# Understanding Anxiety, Self-Efficacy, and Motivation in Online English Learning
**\* \* \* On the Internet \* \* \***

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## Abstract

The present study, based on a cross-lagged panel design, was to examine the directionality of the relationships between anxiety, self-efficacy, and motivation in the context of online English learning. A total of 420 university students in China completed self-efficacy belief, motivation, and anxiety measures twice, eight months apart. The findings suggest that self-efficacy belief mediates the relationship between motivation and anxiety in online English learning, whereas anxiety mediates the relationship between self-efficacy belief and students' motivation. The mediation models based on two times of data collection achieved a satisfactory fit. However, the second model demonstrated a better model fit, highlighting the importance of anxiety in the relationship between motivation and self-efficacy beliefs. Understanding the causes and effects of anxiety for students may lead to training and resource development that are important to maintaining students' self-efficacy belief and motivation in online English learning.

*Keywords*: Self-efficacy, anxiety, motivation, online English learning

Online learning, which refers to the process of acquiring knowledge and skills through digital platforms, brings forth a range of challenges, particularly in the areas of self-efficacy belief, anxiety, and motivation. Students engaging in online learning, particularly in English learning, may face difficulties in developing a strong sense of self-efficacy as they navigate unfamiliar technological tools and adapt to a more independent learning environment, for which target language input is insufficient. Additionally, the absence of face-to-face interactions in virtual classrooms can contribute to heightened levels of anxiety in using English. Furthermore, maintaining motivation in the absence of physical classroom structures and direct teacher-student interactions for learning English can pose a challenge. This highlights a need to recognize and address these challenges, for which educators and institutions can implement strategies and provide support systems that help students build self-efficacy, manage anxiety, and enhance motivation, ultimately fostering a more effective and rewarding online English learning experience.

During the process of learning a foreign language, learners often encounter a diverse array of emotions, with anxiety being a prominent one (Zhu & Aslan, 2023). Anxiety can be partially independent of an individual's actual abilities. Even individuals who perceive themselves as highly competent in a specific task may lack confidence in their ability to complete that task when experiencing anxiety and depression. In other words, when anxiety levels are high, self-efficacy tends to be low, greatly reducing the likelihood of successful task completion. The nature of online English learning underscores the importance of anxiety in the relationship between self-efficacy and motivation, contributing to previous empirical research that explores the impact of perceived self-efficacy on depression and anxiety (Muris, 2002). University students, particularly in the online English environment, are prone to experiencing affective disorders, with feelings of isolation and disconnection being common (Huang, 2019). Therefore, studying the role of anxiety in self-efficacy and motivation among undergraduate students in learning English as a foreign language context becomes essential.

Self-efficacy belief, grounded in social cognitive theory, is an individual's belief in their ability to execute behaviors that are essential to specific performance attainment (Bandura, 1997). Anxiety, which is "a distinct complex of self-perceptions, beliefs, feelings and behaviors" (Horwitz et al., 1986, p. 128), may evoke low self-efficacy. Motivation in online learning is the extent to which students actively engage by thinking, talking, and interacting with the content of an online course, the other students, and the instructor during the online course (Dixson, 2015). Anxiety may affect student motivation, which is a critical element in sustaining students' efforts with the online course (Saadé & Kira, 2007). Building upon prior research that has explored the relationship between English use anxiety, motivation, self-efficacy, and their impact on the English achievements of top university students (Wu et al., 2022), this study aims to investigate the causal associations between anxiety, self-efficacy, and motivation within an online English learning context using a cross-lagged panel design.

In the present research design, correlations of dependent and predictor variables at time 2 serve as replications of time 1 associations. Of more importance, conclusions about the causal relationships among the variables can be determined by comparing the correlation coefficients representing self-efficacy at time 1 with variables at time 2 (cross-lagged model 1) versus anxiety at time 1 with variables at time 2 (cross-lagged model 2). Assuming that causal variables precede effect variables, hypotheses regarding the mediating role of anxiety on the relationships between self-efficacy and variables at time 2 are supported if cross-lagged correlation model 2 is significantly greater than model 1. The study may be the first attempt to understand university students' psychological well-being and preparedness for online English learning.

## Literature Review

### Anxiety

During the transition from a face-to-face to an online learning environment, it is common for students to experience anxiety regarding their ability to succeed in what may be an unfamiliar learning setting (Abdous, 2019). Exploring anxiety is critical as it affects students' learning, performance, motivation, and outcomes (Saadé & Kira, 2007). Learners who experience anxiety may be resistant to learning and motivation. Anxiety exemplifies a situation-specific, subjective feeling of unease, such as tension, apprehension, nervousness, worry, or fear that can be mild or severe. In some situations, anxiety prevents some people from performing successfully in online learning (i.e., when experiencing life during a pandemic). Anxiety is thus "a distinct complex of

self-perceptions, beliefs, feelings and behaviors" (Horwitz et al., 1986, p.128) that lead to nervousness and apprehension in performing specific actions.

The present study conceptualises anxiety as individuals' perceived "disorders" or obstacles in being competent and confident in adopting positive actions under the online learning context. In particular, the definition of anxiety concerns communication apprehension and performance evaluation within the online learning context. Due to the challenges of interpersonal interactions during online learning, communication apprehension is quite relevant to the conceptualisation of anxiety. Communication apprehension is a type of shyness characterized by fear of or anxiety about communicating with people in online learning. Performance evaluation is an ongoing feature of online learning. Anxiety thus also refers to a type of performance anxiety stemming from a fear of failure.

In an empirical study of measuring computer self-efficacy and computer anxiety and their impacts on performance, Hauser et al. (2012) showed that anxiety was related to students' self-efficacy in online learning. Specifically, anxiety had an inverse influence on computer self-efficacy. The increased computer self-efficacy is associated with the quality of the computer learning experience. As argued by Shen et al. (2013), online learning without anxiety-reducing mechanisms would cause a feedback loop that could result in higher anxiety levels. It is essential to foster students with effective screening strategies and interventions to build a stronger self-efficacy belief in psychological resilience to cope with needs of online learning. In a recent article by Wang et al. (2023), the study focused on four key aspects measured through online surveys: emotional adjustment, perceived social support, self-efficacy belief, and anxiety related to online English learning. The data collected from 585 university students revealed the existence of three distinct profiles: high adaptation, moderate adaptation, and low adaptation. Among the participants, those classified under the high adaptation profile (n = 276, 47.1%) exhibited more positive self-efficacy beliefs and demonstrated lower levels of anxiety. Conversely, the students categorized as low adaptation (n = 82, 14%) displayed less positive self-efficacy beliefs and exhibited higher levels of anxiety. It was observed that students with low adaptation had lower levels of self-efficacy belief, contributing to their heightened anxiety levels. These findings emphasize the importance of paying special attention to the psychological well-being and development of vulnerable groups of learners during online English learning. Teachers and educators should be mindful of the unique challenges and needs that certain students may face, particularly those with lower levels of self-efficacy belief and higher anxiety levels.

**Self-Efficacy Belief**

Self-efficacy belief is grounded in social cognitive theory. It determines individuals' behavior change (Bandura, 1997), agency (Teng, 2019), and self-regulation (Teng, 2023). Educational psychology researchers have conceptualised self-efficacy belief as students' beliefs about their capabilities to complete a task. For example, Bandura (1986) defined *self-efficacy beliefs* as ''people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances'' (p. 391). Self-efficacy belief mainly includes two aspects, i.e., perceptions of competence and self-concept (Pintrich & Schunk, 1996). In the present study, self-efficacy belief was conceptualised as students' confidence in making some judgment that they can complete specific actions under the context of online learning. Individuals, particularly novice online learners, who believe they can employ strategies to mitigate emotional stress are more likely to sustain efforts for specific demands and dimensions of online English learning (Ma et al., 2021; Teng et al., 2021; Zembylas, 2008). A relevant example is the study conducted by Teng et al.

(2021) that explored metacognitive strategies, language learning motivation, self-efficacy belief, and English learning achievement within an online English learning environment. The results of their research indicated that self-efficacy belief plays a significant role in predicting English learning achievement. Specifically, the study found that metacognitive strategies and language learning motivation act as mediators, influencing the relationship between self-efficacy belief and English learning achievement. These findings highlight the importance of self-efficacy belief in driving successful outcomes in online language learning, with metacognitive strategies and motivation serving as key factors that mediate this relationship. Essentially, individuals who have a stronger sense of confidence may likely engage in self-care to cope with the needs of online English learning.

In a review study, Linnenbrink and Pintrich (2003) argued that self-efficacy belief is related to students' motivation and learning. They explained that self-efficacy belief can lead to more engagement and, subsequently, to more learning and better achievement, including behavioral engagement, cognitive engagement, and motivational engagement. The engagement also flows back to enhanced self-efficacy belief. Self-efficacy is essential to the underlying social-cognitive mechanisms that benefit students' psychological well-being self-efficacy and anxiety symptoms (Tahmassian & Moghadam, 2011; Wang et al., 2023). Self-efficacy is also an essential factor in guaranteeing the quality of online learning. In a study conducted by Teng and Wu (2023), the focus was on examining the relationship between learners' metacognitive strategies, language learning motivation, self-efficacy beliefs, and their perceived progress in English learning within an online learning environment. Surveys were administered to participants on two separate occasions, and the collected data underwent longitudinal mediation analysis. The findings of the study revealed four significant longitudinal mediation patterns. Overall, self-efficacy beliefs were found to predict the utilization of metacognitive strategies. In turn, the use of metacognitive strategies predicted learners' language learning motivation and their perceived progress in online English learning. These findings provided support for the mediating role of language learning motivation and metacognitive strategies in the relationship between self-efficacy beliefs and learners' progress in online English learning. The results also highlighted the crucial role of self-efficacy beliefs in shaping learners' experiences and outcomes in online English learning. A lower sense of self-efficacy can be a daunting challenge for students to adjust to online learning due to the one-way communication that lacks interactions between students and teachers (Hauser et al., 2012). With that in mind, it is essential to examine the role of self-efficacy belief on learners' motivation in online English learning.

**Motivation in Online Learning**

A basic understanding of motivation can be derived from self-determination theory (Deci & Ryan, 1985). While social cognitive theory treats motivation as a monolithic construct, self-determination theory systematically explains motivation dynamics to understand the contextual and psychological factors that optimize students' learning and engagement. According to self-determination theory, motivation includes three main categories: intrinsic motivation (doing something because it is enjoyable or pleasing), extrinsic motivation (doing something because it leads to a desired outcome), and amotivation (the state of lacking intention to act) (Ryan & Deci, 2017). Motivation in learning contains both affective and behavioral components that arouse, incite, or stimulate actions. Learning achievement depends on the ongoing effort a learner spends on the learning process to achieve learning goals (Coates, 2006). Motivation is essential to sustain online learning because online learning depends on learners' willingness to adopt agency in

learning, initiate meaningful multimodal communications, and develop conceptual understanding through active engagement with digital resources (Chiu et al., 2021). In the present study, motivation is conceptualised as the mental energy and effort students are willing to put into the online English learning process to achieve desired performance.

Learning online is becoming a norm. One common issue includes the problem of being demotivated and disengaged in online learning, as the added stress and anxiety may inhibit learners' motivation in online learning (Hartnett, 2016). Repeated moving from one online course to another can also create a sense of frustration, lack of efficiency, and even lack of motivation (Clausen et al., 2020). Previous studies were conducted to explore the relationship between motivation and students' learning outcomes. In a recent study (Hsu et al., 2019), 330 undergraduate students completed several surveys on support, motivation, perceived knowledge transfer, and perceptions of learning gains. The results indicated that the basic psychological need satisfaction enhanced self-regulated motivation, which yielded higher perceived knowledge transfer and increased online learning achievement. Such results contrast with the results of Chen and Jang's (2010) study, which proposed that meeting learners' needs for autonomy and competence in the online learning environment enhances their self-determination. However, a significant relationship between self-determined motivation and students' learning outcomes was not detected. As argued by Hsu et al. (2019), the differences could be related to whether self-determined motivation should be used as a latent variable or an observed variable. In addition, whether the explored motivation includes the various aspects of motivation could make a difference in the results. Jung and Lee (2018) argued that it is essential to take a multidimensional approach to the emotional, cognitive, and behavioral aspects of learning motivation to promote online learning outcomes. Learning motivation is not a single dimension of learning behavior but consists of multidimensional factors, such as belief, cognition, and emotion (Fredricks et al., 2004).

Xie et al. (2006) examined the following variables: students' perceived interest (intrinsic motivation), value (extrinsic motivation), choice (perceived autonomy), course engagement (the numbers of login and discussion board postings), and attitudes toward the class. The three variables, i.e., intrinsic motivation, extrinsic motivation, and perceived autonomy, were positively correlated with the learners' attitude toward and engagement in the online learning course. Pellas (2014) explored how personal factors (e.g., self-efficacy belief, self-regulated capacity, and self-esteem) affected 305 students' motivation in an online learning course. Pellas reported that self-efficacy belief, metacognitive self-regulation, and self-esteem predicted the students' motivation in online learning as an overall multidimensional construct of cognitive, emotional and behavioral factors. In a recent study conducted by Teng and Yang (2023), the focus was on investigating the impact of metacognition, motivation, and self-efficacy beliefs on learners' English learning within an online learning environment. The researchers utilized longitudinal mediation analysis by collecting surveys at two different time points. The findings of the study provided support for the joint mediating role of metacognition and motivation in influencing the effects of self-efficacy beliefs on English learning achievement. The above studies linked motivation to either attitudes or learning outcomes. However, other aspects, such as anxiety and self-efficacy, may influence motivation. Excluding these dimensions are likely to yield skewed results.

**Rationale for the present study**

Armed with the above knowledge, I assume a relationship between anxiety, self-efficacy belief, and motivation in online English learning. Previous studies did not evaluate these factors in a cross-lagged panel design. The cross-lagged design may provide convergent and divergent validity

for the predictions. For example, anxiety would be explicitly associated with self-efficacy belief. Similarly, poor interpersonal qualities in someone who has a low level of self-efficacy should lead to a low level of motivation. Learners' positive emotions towards their instructors, peer learners, and the online course may influence their motivation, and subsequently, their online English learning performance. This article thus aims to: (a) examine the anxiety mechanisms underlying students' psychological well-being, and (b) identify whether anxiety mediates students' self-efficacy belief and motivation in online English learning. The present study aims to explore the following research questions:

1. To what extent are self-efficacy, anxiety, and motivation in online English learning correlated with each other?

2. To what extent does anxiety mediate the relationship between self-efficacy and motivation in online English learning?

## Method

### Participants

The present study focused on Chinese university students from different universities. The students were learning English as a foreign language. They were enrolled in a University English course. At the time of data collection, all courses, including the University English course, was shifted to online. We contacted teachers that we had connections to help us contact their students. The teachers were from six universities. In total, 551 students responded. Some surveys had to be excluded from the analysis. For example, surveys with missing responses ($n$ = 16, 2.8%); total response time of less than 120 seconds ($n$ = 103, 24.4%); and other reasons (e.g., some students were not willing to do the second survey; $n$ = 12, 2.1%). Ultimately, we included 421 valid responses for data analysis. They were all Chinese university students from six universities, and they were residing in mainland China during the study. Their mean age was 19.1 ($SD$ = 1.1). Among them, 204 were men, and 217 were women.

### Measures

We collected data through several survey instruments. All the surveys were bilingual, presenting both Chinese and English versions for the participants' accurate interpretation of the items. Participants entered their demographic information first, e.g., age, gender, educational level, major, and residential regions. Survey items were all scored on a 7-point Likert-type scale (1 = Not at all; 2 = Just a little; 3 = Somewhat; 4 = neutral; 5 = Moderately; 6 = Quite a lot; 7 = Very much). The internal consistency for the three surveys is presented in the results section.

**Self-Efficacy Belief.** A 12-item measure adapted from Lev and Owen (1996) was used to assess self-efficacy belief. Items were revised to uncover the personal confidence, self-belief of competence, or chances of producing a favorable outcome (Maddux, 2005), particularly under the online English learning setting. A sample item is "Under the online English learning setting, I can keep my stress."

**Anxiety.** The generalized anxiety disorder (GAD) scale (Spitzer et al., 2006) was adapted for the anxiety measures. The original GAD is a self-report scale consisting of 7 items covering various anxiety symptoms (e.g., "Worrying too much about different things"). We modified the items to specifically reflect the characteristics of online learning. For example, a sample item is "Under the online English learning setting, I feel pressure in isolating from surroundings." The purpose was

to evaluate anxiety as an emotional state (state anxiety). Based on Johnson et *al. (2019), the GAD-7 demonstrates acceptable internal consistency.*

**Motivation in Online Learning.** A 10-item survey developed based on self-determination theory was used to assess motivation in online learning. Items reflect the characteristics of college students' intrinsic motivation in online learning. We focused on intrinsic motivation because understanding learners' internal motivation to engage in behavior was essential to online learning as students with intrinsic motivational dispositions performed better than students with extrinsic dispositions. The items were adapted from previous surveys on online learning (Chen & Jang, 2010) and the Motivated Strategies for Learning Questionnaire ([MSLQ] Pintrich & de Groot, 1990). In its original development, the MSLQ measured the types of learning strategies and academic motivation used by college students. We revised the items to reflect the characteristics of intrinsic motivation in online learning. For example, a sample item, "Under the online English learning setting, even it is not fun to have online chats or discussions with the instructor or other students, I keep working until I finish", could reflect an individual's intrinsic motivation to conduct online chats or discussions.

### Procedure

A web-based survey was used to collect data. This survey was sent on the internet through the WeChat public platform, which is a mainstream media in China. The participants accessed the questionnaire by scanning the Quick Response code (QR code) of the questionnaire address or clicking the relevant link. The link also included informed consent forms for the participants to understand the research purpose. We controlled the quality of responses to the survey through response time, response rate, and incentives for participation. This web-based questionnaire was completely voluntary and non-commercial. The survey was administered on two occasions, with the aim of assessing participants' perceptions and experiences. The first administration took place at the beginning of the study, while the second administration occurred about 10 months later. This interval allowed for the examination of potential changes and developments in participants' responses over time.

### Data Analysis

An item-total correlation was adopted to examine the consistency of responses first (Hulland, 1999). Then, Cronbach's alpha was used to examine internal consistencies of responses to the survey items. Confirmatory factor analysis (CFA) assessed the structural aspect of the construct validity of responses to each measurement. Descriptive statistics and Pearson correlations were employed to present the measured outcomes' status quo and bi-variate correlations. Finally, cross-lagged models were employed to test the causal relationship between anxiety, self-efficacy belief, and motivation. Multiple indices, including the $\chi^2/df$ ratio, Tucker–Lewis index (TLI), comparative fit index (CFI), root mean square error of approximation (RMSEA), Standardized Root Mean Residual (SRMR), were used to indicate whether the data fit the model (Kline, 2005). All the data analytical procedures were conducted by the "lavaan" package of R.

## Results

### Structural Aspect of Construct Validity

The first step was to explore the internal consistency of the three variables based on the data collected at two times. The first time, the Cronbach's α for the anxiety, self-efficacy belief, and motivation was .92, .95, and .91, respectively. At the second time, the Cronbach's α for anxiety,

self-efficacy belief, and motivation was .93, .95, and .93, respectively. The Cronbach value all showed sound reliability of the responses to the surveys.

The item-total correlation and CFA were utilized to assess the structural component of construct validity for the measurement responses. The results suggested that, according to the related criteria (Hulland, 1999), the fourth item in the "anxiety" scale in wave 2 had a weak correlation with the total score of "anxiety" ($r = -.03$). All the other items correlated with total score of matched instruments significantly and adequately in the two waves. Thus, the fourth item in the measurement of "anxiety" was deleted. The modification index of CFA suggested correlating the errors of item 2 and item 3, along with item 5 and item 6. These items were theoretically linked, as they were designed to measure the same underlying construct. The measurement model fits the data for the two waves (Table 1).

For self-efficacy, item 8 was removed and the errors of items 1 and 2, items 2 and 3, items 1 and 3, and items 11 and 12 were correlated in the measurement of self-efficacy. The measurement model fits both waves of data (Table 1).

In terms of online learning motivation, item 1 and item 4 were removed and the errors of items 2 and 3, items 6 and 7, and item 8 and 9 were correlated. The measurement model fit both waves of data (Table 1).

**Table 1. Model fit indexes**

| Variables | | χ2/df | CFI | TLI | SRMR | RMSEA | RMSEA 90%CI |
|---|---|---|---|---|---|---|---|
| Anxiety | Wave 1 | 28.6/7 | .97 | .94 | .04 | .08 | 0.05, 0.12 |
| | Wave 2 | 18.5/7 | .98 | .95 | .03 | .06 | 0.03, 0.10 |
| Self-efficacy | Wave 1 | 173/40 | .93 | .90 | .04 | .08 | 0.07, 0.10 |
| | Wave 2 | 176/40 | .93 | .91 | .05 | .09 | 0.08, 0.10 |
| Motivation | Wave 1 | 70.1/17 | .96 | .93 | .04 | .08 | 0.06, 0.11 |
| | Wave 2 | 76.6/17 | .96 | .93 | .04 | .09 | 0.07, 0.11 |

**Descriptive Statistics and Bi-Variate Correlations**

The descriptive statistics for all indicator measures are listed in Table 2.

**Table 2. Descriptive Statistics**

| | M (SD) | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 1.Anxiety_W1 | 3.75 (0.80) | | | | | |
| 2.Self-Efficacy_W1 | 4.31 (0.74) | -.71** | | | | |
| 3.Motivation_W1 | 4.47 (0.74) | -.76** | .72** | | | |
| 4.Anxiety_W2 | 3.70 (0.66) | .79** | -.71** | -.73** | | |
| 5.Self-Efficacy_W2 | 4.41 (0.72) | -.65** | .82** | .68** | -.68** | |
| 6.Motivation_W2 | 4.45 (0.73) | -.74** | .73** | .84** | -.71** | 0.73** |

*Note.* $N = 420$; ** $p < .01$; W1 – measurement at Time 1. W2 – measurement at Time 2.

As shown in Table 2, self-efficacy and motivation were significantly and positively correlated (ranging from .72 to .84 for Wave 1 and Wave 2). The relationship between anxiety and self-

efficacy and that between anxiety and motivation were negative. The findings support the hypothesized associations among the variables.

**Cross-Lagged Mediation Model**

The cross-lagged mediation model is used to examine the relationships between our three variables over time. We are assuming that anxiety mediates the relationship between self-efficacy and online learning motivation or that self-efficacy plays the role of mediator in the relationship between anxiety and online learning motivation. Thus, two lagged mediation models were built for comparison and selection of models. The first lagged mediation model was constructed by extracting latent variables of anxiety, self-efficacy, and online learning motivation in two waves, suggesting that self-efficacy is the mediator in the relationship between anxiety and online learning motivation. The cross-lagged correlations indicated anxiety could be the mediator between the relationship of self-efficacy and online learning motivation as $r$(SE_W1~Anx_W2) > $r$(SE_2~Anx_W1), $r$(SE_W1~Motiv_W2) > $r$(SE_W2~Motiv_W1).The model can be seen in Figure 1.
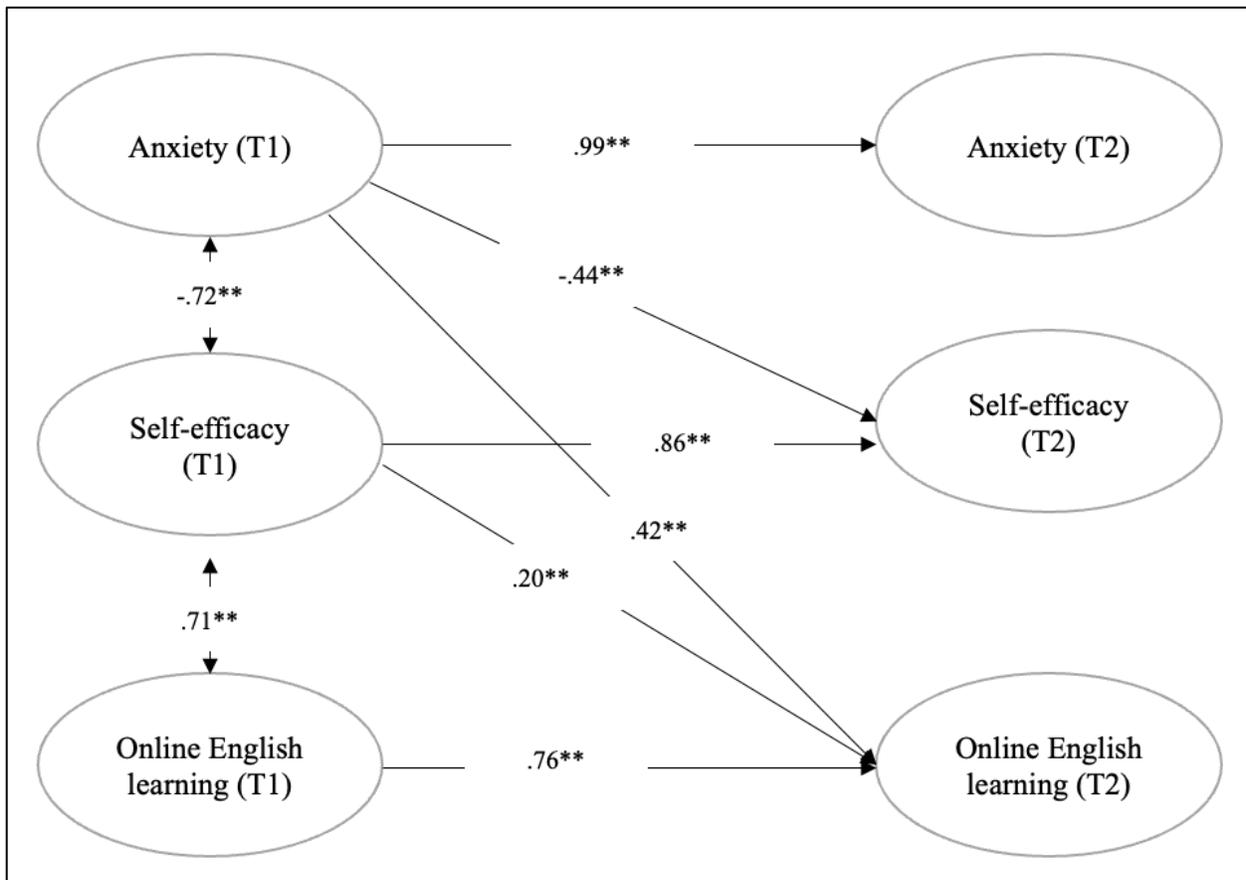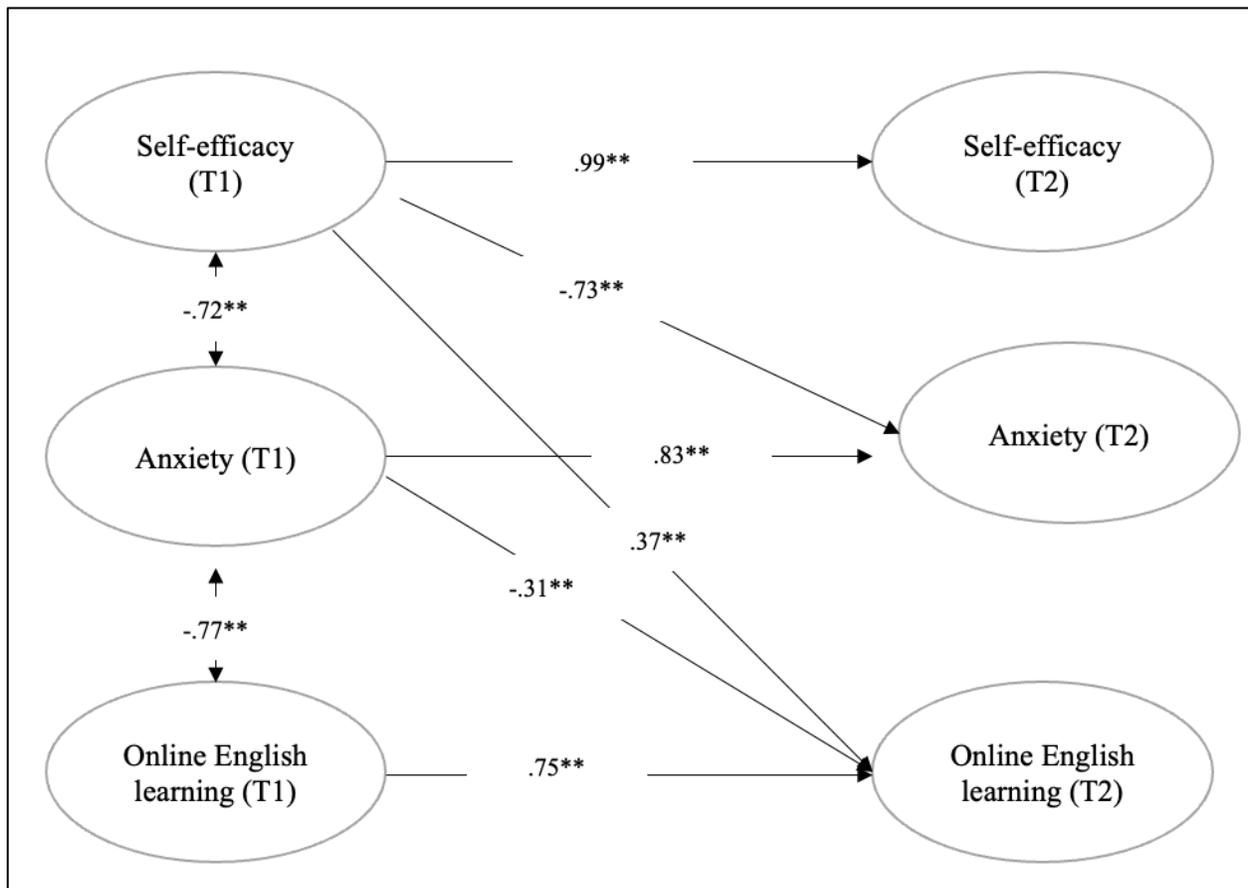


**Figure 1. Cross-Lagged Mediation Model 1**
*Self-Efficacy as the Mediator* (Model fit: $\chi2/df$ = 104.47/3; CFI = .95, TLI = .76; RMSEA = .29; RMSEA 90%CI [.24, .34]; SRMR = .06)

The second model (Figure 2) supports that the anxiety model is the mediator between self-efficacy and motivation. This model reached a better model fit than the first model. Therefore, we concluded that anxiety mediates the impact of self-efficacy on motivation. This model suggested

the total effect of self-efficacy on motivation was .59, and the indirect effect was .23.



**Figure 2. Cross-Lagged Mediation Model 2**
*Anxiety as the Mediator* ($\chi$2/df = 44.17/3; CFI = .98; TLI = .91; RMSEA = .17; RMSEA 90%CI [0.13, 0.22]; SRMR = .04)

## Discussion

In the present study, the cross-lagged model (model 1) highlights the mediating role of self-efficacy beliefs on the relationship between anxiety and motivation in online learning. The cross-lagged model (model 2) revealed that the mediated effect of anxiety on university students' self-efficacy belief and motivation in online learning was positive and significant. Contributing to previous findings (Wang et al., 2023), the present study highlighted the interrelationship among self-efficacy belief and anxiety in online English learning, for which self-efficacy belief encourages argentic behaviors. I thus argue for a proactive model of self-efficacy belief in online learning. Such a model is consistent with previous research that emphasizes the mediational role of self-efficacy belief (e.g., Teng et al., 2021; Teng & Yang, 2023; Teng & Wu, 2023). The proactive model suggests that self-efficacy belief plays an active role in shaping individuals' attitudes, behaviors, and outcomes in the online learning environment. As argued by Teng et al. (2021) and Teng and Yang (2023), individuals with higher self-efficacy beliefs are more likely to engage in proactive learning behaviors, such as seeking out resources, persisting in the face of challenges, and utilizing effective learning strategies, and those behaviors were essential to online English learning. These proactive behaviors, in turn, enhance learning outcomes and overall

performance in online learning settings. By recognizing the significance of self-efficacy belief and its mediating role, this model provides a framework for understanding and promoting effective online English learning experiences. In the present study, self-efficacy belief may deliver information to a neural network acting as the mental machinery that does the construing, motivating, and regulating. It is individuals' componentized sub-personal parts that orchestrate the courses of action for online English learning. As Bandura (1997) mentioned, a strong sense of efficacy enhances human accomplishment and personal wellbeing. Therefore, self-efficacy belief, which may be related to motivation and metacognitive strategies (Teng & Wu, 2023), may play a role in managing symptoms like anxiety in online English learning. The self-efficacy belief may facilitate cognitive consciousness, and the purposive use of information and self-regulative means to meet the demands in online English learning.

The relationship between anxiety and self-efficacy belief was in accord with research exploring the relationship between anxiety symptoms and self-efficacy (Tahmassian & Moghadam, 2011). Such arguments can be interpreted by considering the critical role of self-efficacy in decreasing anxiety regarding competence or chances for a favorable outcome, especially in responding to the uncertain nature of online English learning. In line with Saadé and Kira (2007), a high-stress environment may be a bane of online learning, where students became less confident in online learning when they failed to cope with the stress. The experience of the unpleasant emotional state due to online learning may be associated with subjective feelings of tension, apprehension, and worry, which may be influenced their levels of self-efficacy. In the present study, the level of self-efficacy belief encompasses three different types of beliefs. Firstly, it involves the belief that individuals can navigate and overcome the inherent uncertainties associated with online English learning. This reflects their confidence in adapting to the dynamic and sometimes unpredictable nature of the online English learning environment. Secondly, it encompasses the belief that individuals possess the capability to employ effective stress reduction strategies. This highlights their confidence in utilising techniques and coping mechanisms to manage and alleviate stressors that may arise during online English learning. Lastly, it encompasses self-confidence in making autonomous decisions to guide their own online English learning journey, even in the face of challenges and difficulties. This dimension emphasizes individuals' belief in their ability to take ownership of their online English learning process and make informed choices that align with their goals and preferences. Fostering self-efficacy belief aligns with the core principles of cognitive-behavioral techniques, which aim to empower individuals by helping them find meaning and purpose in their actions within the online learning context (Pellas, 2014). By nurturing self-efficacy belief across these dimensions, individuals are more likely to engage in proactive learning behaviors and experience greater success and fulfillment in their online English learning endeavors.

Similar to previous studies that examined anxiety and motivation in online learning (Chiu et al., 2021; Saadé & Kira, 2007), our results showed that anxiety significantly predicts motivation in online English learning. A lower level of anxiety was associated with students' higher motivation in seeking a psychological adjustment to online English learning. In the present study, the anxiety items included difficulty controlling worry and feelings of panic, and feeling weak or tired. These factors may determine their motivation to achieve goals. The findings suggest the usefulness of alleviating students' anxiety and distress under the online English learning setting. The findings highlight a major component in psychological treatment for university students, which is to provide a social support network with specific skills that aim to enhance their perceived efficacy in confidence and competence in adopting agentic actions to cope with the demands of online English learning.

The results highlight the mediating role of anxiety in the relationship between self-efficacy belief and motivation in online English learning, echoing previous research (e.g., Pellas, 2014). In line with Hsu et al. (2019) and Teng et al. (2021), while self-efficacy belief fulfilled students' basic psychological needs, anxiety is an essential factor that influences learners' motivation and achievement of online English learning. Specifically, students who were anxious about their current situations might not avoid social distractions and focusing on online English learning. Those who experience less anxiety might be more likely to be cognitively motivated for online English learning. Such results can be interpreted by the fact that reduced anxiety was related to an increase in self-efficacy belief and the use of deeper processing strategies such as elaboration and organizational strategies and metacognitive strategies over time (Linnenbrink & Pintrich, 2003). Consistent with Shen et al. (2013), students who were less worried about learning were much more likely to understand the needs for online courses and actively reflect on what they were capable or not capable of for their online English learning. They were also more metacognitive, more likely to plan, monitor, and regulate themselves for online English learning.

In contrast, a higher level of anxiety was related to lower levels of self-efficacy belief, and high levels of anxiety symptoms lead to low sense of self-efficacy. Hence, anxiety can be best regarded as a cognitive factor that mediates self-efficacy belief related to motivation. Acknowledging the influential role of anxiety as a mediator between self-efficacy belief and motivation in the realm of online English learning, it is imperative for future studies to delve into potential approaches that can be employed to strengthen students' self-efficacy beliefs in managing anxiety. One such method worth exploring is the direct cognitive restructuring of students' self-care competence. By implementing interventions that focus on enhancing students' self-care abilities, it may be possible to positively influence their self-efficacy beliefs and equip them with effective coping mechanisms to deal with anxiety. This research contributes valuable insights into the psychological adjustment of university students, specifically in the context of reducing anxiety related to online English learning. These findings lay the groundwork for the development of targeted strategies and interventions aimed at fostering students' well-being and optimizing their online English learning experiences.

## Concluding Remarks

The findings of the present study provide support for the notion that increasing perceived self-efficacy in managing stress can positively impact university students' awareness, leading to reduced anxiety and increased motivation in online English learning. This study still has some limitations. First, the sample was recruited via convenience sampling. Future studies should explore differences in perceptions of anxiety and self-efficacy in different contexts. Second, the survey relied on self-reported data from students, which may introduce biases. Self-report measures may not capture the full complexity of the constructs being assessed. Third, this study did not assess whether the participants had a history of anxiety problems for online English learning. This could have influenced the results. Finally, qualitative data can be triangulated with survey data to shed lights on individual differences in responding to online English learning.

While the present study has its limitations, it is the first of its kind to delve into the mechanisms of anxiety in relation to self-efficacy and motivation in online English learning. Students' anxiety serves as a powerful mediator between their self-efficacy belief and motivation in the online learning setting. The level of anxiety experienced by students can significantly influence their approach to various learning processes and circumstances during online English learning (Teng & Wu, 2021). Specifically, students who possess a higher sense of efficacy in the learning process

are more likely to regulate their strategies and utilize metacognitive skills to effectively cope with the challenges encountered in online English learning. To gain a deeper understanding of effectiveness and provide better support in online English learning, it is crucial for designers and educators to incorporate psychological treatment sessions that promote students' self-efficacy belief in managing anxiety and adapting to the online English learning environment. This research holds implications for enhancing students' psychological well-being. Further studies are warranted to explore students' anxiety and motivation in online English learning. Additionally, this study contributes to the expanding knowledge base surrounding the intricate nature of motivation and its dynamic relationships with learners' self-efficacy belief and anxiety in the online English learning setting. It is my hope that this study serves as a catalyst for further research, addressing learner needs, motivation, and contextual support in the realm of online English learning.

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## Appendix Survey items

Instructions: The following surveys aim to gather information about learners' self-efficacy beliefs, anxiety, and motivation in the context of online English learning. It is important to note that there are no right or wrong answers. Your honest responses are valuable, so please provide your feedback based on your own experiences and perceptions. Your input will contribute to a better understanding of these factors in online English learning. Thank you for your participation.

**Self-efficacy beliefs**
Under the online English learning setting,
1. I can keep my stress.
2. I can convince myself I'll be OK.
3. I can practice stress reduction techniques.
4. I can use relaxation techniques to decrease my anxiety.
5. I can find out a solution for me.
6. I can make decisions for myself
7. I can stand pressure.
8. I can do special things for myself to make me feel better.
9. I can cope with difficulties.
10. I keep checking news/posts on social media.
11. I keep checking the statistics.
12. I think I am not distracted.

**Anxiety**
Under the online learning setting,
1. I feel pressure in isolating from surroundings.
2. I feel anxious in communicating with others.
4. I get upset at thinking of the courses.
5. I am scared of my performance.
6. I am distracted by unwanted thoughts.
7. I feel panicky.

**Motivation**
Under the online learning setting,
1. I try to study on a regular basis.
2. I try to outline class notes to help me remember materials.
3. I try to organize and understand information.
4. I try to take good notes over readings, PowerPoints, or video lectures.
5. I try to ask myself questions to make sure I understand the lecture.
6. I try to find ways to learn the course materials.
7. I try to find ways to make the course interesting to me
8. even it is not fun to have online chats or discussions with the instructor or other students, I keep working until I finish.
9. I try to perform well.
10. I try to get to know other students in class because of the positive feeling I experience.