



OPEN ACCESS

EDITED BY

Guillermo M. Chans,
Monterrey Institute of Technology and Higher
Education (ITESM), Mexico

REVIEWED BY

Amal Zakaria Hal,
Port Said University, Egypt
Pengpeng Cai,
Trinity College Dublin, Ireland

*CORRESPONDENCE

Yan Zhou
✉ bettyzhouyan@aliyun.com

RECEIVED 23 July 2025

ACCEPTED 24 October 2025

PUBLISHED 13 November 2025

CITATION

Zhou Y (2025) The relationship between
strategic approaches and academic
procrastination in English learning among
Chinese college students: the mediating
effect of neuroticism.
Front. Educ. 10:1670701.
doi: 10.3389/feduc.2025.1670701

COPYRIGHT

© 2025 Zhou. This is an open-access article
distributed under the terms of the [Creative
Commons Attribution License \(CC BY\)](#). The
use, distribution or reproduction in other
forums is permitted, provided the original
author(s) and the copyright owner(s) are
credited and that the original publication in
this journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

The relationship between strategic approaches and academic procrastination in English learning among Chinese college students: the mediating effect of neuroticism

Yan Zhou*

School of Foreign Studies, University of Science and Technology Liaoning, Anshan, China

Drawing on the perspectives of planned behavior theory and the triple A theory, this study aims to investigate the association between college students' strategic approaches and academic procrastination in English learning, as well as the mediating effect of neuroticism. A total of 1,169 college students completed surveys including the Approaches and Study Skills Inventory for Students, NEO Five-Factor Inventory, and Aitken's Procrastination Inventory. The findings revealed a significant inverse correlation between strategic approaches and both neuroticism and academic procrastination in English learning. Additionally, neuroticism exhibited a significant positive correlation with academic procrastination. Further analysis confirmed that neuroticism significantly mediated the association between strategic approaches and English learning procrastination, accounting for 12.25% of the total effect. The findings suggest that neuroticism operates as a plausible, though not definitive, mechanism linking strategic learning behaviors to procrastination.

KEYWORDS

college students, strategic approaches, academic procrastination, neuroticism, mediating effect

1 Introduction

Academic procrastination—defined as the avoidant delay of learning tasks despite anticipated negative outcomes (Cheng et al., 2010; Howell et al., 2006; Turner and Hodis, 2023)—affects over half of college students globally (Ebadi and Shakoorzadeh, 2015; Ferreira et al., 2025; Wei, 2023), heightening emotional distress (Krause and Freund, 2014; Rabin et al., 2011) and impairing mental wellbeing (Li et al., 2019). In Chinese universities, where College English is a mandatory course, this issue is particularly critical: 34.3% of students procrastinate in online English learning (Shi and Su, 2016), yet the psychological mechanisms driving this phenomenon remain underexplored. While prior research identifies general predictors of procrastination, the unique role of neuroticism as a mediator between strategic approaches and English-specific procrastination constitutes a significant gap. The aim is to provide theoretical support and empirical evidence

for university education management departments in developing effective intervention programs targeting academic procrastination in English learning, thus fostering an optimal climate for successful language acquisition.

1.1 The relationship between strategic approaches and academic procrastination

Strategic approaches refer to the cognitive processes or behavioral strategies consciously adopted by learners to effectively process and manage information, thereby enhancing knowledge acquisition and skill utilization (Cohen, 1998). Entwistle developed the Approaches and Study Skills Inventory for Students questionnaire (ASSIST), which encompasses three subscales: deep, surface, and strategic approaches employed by students (Entwistle, 1997). The deep approach emphasizes intrinsic motivation and meaning-making, where learners critically engage with material to understand underlying principles (e.g., connecting concepts to real-world contexts). The surface approach reflects extrinsic motivation and passive reproduction, characterized by rote memorization of isolated facts without integrative understanding (e.g., cramming for exams without conceptual synthesis). In contrast, the strategic approach centers on achievement motivation and organized self-regulation, where students systematically optimize learning through goal-aligned planning, time management, and assessment monitoring. This study focuses specifically on the strategic approach given its theorized capacity to mitigate procrastination through structured behavioral control.

Each factor is elucidated by two dimensions: motivation and strategy. Within ASSIST, achievement motivation serves as the driving force behind strategic approaches, enabling learners to meet learning requirements more effectively through organizational learning and management practices. According to planned behavior theory, behavioral intention directly determines behavior (Ajzen, 1991). In the context of learning, stronger achievement motivation toward a specific behavior leads to a higher intention of performing that behavior. Therefore, students employing strategic approaches, characterized by strong achievement motivation and organized self-regulation, are theorized to form stronger intentions to engage in English learning tasks, thereby directly reducing procrastination. This provides the foundational logic for the direct path in our proposed model: Strategic Approaches → Academic Procrastination.

The Chinese college English learning context presents a particularly salient backdrop for investigating the interplay between strategic approaches, neuroticism, and procrastination. Despite significant nationwide reforms in Chinese college English education—including the 2017 National College English Teaching Reform Guidelines shifting focus from standardized testing to communicative competence, widespread adoption of blended learning models combining online modules with interactive classrooms, and the implementation of outcome-based education (OBE) frameworks prioritizing real-world application—persistent exam-oriented practices continue to shape learning behaviors. This inertia stems from three systemic constraints: (1) High-Stakes Standardized Tests: High-stakes standardized tests (notably the

CET-4/6 proficiency exams) remain graduation and employment prerequisites, with 78% of employers requiring CET certificates according to Ministry of Education data. (2) Resource Disparities: Resource disparities hinder reform implementation, particularly in rural institutions where faculty training gaps leave 62% of teachers unprepared for communicative pedagogy. (3) Cultural Emphasis on Measurable Achievement. This unique educational ecology, characterized by a tension between communicative reform goals and deep-seated exam-centric pressures, creates a learning environment where students' strategic approaches are predominantly geared toward test performance rather than holistic language proficiency. This often leads to superficial engagement, increased academic pressure, and a higher susceptibility to negative emotions like anxiety when learning outcomes are perceived as high-stakes yet instrumentally narrow (Ghattas and El-Ashry, 2024). Consequently, this exam-oriented climate fosters assessment-driven learning behaviors that heighten disengagement and procrastination (Miao and Cui, 2019). Therefore, examining the psychological mechanism through which strategic approaches relate to procrastination—specifically the mediating role of neuroticism—within this distinctive context provides a critical contribution to the field, offering insights that are essential for developing culturally and pedagogically relevant interventions in Chinese higher education.

Therefore, this study proposes research hypothesis 1: College students' strategic approaches have a negative predictive effect on academic procrastination in English learning.

1.2 The mediating effect of neuroticism

Personality is one of the influential factors in determining strategic approaches. As a sub-dimension within the Big Five personality model, neuroticism reflects an individual's inclination to experience negative emotions. Research has consistently found a significant negative correlation between the adoption of strategic approaches and neuroticism among college students (Liu, 2011). The utilization of strategic approaches appears to be closely intertwined with learners' emotional states (Emara et al., 2025).

Individuals exhibiting high levels of neuroticism tend to grapple with psychological distress, unrealistic expectations, excessive demands, and maladaptive coping responses. Consequently, their negative emotions, such as anxiety and depression, directly impede the implementation of effective strategies. This emotional burden can lead to a lack of motivation and organizational skills necessary for strategic learning, thereby reducing the likelihood of adopting and maintaining strategic approaches in academic settings.

Personality also plays a pivotal role in procrastination tendencies (Steel, 2007). Folkman's triple A theory provides insights into understanding individual procrastination patterns. When faced with a task, individuals initially evaluate its potential threat toward various aspects of their self-concept or achievements; they assess whether they possess adequate capabilities to successfully complete it. If perceived as threatening, this evaluation triggers negative emotions like anxiety. In order to alleviate these adverse feelings, individuals resort to avoidance behaviors and engage in relatively easier tasks such as entertainment or games—thus

leading to procrastination tendencies. Relevant studies have further demonstrated that negative emotions like anxiety significantly predict academic procrastination (Azure, 2011; Liu, 2014). The reason why individuals with a high level of neuroticism tend to experience more negative emotions is due to the strong positive correlation between neuroticism and academic procrastination, indicating that individuals with a high level of neuroticism are prone to engage in higher levels of academic procrastination (Brekci, 2022).

While the Theory of Planned Behavior explains the direct motivational pathway from intention to action, it does not fully account for the emotional barriers that can disrupt this intention-behavior link. This is where the Triple-A theory (Folkman) provides a crucial complementary mechanism. The Triple-A theory's temporal logic (threat appraisal → negative emotion → avoidance) delineates the emotional process that can lead to procrastination. We propose that neuroticism, as a trait predisposition to experience negative emotions, amplifies this process. Individuals high in neuroticism are more likely to appraise academic tasks as threatening, which triggers negative emotions like anxiety. To alleviate these emotions, they engage in avoidance behaviors, leading to procrastination. Thus, strategic approaches may not only strengthen behavioral intention (per TPB) but also help mitigate the threat appraisal and subsequent negative emotional response (per Triple-A theory) by providing a sense of control and structure. This explains the indirect path in our model: Strategic Approaches → (Lower) Neuroticism → (Reduced) Academic Procrastination.

In summary, the two theories offer complementary explanations: the TPB outlines the cognitive-motivational pathway (intention-driven action), while the Triple-A theory elucidates the emotional-affective pathway (threat-driven avoidance). Neuroticism serves as the critical bridge, representing the emotional vulnerability that disrupts the intention-behavior link. Our integrated model posits that strategic approaches help reduce procrastination both by strengthening the intention to act (TPB) and by dampening the negative emotional reactivity (Triple-A theory) that leads to avoidance. Given the significant relationships between strategic approaches, neuroticism, and academic procrastination in English learning, this study proposes research hypothesis 2: Neuroticism plays a mediating role in the relationship between strategic approaches and academic procrastination in English learning among college students. This hypothesis suggests that the negative correlation between strategic approaches and academic procrastination may be partially or fully explained by the presence of neuroticism. Specifically, higher levels of strategic approaches may reduce neuroticism, which in turn may decrease academic procrastination in English learning.

2 Materials and methods

2.1 Participants

Cluster random sampling was employed across three public universities in Liaoning Province, including two comprehensive universities and one polytechnic university, to ensure a diverse range of disciplines and academic fields were represented. Informed

consent was obtained from all participants in accordance with the Declaration of Helsinki. The college served as the primary unit for data collection, with instructors distributing the questionnaire link (via Questionnaire Star) within each class group for online completion. A total of 1,241 questionnaires were collected, and after excluding 72 invalid responses, the final sample size consisted of 1,169 valid responses, yielding an effective rate of 94.20%. The sample included 657 males (56.2%) and 511 females (43.7%), with 463 students (39.6%) holding urban residency and 706 students (60.4%) having rural hukou status. The age of participants ranged from 17 to 23 years old, with an average age of 19.88 years and a standard deviation of 1.26.

2.2 Measures

2.2.1 Approaches and Study Skills Inventory for Students

In this study, the Approaches and Study Skills Inventory for Students (ASSIST) developed by Entwistle was utilized (Entwistle, 1997). This inventory comprises three subscales: deep, surface, and strategic approaches, with each subscale consisting of 10 items. A 5-point Likert scale was employed, ranging from 1 (completely disagree) to 5 (completely agree). Specifically, the strategic approaches subscale encompasses organized studying, time management, alertness to assessment demands, and monitoring effectiveness. The internal consistency reliability coefficient for the strategic approaches subscale in this study was 0.754.

2.2.2 The NEO Five-Factor Inventory

In this study, the NEO Five-Factor Inventory (NEO-FFI), a shortened version of the Big Five Personality Inventory questionnaire developed by McCrae and Costa (1991), was employed. The NEO-FFI comprises five subscales that measure neuroticism, extroversion, openness, agreeableness, and conscientiousness traits, respectively. Each subscale contains 12 items rated on a 5-point scale, with higher scores indicating higher levels of the corresponding personality traits. Specifically, this study focused on the neuroticism subscale, which demonstrated an internal consistency coefficient of 0.817.

2.2.3 Aitken's Procrastination Inventory

Aitken's Procrastination Inventory (Aitken, 1982), which has been revised into Chinese version by Chen et al. (2008), was adopted as an evaluation tool for academic procrastination among college students (Zheng and Xu, 2022). We contextualized it for English learning through three modifications: First, instructional prompts explicitly directed respondents to reference "English-specific tasks (e.g., vocabulary review, essay writing, listening practice)." Second, four items were scenario-anchored to language learning contexts (e.g., "I postpone practicing English speaking despite knowing it's crucial for my studies" replacing generic "I delay important course work"). This inventory consists of a total of nineteen items with nine reverse-scored ones, and employs a 5-point Likert rating method ranging from "completely disagree" to "completely agree." Higher scores indicate more severe academic procrastination tendencies. The internal consistency reliability coefficient for this inventory in our study is reported as 0.842.

2.3 Process

Data collection was conducted during March 2023 (weeks 3–6 of the spring semester) to avoid examination periods that could artificially inflate procrastination behaviors. Participants accessed the survey via Questionnaire Star.¹ Invalid questionnaires were excluded based on two criteria: (1) questionnaires with 20% missing data ($n = 41$); and (2) straight-line responding ($n = 31$).

2.4 Statistical method

The statistical software SPSS 24.0 was utilized to conduct correlation analysis, reliability analysis, and exploratory factor analysis. Additionally, the structural equation model was constructed using Mplus 8.1.

3 Results

3.1 Common method bias test

To mitigate common method biases in the analysis of self-rated questionnaires, all participants completed the questionnaires anonymously to enhance the authenticity of their responses. Harman's single factor test method was employed to conduct exploratory factor analysis on the 51 items across four scales. The analysis resulted in the extraction of eight factors with eigenvalues greater than one ($KMO = 0.912$, $\chi^2 = 11343.314$, $df = 820$, $p < 0.001$). The first factor accounted for only 19.07% of the variance, which is less than the criterion threshold of 40%. This indicates that there is no evidence of common method bias in this study.

3.2 Correlation analysis among variables

The findings revealed a significant negative correlation between strategic approaches and the other two variables, namely neuroticism and academic procrastination in English learning. Additionally, there was a noteworthy positive correlation between neuroticism and academic procrastination in English learning. The detailed results are presented in Table 1.

3.3 Mediation effect analysis

To examine the relationships between strategic approaches, neuroticism, and academic procrastination in English learning, these variables were treated as latent variables, necessitating the use of a structural equation model (SEM). The bias-corrected non-parametric percentile bootstrap estimation method was employed for testing purposes, with all variables standardized.

The total effect model was established to test the significance of the total effect coefficient. The results indicated a significant

total effect coefficient of -0.651 ($p < 0.001$), suggesting a strong negative relationship between strategic approaches and academic procrastination in English learning. Additionally, the goodness-of-fit indicators were satisfactory (see Table 2).

The significance of individual path coefficients was examined. A mediation model was constructed with strategic approaches as the independent variable, academic procrastination in English learning as the dependent variable, and neuroticism as the mediating variable (see Figure 1). The structural equation modeling analysis demonstrated good fit indices (see Table 2), indicating that our model adheres to standard practices. Consequently, it can be concluded that neuroticism plays a mediating role in influencing academic procrastination in English learning through strategic approaches.

Additionally, we estimated 95% confidence intervals for path coefficients by conducting 1,000 repetitions of sampling. The results revealed one significant indirect effect within the mediating process: the standardized indirect effect generated by the pathway from strategic approaches to academic procrastination in English learning had a confidence interval of $(-0.317, -0.121)$, which did not include zero. This confirms its statistical significance at the $p < 0.05$ level. The magnitude of this mediating effect was 0.080, accounting for approximately 12.25% of the total effect.

These results indicate that neuroticism significantly mediates the relationship between strategic approaches and academic procrastination in English learning among college students. This mediation model provides valuable insights into the underlying psychological mechanisms that influence academic procrastination, highlighting the importance of addressing neuroticism in interventions aimed at reducing procrastination behaviors in English learning.

4 Discussion

4.1 The relationship between strategic approaches and academic procrastination behavior in English learning

The present study investigated the association between strategic approaches and academic procrastination in English language acquisition among college students. The findings indicate that strategic approaches significantly and negatively predict academic procrastination in English learning. This relationship can be understood through the lens of planned behavior theory (Ajzen, 1991), which posits that behavioral intention plays a crucial role in determining one's actions. Academic procrastination essentially involves individuals avoiding the implementation of their learning intentions, resulting in a discrepancy between intention and behavior, ultimately leading to delayed learning activities or incomplete tasks.

Behavioral intention refers to motivational factors influencing behavior, while achievement motivation serves as the driving force behind strategic approaches (Entwistle, 1997). Different levels of achievement motivation can lead to distinct behavioral and emotional processes, subsequently impacting learners' overall learning outcomes. Achievement motivation enables learners to

¹ www.wjx.cn

TABLE 1 Descriptive statistics and correlation matrix for each variable (N = 1,169).

Variable	M	SD	1	2	3
1 Strategic	3.203	0.563	1		
2 Neuroticism	3.056	0.669	−0.177**	1	
3 English academic procrastination	2.581	0.548	−0.473**	0.314**	1

***p* < 0.01.

TABLE 2 Total effect model and mediating model fit indices.

Model	χ^2	df	CFI	TLI	SRMR	RMSEA
Total effect model	80.303	13	0.966	0.944	0.033	0.067
Mediating model	234.482	32	0.934	0.908	0.048	0.074

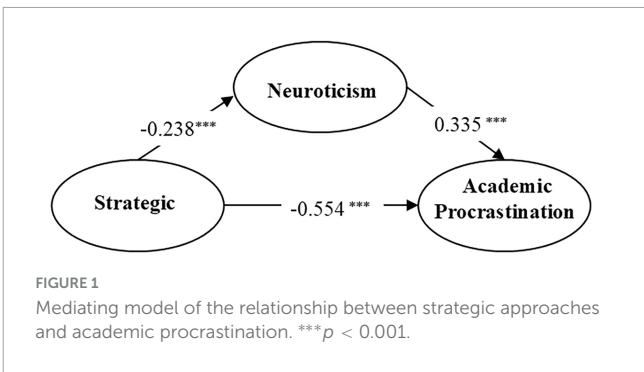
immerse themselves in the learning process and exhibit high levels of engagement (Lu and Chen, 2017). Zhou and Gao discovered that long-term instrumental needs are the primary driving force behind college students' English language acquisition (Zhou and Gao, 2009). However, due to the limited utilization of English among most college graduates in their future careers, many lack motivation when it comes to learning English. This results in a lack of interest and enthusiasm for English language learning, ultimately leading to procrastination.

Planned behavior theory provides an explanation and prediction of learning behavior by examining the relationship between intention and actual behavior, which aligns with the core essence of academic procrastination in English language acquisition. The findings of this study underscore the importance of fostering achievement motivation and strategic approaches in English learning to mitigate procrastination behaviors. By enhancing students' motivation and organizational skills, educational interventions can potentially reduce procrastination and improve learning outcomes in English language acquisition.

4.2 The mediating effect of neuroticism

The present study revealed that neuroticism serves as a mediating factor in the association between strategic approaches and academic procrastination in English language acquisition. Neuroticism is indicative of an individual's emotional stability. During the process of engaging in English learning activities, college students often struggle to complete essential learning tasks within designated timeframes due to their lack of intrinsic motivation, ineffective strategies, and methods, consequently leading to negative emotions such as anxiety and diminished cognitive, behavioral, and emotional investment. Conversely, if college students can establish clear learning objectives prior to engaging in English language acquisition and employ effective strategic approaches throughout the learning process, they will be more inclined to dedicate themselves fully to English learning while experiencing positive emotions.

Previous studies have confirmed a strong positive correlation between neuroticism and academic procrastination, indicating that individuals with high levels of neuroticism tend to engage in more academic procrastination (Miao and Cui, 2019). Certain sub-dimensions of neuroticism, such as depression, may contribute to excessive emotional attachment and hinder



individuals from allocating sufficient time and energy toward task completion, consequently leading to academic procrastination. As a manifestation of self-regulation, academic procrastination is defined as the discrepancy between intended behavior and actual behavior among procrastinators, resulting in negative emotions (Zhang et al., 2010). In other words, learners are aware of what they should do but fail to implement the necessary actions according to established guidelines for completing learning tasks; this failure subsequently leads to emotional distress.

Faced with pressure related to English language acquisition, individuals who adopt an emotional coping strategy often avoid problem-solving altogether. Instead of directly addressing the stressor through relevant activities or efforts in English learning tasks themselves, they tend to substitute these tasks with online games or short videos for entertainment purposes only. When individuals become immersed in self-blame and isolation while passively waiting for problems to resolve on their own accord without taking proactive measures themselves, this ultimately contributes to academic procrastination.

It is important to note that the mediating effect of neuroticism, while statistically significant, accounted for 12.25% of the total effect, indicating a partial and relatively modest mechanism. This suggests that while emotional stability (the inverse of neuroticism) is one pathway through which strategic approaches reduce procrastination, other substantive mechanisms are likely at play. The direct effect of strategic approaches on reducing procrastination remained strong, underscoring the primary importance of organized planning and self-regulation. This aligns with the core premise of the Theory of Planned Behavior, where

behavioral intention (fostered by strategic approaches) is a powerful direct predictor of behavior.

The modest size of the mediation effect invites consideration of other potential mediators that may operate alongside or interact with neuroticism. For instance, self-efficacy—an individual's belief in their capability to execute learning tasks—could be a potent mediator. Strategic approaches may bolster self-efficacy through successful task completion, which in turn reduces avoidance behaviors. Similarly, self-control, or the capacity to override impulses, might explain a significant portion of the variance, as strategic planning conserves cognitive resources needed for impulse regulation. Furthermore, intrinsic motivation could serve as a mediator; strategic approaches might help students find value and enjoyment in English learning, thereby reducing the need for procrastination as a coping mechanism for disinterest. Future research should therefore adopt a multi-mediator framework to disentangle the unique and shared contributions of neuroticism, self-efficacy (Grogan and Wipawayangkool, 2025), self-control, and motivation. This would provide a more comprehensive understanding of the psychological architecture linking learning strategies to procrastination, clarifying whether neuroticism is one of several parallel pathways or a minor contributor within a more complex network.

In summary, the findings highlight the critical role of neuroticism in mediating the relationship between strategic approaches and academic procrastination in English language acquisition. Addressing neuroticism through targeted interventions that enhance emotional regulation and strategic learning approaches can potentially reduce academic procrastination and improve learning outcomes. Future research should explore additional mediating factors and develop comprehensive intervention programs to support students in overcoming procrastination and fostering effective learning behaviors.

4.3 Limitations and prospects

The cross-sectional design fundamentally limits causal inferences regarding the mediation model. Furthermore, the overrepresentation of STEM students (89% of the sample) may limit the generalizability of the findings to students from arts or humanities backgrounds, who may exhibit different motivational and emotional profiles in language learning. The exclusive reliance on self-reported measures also introduces the possibility of common method variance, despite our statistical checks. Future research should employ longitudinal designs, incorporate behavioral data (e.g., from learning management systems), and ensure more balanced disciplinary sampling to validate and extend these findings.

4.4 Educational implications and intervention strategies

The findings of this study offer clear pathways for designing targeted interventions to mitigate academic procrastination in English learning. Moving

beyond theoretical explanation, we propose several concrete strategies for university educators and student support services.

First, curriculum designers and instructors should integrate explicit training in strategic learning approaches directly into English courses. This could take the form of short, modular workshops embedded within the syllabus, focusing on goal-setting, time management, and self-monitoring techniques specific to language acquisition tasks (e.g., breaking down a reading assignment into manageable steps, using digital planners for vocabulary review). By equipping students with these organizational skills, universities can strengthen the direct pathway identified by the Theory of Planned Behavior, fostering stronger intentions and reducing the likelihood of procrastination.

Second, given the mediating role of neuroticism, student counseling centers and English departments should collaborate to offer emotional regulation training tailored to the anxieties of language learning. Interventions could include cognitive-behavioral therapy (CBT) elements delivered in group workshops, focusing on challenging negative appraisals of English tasks (e.g., fear of making mistakes in speaking) and developing healthier coping mechanisms. For instance, mindfulness-based stress reduction (MBSR) techniques have shown promise in reducing the negative emotional reactivity associated with neuroticism, thereby potentially weakening the avoidance pathway outlined by the Triple-A theory.

Third, interventions must be context-sensitive. Our findings suggest that a one-size-fits-all approach may be insufficient. For STEM students, who often view English instrumentally, interventions could link language tasks directly to their career aspirations (e.g., practicing writing scientific abstracts or understanding technical manuals). In contrast, for arts and humanities students, interventions might leverage their intrinsic interest in culture and narrative by incorporating project-based learning involving film analysis or literary translation. Such discipline-specific strategies can enhance the perceived value and relevance of English learning, thereby increasing engagement and reducing procrastination at its root.

In summary, a multi-pronged intervention strategy—combining skill-based training in strategic learning, emotion-focused support for managing neuroticism, and discipline-tailored pedagogical practices—holds the greatest promise for addressing academic procrastination in English learning. Universities are encouraged to pilot and evaluate such integrated programs to foster more effective and psychologically sustainable language acquisition environments.

5 Conclusion

The study concludes that strategic approaches can directly and negatively predict academic procrastination in English learning among college students. Additionally, neuroticism plays a mediating role in the relationship between strategic approaches and academic procrastination in English learning among college students.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by the Research Ethics Committee of the University of Science and Technology Liaoning (China). The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

YZ: Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Writing – original draft, Writing – review & editing.

Funding

The author(s) declare that no financial support was received for the research and/or publication of this article.

References

- Aitken, M. E. (1982). *A personality profile of the college student procrastinator. Doctoral dissertation*. Ann Arbor: University of Pittsburgh.
- Ajzen, I. (1991). The theory of planned behavior. *Organ. Behav. Hum. Decis. Processes* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T
- Azure, J. A. (2011). Correlates of course anxiety and academic procrastination in higher education. *Global J. Educ. Res.* 10, 55–65. doi: 10.4314/GJEDR.V10I1
- Brekci, C. (2022). Investigating high school students' personality traits and academic procrastination with cluster analysis. *Eur. J. Psychol. Educ. Res.* 15, 63–76. doi: 10.12973/ejper.5.1.63
- Chen, X. L., Dai, X. Y., and Dong, Q. (2008). A research of aitken procrastination inventory applied to Chinese college students. *Chinese J. Clin. Psychol.* 16, 22–23.
- Cheng, S. P., Li, M., and Zhang, W. (2010). A survey on undergraduates' procrastination behavior and its relationship with meta-cognitive and emotion. *Chinese J. Clin. Psychol.* 18, 238–240.
- Cohen, A. (1998). *Strategies in Learning and using a second language*. London: Longman.
- Ebadi, S., and Shakoordadeh, R. (2015). Investigation of academic procrastination prevalence and its relationship with academic self-regulation and achievement motivation among high-school students in Tehran city. *Int. Educ. Stud.* 8, 193–199. doi: 10.5539/ies.v8n10p193
- Emara, M., Schwab, S., Alnahdi, G., and Gerdenitsch, C. (2025). The relationship between students' personality traits, attention state, and use of regulatory strategies during emergent distance learning. *BMC Psychol.* 13:118. doi: 10.1186/s40359-025-02451-3
- Entwistle, N. J. (1997). *The approaches and study skills inventory for students (ASSIST)*. Edinburgh: University of Edinburgh Centre for Research on Learning and Instruction.
- Ferreira, A., Caetano, S., Xavier, S., Marques, M., Martins, J., António, Q., et al. (2025). Stop procrastination: acceptability and feasibility of a new acceptance and compassion-based intervention in higher education. *Curr. Psychol.* 44, 1560–1563. doi: 10.1007/s12144-024-07270-0
- Ghattas, A. H. S., and El-Ashry, A. M. (2024). Perceived academic anxiety and procrastination among emergency nursing students: The mediating role of cognitive emotion regulation. *BMC Nursing* 23:670. doi: 10.1186/s12912-024-02302-3
- Grogan, A., and Wipawayangkool, K. (2025). Not now, maybe later: The mediating influence of techno-overload on the relationship between academic self-efficacy and procrastination. *J. Comput. High. Educ.* 37, 1285–1305. doi: 10.1007/s12528-024-09423-3
- Howell, A. J., Watson, D. C., Powell, R. A., and Buro, K. (2006). Academic procrastination: The pattern and correlates of behavioural postponement. *Pers. Individ. Dif.* 40, 1519–1530. doi: 10.1016/j.paid.2005.11.023
- Krause, K., and Freund, A. M. (2014). Delay or procrastination: A comparison of self-report and behavioral measures of procrastination and their impact on affective well-being. *Pers. Individ. Dif.* 63, 75–80. doi: 10.1016/j.paid.2014.01.050
- Li, H. X., Zhang, J. J., Zhao, X., Si, J. W., and Huang, B. J. (2019). Relationships among epistemological beliefs, self-regulated learning and academic procrastination in college students: A moderated mediation model. *Psychol. Dev. Educ.* 35, 557–565.
- Liu, H. (2014). *Research on correlations of postgraduates' academic procrastination with academic anxiety and copying styles*. Master dissertation. Lanzhou: Lanzhou University.
- Liu, N. N. (2011). A study on the relationship between college students' Big Five personalities and learning strategies. *J. Luohe Vocat. Technol. Coll.* 10, 108–109. doi: 10.1051/shsconf/202522203025
- Lu, Z. Y., and Chen, J. W. (2017). The relationship between college students' critical thinking disposition and learning engagement: the mediating role of achievement goal orientation and academic self-efficacy. *J. High. Educ.* 38, 69–77.
- McCrae, R. R., and Costa, P. T. (1991). Adding liebe und arbeit: The full five-factor model and well-being. *Pers. Soc. Psychol. Bull.* 17, 227–232. doi: 10.1177/014616729101700217
- Miao, J., and Cui, Z. (2019). An empirical study on the determinants of non-english majors' procrastination in english learning. *J. Beijing Int. Stud. Univer.* 41, 15–18.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The authors declare that no Generative AI was used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

- Rabin, L. A., Fogel, J., and Nutter-Upham, K. E. (2011). Academic procrastination in college students: The role of self-reported executive function. *J. Clin. Exp. Neuropsychol.* 33, 344–357. doi: 10.1080/13803395.2010.518597
- Shi, L. H., and Su, S. J. (2016). A study on the influencing factors of college students' English online learning procrastination. *J. Xian Int. Stud. Univer.* 24, 76–80. doi: 10.1142/S0129156424400457
- Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychol. Bull.* 133, 65–94. doi: 10.1037/0033-2909.133.1.65
- Turner, M., and Hodis, F. A. (2023). A systematic review of interventions to reduce academic procrastination and implications for instructor-based classroom interventions. *Educ. Psychol. Rev.* 35:39. doi: 10.1007/s10648-023-09838-x
- Wei, Z. F. (2023). Effect of self-control on academic procrastination in college students: The chain mediating role of mobile phone addiction and learning engagement. *Chinese J. Clin. Psychol.* 31, 1248–1252.
- Zhang, C. H., Si, J. W., and Zhang, B. C. (2010). Review of research on influencing factors of learning procrastination. *J. Shandong Univer. Technol. Soc. Sci. Ed.* 1, 4–7.
- Zheng, Y. L., and Xu, Y. (2022). The effect of mindfulness on academic procrastination of college students in online learning environments: Resilience and self-control as chain mediator. *J. Psychol. Sci.* 45, 1450–1457.
- Zhou, Y., and Gao, Y. H. (2009). The development of English learning motivation in the basic stage of college: A follow-up study of five universities. *For. Lang. Teach. Res.* 41, 113–118.