

# Exploring emotional regulation, well-being, and academic engagement: A comparative study among Chinese high school and college EFL learners

Hong Shi<sup>\*</sup>, Wei Sun

China University of Petroleum, Beijing, China

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## ABSTRACT

This study examined emotion regulation strategies, well-being, and academic engagement among 298 senior high school and 306 college English as a foreign language (EFL) learners. The results showed that cognitive reappraisal was commonly used across both groups, while expressive suppression was more prevalent among college students. Despite no significant differences in well-being between the two groups, college EFL learners exhibited lower agentic and behavioral engagement but higher cognitive engagement. Cognitive reappraisal was found to positively predict academic engagement in both groups, with well-being mediating this relationship only for senior high school students. No significant effects of expressive suppression on academic engagement were observed, nor did well-being mediate this relationship. These findings offer theoretical and pedagogical insights into emotion regulation and academic engagement in EFL contexts.

## Introduction

Acquiring a second language (L2) involves complex emotional experiences that can significantly impact the learning process (Dewaele, 2023; Dewaele & Li, 2021). In this context, emotion regulation (ER) is critical in facilitating effective language learning (Gao & Yang, 2023). Effective ER strategies help mitigate negative emotions and amplify the benefits of positive ones, thus influencing L2 learners' outcomes (Harley et al., 2019). Recent studies have begun to focus on how different ER strategies contribute to various aspects of L2 learning, including enjoyment (Zhang et al., 2021), boredom coping (Solhi et al., 2023), motivation (Namaziandost et al., 2023), and writing skills (Shafiee Rad & Jafarpour, 2023).

In general psychology, individuals who effectively regulate their emotions tend to experience better mental health and higher engagement in their tasks (Beaumont et al., 2023; Kwon et al., 2018). Among students, the use of specific ER strategies is closely linked to psychological functioning, academic engagement, and performance (Gross & John, 2003; Pan et al., 2023). However, while research in second language acquisition (SLA) has focused largely on ER in the context of L2 teachers' well-being and engagement (e.g., Greenier et al., 2021), far less attention has been paid to how ER strategies affect L2 learners themselves (Wang et al., 2021). Given the significant impact of ER strategies on learners' well-being and academic engagement, it is

essential to explore their role in L2 learning (Gross & John, 2003; Pan et al., 2023).

A further gap in the literature is the tendency to treat ER strategies as a general construct (e.g., Solhi et al., 2023), with insufficient attention given to specific strategies and their differential effects (Gao & Yang, 2023). In addition, the interaction between ER strategies and other constructs in SLA remains underexplored, and a more nuanced understanding of these interactions could help improve language learning outcomes and emotional well-being (Solhi et al., 2023). Moreover, recent studies point to contradictory findings regarding the effects of expressive suppression on academic engagement and well-being, highlighting the need for further investigation across different contexts and participant groups (Bakır-Yalçın & Usluel, 2024; Zhoc et al., 2022). This calls for a deeper exploration of how expressive suppression operates in diverse educational settings.

A significant research gap that has received little attention in educational research is the dynamic nature of ER strategy use (e.g., Smith et al., 2023; Zimmermann & Iwanski, 2014), well-being (e.g., Conley et al., 2020; Gutman & Vorhaus, 2012), and academic engagement (e.g., Appleton et al., 2008; Aubrey et al., 2022) from adolescence to emerging adulthood. This is especially important in L2 research, which often uses age-homogeneous samples, typically focusing either on senior high school or college students (e.g., Dewaele & Li, 2021; Pan et al., 2023). As a result, important contextual differences between these

<sup>\*</sup> Corresponding author at: School of Foreign Languages, China University of Petroleum-Beijing, Beijing 102249, China.

E-mail address: [shihong2005sd@163.com](mailto:shihong2005sd@163.com) (H. Shi).

educational stages, such as those found in Chinese senior high schools and colleges, remain unexplored. Therefore, empirical studies examining ER strategies, well-being, and academic engagement across these stages of development are crucial to understanding how these variables evolve and interact during key developmental stages.

In light of these gaps, this study aims to first explore the differences in the general levels of ER strategy use, well-being, and academic engagement between these two groups of EFL learners. It further investigates structural relationships between L2 learners' ER strategy use, well-being, and academic engagement, comparing senior high school and college students in China. By building on existing research within the L2 ER framework, this study offers a fresh perspective on the interplay between these variables. Additionally, it carries practical significance for L2 educators in both senior schools and colleges, providing insights to enhance students' ER strategies, well-being, and academic engagement.

### *Academic engagement*

Academic engagement in SLA refers to students' active involvement and commitment to language learning, characterized by focused physical and mental efforts toward clear goals (Hiver et al., 2024). This construct includes three primary components: behavioral, emotional, and cognitive engagement (Fredricks et al., 2004). Behavioral engagement, the most observable dimension (Oga-Baldwin, 2019), involves learners' actual participation in tasks (Mercer, 2019). Emotional engagement reflects learners' affective responses during language activities (Hiver et al., 2024), while cognitive engagement pertains to the mental effort and activities displayed by learners (Hiver et al., 2024). However, these three dimensions "fall short of capturing the extent to which students contribute agentically into the ongoing flow of the instruction they receive" (Reeve & Tseng, 2011, p. 258). To address this, the agentic dimension was introduced, encompassing students' intentional actions like personalizing instructional materials, expressing preferences, seeking clarification, and offering suggestions (Reeve & Tseng, 2011). This expanded model was adopted for the study as it better captures the full range of student engagement (Reeve & Tseng, 2011), essential for the automatization of language skills (Mercer & Dörnyei, 2020). It supports task-based and communicative language teaching approaches, fostering meaningful learning relevant to real-life language use (Dörnyei, 2019). This four-dimension model has been widely validated in SLA research (Oga-Baldwin, 2019; Sadoughi & Hejazi, 2023; Sun et al., 2024).

To facilitate L2 learning, learners must be actively involved (Mercer, 2019). Active academic engagement is essential for mastering an L2 as it necessitates sustained effort and attention, which are crucial for automating language skills, potentially making it more critical than subjects like science and mathematics (Mercer & Dörnyei, 2020). Extensive academic engagement positively influences various educational outcomes, including interest, motivation, mastery goals, self-confidence, and academic performance (Christenson et al., 2012). Without active engagement, achieving proficiency in communicative language skills becomes impossible, as extensive practice and participation are vital (Mercer & Dörnyei, 2020). Engaged L2 learners demonstrate active participation and commitment to their learning; the lack of such engagement can significantly hinder meaningful learning (Hiver et al., 2024). Dörnyei (2019) emphasizes the importance of assessing L2 learners' academic engagement and identifying factors that can enhance it, especially within task-based and communicative language teaching approaches (Sadoughi & Hejazi, 2023). Examining engagement from teaching and learning perspectives provides a comprehensive framework for understanding the interactions between classroom dynamics, instructional practices, and student outcomes, ultimately fostering active participation and meaningful involvement (Fredricks et al., 2004).

As academic engagement is contextually situated, students in high schools and colleges may potentially encounter varying degrees of

academic engagement (Hiver et al., 2024). Several factors influence academic engagement, including schools, classrooms, peers, specific activities and tasks, cultures, families, and communities (Finn & Zimmer, 2012). Additionally, engagement is malleable and dynamic, subject to developmental trajectories (Appleton et al., 2008; Aubrey et al., 2022). According to Fredricks et al. (2004), learners can enhance their academic engagement levels when appropriate intrapersonal and contextual conditions are present. However, previous studies indicate that students' academic engagement often declines as they progress through different educational levels, facing increased academic demands and more cognitively challenging tasks (Juvonen, 2007). As students advance in their academic journey, they encounter a greater number of subjects and teachers, which can lead to heightened competition and decreased individual support (Wang & Hofkens, 2019). Interestingly, some recent research suggests that university students may exhibit higher levels of academic engagement than high school students (Santos et al., 2021). Nonetheless, further research is needed to explore academic engagement differences between college and high school students, particularly in the context of SLA.

### *Well-being*

The study of well-being generally encompasses two approaches: psychological (eudaimonic) well-being and subjective (hedonic) well-being (Deci & Ryan, 2008). Subjective well-being focuses on the pursuit of pleasure and happiness, involving cognitive evaluations like life satisfaction and affective evaluations of positive and negative emotions (Diener, 1984), while psychological well-being emphasizes fulfilling human potential and positive functioning, incorporating elements such as autonomy, self-acceptance, and life purpose (Ryff, 1989). Positive psychology integrates both eudaimonic and hedonic dimensions of well-being (Yang, 2021). Mercer (2021) argues that well-being is a synthesis of "feeling good" and "living well." Seligman's (2011) PERMA model (Positive emotions, Engagement, Relationships, Meaning, and Accomplishment) effectively combines elements from both perspectives and has been applied in L2 research (MacIntyre et al., 2019). Oxford (2016) further extended this model to create the EMPATHIC model (Emotion and empathy, Meaning and motivation, Perseverance, Agency and autonomy, Time, Habits of mind, Intelligence, Character strengths, and Self-factors), incorporating aspects specific to SLA. Tennant et al. (2007) highlight the complexity of well-being through the interplay of affect and psychological functioning. By adopting this interdisciplinary approach, the study recognizes well-being as a holistic synthesis of psychological functioning and subjective feelings, emphasizing its dynamic nature shaped by external conditions and enduring psychological traits (Proietti Ergün & Dewaele, 2021).

Research indicates that older learners often exhibit lower levels of well-being compared to younger peers (Gutman & Vorhaus, 2012; Kroshus et al., 2021). This disparity may stem from the attitudes of school administrators, parents, and teachers, who tend to prioritize the psychological and social development of younger students, offering them more support than older students. This lack of support can negatively affect the well-being and academic performance of older students and young adults (Kaya & Erdem, 2021). Furthermore, well-being during the transition to college is shaped not only by individual abilities but also by stressors that influence student behavior (Kroshus et al., 2021). Kaya and Erdem (2021) argue that academic pressures can lower achievement, which in turn impacts students' well-being. These insights emphasize the need to consider age-related differences in student well-being. However, there has been limited focus on the well-being of L2 learners across different age groups, such as senior high school and college students, within the field of SLA. This study aims to address this gap by exploring the well-being and academic engagement of L2 learners across these age groups, providing a nuanced understanding of how well-being influences academic engagement in SLA contexts.

## ER strategies

ER involves managing emotions by selecting specific responses to achieve various goals in different situations (Gross, 1998). In L2 studies, the process model of emotion regulation (PMER) is a commonly referenced framework (Gross, 1998, 2015). According to Gross (2015), ER manifests at different stages of the emotion generation process through five primary strategies: *situation selection*, *situation modification*, *attention deployment*, *cognitive change*, and *response modification*. Cognitive reappraisal and suppression are the most frequently studied forms of *cognitive change* and *response modification*, respectively (Gross, 1998, 2015). Cognitive reappraisal is an “antecedent-focused” strategy aimed at altering one’s perception to mitigate negative emotional impact. This may involve reframing beliefs about a situation or focusing on its positive aspects to change the emotional outcome (Gross, 2015). In contrast, expressive suppression is a response-focused strategy where individuals regulate emotions by consciously inhibiting the outward expression of feelings they have already experienced (Gross, 1998, 2015). For example, a student employing expressive suppression may put on a smile to conceal the anxiety caused by presenting in front of others (Gao & Yang, 2023).

High school and college students may differ in their ER strategies due to developmental changes associated with age (John & Gross, 2004). During adolescence and emerging adulthood, young individuals, especially youth, often report low emotional stability, a trait that is still in the process of development (Zimmermann & Iwanski, 2014). This stage of life is characterized by greater variation in emotions and an increased capacity for emotion regulation (Smith et al., 2023). These periods are characterized by an increased capacity for emotional flexibility, with individuals demonstrating greater coherence in recognizing and understanding feelings, as well as exhibiting selectivity in their perceptions, evaluations, and reactions to emotional situations (Zimmermann, 1999). This evidence suggests that senior high school students, who are typically in the mid-adolescence stage, and college students, who are generally transitioning from late adolescence to early adulthood, may exhibit differences in their ER strategies. However, the existing empirical evidence for L2 learner ER strategies derives primarily from college students (e.g., Namaziandost et al., 2023; Solhi et al., 2023), whereas there is a dearth of research specifically targeting L2 learners in senior schools.

## ER strategies and academic engagement: well-being as a mediator

The relationship between ER strategies and academic engagement is well-documented in educational psychology. Studies indicate that students using cognitive reappraisal tend to remain actively engaged in academic tasks, as this strategy fosters adaptive emotional responses and reduces negative affect (Brady et al., 2018; Santos et al., 2021). Conversely, reliance on expressive suppression is linked to disengagement, heightened stress, and academic burnout (Fried & Chapman, 2012; Seibert et al., 2017). However, findings are inconsistent across studies in general education. For example, Bakır-Yalçın and Usluel (2024) found that cognitive reappraisal positively predicted academic engagement in a sample of 1450 Turkish university students, while expressive suppression showed no significant relationship. Similarly, Zhoc et al. (2022) reported that cognitive reappraisal positively predicted all dimensions of academic engagement in a study of 965 Chinese university students, but suppressive expression only had a minor positive effect on behavioral engagement. These mixed findings suggest that the relationship between ER strategies and academic engagement varies across contexts. Moreover, these inconsistencies indicate that the mechanisms through which ER strategies predict academic engagement remain unclear, particularly among L2 learners across different age groups. This study proposes that well-being serves as a key mediator in this relationship, aligning with both theoretical frameworks and existing empirical evidence.

The link between ER strategies and well-being can be grounded in PMER (Gross, 1998, 2015), suggesting that cognitive reappraisal promotes psychological well-being, while habitual suppression leads to negative outcomes. Reappraisal helps individuals reduce negative emotional responses to adversity, acting as a protective factor against depressive symptoms (Gross & John, 2003). It is associated with positive emotional and social outcomes, greater life satisfaction, and higher self-esteem, fostering optimism and a belief in one’s ability to manage challenges (Gross & John, 2003). Conversely, suppression is linked to increased negative emotions, ineffective coping, rumination, lower social support, and a higher risk of depression (Gross & John, 2003; Nolen-Hoeksema & Morrow, 1991). Suppressors often experience lower life satisfaction and self-esteem due to avoidance behaviors and weaker social connections (Gross & John, 2003). Research supports these findings, showing that reappraisal enhances positive emotions, decreases negative affect, and improves well-being (Beaumont et al., 2023). For instance, Jiang et al. (2023) identified reappraisal as a predictor of subjective well-being, while King and dela Rosa E. D. (2019) found it positively associated with life satisfaction. Conversely, research suggests that engaging in expressive suppression can induce feelings of inauthenticity, stemming from the disconnect between one’s internal emotions and outward expressions (English & John, 2013). As a result, students who frequently employ suppression may be at a greater risk for lower well-being (Beaumont et al., 2023), as their negative emotional states could be intensified and prolonged (Chervonsky & Hunt, 2019).

The predictive effect of well-being on academic engagement in this study is grounded in Fredrickson’s broaden-and-build theory (Fredrickson, 2001). The main tenet of the theory is that positive emotions, as implied by well-being, broaden people’s thought-action repertoires, which further help to build their resources, while negative emotions have the opposite narrowing effect (Fredrickson, 2001). In SLA, higher well-being enables learners to absorb more input and develop resources for further language learning, thereby facilitating L2 engagement (Dewaele & Li, 2021). As posited by Khajavy and Vaziri (2024), well-being in L2 learning extends beyond merely the absence of negative factors like disengagement and anxiety; it also includes fostering positive outcomes such as meaning, happiness, and engagement. Supporting this finding, Pan et al. (2023) found a strong positive relationship between psychological well-being and academic engagement among 1968 Chinese EFL learners, with each variable explaining 56 % of the variance in the other. Similarly, Li et al. (2024) reported that general life satisfaction positively influenced L2 engagement among 1109 rural 7th-grade EFL learners. These findings underscore the critical role of well-being in L2 learners’ academic engagement. However, recent research has primarily focused on the link between well-being and work engagement among L2 teachers (Mercer, 2021), with less attention given to language learners’ well-being and their academic engagement when learning an L2. This gap presents an opportunity for further exploration in this area (Shafiee Rad & Jafarpour, 2023).

Taking together, the inclusion of well-being as a mediator in the relationship between ER strategies and academic engagement is supported by PMER (Gross, 1998, 2015) and the broaden-and-build theory (Fredrickson, 2001). Specifically, students who utilize adaptive ER strategies, such as cognitive reappraisal, are more likely to experience enhanced well-being, which in turn promotes their ability to stay engaged in L2 learning. Conversely, maladaptive strategies like expressive suppression can undermine well-being by exacerbating negative emotions, which may lead to disengagement from L2 learning (Dewaele & Li, 2021; Gross & John, 2003). In addition, recent studies further provide partial empirical evidence for this mediating role of well-being with the predictive effects of ER strategies on well-being (e.g., Beaumont et al., 2023; Gross & John, 2003), which, in turn, predicts students’ engagement in L2 learning (e.g., Li et al., 2024; Pan et al., 2023). However, to our knowledge, there are few empirical studies that examine them jointly in a single study among learners in general education, not to mention within the specific context of L2.

## The present study

Adolescence and young adulthood are critical developmental periods characterized by significant emotional and psychological changes (Zimmermann & Iwanski, 2014). Understanding how ER strategies impact well-being and academic engagement during these stages can help promote better developmental outcomes (Gutman & Vorhaus, 2012). This research emphasizes the need for age-specific interventions by highlighting differences in ER strategies between senior high school and college students (Zimmermann & Iwanski, 2014). For high school students, enhancing cognitive reappraisal can improve emotion regulation, leading to better academic outcomes and a smoother transition into adulthood (Conley et al., 2020; Gutman & Vorhaus, 2012). In contrast, university students facing higher academic and social pressures can benefit from strategies that reduce expressive suppression and promote cognitive reappraisal, enhancing their emotional well-being and academic engagement (Kroshus et al., 2021). By addressing these specific needs, educational institutions can foster positive developmental outcomes (Beaumont et al., 2023). These insights can inform tailored programs supporting the emotional and academic needs of L2 learners, ultimately enhancing their long-term success and well-being.

Given the critical role of ER strategies in SLA, this study explores the relationships among ER strategies, well-being, and academic engagement among senior school and college students in a Chinese EFL context. Specifically, we aim to address the following research questions (RQs) and corresponding hypotheses (Hs):

RQ1. Do senior high school and college students differ in terms of their use of ER strategy, levels of well-being, and academic engagement in the Chinese EFL context?

H1. High school and college students differ in terms of their use of ER strategy, levels of well-being, and academic engagement in the Chinese EFL context.

RQ2. What are the associations between ER strategy use, well-being, and students' academic engagement, and whether these associations vary between senior high school and college students?

H2. Cognitive reappraisal will positively predict well-being and all dimensions of academic engagement in both groups.

H3. Expressive suppression will negatively predict well-being or any dimension of academic engagement for both groups.

H4. Well-being will positively predict all dimensions of academic engagement and mediate the links between ER strategies and academic engagement for both groups.

## Method

### Participants and contexts

Convenience sampling was utilized to gather data from 306 university students from a prominent public university, as well as 298 adolescents in a key senior high school in Northern China. As native Chinese speakers, all participants learned English as an L2 and they had no overseas experiences. The sample of senior high school students consisted of 167 (56.0 %) female students, 123 (41.3 %) male students, and 8 (2.7 %) students who did not report their gender. Except for 13 (4.4 %) participants who did not report their age, the remaining 285 participants' ages ranged from 14 to 17 ( $n = 285$ ,  $M = 15.89$ ,  $SD = 0.69$ ). The sample of college students comprised 168 (54.9 %) female students and 138 (45.1 %) male students, with ages ranging from 17 to 25 ( $n = 306$ ,

$M = 19.92$ ,  $SD = 1.49$ ). Among these college students, 116 (37.9 %) were English majors, and 190 (62.1 %) were non-English majors. The senior high school students had been learning English for an average of 7.46 years ( $SD = 1.08$ ), while the college students had been learning English for an average of 11.01 years ( $SD = 2.86$ ).

For the sample of senior high school students in this study, English language learning was a mandatory component of their high school curriculum. They were required to study English throughout their high school years as part of their preparation for the National College Entrance Examination, also known as the *Gaokao*. The *Gaokao* was a highly competitive and pivotal examination that played a crucial role in university admissions and was a significant determinant of students' academic and socio-economic futures (João Pires, 2019). At the college level, English remained a compulsory subject for undergraduate students in their first and second years. Despite some changes in testing requirements in this university, such as the disconnection of the *College English Test Band 4* (CET-4), a prominent high-stake examination, from direct degree requirements, the test results still influenced scholarship opportunities and other rewards, maintaining its relevance in students' EFL learning experiences. For students majoring in English, passing the *Test for English Majors Band 4* (TEM-4) was necessary to obtain their bachelor's degree, further underscoring the importance of English proficiency in their academic trajectory.

### Measures.

#### ER strategy

The Emotion Regulation Questionnaire (ERQ) developed by Gross and John (2003) was used to measure students' ER strategy. The original 10-item ERQ, which measures two dimensions of emotion regulation, namely, six items for cognitive reappraisal and four items for expressive suppression, was modified by adjusting the wording of items to reflect challenges specific to English language learning. For example, an item for cognitive reappraisal was adapted to: "When I'm faced with a stressful situation [in English learning], I make myself think about it in a way that helps me stay calm," and for expressive suppression: "When I am feeling negative emotions [in English learning], I make sure not to express them." Participants rated themselves on a 7-point Likert scale, ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). The internal consistency of the Reappraisal subscale and Suppression subscale was found to be good with Cronbach's alpha coefficients of 0.94 and 0.77, respectively.

#### Well-being

The Short Warwick Edinburgh Mental Well-being Scale (SWEMWBS) developed by Tennant et al. (2007) was used in this study to assess the well-being of students. The 7-item scale was designed to recognize degrees of positive mental health and comprises concepts of well-being such as hedonic well-being (representing pleasure and satisfaction) as well as flourishing, which involves living a purposeful and satisfying life. According to the information provided on their website (<https://warwick.ac.uk/fac/sci/med/research/platform/wemwbs/using>), the copyright owner of the SWEMWBS granted permission for its use via email. The scale was modified to suit an EFL context with adjustments made to ensure the items were relevant to language learning experiences to better capture emotional states specific to the challenges and experiences of EFL learners. A sample item from the adapted scale was: "I've been feeling relaxed [when learning English]." Participants were asked to indicate their agreement level with the statement on a 5-point Likert scale, where 1 denoted "None of the Time" and 5 denoted "All of the Time". The scale displayed a high level of internal consistency in this study, as confirmed by a Cronbach's alpha coefficient of 0.85.

#### Academic engagement

To measure academic engagement in an EFL context, Reeve and Tseng's (2011) Academic Engagement Scale was adapted to reflect the specific experiences of EFL learners. Modifications included rewording



items to make them more relevant to English language learning. For example, the agentic sub-dimension was adapted to: “[During English class], I express my preferences and opinions,” and the emotional sub-dimension to: “[English class] is fun.” The behavioral sub-dimension retained focus on effort, e.g., “I try very hard in [English class],” while the cognitive sub-dimension included items like “Before I begin to [study English], I think about what I want to get done.” Participants rated the items on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The adapted scale showed strong internal consistency, with Cronbach’s alpha coefficients of 0.90, 0.91, 0.92, and 0.93 for the four subscales, confirming its reliability in the EFL context.

#### Data collection

To ensure accuracy and quality, the questionnaire underwent a rigorous translation process: it was first translated from English to Chinese and then back-translated into English. Two experts in translation and applied linguistics reviewed the translated survey. For the high school sample, participants were recruited through coordination with school administrators, who facilitated the distribution of study information and consent forms during school hours. Teachers guided students in completing the questionnaires during English lessons, ensuring they responded honestly within a 20-min timeframe, after which completed questionnaires were promptly collected. Students received a pen or notebook as compensation. For the college sample, a self-selection process was used, with announcements made on social media platforms like WeChat and QQ. Interested students contacted the research team directly, and after obtaining consent, questionnaires were distributed via an online survey platform (<http://www.wjx.cn/>). To ensure the ethical integrity of the study, several key ethical considerations were addressed. First, all participants were provided with clear and detailed information about the study’s purpose and procedures. Before participation, informed consent was obtained from all participants, ensuring that they understood their rights, including their right to withdraw from the study at any time without consequence. For the high school sample, consent forms were distributed to both students and their parents or guardians to ensure parental approval. For the college sample, participants provided consent electronically through the online survey platform. Participants were assured that their responses would remain anonymous and that data would be stored securely. To prevent any potential coercion, participation was entirely voluntary, and the compensation provided (a pen or notebook for high school students, and a small monetary reward for college students) was not contingent on completing the questionnaire. Additionally, participants were informed that their participation would have no impact on their academic performance or relationship with the researchers. The study received ethical approval from the Institutional Review Board at China University of Petroleum-Beijing, and all research procedures adhered to the ethical guidelines established by the university.

#### Data analysis

The data collected in the study was subjected to analysis using both SPSS 26 and Mplus 8.3 (Muthén & Muthén, 2017). Data cleaning was first conducted by examining the missing data and removing outliers. The data were then analyzed using descriptive statistics and confirmatory factor analyses (CFAs) to assess the normality of the data and determine the reliability and validity of the constructs. The maximum likelihood estimation method was utilized for CFAs and structural equation modeling (SEM) due to its ability to provide unbiased estimation, even in the presence of non-normally distributed variables within a large sample size (Hau & Marsh, 2004). The model’s goodness of fit was evaluated based on the following criteria: a Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) equal to or greater than 0.90, and a Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA) equal to or less than 0.08 (Kline, 2011), a chi-square divided by degrees of freedom ( $\chi^2/df$ ) value below 3 (Tseng & Schmitt, 2008).

To ensure comparability between data from senior high school and college participants, a set of CFA models was implemented in three stages: configural invariance, metric (or weak) invariance, and scalar (or strong) invariance, to investigate measurement invariance. Configural invariance was the initial step in which the structures of the constructs were assessed to be equivalent across groups. Following this, the metric invariance tests required setting equal constraints on factor loadings across groups, while the scalar invariance tests involved setting equal constraints on both factor loadings and item intercepts across groups. Evidence of invariance is deemed to be supported if changes in model fit indices meet the suggested cutoff values. Specifically, a change in CFI ( $\Delta CFI$ ) and TLI ( $\Delta TLI$ ) of less than 0.01 and a change in RMSEA ( $\Delta RMSEA$ ) of less than 0.015 are considered acceptable criteria for establishing measurement invariance (Chen, 2007; Cheung & Rensvold, 2002).

To answer question 1, the MANOVAs and ANOVA were conducted to explore group differences between high school and college students on ER strategy use (i.e., cognitive reappraisal and expressive suppression), well-being, and dimensions of academic engagement (i.e., agentic engagement, behavioral engagement, emotional engagement, and cognitive engagement). To assess and compare the relationships between ER strategy use, well-being, and academic engagement for senior high school students and college students, an initial analysis of zero-order correlations was conducted, followed by two separate SEM analyses. Finally, a bootstrap analysis consisting of 5000 samples and 95 % confidence intervals was conducted to investigate the mediation effects.

## Results

### Preliminary analyses

During the initial analysis, no missing values were found in the college sample since the online questionnaire required responses for all items. However, 12 missing data points (3.7 %) were identified among the senior high school students. To maintain dataset integrity, participants with over 20 % missing data were excluded, resulting in 5 exclusions. The remaining missing data were imputed using the Expectation-Maximization algorithm, appropriate for data assumed to be missing at random (Kline, 2011). Univariate outliers, defined as values with z-scores exceeding 3 standard deviations from the mean, led to the removal of 4 cases. Additionally, multivariate outliers were detected using Mahalanobis distance (Tabachnick & Fidell, 2007), resulting in the exclusion of 18 participants with extreme values. This left a total of 604 cases for further analysis. The data displayed a normal distribution, with skewness and kurtosis values within the acceptable range of  $-2.0$  to  $+2.0$  for all variables (Kim, 2013). Reliability coefficients for all variables ranged from 0.77 to 0.94, indicating good internal consistency. The measurement scales demonstrated discriminant validity, with the square root of the average variance extracted (AVE) exceeding the inter-correlations between constructs (Fornell & Larcker, 1981).

CFAs (see Table 1 in the supplemental file) were conducted on the ER strategy, well-being, and engagement scales. To enhance the statistical acceptability of the model, one item from the expressive suppression scale was eliminated due to its strong cross-loading on the other latent variable, namely, cognitive reappraisal. All measurement models exhibited satisfactory fit values. The absence of Heywood cases (i.e., correlations that exceed 1 or negative variance) was confirmed (see Table 2 in the supplemental file), which also revealed that all standardized parameters differed significantly from zero (Hair et al., 2014). All scales, except for the well-being scale with an AVE value of 0.45, demonstrated satisfactory convergent validity values above the recommended threshold of 0.50, while the composite reliability for the well-being scale (0.86) exceeded the minimum threshold of 0.60, therefore justifying the acceptance of lower AVE values, as per Fornell and Larcker (1981).

**Table 1**

Differences in ER strategy use, well-being, and academic engagement between senior high school and college students.

Variables	<i>M(SD)</i>		<i>F</i>	Partial $\eta^2$
	Senior high school students	College students		
<i>ER strategy</i>				
Cognitive reappraisal	5.17(1.20)	5.08(1.23)	0.85	0.00
Expressive suppression	4.16(1.34)	4.51(1.38)	10.11**	0.02
Well-being	3.51(0.67)	3.43(0.71)	1.84	0.00
<i>Academic engagement</i>				
Agentic engagement	3.08(0.86)	2.94(0.90)	3.79	0.01
Behavioral engagement	3.93(0.71)	3.79(0.76)	6.14*	0.01
Emotional engagement	3.73(0.78)	3.69(0.86)	0.41	0.00
Cognitive engagement	3.54(0.72)	3.68(0.80)	4.84*	0.01

Notes. \* $p < .05$ , \*\* $p < .01$ .

The findings of measurement invariance tests (see Table 3 in the supplemental file) indicate that all three invariance models for the ER strategy measure, well-being measure, and academic engagement measure exhibited a favorable fit. This is evidenced by SRMR values below 0.07, RMSEA values below 0.07, TLI and CFI values exceeding

0.94. The observed decrease in CFI, TLI, and RMSEA values for each invariance comparison within each measure was found to be statistically insignificant, with changes of less than 0.01. Scalar invariance was thus established for all three measures. The results indicate a sound psychometric basis for comparing the data between both groups of students.

*Differences in levels of ER strategy use, well-being, and academic engagement between senior high school and college students*

Table 1 presents the differences in ER strategy use, well-being, and academic engagement between senior high school and college students. A one-way MANOVA was conducted to examine differences between senior high school and college students on ER strategies. The educational level (senior high school vs. college) showed a significant impact on the use of ER strategies (Wilks' Lambda = 0.98,  $F(2, 601) = 7.03$ ,  $p = .001$ ,  $\eta^2 = 0.02$ ). Specifically, college students reported higher levels of expressive suppression strategy use ( $F(1, 602) = 10.11$ ,  $p = .002$ ,  $\eta^2 = 0.02$ ). No significant differences were detected between the groups in cognitive reappraisal ( $p = .357$ ). A separate one-way MANOVA was conducted to examine differences in academic engagement between senior high school and college students. There was a statistically significant difference in academic engagement based on the educational level (Wilks' Lambda = 0.08,  $F(4, 599) = 12.62$ ,  $p < .001$ ,  $\eta^2 = 0.08$ ). Follow-up univariate analyses revealed that college students reported higher levels of cognitive engagement ( $F(1, 602) = 4.84$ ,  $p = .028$ ,  $\eta^2 = 0.01$ ) compared to senior high school students. In contrast, senior high

**Table 2**

Zero-order correlation between ER strategy use, well-being, and academic engagement for senior high school students and college students.

	Cognitive Reappraisal	Expressive Suppression	Well-being	Agentic Engagement	Behavioral Engagement	Emotional Engagement	Cognitive Engagement
Cognitive Reappraisal	–	0.36***	0.51***	0.55***	0.64***	0.61***	0.69***
Expressive Suppression	0.25***	–	0.22***	0.25***	0.27***	0.24***	0.33***
Well-being	0.44***	0.15*	–	0.38***	0.39***	0.37***	0.44***
Agentic Engagement	0.52***	0.18**	0.43***	–	0.53***	0.62***	0.59***
Behavioral Engagement	0.64***	0.17**	0.41***	0.52***	–	0.80***	0.73***
Emotional Engagement	0.58***	0.19**	0.44***	0.64***	0.81***	–	0.78***
Cognitive Engagement	0.60***	0.22***	0.51***	0.66***	0.71***	0.79***	–

Notes. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . The lower half of the correlation matrix represents the correlations between ER strategy use, well-being, and academic engagement variables specifically for senior high school students. On the other hand, the upper half of the matrix displays the correlations for college students.

**Table 3**

Results of bootstrapping mediation analysis.

Indirect path	Education level	Unstandardized Estimate	Standardized Estimate	Boot S.E.	Bias-Corrected 95 %CI		Percentile 95 %CI	
					Lower	Upper	Lower	Upper
CR → WB → AE	Senior	0.09	0.14	0.05	0.06	0.26	0.05	0.25
	College	0.06	0.07	0.04	−0.01	0.16	−0.01	0.15
CR → WB → BE	Senior	0.05	0.09	0.05	0.00	0.21	0.00	0.21
	College	0.03	0.05	0.04	−0.02	0.13	−0.02	0.13
CR → WB → EE	Senior	0.06	0.11	0.05	0.03	0.23	0.03	0.23
	College	0.03	0.04	0.04	−0.04	0.12	−0.05	0.12
CR → WB → CE	Senior	0.10	0.16	0.06	0.06	0.30	0.06	0.30
	College	0.05	0.07	0.04	−0.01	0.15	−0.01	0.14
ES → WB → AE	Senior	0.01	0.02	0.02	−0.02	0.07	−0.02	0.07
	College	0.01	0.01	0.01	−0.01	0.04	−0.01	0.04
ES → WB → BE	Senior	0.01	0.01	0.02	−0.01	0.07	−0.02	0.06
	College	0.00	0.01	0.01	−0.01	0.04	−0.01	0.03
ES → WB → EE	Senior	0.01	0.02	0.02	−0.02	0.07	−0.02	0.06
	College	0.00	0.00	0.01	−0.01	0.04	−0.01	0.03
ES → WB → CE	Senior	0.01	0.02	0.03	−0.03	0.09	−0.03	0.08
	College	0.00	0.01	0.01	−0.01	0.04	−0.01	0.03

Notes. CR = Cognitive Reappraisal, ES = Expressive Suppression, WB = Well-being, AE = Agentic Engagement, BE = Behavioral Engagement, EE = Emotional Engagement, CE = Cognitive Engagement.

school students exhibited higher levels of behavioral engagement ( $F(1, 602) = 6.14, p = .013, \eta^2 = 0.01$ ) and, at borderline significance, higher agentic engagement ( $F(1, 602) = 2.94, p = .052, \eta^2 = 0.01$ ) than college students. No significant differences were found between the groups in emotional engagement ( $p = .522$ ). One-way ANOVA results for well-being showed no significant differences between senior high school and college students ( $p = .176$ ).

#### Differences in the relationships between ER strategies, well-being, and academic engagement between senior high school and college students

Zero-order correlations were carried out to investigate the relationships between ER strategy use, academic engagement, and well-being separately for senior high school students and college students. The results indicated noteworthy positive associations among all the subscales within each group, with correlation coefficients ranging from 0.15 to 0.81 (refer to Table 2 for specific correlation values).

To assess and compare the structural relationships between ER strategy use, well-being, and academic engagement for senior high school students and college students, two separate SEM analyses were performed. The findings demonstrated that the SEM analysis for senior high school group yielded a satisfactory fit to the collected data,  $\chi^2(df) = 1233.78(633), p < .001, \chi^2/df = 1.95, RMSEA = 0.06, 90\% CI [0.05, 0.06], CFI = 0.93, TLI = 0.92, SRMR = 0.04$ . As illustrated by Fig. 1, cognitive reappraisal strategy use had a significant impact on agentic engagement ( $\beta = 0.40, p < .001$ ), cognitive engagement ( $\beta = 0.43, p < .001$ ), behavioral engagement ( $\beta = 0.60, p < .001$ ), emotional engagement ( $\beta = 0.52, p < .001$ ), and well-being ( $\beta = 0.48, p < .001$ ) for the senior high school students. Additionally, it was observed that well-being positively predicted agentic engagement ( $\beta = 0.29, p < .001$ ), behavioral engagement ( $\beta = 0.18, p = .067$ ), cognitive engagement ( $\beta = 0.34, p < .001$ ), and emotional engagement ( $\beta = 0.24, p = .007$ ). However, expressive suppression strategy use had no significant effect on either well-being or any dimension of academic engagement, with  $p$ -values greater than 0.05.

The results of the SEM analysis for the college group showed a good fit to the data,  $\chi^2(df) = 1225.03(633), p < .001, \chi^2/df = 1.94, RMSEA = 0.06, 90\% CI [0.05, 0.06], CFI = 0.94, TLI = 0.93, SRMR = 0.05$ . Among college students (refer to Fig. 2), well-being did not have a significant effect on any dimension of engagement, as indicated by  $p$ -values greater than 0.05. However, it is worth noting that the cognitive reappraisal strategy use demonstrated a substantial influence on their behavioral

engagement ( $\beta = 0.58, p < .001$ ), agentic engagement ( $\beta = 0.49, p < .001$ ), emotional engagement ( $\beta = 0.58, p < .001$ ), cognitive engagement ( $\beta = 0.59, p < .001$ ), and well-being ( $\beta = 0.51, p < .001$ ). Similar to senior high school students, the expressive suppression strategy use for college students did not demonstrate any significant effect on either well-being or any dimension of academic engagement, with  $p$ -values greater than 0.05.

A bootstrap sampling method of 5000 iterations was employed to examine the mediating role of well-being in the relationship between ER strategy and academic engagement. According to Table 3, for senior high school students, well-being was found to mediate the association between cognitive reappraisal and each dimension of academic engagement, as indicated by the non-inclusion of zero within the 95 % confidence intervals. Conversely, this mediating effect was not observed among college students. Furthermore, well-being did not serve as a mediator between expressive suppression and either dimension of academic engagement for both groups, as the 95 % confidence intervals included zero.

#### Discussion

##### Differences in levels of ER strategy use, well-being, and academic engagement between senior high school and college students.

The study examined ER strategy use between senior high school and college students, finding both groups employed similar levels of cognitive reappraisal. This suggests that cognitive reappraisal is a common ER strategy among EFL learners, irrespective of educational level, contrasting Garnefski and Kraaij (2006), who found fewer adaptive strategies in early adolescents compared to late adolescents or adults. Their study, however, was conducted in the context of general psychology rather than educational psychology or SLA. Thus, the observed similarity in cognitive reappraisal use in this study may be influenced by the specific context of EFL learning. Emotions and their regulation are deeply rooted in situational contexts (Jarrell & Lajoie, 2017), and previous research has identified situationally dependent differences between adolescents and adults (Blanchard-Fields et al., 2004). The educational environment and unique challenges of EFL learning might promote the use of cognitive reappraisal as an effective strategy for managing emotions across both age groups. Thus, this context-specific demand for emotion regulation could potentially diminish the age-related differences typically observed in other contexts (Blanchard-

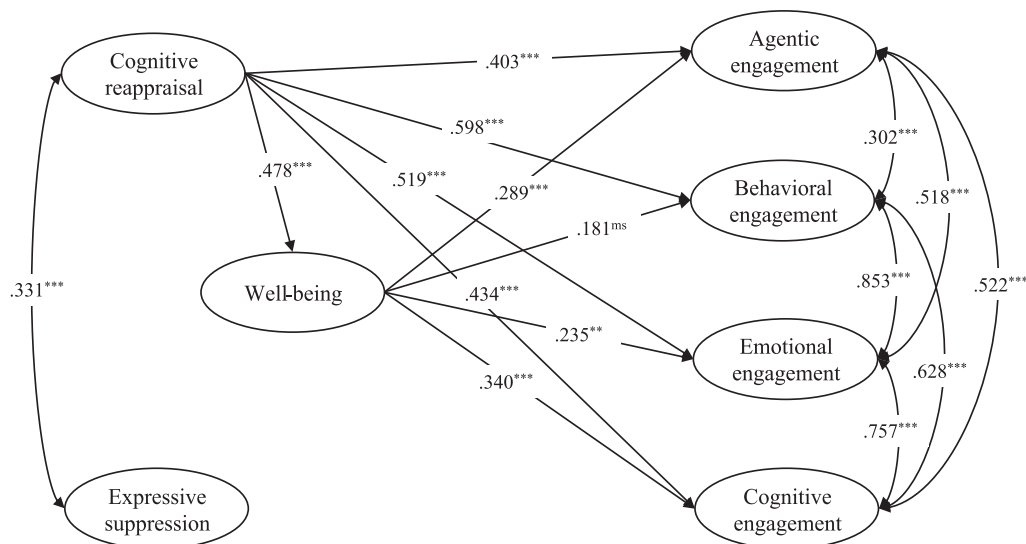


Fig. 1. The structural relationships between ER strategy use, well-being, and academic engagement for senior high school students. Notes.  $**p < .01$ ,  $***p < .001$ , ms = marginally significant.

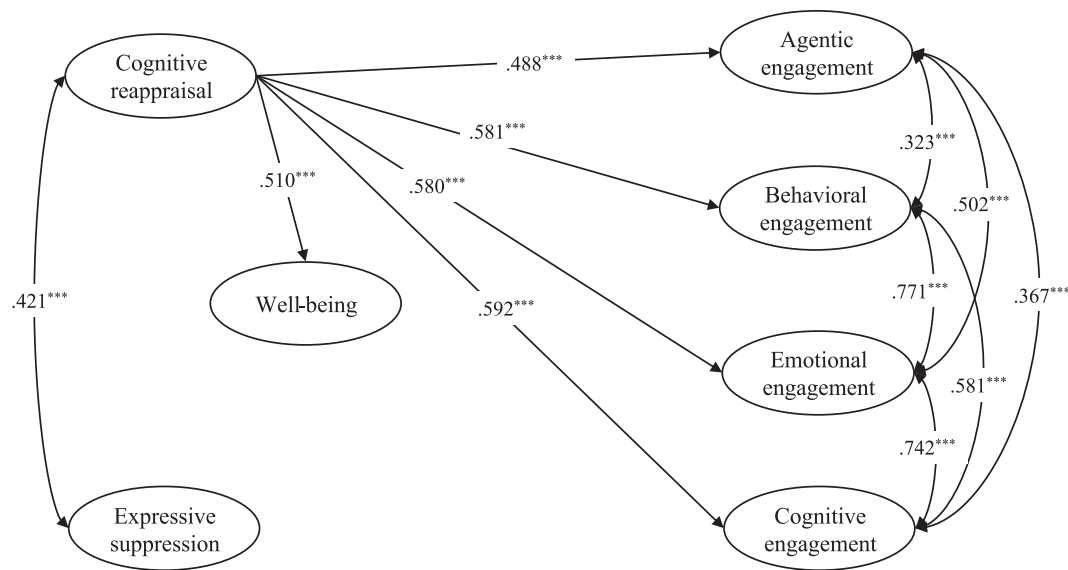


Fig. 2. The structural relationships between ER strategy use, well-being, and academic engagement for college students.  
Notes. \*\*\* $p < .001$ .

Fields et al., 2004). Nonetheless, this speculation requires further empirical support. Another possible explanation might be that the narrow age range in our study (ages 14–17 for high school, ages 17–25 for college) might not capture significant developmental differences in cognitive regulation, as indicated by prior research (e.g., Garnefski & Kraaij, 2006; Smith et al., 2023; Zimmermann & Iwanski, 2014). However, a significant difference was observed in the use of expressive suppression, with college students relying more on this strategy than senior high school students. This aligns with developmental psychology research indicating a positive correlation between age and the tendency to suppress emotions (De France & Hollenstein, 2017; Loughheed & Hollenstein, 2012). The transition to college often brings new challenges—academic pressures, social adjustments, and increased independence—that can trigger emotions individuals may feel compelled to suppress, especially in unfamiliar or judgmental contexts (Kroshus et al., 2021). Overall, these findings support Blanchard-Fields and Coats (2008), showing a lack of age-related changes in instrumental problem-solving strategies while highlighting an increase in passive ER strategies, like suppression, from late adolescence to adulthood.

The study's findings illustrate the nuanced dynamics of academic engagement across both groups, with college students demonstrating higher cognitive engagement but lower agentic and behavioral engagement. These results support the notion that academic engagement is dynamic, malleable, and context-dependent (Appleton et al., 2008; Finn & Zimmer, 2012; Hiver et al., 2024). That being said, the differences might be as a result of different language learning contexts where EFL learners are situated. Specifically, high school students, facing pressures from college entrance exams, are likely to engage more actively in structured environments (João Pires, 2019; Li et al., 2018; Teuber et al., 2021; Wu et al., 2024). Conversely, the transition to a more independent college learning style may reduce agentic participation. However, the nearly significant difference in agentic engagement highlights a trend worth exploring further with a larger sample. Interestingly, the emotional engagement between the two groups was almost the same. This finding suggests that students' emotional engagement is very complex since the emotional engagement of EFL learners is not only shaped by learner-internal factors such as intrinsic values and interest (e.g., Sun et al., 2024), but also determined by learner-external factors like learning environment and teacher support (e.g., Pan et al., 2023; Sadoughi & Hejazi, 2023).

In terms of well-being, the study found no significant differences in

well-being levels between senior high school and college students in the context of EFL learning, contradicting some prior research (Conley et al., 2020; Gutman & Vorhaus, 2012; Kaya & Erdem, 2021; Kroshus et al., 2021). This discrepancy may arise from those studies focusing on broader well-being aspects, rather than the specific EFL context. The similar well-being levels can be understood through Confucian influences, which emphasize education as vital for personal and national improvement, creating pressure across all educational levels (Hu, 2002). In addition, both groups are driven by the high stakes associated with English proficiency, such as the *Gaokao* and CET-4/6 exams, which are crucial for job prospects and financial stability (Chen, Burton, & Bonanno, 2020; Chen, Hao, & Xiao, 2020; Gao & Yang, 2023). This shared pressure and the internalization of educational values likely explain the lack of significant differences in well-being between the two groups (Hu, 2002; Li et al., 2012).

#### *Differences in the relationships between ER strategies, well-being, and academic engagement between senior high school and college students*

This research explored and compared the differences in the relationships between well-being, ER strategy use, and academic engagement between senior high school students and college students, an area that has not been previously examined by other research. The results addressed this research gap by revealing both similarities and differences in the relationship patterns between constructs.

In terms of similarities, two significant findings emerged from the study. First, for both groups of students, cognitive reappraisal positively predicted all components of academic engagement. These findings resonated with prior studies which revealed that students frequently using cognitive reappraisal generally demonstrated a higher level of engagement in their academic tasks (Santos et al., 2021). The adaptive nature of cognitive reappraisal likely accounts for its positive influence on academic engagement (Garnefski & Kraaij, 2006). Specifically, cognitive reappraisal involves reframing or reinterpreting a situation more constructively or positively (Gross, 1998), which allows individuals to better manage stress and challenges (Gross, 2015; Gross & John, 2003). By using cognitive reappraisal, students may be able to view academic tasks as less threatening or overwhelming, leading to increased motivation, focus, and enthusiasm for their studies (Brady et al., 2018).

More importantly, the study's findings indicate that well-being



mediates the relationship between cognitive reappraisal and academic engagement among high school students, suggesting that emotional and psychological states play a crucial role in how cognitive reappraisal affects their engagement in L2 learning. This implies that the use of cognitive reappraisal may promote L2 learners' well-being, which, in turn, enhances their academic engagement. These results can be explained by the PMER (Gross, 1998, 2015) and the broaden-and-build theory (Fredrickson, 2001). Specifically, as an adaptive ER strategy, cognitive reappraisal allows L2 learners to reinterpret negative or challenging situations in a more positive way (Beaumont et al., 2023). By reframing these perceptions, students can reduce stress and anxiety, thereby improving their emotional well-being (Gross & John, 2003). In turn, this improved well-being promotes a broader range of thoughts and behaviors, fostering resilience and adaptive academic engagement in L2 learning (Dewaele & Li, 2021). The lack of a significant mediating effect among college students suggests that their experiences and contexts may diminish the influence of well-being. These results aligned with claims by Wong et al. (2024) that age might influence the relationships between these variables through alterations in the school environment, such as school transitions, or through developmental maturation and other changes within the students that come with growing older. It is possible that senior high school students may still be developing their coping strategies and emotional regulation skills, making them more sensitive to the influence of well-being on their academic engagement. In comparison, college students face a wider range of experiences, responsibilities, and stressors (Conley et al., 2020). Consequently, the link between well-being and academic engagement may be moderated by factors such as academic workload, social pressures, and the transition to adulthood (Kaya & Erdem, 2021; Kroshus et al., 2021). Notably, despite these different mediation relationships between the two groups, further empirical investigation is warranted, preferably with a larger sample size, to better assess the robustness of these relationships.

However, while the correlation results indicated significant positive associations between expressive suppression and academic engagement, regression analyses revealed no link between expressive suppression and any dimension of academic engagement, and well-being did not mediate the relationship for either group. Overall, these findings align with Bakır-Yalçın and Usluel (2024) and provide partial support for Zhoc et al. (2022), indicating that expressive suppression exerts only a minimal impact on the behavioral dimension of engagement, while contradicting Seiber et al. (2017) finding that expressive suppression significantly predicts academic disengagement. In addition, the findings were inconsistent with previous research on expressive suppression (Ben-Eliyahu & Linnenbrink-Garcia, 2015; Gross & Cassidy, 2019; Richards & Gross, 2000), which revealed the significant negative effects of expressive suppression on well-being. Interestingly, the positive correlations observed resonate with Zhoc et al. (2022), which was also conducted in a Chinese context. One possible explanation for these findings is the cultural emphasis on emotional restraint and self-control in Chinese Confucian culture (Chen, Burton, & Bonanno, 2020; Chen, Hao, & Xiao, 2020), which may lead students to habitually suppress their emotions in academic settings. In this context, the frequent use of emotional suppression is associated with a greater ability to effectively manage and control emotions (Chen, Burton, & Bonanno, 2020; Chen, Hao, & Xiao, 2020). This robust relationship can mitigate the negative effects typically associated with suppression and offset its negative impact on well-being (Chen, Burton, & Bonanno, 2020; Chen, Hao, & Xiao, 2020). In China, emotional suppression is often used to address contextual needs, which further supports the idea that frequent emotional suppression is not necessarily maladaptive in Chinese cultures (Soto et al., 2011). Such habitual response may, therefore, foster a superficial sense of well-being and academic engagement without fostering deeper engagement in learning activities as indicated by the low-to-moderate correlations in this study. Thus, when included in the model alongside cognitive reappraisal, the adaptive effects of cognitive

reappraisal may overshadow those of expressive suppression, thereby limiting its predictive effects on well-being and academic engagement. However, this tentative explanation warrants further empirical exploration. Despite the potential cultural influences, the non-significant predictive effects of expressive suppression could also be attributed to its maladaptive nature, which fails to modify the emotions experienced, leaving negative feelings unresolved and even accumulated (Gross, 1998, 2015). Such suppression requires continual effort and resources to monitor and control emotions, ultimately impairing cognitive functioning necessary for optimal learning performance (Zhoc et al., 2022).

### Implications, limitations, and suggestions for future research

Theoretically, this study provided empirical support for the applicability of PMER (Gross, 1998, 2015) in SLA. It is the first research to investigate the differences in ER strategy use, well-being, academic engagement, and their relationships among college students and senior high school students in the Chinese EFL context.

Furthermore, the study's findings offer important pedagogical implications for English educators in both senior high school and college settings. For senior high school EFL learners, to enhance their cognitive engagement, teachers should empower students with greater autonomy, utilize authentic materials, and create classroom activities that foster independent analytical and problem-solving skills (Santos et al., 2021; Wu et al., 2024). For college students who displayed lower agentic and behavioral engagement, teachers could adopt strategies like organizing innovation training and projects, incorporating interactive learning activities that promote communication (Zare-ee & Hejazi, 2018), and using the teacher's emotional or personality charm like humor as a means to motivate students to actively engage in the classroom and dedicate significant effort to their studies (Dewaele & Li, 2021). To address the tendency for expressive suppression among college learners, teachers are advised to foster a supportive environment by building positive relationships with students and providing specific positive feedback in addition to corrective feedback to help learners build on their achievements (Khajavy & Vaziri, 2024). For both groups of L2 learners, positive reappraisal can be encouraged by offering students opportunities to differentiate between positive and negative thinking through role-play, real-life case presentations, group discussions, or fictional stories (Santos et al., 2021). Additionally, activities that promote self-awareness, such as identifying personal strengths and resources, can help students navigate challenging learning situations (Santos et al., 2021). Furthermore, teachers are advised to encourage open emotional expression and provide a supportive environment where students feel safe to share their feelings. This can be achieved through group work, peer support systems, and fostering a classroom culture that values emotional honesty (Khajavy & Vaziri, 2024; Sadoughi & Hejazi, 2023). Moreover, encouraging learners to reflect on their stressors and potential strategies serves as a valuable communicative activity that fosters awareness of their well-being and empowers them, as they recognize that their ideas and suggestions are valued by their teachers (Khajavy & Vaziri, 2024). In addition to focusing on learner well-being when instructing and engaging with students, teachers can deliberately teach well-being skills, including physical and mental self-care (Mercer, 2021), and assist students in cultivating positive perceptions, beliefs, and attitudes regarding their surrounding environment (Li et al., 2024).

While the study offers valuable insights, it is crucial to acknowledge its limitations. First, its quantitative nature may have overlooked nuances in the relationships between ER strategy use, well-being, and academic engagement, such as individual variability, contextual influences, and the dynamics of personal experiences. Incorporating a mixed-methods approach like qualitative interviews, could provide richer insights. Second, the cross-sectional design restricts the ability to explore longitudinal changes in students' profiles. Future research with a longitudinal design is essential to capture the dynamic nature of ER strategy use, well-being, and academic engagement. Additionally, the

study did not differentiate between English majors and non-English majors, which could yield different findings. Future studies can investigate how specialized language training influences these variables. Furthermore, the study did not include gender as a variable in the current analysis to maintain a focused investigation on the overall patterns of ER strategies, well-being, and academic engagement among EFL learners, prioritizing broad trends across the entire sample. However, future studies could consider exploring gender differences, as they may play a significant role in shaping these variables (e.g., Blanchflower & Bryson, 2024; Santos et al., 2021). Lastly, the small sample size may limit the robustness and generalizability of the findings. Future research should aim for larger sample sizes and consider diverse educational settings to enhance the validity of the findings.

Some suggestions for further research are also worth noting. ER strategy use is significantly influenced by context, as the same strategy can be adaptive or maladaptive depending on situational factors that shape motives and outcome expectations (Gross, 2015; Jarrell & Lajoie, 2017). Thus, context is a critical but often overlooked aspect of emotion regulation, and its significance extends to the regulation of achievement emotions (Jarrell & Lajoie, 2017). It is therefore recommended to further investigate ER strategies in a specific social and learning context and examine additional specific ER strategies, such as seeking emotional support and substance use. In addition, future research could examine how contextual factors moderate the relationship between well-being and academic engagement, with qualitative and naturalistic data offering valuable insights into their influences on L2 outcomes. Additionally, while learner well-being has garnered greater focus, there remain significant gaps in our understanding of its dynamics in connection to language learning and the most effective strategies for promoting it alongside language skills (Mercer, 2021). To gain a more holistic comprehension of the relationships among the variables, it is also suggested that a person-centered approach like latent profile analysis be employed, which takes into account the potential existence of distinct subgroups within the sample.

## Conclusion

In conclusion, this research has provided valuable insights into the differences in ER strategy use, well-being, academic engagement, and relationships between college students and senior high school students in the context of Chinese EFL learning. The results indicated that cognitive reappraisal was a commonly utilized ER strategy among EFL learners regardless of their educational level, while expressive suppression was more prevalent in college students compared to senior high school students. It was also revealed that college EFL learners exhibited lower levels of agentic engagement and behavioral engagement, but higher levels of cognitive engagement compared to senior high school students. However, no significant difference was observed between the two groups regarding their well-being levels. Moreover, while significant correlations were observed among all study variables for both groups, expressive suppression showed no significant effect on any dimension of engagement, and well-being did not mediate this relationship for either group. Notably, cognitive reappraisal emerges as a crucial predictor of academic engagement across both groups, with well-being mediating this relationship among high school students but not among college students. However, expressive suppression did not predict any dimension of academic engagement or well-being for both groups.

## CRedit authorship contribution statement

**Hong Shi:** Writing – review & editing, Supervision, Project administration, Methodology, Conceptualization, Funding acquisition, Investigation. **Wei Sun:** Writing – original draft, Investigation, Software.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appdev.2025.101773>.

## Data availability

The data that has been used is confidential.

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