0.001, CFI = 0.980, TLI = 0.973, RMSEA = 0.043, 90\% CI [0.031, 0.055], SRMR = 0.027$. The results of latent bivariate correlations are reported in Table 2. We found that FL boredom was negatively correlated with elaboration strategies and FL achievement. Besides, the positive correlation between elaboration strategies and FL achievement was confirmed. The correlation between gender and FL achievement and the correlation between age and FL achievement was significant.

4.4. Structural equation modelling

The proposed model presented in Figure 1 (gender and age were treated as covariates) was examined using SEM. The fit of the proposed model was good, with $\chi^2(60) = 114.414, p < 0.001, CFI = 0.980, TLI = 0.975, RMSEA = 0.042, 90\% CI [0.030, 0.054], SRMR = 0.030$. The standardized regression weights of the proposed model are presented in Figure 2. In this phase, we had five findings. (1) FL boredom negatively affected elaboration strategies ($\beta = -0.58, SE = 0.04, p < 0.001$) and FL achievement ($\beta = -0.28, SE = 0.06, p < 0.001$). (2) Elaboration strategies were positively correlated with FL achievement ($\beta = 0.23, SE = 0.06, p < 0.001$). (3) Gender (male = 0 and female = 1) was positively correlated with FL achievement ($\beta = 0.08, SE = 0.04, p < 0.05$), showing that female learners have higher FL proficiency than male learners. (4) Age was negatively correlated with FL achievement ($\beta = -0.11, SE = 0.04, p < 0.01$), demonstrating that the older the secondary EFL learners, the worse their English proficiency. (5) FL boredom explained significant proportions of variance in elaboration strategies (33.7%) and FL achievement (21.9%).

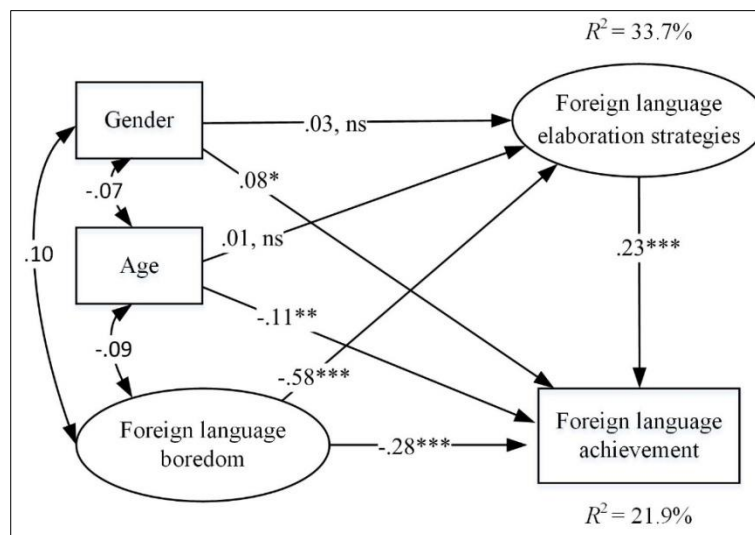


Figure 2 The relationship between FL boredom, elaboration strategies, and FL achievement. All the correlations and path coefficients are standardized, and ‘ns’ denotes insignificant coefficients. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

The mediating effect of elaboration strategies between FL boredom and achievement was explored using a bootstrap procedure with 5000 re-samples. The results of BCa 95% CIs are shown in Table 3. For the lower and upper bounds of the BCa 95% CIs $[-0.21, -0.07]$ exclude zero for the model path of “FL boredom→elaboration strategies→FL achievement”, indicating that the mediating effect of elaboration strategies was significant. Besides, the direct effect of

FL boredom on FL achievement was significant (BCa 95% CIs [-0.39, -0.16]), indicating that elaboration strategies partially mediated the relationship between FL boredom and achievement.

Table 3 Results of mediation analysis

Model path	Effect	SE	Bias-corrected CIs 95%	
			Lower	Upper
Total effect	-0.41	0.05	-0.49	-0.32
Indirect effect: Boreodm →Elaboration strategies→ Achievement	-0.13	0.04	-0.21	-0.07
Direct effect	-0.28	0.06	-0.39	-0.16

5. Discussion

Achievement emotions and cognitive strategies are the prominent antecedents of school education. However, few studies have investigated the relationship between achievement emotions and cognitive strategies, and even fewer studies have explored the link between achievement emotions, cognitive strategies, and academic achievement. In light of this, the present study was designed to explore the possible relationship between achievement emotions (e.g., FL boredom), cognitive strategies (e.g., elaboration strategies), and academic achievement (i.e., FL proficiency) with 505 Chinese secondary EFL learners.

First, the present study found that FL boredom was negatively correlated with FL proficiency, indicating that H₁ was supported. This finding is consistent with the theoretical hypothesis of the control-value theory [19]. This finding provides empirical evidence for the validity of the control-value theory, that is, in a cohort of Chinese secondary EFL learners, negative achievement emotions (e.g., FL boredom) adversely affect academic achievement (e.g., FL achievement). Also, these findings are consistent with existing empirical studies [7,40]. However, some research show that boredom is not always bad for academic achievement [41,42], which prompted us to take participants' cultural backgrounds into account. The present study contributes to the literature by confirming that FL boredom could adversely affect FL achievement in the Confucian heritage cultural context.

Second, we found that FL boredom was negatively correlated with elaboration strategies, showing that H₂ was supported. On the one hand, this finding provides empirical evidence for the resource limitation theory [43] in that an individual's cognitive resources are limited, and high-arousal boredom would occupy part of cognitive resources, thereby reducing his or her application of cognitive strategies (e.g., elaboration strategies) in the learning context. On the other hand, this finding is consistent with some previous studies [4] and inconsistent with others [44]. Previous studies have found a negative correlation between academic boredom and learning strategies [4,44]. However, prior research on the causal link between academic boredom and learning strategies has not been consistent. The present study contributes to the literature by identifying that FL boredom negatively affects elaboration strategies.

Third, elaboration strategies mediated the association between FL boredom and EFL proficiency, suggesting that H₃ was supported. Achievement emotions and cognitive strategies are important antecedents of school outcomes [45,46]. However, to our best knowledge, few studies have explored the relationship between achievement emotions, cognitive strategies, and academic achievement. The present study contributes to the literature by documenting that FL boredom could affect FL proficiency through elaboration strategies. Besides, this study corroborated the mediation model of "FL boredom→elaboration strategies→FL achievement", indicating that academic boredom was an antecedent of cognitive strategies (e.g., elaboration strategies), not the other way around.

6. Implications, limitation and directions for future research

The findings have theoretical and practical implications. First, this study provides empirical evidence for the control-value theory [19] and the resource limitation theory [43]. More specifically, the negative correlation between FL boredom and FL proficiency was confirmed, which supports the control-value theory: negative emotions would adversely affect academic achievement. Also, the finding that FL boredom adversely affects elaboration strategies is consistent with the resource limitation theory, showing that FL boredom would occupy the limited cognitive resources of a student and thus hinder his or her application of cognitive strategies (e.g., elaboration strategies). Second, the findings that FL boredom could directly or indirectly affect FL proficiency, suggesting that EFL educators and teachers

need to take actions (e.g., providing teacher support, showing more teacher enthusiasm to students, and setting appropriate achievement goals) to reduce EFL learners' boredom levels in learning English [2,47,48].

There are three deficiencies in the present study that need to be further explored. First, this study found that elaboration strategies partially mediated between FL boredom and proficiency, suggesting that there are other mediators besides elaboration strategies. Thus, future research is recommended to take more mediators (e.g., academic engagement) into consideration to have a more comprehensive understanding of the mediating mechanisms between FL boredom and proficiency. Second, this study confirmed the mediation model of "FL boredom → elaboration strategies → FL achievement", which partially reflects that FL boredom affects elaboration strategies rather than elaboration strategies affecting FL boredom. However, the causal relationship between FL boredom and elaboration strategies could not be drawn because the present study adopted a cross-sectional design. Future studies are suggested to explore the potential causal relationship between FL boredom and elaboration strategies with longitudinal data. Third, this study only sampled Chinese Han students. In addition to the Han nationality influenced by Confucian heritage culture, there are fifty-five ethnic minorities in Mainland China. Therefore, there is a need to sample participants from more diverse cultural regions to represent Chinese secondary school students.

7. Conclusion

The present research explored the relationship between FL boredom, elaboration strategies, and FL proficiency in the Chinese EFL learning context and found that FL boredom could directly affect FL proficiency or indirectly through elaboration strategies. Given the negative effect of FL boredom on elaboration strategies and FL proficiencies, EFL teachers and educators are expected to take measures to alleviate their students' FL boredom levels.

Compliance with ethical standards

Acknowledgments

Authors thank the principals and English teachers of the participating schools for their help, and the students for their active participation in the questionnaire survey.

Disclosure of conflict of interest

The authors declare that there is no potential conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] Pekrun R, Goetz T, Titz W, Perry RP. Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educ Psychol.* 2002;37(2):91–105.
- [2] Wu Y, Kang X. Relationship between perceived teacher support and learning engagement in EFL context: The mediating role of achievement emotions. *Int J Educ Humanit.* 2023;3(1):85–98.
- [3] Kang X, Wu Y. Investigating the linkage between school psychological capital and achievement emotions in secondary school mathematics. *Asia-Pacific Educ Res [Internet].* 2022;31(6):739–48. Available from: <https://doi.org/10.1007/s40299-021-00623-4>
- [4] Tan J. Relationships between achievement emotions, motivation and language learning strategies of high, mid and low English language achievers. *J Lit Art Stud.* 2017;7(6):770–8.
- [5] Donker AS, de Boer H, Kostons D, Dignath van Ewijk CC, van der Werf MPC. Effectiveness of learning strategy instruction on academic performance: A meta-analysis. *Educ Res Rev [Internet].* 2014;11:1–26. Available from: <http://dx.doi.org/10.1016/j.edurev.2013.11.002>
- [6] Putwain DW, Pekrun R, Nicholson LJ, Symes W, Becker S, Marsh HW. Control-value appraisals, enjoyment, and boredom in mathematics: A longitudinal latent interaction analysis. *Am Educ Res J.* 2018;55(6):1339–68.
- [7] Wu Y, Kang X. The relationship between academic boredom and EFL achievement: Examining the mediating role of behavioral engagement. *J Lang Teach.* 2023;3(2):1–10.

- [8] Carmona-Halty M, Salanova M, Llorens S, Schaufeli WB. Linking positive emotions and academic performance: The mediated role of academic psychological capital and academic engagement. *Curr Psychol*. 2021;40:2938–47.
- [9] Méndez-Aguado C, Aguilar-Parra JM, Álvarez JF, Trigueros R, Fernández-Archilla JA. The influence of emotions, motivation and habits in the academic performance of primary education students in french as a foreign language. *Sustainability*. 2020;12(6):2531.
- [10] Pekrun R, Goetz T, Daniels LM, Stupnisky RH, Perry RP. Boredom in achievement settings: Exploring control-value antecedents and performance outcomes of a neglected emotion. *J Educ Psychol*. 2010;102(3):531–49.
- [11] Raccanello D, Florit E, Brondino M, Rodà A, Mason L. Control and value appraisals and online multiple-text comprehension in primary school: The mediating role of boredom and the moderating role of word-reading fluency. *Br J Educ Psychol*. 2022;92(1):258–79.
- [12] Virgã D, Pattusamy M, Kumar DP. How psychological capital is related to academic performance, burnout, and boredom? The mediating role of study engagement. *Curr Psychol*. 2020;1–13.
- [13] Garavan T, O'Brien F. Elaboration strategies and human resources development. In: Seel NM, editor. *Encyclopedia of the sciences of learning*. New York: Springer; 2011. p. 1105–8.
- [14] Oxford RL. *Language learning strategies: What every teacher should know*. Boston: Heinle & Heinle Publishers; 1990.
- [15] Priawasana E, Degeng INS, Utaya S, Kuswandi D. An experimental analysis on the impact of elaboration learning on learning achievement and critical thinking. *Univers J Educ Res*. 2020;8(7):3274–9.
- [16] Chiu MM, Chow BWY, McBride-Chang C. Universals and specifics in learning strategies: Explaining adolescent mathematics, science, and reading achievement across 34 countries. *Learn Individ Differ*. 2007;17(4):344–65.
- [17] Pintrich PR, Smith DAF, Garcia T, McKeachie WJ. *A Manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)*(Tech. Report No.91-B-004). Ann Arbor; 1991.
- [18] Salwah, Ashari NW. The effectiveness of elaboration strategy in improving students learning achievement. *J Pedagog*. 2015;1(1):97–113.
- [19] Pekrun R. The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educ Psychol Rev*. 2006;18(4):315–41.
- [20] Dewaele JM, Li C. Foreign language enjoyment and anxiety: Associations with general and domain-specific English achievement. *Chinese J Appl Linguist*. 2022;45(1):32–48.
- [21] Artino AR, Jones KD. Exploring the complex relations between achievement emotions and self-regulated learning behaviors in online learning. *Internet High Educ [Internet]*. 2012;15(3):170–5. Available from: <http://dx.doi.org/10.1016/j.iheduc.2012.01.006>
- [22] Pekrun R, Goetz T, Frenzel AC, Barchfeld P, Perry RP. Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). *Contemp Educ Psychol*. 2011;36(1):36–48.
- [23] Li L, Wu Y, Kang X. Foreign language learning boredom, academic engagement, and achievement: A mediation model. *Asian J Interdiscip Res*. 2022;5(3):22–31.
- [24] Dowson M, McInerney DM. The development and validation of the goal orientation and learning strategies survey (GOALS-S). *Educ Psychol Meas*. 2004;64(2):290–310.
- [25] Tachibana Y, Matsukawa R, Zhong Q. Attitudes and motivation for learning English: A cross-national comparison of Japanese and Chinese high school students. *Psychol Rep*. 1996;79:691–700.
- [26] Dello-Iacovo B. Curriculum reform and “Quality Education” in China: An overview. *Int J Educ Dev*. 2009;29(3):241–9.
- [27] Meyer S, Schlesier J. The development of students' achievement emotions after transition to secondary school: A multilevel growth curve modelling approach. *Eur J Psychol Educ*. 2022;37(1):141–61.
- [28] Chen M-L. Age differences in the use of language learning strategies. *English Lang Teach*. 2014;7(2):144–51.
- [29] Chyung SY. Age and gender differences in online behavior, self-efficacy, and academic performance. *Q Rev Distance Educ*. 2007;8(3):213–22.
- [30] Chaplin TM, Aldao A. Gender differences in emotion expression in children: A meta-analytic review. *Psychol Bull*. 2013;139(4):735–65.

- [31] Doró K, Habók A. Language learning strategies in elementary school: The effect of age and gender in an EFL context. *J Linguist Lang Teach*. 2013;4(2):25–37.
- [32] Denies K, Heyvaert L, Dockx J, Janssen R. Mapping and explaining the gender gap in students' second language proficiency across skills, countries and languages. *Learn Instr* [Internet]. 2022;80:101618. Available from: <https://doi.org/10.1016/j.learninstruc.2022.101618>
- [33] Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J Appl Psychol*. 2003;88(5):879–903.
- [34] Malhotra NK, Kim SS, Patil A. Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Manage Sci*. 2006;52(12):1865–83.
- [35] Roever C, Phakiti A. *Quantitative methods for second language research: A problem-solving approach*. New York: Routledge; 2017.
- [36] Comrey AL, Lee HB. *A first course in factor analysis*. New York: Psychology Press; 2009.
- [37] Muthén LK, Muthén BO. *Mplus user's guide*. Los Angeles: Muthén & Muthén; 2017.
- [38] Chen FF. Sensitivity of goodness of fit indexes to lack of measurement invariance. *Struct Equ Model A Multidiscip J*. 2007;14(3):464–504.
- [39] Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Model A Multidiscip J*. 1999;6(1):1–55.
- [40] Tze VMC, Daniels LM, Klassen RM. Evaluating the relationship between boredom and academic outcomes: A meta-analysis. *Educ Psychol Rev*. 2016;28(1):119–44.
- [41] Chentsova-Dutton YE, Senft N, Ryder AG. Listening to negative emotions: How culture constrains what we hear. In: Parrott WG, editor. *The positive side of negative emotions*. New York: The Guilford Press; 2014. p. 146–78.
- [42] Bench SW, Lench HC. Boredom as a seeking state: Boredom prompts the pursuit of novel (even negative) experiences. *Emotion*. 2019;19(2):242–54.
- [43] Kahneman D. *Attention and effort*. New Jersey: Prentice Hall; 1973.
- [44] Chou MH. The mediating role of achievement emotions in the relationship between instructional clarity, English proficiency, and reading strategies. *Educ Psychol* [Internet]. 2021;41(5):582–601. Available from: <https://doi.org/10.1080/01443410.2021.1882660>
- [45] Zull JE. *Key aspects of how the brain learns*. New Dir adult Contin Educ. 2006;110:3–9.
- [46] Conley MW. Cognitive strategy instruction for adolescents: What we know about the promise, what we don't know about the potential. *Harv Educ Rev*. 2008;78(1):84–106.
- [47] Bieg S, Dresel M, Goetz T, Nett UE. Teachers' enthusiasm and humor and its' lagged relationships with students' enjoyment and boredom - A latent trait-state-approach. *Learn Instr*. 2022;81:101579. Available from: <https://doi.org/10.1016/j.learninstruc.2021.101579>
- [48] Lüftenegger M, Klug J, Harrer K, Langer M, Spiel C, Schober B. Students' achievement goals, learning-related emotions and academic achievement. *Front Psychol*. 2016;7:1–10.