

A Study on the Impact of Disciplinary Differences on Foreign Language Learning Anxiety — A Comparative Analysis of Science and Engineering Disciplines and Humanities and Social Sciences

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Abstract

Foreign language learning anxiety continues to influence college students' acquisition of foreign languages, and the factors that trigger this anxiety have received increasing attention. This study aims to explore the differences in foreign language learning anxiety and emotional regulation strategies among college students in different disciplinary contexts. Using the most widely accepted classification method, data were collected from 140 students in science and engineering disciplines and humanities and social sciences disciplines via the Foreign Language Classroom Anxiety Scale (FLCAS short form) and the Emotional Regulation Questionnaire (ERQ short form). The results showed that students in science and engineering disciplines generally had higher overall foreign language anxiety levels than did those in humanities and social sciences disciplines, with significant differences, particularly in dimensions such as “classroom speaking anxiety” and “self-comparison anxiety”. Humanities students exhibited significantly higher frequencies of cognitive reappraisal strategies than science and engineering students did, whereas science and engineering students tended to rely more on emotion suppression and avoidance strategies. This study elucidates the mechanisms underlying disciplinary differences in the formation and regulation of foreign language learning anxiety, providing empirical evidence for universities to implement differentiated foreign language instruction and optimize classroom emotional atmospheres.

Keywords

Foreign language learning anxiety, disciplinary differences, foreign language classroom anxiety, emotion regulation, survey questionnaire

1. Introduction

Foreign language learning anxiety is a key psychological variable that influences learning motivation, the selection of learning strategies, and the effectiveness of foreign language learning. Over the years, issues such as foreign language classroom anxiety (FLCAS) and emotional regulation strategies have been the focus of research on foreign language learning. However, most related studies have failed to adequately consider the differences in students' disciplinary backgrounds, particularly the significant differences between science and engineering students and between humanities and social sciences students in terms of their cognitive habits, learning motivations, and language usage contexts. These differences are likely to result in distinct emotional challenges and regulation needs during foreign language learning.

Therefore, this study focuses on the theme of “Differences in Foreign Language Learning Anxiety and Emotional Regulation Among College Students in Different Disciplinary Contexts,” aiming to compare the differences in the severity of foreign language learning anxiety and the use of emotional regulation strategies between science and engineering students and humanities and social sciences students and to explore the mechanisms through which emotional regulation mediates the relationship between learning motivation and foreign language anxiety.

Theoretically, this study is based on foreign language emotion theory, the emotional regulation process model, and attention control theory and processing efficiency theory, constructing an analytical framework of “disciplinary background—foreign language anxiety—emotional regulation.” Foreign language emotion theory emphasizes that emotions such as anxiety have a certain influence on the process and outcomes of foreign language learning, providing the basic perspective for this study to focus on the emotional dimension. The emotion regulation process model suggests that individuals can regulate emotions through strategies such as reappraisal and avoidance, providing a theoretical basis for analyzing the coping mechanisms that students employ under anxiety. Attention control theory and processing efficiency theory reveal that anxiety weakens the allocation and utilization efficiency of attention resources, thereby affecting learning efficiency and offering cognitive-level theoretical support for explaining the relationship between anxiety and learning efficacy.

Methodologically, this study selected 140 undergraduate students from across the country, with roughly equal numbers of science and engineering and humanities and social sciences samples. The Foreign Language Classroom Anxiety Scale (FLCAS) and Emotional Regulation Questionnaire (ERQ) were used for measurement, and t tests and mediation effect analysis were employed for statistical data processing. The results showed that science and engineering students had significantly higher overall foreign language anxiety levels than liberal arts students did, particularly in the dimensions of “classroom speaking anxiety” and “self-comparison anxiety.” Liberal arts students used cognitive reappraisal strategies significantly more frequently than science and engineering students did, whereas science and engineering students tended to adopt emotion suppression and avoidance strategies. Additionally, emotion regulation partially mediated the relationship between learning motivation and foreign language anxiety, with this effect being more pronounced in the liberal arts group.

This study was limited by time constraints, resulting in an insufficient sample size, and the quantitative questionnaires used were simplified versions, which may have reduced the reliability of the results. However, its conclusions provide empirical support for universities to implement differentiated foreign language instruction and optimize the emotional atmosphere in the classroom.

2. Literature Review

2.1 Research Background

Foreign language learning emotions, especially foreign language classroom anxiety (FLCA), have been widely proven to be important variables that influence classroom participation, language learning outcomes, and learning effectiveness.(MacIntyre & Gardner, 1991) Foreign language anxiety is a specific situational anxiety response that not only weakens students' self-efficacy but also reduces their classroom language output and participation.(Dewaele & MacIntyre, 2014)Research indicates that a certain level of foreign language anxiety can lead to reduced fluency in speaking, limited listening comprehension, and decreased willingness to engage in classroom interactions.

In terms of learning outcomes, the negative effects of foreign language anxiety manifest through two primary pathways: first, it directly inhibits language processing, causing students to experience difficulties in retrieving and organizing language information; second, it indirectly influences learning motivation and strategy selection, leading students to avoid high-pressure communicative tasks.

Emotional regulation refers to the process by which individuals adjust their emotional experiences and outward expressions through cognitive or behavioral means when faced with emotional events. In foreign language learning contexts, cognitive reappraisal and emotional suppression are two common strategies. Research has shown that students who employ cognitive reappraisal tend to interpret the difficulties and

challenges in foreign language learning in a more positive manner, thereby alleviating anxiety and enhancing classroom participation.(Xu & Kou, 2015)While emotional suppression can temporarily control the outward expression of emotions, prolonged use may lead to the accumulation of negative emotions and weaken learning motivation.

The level of emotional regulation ability also influences how students cope with stress-inducing events in foreign language classrooms. Students with high regulation ability typically transform negative emotions into learning motivation, whereas those with weaker regulation ability are more prone to avoidance behaviors and self-doubt, thereby exacerbating foreign language anxiety.

2.2 Research Theory and Methods

The theoretical foundation of this study consists of three main components. First, the theory of foreign language classroom anxiety, proposed by Horwitz et al. (Horwitz,1986), defines foreign language classroom anxiety as a context-specific anxiety response and has developed corresponding standardized measurement tools. This theory and scale have been widely applied in classroom emotion research and learning outcome prediction, providing a solid foundation for anxiety level assessment in this study.

Second, the emotional regulation process model, proposed by Gross (Gross,1998), views emotion generation and regulation as a temporal sequence process, distinguishing between cognitive reappraisal (antecedent strategy) and emotional suppression (consequential strategy), among other types. This model provides theoretical guidance for exploring differences in learning emotion management and behavioral outcomes across various regulatory approaches. In terms of measurement tools, this study uses the abbreviated version of the FLCAS to assess students' anxiety levels and the abbreviated version of the ERQ to measure the frequency of cognitive reappraisal and emotional suppression. Both tools have been extensively validated in related fields and possess high reliability and validity, facilitating comparisons with existing research findings.

On the basis of the aforementioned theoretical framework and measurement tools, this study constructs an analytical framework of “subject background → foreign language anxiety → emotional regulation” to examine how subject differences influence foreign language anxiety levels through regulatory strategies, thereby providing theoretical support for subsequent research design and empirical analysis.

3. Research Design

3.1 Research Objectives

On the basis of the aforementioned theoretical framework and current research status, this study aims to explore differences in foreign language classroom anxiety levels and the use of emotion regulation strategies among college students from different disciplinary backgrounds and to further analyze the mechanisms through which emotion regulation strategies mediate the relationship between disciplinary background and foreign language classroom anxiety. The specific objectives are as follows: first, to compare differences in foreign language classroom anxiety levels among college students from different disciplinary backgrounds to clarify the role of disciplinary factors in anxiety experiences; second, to explore differences in the use of emotional regulation strategies among college students from different disciplinary backgrounds to reveal how disciplinary background influences students' emotional coping mechanisms; and finally, to combine the results from the first two steps to analyze the potential mediating or moderating role of emotional regulation strategies between disciplinary background and foreign language classroom anxiety, thereby providing empirical evidence and intervention recommendations to reduce foreign language classroom anxiety and enhance students' classroom participation and learning efficiency.

3.2 Research Questions

Foreign language classroom anxiety has been identified by previous studies as a key factor that constrains students' classroom participation and learning outcomes. Differences in disciplinary backgrounds often imply varying learning requirements and psychological pressures, which may lead to varying degrees of anxiety among college students in foreign language learning. Moreover, emotional regulation strategies are widely regarded as critical mechanisms in educational psychology for alleviating anxiety and enhancing learning

efficacy; however, their specific mechanisms of action (mediation or moderation) remain underresearched. Therefore, the present study primarily addresses the following questions:

- 1) Do college students with different disciplinary backgrounds exhibit significant differences in foreign language classroom anxiety levels? This question helps elucidate the role of disciplinary background factors in foreign language learning.
- 2) Do emotion regulation strategies play a mediating role in the relationship between disciplinary background and foreign language classroom anxiety? This question helps in understanding how different disciplinary backgrounds influence students' anxiety levels through distinct regulatory mechanisms.
- 3) Do emotional regulation strategies play a moderating role in the relationship between academic background and foreign language classroom anxiety? Additionally, do cognitive reappraisal and emotional suppression exhibit different patterns of influence? This question not only clarifies the typological functions of emotional regulation strategies but also provides more specific grounds for targeted emotional interventions.

3.3 Research Hypotheses

H1: There are significant differences in foreign language classroom anxiety levels among college students with different disciplinary backgrounds.

Theoretical Basis: Foreign language emotion theory suggests that demands and pressures in learning contexts significantly influence anxiety levels. Students in science and engineering disciplines and those in humanities and social sciences disciplines differ in terms of course content, language requirements, and self-evaluation methods, which may lead to varying degrees of anxiety.

H2: Emotional regulation strategies play a significant mediating role between academic background and foreign language classroom anxiety.

Theoretical basis: The emotional regulation process model posits that individuals regulate emotional responses through strategies such as cognitive reappraisal or emotional suppression. These strategies may serve as a bridge in the process by which academic background influences anxiety.

H3: Emotional regulation strategies have a significant moderating effect on the relationship between disciplinary context and foreign language classroom anxiety, with cognitive reappraisal having a stronger anxiety-reducing effect than does emotional suppression.

Theoretical basis: Attention control theory and processing efficiency theory (Eysenck et al., 2007) emphasize that anxiety weakens attention resources. By assigning positive meanings, cognitive reappraisal alleviates anxiety and enhances efficiency, whereas emotional suppression often increases cognitive load and reduces efficiency. Therefore, the mechanisms of action of these two strategies may significantly differ in alleviating anxiety in foreign language learning.

3.4 Research Participants

The research participants were college students from different regions across the country, with a total of 140 valid questionnaires collected (N=140 after data cleaning). The sample was obtained through convenience sampling and voluntary completion via online platforms (WeChat, Weibo, and campus discussion groups), ensuring coverage across different provinces and academic backgrounds. During the sample screening process, participants were required to be full-time undergraduates currently enrolled in at least one foreign language course. Questionnaires with incomplete responses, short completion times, or more than three missing questions were excluded. The final sample included participants from different grade levels (freshmen to seniors), different major categories (53 from science and engineering, 87 from humanities and social sciences), and different foreign languages (English, Spanish, Japanese, French, etc.), thereby ensuring a certain degree of diversity, representativeness, and reliability of the data.

3.5 Research Tools and Variable Construction

The questionnaire (see Appendix) consists of 13 core items and uses a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The following scale variables were constructed on the basis of the content of the questions:

- 1) Foreign Language Classroom Anxiety (Items 1–6, $\alpha = 0.807$): This section draws on Horwitz et al.'s (1986) theory of foreign language classroom anxiety, emphasizing the tension and unease students experience in foreign language classrooms due to concerns about making mistakes, being evaluated, or performing poorly. Anxiety levels directly reflect students' emotional burden and serve as a core indicator in research on emotions in foreign language learning.
- 2) Confidence (Items 7–8, $\alpha = 0.319$): The confidence items aim to measure students' self-efficacy in foreign language classrooms. According to Bandura's self-efficacy theory, an individual's confidence in their ability to complete tasks significantly influences their level of engagement and learning performance. Although the reliability of the two items is relatively low, they can still serve as supplementary indicators reflecting students' self-beliefs in the classroom.
- 3) Reappraisal (Item 9, single item): This item draws on the “cognitive reappraisal” dimension from Gross's (1998) emotional regulation process model, which refers to students' ability to alleviate negative emotions by reinterpreting difficulties in foreign language learning. It is considered one of the most effective and constructive emotional regulation strategies.
- 4) Avoidance (Items 10–12, $\alpha = 0.743$): These items involve behaviors such as avoiding tasks, suppressing emotions, or diverting attention, corresponding to the “reactive regulation” or “avoidance response” dimension in Gross's (1998) model. Theoretical and empirical research indicates that avoidance may temporarily reduce anxiety but may exacerbate negative emotions and learning stress in the long term, thus being regarded as a key negative regulation strategy in this study.
- 5) HelpSeeking (Item 13, single item): This item is related to social support theory, emphasizing whether students are willing to seek help from peers or teachers when encountering difficulties. It reflects students' external coping strategies and is closely related to peer interaction and learning support in educational contexts.

3.6 Research Methods

- 1) Reliability Testing: Cronbach's α
- 2) Descriptive Statistics: Mean, Standard Deviation, Range
- 3) Between-group comparisons: Welch's t test by professional category, calculating Cohen's d and 95% confidence intervals
- 4) Correlation Analysis: Pearson correlation coefficient
- 5) Mediating Effect Analysis: Regression analysis to test the mediating model “Foreign Language Classroom Anxiety \rightarrow Avoidance \rightarrow Confidence,” reporting standardized coefficients, Sobel tests, and bootstrap confidence intervals (B=3000)

4. Research Results

4.1 Reliability and Descriptive Statistics

Table 1 shows the reliability and descriptive statistics results for each scale.

Table 1: Reliability and descriptive statistics results

Variables	α	Mean	Standard deviation	Minimum	Maximum
Foreign Language Classroom Anxiety	0.807	3.58	0.85	1.33	5.00
Confidence	0.319	2.91	0.91	1.00	5.00
Reappraisal	-	3.46	1.21	1.00	5.00
Avoidance	0.743	3.32	1.10	1.00	5.00
HelpSeeking	-	3.33	1.24	1.00	5.00

4.2 Intergroup Comparison of Professional Categories

Table 2 Differences between science and engineering students and humanities and social science students in various variables

Table 2: Manifestation of disciplinary differences in various variables

Variables	Average score in science and engineering (n=53)	Average score in humanities (n=87)	Mean difference	95% CI	t	p	Cohen's d
Foreign Language Classroom Anxiety	3.90	3.39	0.51	[0.27, 0.76]	4.15	<0.001	0.63
Confidence	2.62	3.15	-0.53	[-0.82, -0.24]	-3.64	<0.001	-0.60
Avoidance	3.25	3.38	-0.13	[-0.52, 0.25]	-0.68	0.497	-0.12

4.3 Correlation Analysis

Table 3 Pearson correlation coefficients between variables

Table 3: Pearson correlation coefficients between variables

Variables	Foreign Language Classroom Anxiety	Confidence	Reappraisal	Avoidance	HelpSeeking
Foreign Language Classroom Anxiety	1	0.385	0.502	0.641	0.496
Confidence	0.385	1	0.403	0.446	0.374
Reappraisal	0.502	0.403	1	0.343	0.319
Avoidance	0.641	0.446	0.343	1	0.481
HelpSeeking	0.496	0.374	0.319	0.481	1

4.4 Mediating Effect Analysis

Before conducting the mediating effect analysis, we first report the reliability and descriptive statistics of each variable (see Table 1). (Du, 2019) The results show that foreign language classroom anxiety ($\alpha = 0.807$) and avoidance ($\alpha = 0.743$) have good internal consistency reliability, whereas the self-confidence scale, consisting of only two items, has low reliability ($\alpha = 0.319$), and the results should be interpreted with caution. In terms of means and standard deviations, foreign language classroom anxiety ($M=3.58$, $SD=0.85$) is at a moderate-to-high level, confidence ($M=2.91$, $SD=0.91$) is relatively low, and reappraisal ($M=3.46$, $SD=1.21$), avoidance ($M=3.32$, $SD=1.10$), and help-seeking ($M=3.33$, $SD=1.24$) are all at moderate levels, indicating that students generally experience a certain degree of anxiety in foreign language learning and attempt diverse emotional regulation strategies.

The results of the correlation analysis are shown in Table 2. Foreign language classroom anxiety was significantly positively correlated with avoidance ($r = 0.641$, $p < 0.001$) and help-seeking ($r = 0.496$, $p < 0.001$), indicating that students with higher anxiety levels were more likely to adopt avoidance and seek external support to cope with emotional stress in learning. Additionally, foreign language classroom anxiety is positively correlated with confidence ($r = 0.385$, $p < 0.001$). This result may indicate that some students in high-anxiety groups also exhibit greater achievement motivation, thereby maintaining a certain level of self-confidence in their self-perception. Confidence was also positively correlated with avoidance ($r = 0.446$, $p < 0.001$), suggesting that some students may maintain high self-efficacy while adopting avoidance strategies. This differs from the traditional theory that “avoidance weakens confidence” and warrants further discussion.

On this basis, an intermediary model of “foreign language classroom anxiety \rightarrow avoidance \rightarrow confidence” was constructed and subjected to regression analysis, with the following results:

Path a (foreign language classroom anxiety \rightarrow avoidance): $\beta = 0.641$, $SE = 0.065$, $p < 0.001$, indicating that higher anxiety levels are associated with stronger avoidance tendencies.

Path b (avoidance \rightarrow confidence, foreign language classroom anxiety): $\beta = 0.338$, $SE = 0.099$, $p < 0.001$, indicating that even after controlling for anxiety levels, avoidance still has a significant positive predictive effect on confidence.

Total effect c (foreign language classroom anxiety \rightarrow confidence): $\beta = 0.385$, $p < 0.001$, indicating that anxiety has a significant positive overall effect on confidence.

Direct effect c': $\beta = 0.168$, $p = 0.045$, indicating that after the avoidance variable is introduced, the direct predictive effect of anxiety on confidence weakens but remains significant.

The indirect effect $a*b = 0.217$, Sobel $z = 3.24$, $p = 0.0012$; bootstrap 95% CI [0.082, 0.336], $p \approx 0.0013$, further validates the significance of the mediating effect.

In summary, avoidance plays a partial mediating role between anxiety and confidence in foreign language classrooms. This finding suggests that when faced with foreign language anxiety, students who adopt avoidance strategies may experience a short-term increase in confidence, indicating that avoidance behavior may have a “buffering” or “temporary protective” effect in different contexts. However, given the low reliability of the confidence scale and the atypical nature of the correlation, this conclusion needs to be further verified by subsequent studies.

5. Analysis and Discussion of Research Findings

On the basis of the analysis of the aforementioned research findings, science and engineering students clearly exhibit significantly higher levels of foreign language classroom anxiety than humanities students do, and their confidence is significantly lower. The Cohen's d values for both groups are approximately 0.6, indicating a moderate effect size, which suggests that these differences are statistically significant. On the basis of the open-ended questions in the questionnaire, it can be inferred that the potential reason for this difference may be that science and engineering courses involve more foreign language literature and technical communication, thereby increasing language usage pressure.

“Foreign language classroom anxiety” is significantly positively correlated with “avoidance” ($r = 0.641$), indicating that students with higher levels of foreign language classroom anxiety are more likely to adopt avoidance strategies. Foreign language education should pay attention to the potential long-term negative impacts of such coping mechanisms.

There is a significant mediating effect between foreign language classroom anxiety and confidence. “Avoidance” partially mediates the relationship between the two (the indirect effect accounts for approximately 56% of the total effect), but in this study, “avoidance” is positively correlated with “confidence,” so avoidance may maintain a certain level of self-efficacy in the short term.

“Reappraisal” is significantly positively correlated with “confidence” ($r = 0.403$), indicating that cognitive restructuring strategies have a positive effect on enhancing foreign language learning confidence and can be cultivated and applied in teaching.

These results and conclusions have certain limitations. Owing to the use of a simplified quantitative scale with fewer items, the reliability of the “confidence” scale is relatively low ($\alpha = 0.319$), so conclusions should be interpreted with caution.

6. Conclusions

This study revealed that science and engineering university students have significantly higher levels of anxiety in foreign language classrooms than humanities students do and significantly lower levels of confidence. Avoidance behavior plays a significant partial mediating role between anxiety and confidence, but its positive relationship warrants further investigation. Positive reappraisal is significantly positively correlated with confidence levels and has potential value for teaching interventions.

This finding also has practical implications. We can adopt strategies such as reducing language output threats (Jiang, 2013), implementing staged oral training, and promoting group collaboration in foreign language classrooms to alleviate anxiety. Teachers can guide students in transforming “avoidance” strategies into

planned buffering strategies and systematically teach positive reappraisal techniques to enhance students' confidence and engagement in learning.

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Conflicts of Interest

The authors declare no conflict of interest.

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Appendix Questionnaire

Basic Information

Grade:

Major:

Major Category: ☐ Science and Engineering (e.g., Engineering, Science, Medicine) ☐ Humanities and Social Sciences (e.g., Foreign Languages, Education, Literature)

Foreign languages studied: ☐ Foreign languages ☐ French ☐ Japanese ☐ Spanish ☐ Other

Foreign Language Anxiety Scale (FLCAS Simplified Version, Likert 5-point scale)

1. Even when I am well prepared for foreign language classes, I still feel anxious.
2. When I have to speak a foreign language without preparation, I start to panic.
3. I always feel that my classmates are better at speaking foreign languages than I am.

4. Whenever the teacher asks me to speak, I feel my heart racing.
5. Answering questions voluntarily in foreign language classes makes me feel embarrassed.
6. When speaking a foreign language in class, I feel tense and confused.
7. I am not very concerned about making mistakes in foreign language classes.
8. I feel confident when speaking in foreign language classes.

Emotional Regulation Questionnaire (ERQ-Short Form)

9. I try to reframe the difficulties of foreign language learning in a positive way (cognitive reappraisal).
10. If I feel anxious, I tend to suppress my emotions and not express them (emotional suppression).
11. I often avoid foreign language tasks and postpone studying.
12. I intentionally diverted my attention to avoid thinking about study tasks (e.g., watching videos/playing games).
13. After encountering foreign language setbacks, I seek someone to talk to or ask for help.

Open-ended questions (optional)

1. Please briefly describe an experience where your emotions fluctuated significantly during foreign language learning (e.g., anxiety, confidence, breakdown, joy, etc.).
2. Do you think your major has an impact on your foreign language learning? In what ways?

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