The Mediating Role of Cognitive Reappraisal in The Relationship Between Perceived Autonomy Support and Mental Health Among Vocational College Students in Shanghai, China

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ABSTRACT

China's Technical and Vocational Education and Training (TVET) system has experienced policy-driven expansion and reform, drawing increasing attention to the mental health of vocational students. Existing research suggests that students in vocational education contexts may experience elevated levels of psychological distress, highlighting the need to examine educational and psychological factors associated with their mental health. Grounded in Self-Determination Theory (SDT), this study examined whether cognitive reappraisal mediates the association between perceived autonomy support and mental health among vocational college students in Shanghai, China. A quantitative descriptive correlational design was adopted, involving 220 students enrolled in vocational colleges. Data were collected using the Autonomy Support Questionnaire (ASQ), the Learning Climate Questionnaire (LCQ), the Emotion Regulation Questionnaire (ERQ), and the Mental Health Continuum–Short Form (MHC-SF). Reliability analysis indicated good to excellent internal consistency across the study measures (Cronbach's α = .831–.938). Confirmatory factor analysis supported the adequacy of the measurement model, with acceptable overall fit and evidence of convergent validity. Correlation analysis showed that perceived autonomy support, cognitive reappraisal, and mental health were all positively associated. Mediation analysis further indicated that cognitive reappraisal partially mediated the association between perceived autonomy support and mental health (β = .176, 95% CI [0.098, 0.259]). The model explained 29.6% of the variance in cognitive reappraisal and 48.3% of the variance in mental health. These findings suggest that autonomy-supportive environments may be linked to better mental health partly through students' use of cognitive reappraisal, with implications for student support and well-being promotion in TVET.

Keywords: Perceived Autonomy Support, Cognitive Reappraisal, Mental Health, Self-Determination Theory, Emotion Regulation, TVET.

1. Introduction

China's vocational education system, situated within the broader Technical and Vocational Education and Training (TVET) sector, has experienced substantial policy support and structural reform over the past decade. Since the release of the *National Medium- and Long-Term Education Reform and Development Outline (2010–2020)* by the State Council, vocational education has been positioned as a strategic component of national human-capital development, with increasing emphasis on the quality and sustainability of vocational talent cultivation.

Within this system, vocational higher education has expanded rapidly. By 2022, China had established a large-scale vocational education infrastructure nationwide, reflecting substantial institutional expansion and student participation (MOE, 2023). However, the rapid expansion of vocational colleges has also drawn attention to student-level outcomes, particularly the psychological well-being of vocational college students, a population that has long remained underrepresented in mainstream educational and psychological research.

Vocational college students must navigate academic coursework, skill-based training, and early career choice during the transition from late adolescence to emerging adulthood, a developmental period characterized by heightened emotional reactivity and increased sensitivity to stress (Ahmed et al., 2015; Orben, 2020). While some studies suggest that vocational college students may also experience concerns related to social comparison and perceived status, empirical evidence in this population remains limited, underscoring the need for more rigorous investigation into the psychosocial factors shaping their mental health.

Against this developmental and contextual backdrop, both teacher and parental support have been identified as important external resources influencing vocational college students' emotional adjustment. Research conducted in vocational college contexts indicates that perceived teacher emotional support is positively associated with mental well-;being and related to psychological resilience and anxiety among Chinese vocational college students (Fan & Liu, 2024; Zeng et al., 2019). Similarly, teacher support has been found to enhance students' positive emotions through behavioral and cognitive pathways, such as increased academic control and engagement with peers (Chen & Leung, 2023). Beyond the institutional context, parental autonomy support has been shown to exert a lasting influence on adolescents' and young adults' emotional development. Prior studies demonstrate that parental autonomy support is associated with greater life satisfaction, better mental health, and more adaptive emotion-regulation tendencies (Li & Liu, 2023). Among vocational college students specifically, parental support has been linked to stronger autonomous motivation and healthier adjustment patterns (Shen et al., 2023), while parental emotional and autonomy support has been found to reduce depressive symptoms through psychological satisfaction and cognitive reappraisal (Van der Kaap-Deeder et al., 2020).

However, these relationships remain insufficiently examined in vocational and TVET contexts, particularly among vocational college students in China, whose academic pathways and developmental demands differ in important ways from those of general higher education populations. In the present study, Perceived Autonomy Support (PAS) was examined as an aggregate construct reflecting students' overall perceptions of autonomy support across important interpersonal contexts. This approach was adopted for both practical and

psychometric reasons, as it allowed the analysis to focus on the broader autonomy-supportive climate experienced by students while remaining consistent with the study's overall measurement and analytic framework.

Cognitive Reappraisal (CR), an emotional regulation strategy involving the reframing of stressful events to modify emotional responses. Evidence consistently shows that CR is associated with reduced negative affect, and improved mental health outcomes among adolescents and emerging adults (Gross, 2015; Shum et al., 2025; Roos & Bennett, 2023).Recent studies with Chinese college populations further indicate that frequent use of CR predicts lower stress responses and higher well-being (Fan & Liu, 2024). Given the specific psychological vulnerabilities of vocational college students, CR may serve as a crucial internal resource that enables them to translate PAS into healthier emotional and mental states.

CR may be particularly relevant in East Asian contexts, where emotional moderation, self-regulation, and the maintenance of interpersonal harmony are often culturally valued (Song et al., 2024; Wei et al., 2013). In such contexts, reinterpreting stressful situations in less disruptive ways may be more socially reinforced than more outwardly expressive responses. This cultural consideration is relevant to the present study, as it suggests that the mediating role of CR among Chinese vocational college students should be interpreted not only as an individual regulatory process, but also as one shaped by broader sociocultural expectations.

Grounded in Self-Determination Theory (SDT) and emotion-regulation theory, this study pre-specified a mediation model in which PAS was hypothesised to predict Mental Health (MH) both directly and indirectly through cognitive reappraisal among vocational college students in Shanghai, China. Specifically, PAS was expected to positively predict CR and MH, while CR was expected to positively predict MH. The mediation test was treated as the primary confirmatory analysis, whereas supplementary analyses assessed robustness after adjusting for age and gender. The findings aim to inform educational practice and MH support in vocational college contexts, particularly within Shanghai and similar TVET settings in China.

One contribution of the present study is its focus on vocational college students, who remain underrepresented in mental-health research within China's TVET context. It also examines whether CR mediates the association between PAS and MH. The results clarify how CR is involved in the relationship between PAS and MH and offer implications for student support and mental health promotion in vocational higher education.

Research Questions:
RQ1: What are the relationships between perceived autonomy support, cognitive reappraisal, and mental health among vocational college students in Shanghai?
RQ2: Does Cognitive Reappraisal mediate between perceived autonomy support and mental health among vocational college students?

The hypothesised relationships among the study variables are reflected in the following research hypotheses:

Research Hypotheses:

Ha_1:Perceived autonomy support has a positive effect on cognitive reappraisal.
Ha_2:Cognitive reappraisal has a positive effect on mental health.
Ha_3:Perceived autonomy support has a positive effect on mental health.
Ha_4:Cognitive reappraisal mediates the relationship between perceived autonomy support and mental health.

2. Literature Review

2.1. Emotion Regulation

Cognitive Reappraisal (CR), an emotion regulation strategy that involves changing the way one interprets emotion-eliciting situations to alter their emotional impact (Gross, 1998). Unlike suppression, which inhibits emotional expression, CR targets cognitive evaluation, allowing individuals to reduce negative emotions while enhancing positive emotions (Gross, 2015). CR has been associated with better psychological adjustment, improved interpersonal relationships, and higher subjective well-being (Fan & Liu, 2024).

A growing body of research suggests that CR not only attenuates negative emotional experiences but also supports more effective coping with stress (Ahmed et al., 2015; Fan & Liu, 2024). Empirical research with adolescents and young adults indicates that reappraising stressful academic and developmental challenges in more constructive terms is associated with better adjustment under stress (Troy et al., 2010; Silvers, 2022). Mechanistically, such reframing can reduce threat appraisals and help individuals maintain approach-oriented engagement with valued goals rather than disengaging or ruminating. In TVET contexts, where students often face sustained performance pressure and career uncertainty, CR may therefore be particularly beneficial. Consistent with this account, more frequent use of CR has been linked to lower anxiety, depression, and burnout, as well as higher life satisfaction and resilience (Riepenhausen et al., 2022; Stover et al., 2024; Chen & Leung, 2023).

CR is also shaped by cultural and educational contexts. Prior evidence suggests that Chinese individuals report relatively frequent use of cognitive reappraisal, and East Asian educational settings are often characterised by strong academic and social evaluative pressures, which may increase the relevance of reappraisal in managing school related stress (Qu et al., 2017; Chyu et al., 2022). A plausible explanation is that reappraisal aligns with culturally valued self-regulation goals, such as maintaining composure and interpersonal harmony, and can be enacted without overt emotional expression. For vocational college students facing academic and career challenges, CR provides a critical cognitive resource to enhance adaptation and psychological well-being (Li & Liu, 2023).

Neurocognitive studies further support the effectiveness of CR. Functional imaging and psychophysiological research indicate that CR engages prefrontal regulatory circuits and modulates amygdala activity, reducing emotional reactivity and enhancing emotion regulation capacity (Ahmed et al., 2015; Morawetz et al., 2017). This evidence demonstrates that CR is not only a psychological strategy but also has measurable neurocognitive correlates, reinforcing its role as a robust factor in improving Mental Health (MH). These neurocognitive findings are consistent with the mechanistic view that reappraisal involves top–down regulatory processes that can dampen emotional reactivity.

Recent literature indicates that CR may function as an important mediating pathway between environmental support and psychological outcomes. Within the framework of Self-Determination Theory (SDT), autonomy-supportive environments are expected to satisfy students' basic psychological needs, especially the need for autonomy, thereby fostering more autonomous rather than controlled forms of regulation (Deci & Ryan, 1985, 2000; Ryan & Deci, 2024). When students experience their environment as autonomy-supportive, they may be more likely to process stressful situations in flexible, self-endorsed, and reflective ways, rather than in rigid or externally pressured ways. From the perspective of emotion-regulation theory, CR involves reinterpreting potentially stressful situations in ways that modify their emotional impact (Gross, 1998; Gross, 2015). Accordingly, CR can be understood as a theoretically plausible mechanism through which perceived autonomy support may be associated with better mental health. Simultaneously, the present study conceptualises CR as one theoretically grounded mediating pathway, rather than the only mechanism linking autonomy support to MH, as other SDT-relevant processes, such as competence, relatedness, and broader psychosocial support, may also be involved (Ryan & Deci, 2024; Vasconcellos et al., 2020).

2.2. The Relationship between Cognitive Reappraisal, Perceived Autonomy Support and Mental Health

Besides SDT, the environmental and personal resource perspective also provides a useful framework for understanding the connection between situational support, individual self-regulation, and well-being (Gee & Cohodes, 2023; Fan & Liu, 2024). Within this framework, PAS can be considered a key situational resource, while CR is an important individual self-regulation resource associated with better MH outcomes. SDT typically understands autonomy support as an atmosphere or style of interpersonal interaction (Ryan & Deci, 2000). However, in students' daily lives, autonomy support may come from multiple significant others, including teachers, parents, friends and school peers, and these sources may function in distinct ways (Tilga et al., 2021; Audet et al., 2021). Mechanistically, supportive interactions may foster more autonomous and integrative forms of regulation, thereby increasing the likelihood of adaptive meaning construction strategies such as CR (Ryan & Deci, 2000; Benita, 2020).

However, the significance of autonomy support may vary across stressful contexts. Teacher autonomy support is typically embedded in learning environments and is closely tied to task engagement, instructional feedback, and students' perceived control in academic settings, whereas parental autonomy support may be especially salient in relation to family expectations and developmental decision-making, particularly in collectivist cultural contexts in which family-related goals remain highly influential (Marbell-Pierre et al., 2019; Mammadov et al., 2023). By contrast, peers may play a more prominent role in interpersonal coping, as peer interactions can facilitate emotion regulation by providing social reappraisal, validation, and alternative perspectives on emotionally salient situations (Sahi et al., 2023). Although some studies have examined autonomy support from multiple sources, including teachers, parents, and peers, the source-specific mechanisms through which these forms of support operate remain insufficiently differentiated. Accordingly, although the present study operationalizes autonomy support at the overall perceived level, distinguishing among different sources and testing their unique pathways represents an important direction for future research.

Perceived Autonomy Support (PAS) refers to students' perceptions that significant figures in their environment, such as teachers, parents, and peers, encourage choice, self-initiation, and independent problem-solving (Ryan & Deci, 2000). As a core concept of SDT, PAS supports the fulfillment of basic psychological needs, autonomy, competence, and relatedness, which are essential for optimal psychological functioning (Deci & Ryan, 1985; Ryan & Deci, 2024).

Research has consistently shown that autonomy-supportive teaching and parenting are associated with better MH outcomes, including greater well-being and fewer emotional problems, among adolescents and young adults (Ma et al., 2022; Kristensen & Jeno, 2024). In educational settings characterised by substantial academic and developmental demands, PAS may help buffer stress and strengthen students' emotional and motivational resources (Lan & Moscardino, 2019).

Beyond direct effects, PAS also promotes adaptive emotion regulation strategies, particularly CR. Students in autonomy-supportive environments are more likely to engage in cognitive reappraisal, reinterpreting challenging situations in ways that are associated with lower emotional distress (Shen et al., 2023). Previous studies using Structural Equation Modeling (SEM) have reported significant associations among autonomy-supportive environments, CR, and MH, suggesting that CR may play a linking role between PAS and emotional well-being (Li & Liu, 2023; Zeng et al., 2019).

Additionally, PAS may not operate in isolation, but rather in conjunction with other psychosocial resources, such as perceived competence and peer support, in facilitating students' use of adaptive emotion regulation strategies, particularly CR. From the perspective of SDT, autonomy-supportive environments promote more self-endorsed functioning and are closely associated with the satisfaction of basic psychological needs, especially competence, thereby providing a favorable psychological basis for flexible and constructive regulation of stressful experiences (Ryan & Deci, 2000). Empirical research has further shown that perceived teacher autonomy support is positively associated with students' self-efficacy, and that peer support may strengthen the beneficial effects of autonomy-supportive contexts on student functioning (Zhao & Qin, 2021). Related evidence further suggests that supportive interpersonal and psychosocial resources are associated with greater use of CR and may contribute to better stress adaptation and resilience among young people (Mohan et al., 2024; Ye et al., 2022).

In parallel, a growing body of evidence indicates that cognitive reappraisal is a protective regulatory strategy that is positively related to stress adaptation and resilience (Riepenhausen et al., 2022; Stover et al., 2024). In summary, these findings underscore the importance of considering both supportive environments and individual cognitive strategies when examining MH outcomes. While the present study focuses on CR as a theoretically grounded mediator, other mechanisms may also link autonomy support to MH. For example, perceived competence, relatedness need satisfaction, and broader social support may operate as parallel or complementary mediators. Future research could therefore test multi-mediator models to clarify the unique and shared contributions of these pathways.

Within the SDT framework, autonomy-supportive environments are expected to foster more autonomous rather than controlled forms of regulation (Ryan & Deci, 2000; Ryan & Deci, 2024). From this perspective, CR may be understood as a relatively adaptive and self-endorsed emotion-regulation strategy, because it involves actively reinterpreting stressful experiences in

ways that preserve goal-directed functioning rather than merely suppressing emotional expression or reacting under external pressure (Gross, 1998; Gross, 2015; Benita, 2020). This makes CR a theoretically plausible mediator between PAS and MH. Specifically, when students perceive their social environment as autonomy-supportive, they may be more likely to adopt flexible and self-endorsed regulatory responses, which in turn may contribute to better MH outcomes (Fan & Liu, 2024; Shen et al., 2023; Li & Liu, 2023). Simultaneously, the present study does not assume that CR is the only pathway through which PAS may relate to MH. In line with SDT, other mechanisms, such as competence-related beliefs, relatedness need satisfaction, and broader supportive resources, may also operate alongside CR (Ryan & Deci, 2024; Zhao & Qin, 2021; Fan & Liu, 2024).

3. Methodology

3.1. Research Design

This study employed a quantitative descriptive correlational survey design to examine the relationships among perceived autonomy support, cognitive reappraisal, and mental health among vocational higher education students in Shanghai, China. A correlational approach is appropriate for examining associations among psychological constructs that cannot be manipulated experimentally (Creswell & Creswell, 2017). The study was guided by a post-positivist paradigm, which assumes that reality can be approximated through systematic inquiry while acknowledging that complete objectivity is unattainable (Phillips & Burbules, 2000). In line with the study's theoretical framework, mediation analysis was used to examine whether cognitive reappraisal statistically mediated the association between perceived autonomy support and mental health. However, because the data were cross-sectional, the mediation findings should be interpreted as associational rather than as evidence of strict causal relationships.

3.2. Research Sample

Convenience sampling was used to recruit participants from vocational colleges in Shanghai, China, between 2 August 2025 and 26 November 2025. To be eligible for inclusion, participants had to be vocational college students in Shanghai, be at least 18 years old, and participate voluntarily in the study. Only fully completed questionnaires from eligible participants were included in the final analysis. Responses were excluded if the respondent was not a vocational college student in Shanghai, was under 18 years of age, submitted an incomplete questionnaire, or submitted duplicate responses.

The research team first contacted school administrators by email to seek permission and facilitate access. Subsequently, homeroom teachers distributed an online survey link hosted on Questionnaire Star (Wenjuanxing) to eligible students, who completed the questionnaire voluntarily. An a priori power analysis was conducted using G*Power based on a linear multiple regression model, assuming a medium effect size ($f^2 = .15$), an alpha level of .05, a statistical power of .80, and two predictors. The analysis indicated a minimum required sample size of 68 participants. This analysis was used as a general adequacy check for the planned regression-based analyses. In addition, a post hoc sensitivity analysis was conducted in G*Power based on the final sample size of 220, $\alpha = .05$, power = .80, and two predictors. The

analysis indicated that the present sample was sufficient to detect a minimum effect size of f^2 = .044, providing further support for the adequacy of the sample for the planned analyses.

A total of 260 questionnaires were distributed during the recruitment period, and 220 completed questionnaires were retained in the final dataset, yielding a response rate of 84.62%. The final sample consisted of 220 vocational college students. All quantitative data were analysed using IBM SPSS Statistics 27.0. Table 1 presents the demographic profile of the participants. Because participants were recruited through convenience sampling from vocational colleges in Shanghai, the findings should be interpreted with caution in relation to generalisability beyond this specific context.

Table 1. Demographic Profile of Students (n=220)

Demographic Variable	Profile	Frequency	Percentage (%)
Gender	Male	132	60.00
	Female	88	40.00
Grade	Grade 1 / First-year	91	41.36
	Grade 2 / Second-year	59	26.82
	Grade 3 / Third-year	70	31.82
Ethnicity	Han	188	85.45
	Others	32	14.55
Total		220	100.00

3.3. Ethical Consideration

This study received ethical approval from the Ethics Committee of Universiti Putra Malaysia (JKEUPM-2025-359).

3.4. Instrument

All instruments used in this study, including the ASQ, LCQ, ERQ, and MHC-SF, were administered in accordance with ethical guidelines and standard research procedures. The instruments were translated from English into Chinese by two bilingual experts with backgrounds in educational psychology. To improve linguistic accuracy and contextual appropriateness, four additional experts, including an educational psychologist, a vocational education specialist, a Chinese language teacher, and an English language teacher, reviewed the translated items and recommended revisions where necessary. After these revisions had been incorporated, the final Chinese version was further reviewed to confirm its suitability for the present study. A formal back-translation procedure was not conducted in the present study, which should be acknowledged as a limitation of the instrument adaptation process.

3.4.1. Emotional Regulation Questionnaire (ERQ)

The ERQ assesses habitual use of cognitive reappraisal and expressive suppression. In the present study, only the six items measuring cognitive reappraisal were used. Responses were rated on a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”), with higher scores indicating greater use of cognitive reappraisal. The cognitive reappraisal subscale of the ERQ has demonstrated good reliability in previous research (α = .79; Gross & John, 2003).

Perceived autonomy support (PAS) was assessed using two validated instruments: The Autonomy Support Questionnaire (ASQ) and the Learning Climate Questionnaire (LCQ).

3.4.2. Autonomy Support Questionnaire (ASQ)

The ASQ, originally developed by Deci et al. (2006) and later adapted by Legate, Ryan, and Weinstein (2012), is a self-report measure assessing perceived autonomy support from parents, friends, and school peers. It comprises three subscales: parents (ASQP), friends (ASQF), and school peers (ASQSP), with a total of 30 items. Responses were rated on a 7-point Likert scale ranging from 1 ("not at all true") to 7 ("very true"). The scale has demonstrated good reliability in previous research (α = .89; Legate et al., 2012). Although the ASQ was originally developed in a Western context, the translated version used in the present study underwent expert review to improve its linguistic accuracy and contextual appropriateness. Moreover, the scale demonstrated acceptable psychometric properties in the current sample. However, it remains possible that certain culturally specific patterns of interpersonal support and relational expectations in the Chinese TVET context were not fully represented.

3.4.3 Learning Climate Questionnaire (LCQ)

The LCQ was used to assess students' perceptions of teacher autonomy support. The full 15-item version was adopted, and responses were rated on a 7-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"), including one reverse-scored item. The LCQ has demonstrated good reliability in previous research (α = .82; Williams & Deci, 1996). Although both the ASQ and LCQ used 7-point response formats, their scale anchors differed, which should be taken into account when interpreting descriptive comparisons across the two measures.

3.4.4 Mental Health Continuum – Short Form (MHC-SF)

The MHC-SF is a 14-item questionnaire that assesses mental health across three domains: emotional, psychological, and social well-being. It was developed as a brief version of the original Mental Health Continuum long form (Keyes, 2009). Participants indicated the frequency of each experience over the past month on a 6-point Likert scale ranging from 1 ("never") to 6 ("every day"). The MHC-SF has demonstrated good reliability in previous research (α = .80; Keyes, 2009).

3.5. Data Analysis

Data analysis was conducted using IBM SPSS Statistics 27.0 and AMOS 28.0. Descriptive statistics, reliability analysis, and Pearson correlation analysis were performed in SPSS 27.0. Confirmatory Factor Analysis (CFA) was conducted in AMOS 28.0 to examine the measurement properties of the study constructs.

Scale scores for each construct were calculated using raw mean scores across the relevant items rather than standardized z-scores. Because the instruments used different response formats, score interpretation was based on each scale's original response range, and direct comparison of mean values across different instruments was made with caution. Cronbach's alpha

coefficients were computed to assess internal consistency. CFA was used to evaluate the measurement model, and model fit was assessed using multiple indices, including χ^2/df, RMSEA, IFI, CFI, TLI, NFI, and RFI. In addition, composite reliability (CR) and average variance extracted (AVE) were calculated to assess convergent validity.

After the measurement model had been evaluated, descriptive statistics and Pearson correlation coefficients were computed for the main study variables. Mediation analysis was then conducted in AMOS 28.0 using a structural path model to examine whether cognitive reappraisal mediated the association between perceived autonomy support and mental health. In addition to the primary mediation model, an adjusted model was estimated with age and gender included as control variables to examine the robustness of the observed associations. Prior to interpreting the adjusted model, collinearity diagnostics were conducted using tolerance and variance inflation factor (VIF) values to assess whether multicollinearity among the predictors was a concern. The indirect effect was estimated using a bias-corrected bootstrap procedure with 5,000 resamples and 95% confidence intervals. An indirect effect was considered statistically significant when the confidence interval did not include zero. Because the data were cross-sectional, the mediation results were interpreted as statistical associations rather than as evidence of strict causal relationships.

4. Findings

4.1. Measurement Model Assessment

Cronbach's alpha (α) coefficients were calculated to assess the internal consistency of all study measures. As shown in Table 2, the study measures demonstrated acceptable to excellent reliability and convergent validity. The overall mental health construct showed good internal consistency (α = .847), the cognitive reappraisal subscale of the ERQ showed high reliability (α = .892), and the overall perceived autonomy support construct demonstrated excellent internal consistency (α = .925). In addition, perceived teacher autonomy support, as measured by the LCQ, showed excellent internal consistency (α = .938). These results indicate that the measures were sufficiently reliable for the subsequent analyses. Notably, the Cronbach's alpha for the ERQ cognitive reappraisal subscale in this study (.892) was higher than that reported in the original scale development study (.79; Gross & John, 2003), which may reflect differences related to the adapted Chinese version or the characteristics of the present sample.

Confirmatory Factor Analysis (CFA) was conducted in AMOS 28.0 to examine whether the established factor structures of the study measures were replicated in the present sample. The measurement model showed satisfactory overall fit to the data, with χ^2/df = 1.812, RMSEA = .048, IFI = .967, CFI = .966, TLI = .950, NFI = .929, and RFI = .896. Most fit indices met commonly used criteria for acceptable model fit. Although the RFI value (.896) was slightly below the conventional .90 thresholds, it was very close to the range typically interpreted as acceptable for incremental fit indices, and the remaining fit indices consistently supported acceptable to good overall model fit (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003). As shown in Table 2, all reported standardized loadings were statistically significant and exceeded .50, indicating adequate indicator reliability (Hair et al., 2019). Composite reliability (CR) values ranged from .703 to .861, exceeding the commonly recommended threshold of .70 (Hair et al., 2019), and average variance extracted (AVE) values ranged from .563 to .624,

exceeding the recommended criterion of .50, thereby supporting convergent validity (Fornell & Larcker, 1981). Discriminant validity was further assessed using the Fornell–Larcker criterion (Fornell & Larcker, 1981). As shown in Table 3, the square root of the average variance extracted for each construct exceeded its correlations with the other constructs. Specifically, the square root of the AVE was 0.760 for mental health, 0.790 for cognitive reappraisal, and 0.750 for perceived autonomy support, all of which were greater than the corresponding inter-construct correlations. These results support the discriminant validity of the measurement model. In summary, these results indicate that the measurement model was appropriate for the subsequent analyses.

Table 2. Measurement Properties of Study Constructs

Construct		**Cronbach's α**	**Factor Loading**	**Composite Reliability (CR >.70)**	**Average Variance Extracted (AVE >.50)**
Mental Health (MH)		0.847		0.703	0.578
EWB			0.63		
SWB			0.77		
PWB			0.75		
Cognitive Reappraisal (CR)		.892		0.861	0.624
ERQ1			0.76		
ERQ2			0.82		
ERQ3			0.81		
ERQ4			0.85		
ERQ5			0.71		
ERQ6			0.78		
Perceived Autonomy Support (PAS)		0.925		0.744	0.563
Parents			0.79		
Friends			0.73		
School Peers			0.76		
Teachers			0.72		

Table 3. Discriminant Validity Assessment

Construct	**1**	**2**	**3**
Mental Health (MH)	0.760		
Cognitive Reappraisal (CR)	0.582	0.790	
Perceived Autonomy Support (PAS)	0.645	0.481	0.750
Note. Diagonal values in bold represent the square roots of the AVE for each construct. Off-diagonal values represent inter-construct correlations.			

4.2. Descriptive Statistics and Correlation Analysis

Descriptive statistics and bivariate correlations for the main study variables are presented in Table 4. On the 1–6 MHC-SF scale, the mean mental health score was 4.43 (*SD* = 0.92). On the 1–7 scales, the mean score was 5.65 (*SD* = 1.29) for cognitive reappraisal and 5.31 (*SD* = 0.96) for perceived autonomy support. Because the instruments used different response formats, the reported means should be interpreted with reference to each scale's original response range, and direct comparisons of mean values across different instruments should be made with

caution. Pearson correlation analysis indicated that the three main study variables were all significantly and positively correlated at the .01 level. Mental health was positively associated with cognitive reappraisal (r = .582, p < .01) and perceived autonomy support (r = .645, p < .01). Cognitive reappraisal was also positively associated with perceived autonomy support (r = .481, p < .01). Overall, these findings indicate that higher levels of perceived autonomy support and cognitive reappraisal were associated with better reported mental health, and that perceived autonomy support was also positively associated with cognitive reappraisal. These results provided the basis for the subsequent mediation analysis.

Table 4. Descriptive statistics and correlation analysis (n=220)

Construct	Mean	SD	1	2	3
Mental Health	4.43	0.92	-		
Cognitive Reappraisal	5.65	1.29	0.582**	-	
Perceived Autonomy Support	5.31	0.96	0.645**	0.481**	-

Note. p < .01 (two-tailed). Mental Health was measured on a 1–6 scale; Cognitive Reappraisal and Perceived Autonomy Support were measured on 1–7 scales. Means should therefore be interpreted with reference to each scale's response range.

4.3. Mediation Analysis

Figure 1 and Table 5 present the results of the AMOS structural path model testing cognitive reappraisal as a mediator of the association between perceived autonomy support and mental health. Perceived autonomy support was positively associated with cognitive reappraisal (β = 0.544, SE = 0.057, p < .001), and cognitive reappraisal was positively associated with mental health (β = 0.323, SE = 0.058, p < .001). The total effect of perceived autonomy support on mental health was β = 0.640. When cognitive reappraisal was included in the model, the direct effect of perceived autonomy support on mental health remained significant (β = 0.464, SE = 0.058, p < .001), indicating partial mediation. Bootstrap mediation analysis based on 5,000 resamples indicated a significant indirect effect of perceived autonomy support on mental health through cognitive reappraisal (β = 0.176, 95% CI [0.098, 0.259]). Because the confidence interval did not include zero, the indirect effect through cognitive reappraisal was considered statistically significant. The model explained 29.6% of the variance in cognitive reappraisal (R^2 = .296) and 48.3% of the variance in mental health (R^2 = .483).

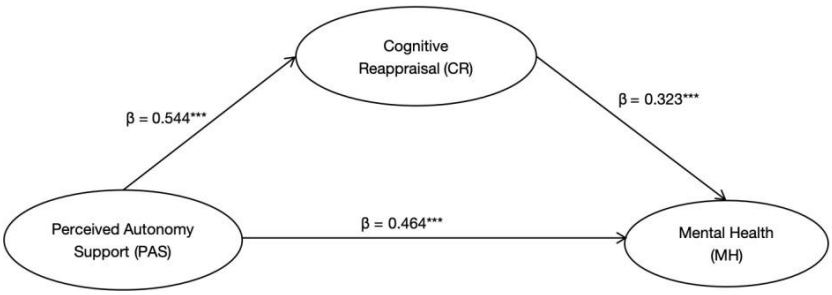

Figure 1. Mediation Effects Model

Table 5. Mediation Effects of CR Between PAS and MH

Path	Beta (β)	SE	t	p	95% CI (Bootstrap)
PAS → CR	0.544	0.057	9.541	<.001	-
CR → MH	0.323	0.058	5.543	<.001	-
PAS → MH (direct effect)	0.464	0.058	7.968	<.001	-
PAS → CR → MH (indirect effect)	0.176	-	-	-	[0.098, 0.259]
PAS → MH (total effect)	0.640	-	-	-	-
R^2 for CR	0.296				
R^2 for MH	0.483				

Note. PAS = Perceived Autonomy Support; CR = Cognitive Reappraisal; MH = Mental Health. Bootstrap samples = 5,000.

4.4. Common-Method Bias Check

Given the cross-sectional and self-report nature of the data, an additional assessment of common-method bias was conducted using the full-collinearity VIF approach. Prior methodological work has suggested that full-collinearity VIF values below 3.3 indicate that common-method bias is unlikely to be severe (Kock, 2015). In the present study, the full-collinearity VIF values were 1.836 for mental health, 1.627 for cognitive reappraisal, and 1.716 for perceived autonomy support. These results therefore suggest that common-method bias was unlikely to pose a serious threat to the present findings.

Table 6. Full-Collinearity VIF Values for Common-Method Bias Assessment

Construct	VIF
Mental Health	1.836
Cognitive Reappraisal	1.627
Perceived Autonomy Support	1.716

Note. All full-collinearity VIF values were below 3.3, indicating that common-method bias was unlikely to be a serious concern (Kock, 2015).

To examine the robustness of the mediation findings after accounting for basic demographic characteristics, an adjusted model including age and gender was also considered. In addition, conventional collinearity diagnostics were conducted for the adjusted regression model, with mental health as the dependent variable and perceived autonomy support, cognitive reappraisal, age, and gender as predictors. As shown in Table 7, the tolerance values ranged from .738 to .980, and the Variance Inflation Factor (VIF) values ranged from 1.021 to 1.354. These values were well within commonly accepted limits, according to which tolerance values below .20 and VIF values above 5 may indicate problematic multicollinearity (Hair et al., 2010; O'Brien, 2007). Therefore, multicollinearity was not considered a serious concern in the adjusted model.

Table 7. Multicollinearity Statistics for the Adjusted Model

Variables	Tolerance	Collinearity VIF
Perceived Autonomy Support (PAS)	0.744	1.344
Cognitive Reappraisal (CR)	0.738	1.354
Gender	0.980	1.021
Age	0.951	1.051

Note. Dependent variable = mental health (MH). Predictors = PAS, CR, Age, and Gender.

4.5 Hypothesis Testing Results

Table 8 summarizes the results of hypothesis testing. Ha_1, Ha_2, and Ha_3 were supported, as perceived autonomy support significantly and positively predicted cognitive reappraisal, cognitive reappraisal significantly and positively predicted mental health, and perceived autonomy support significantly and positively predicted mental health. Ha4 was also supported, as cognitive reappraisal significantly mediated the relationship between perceived autonomy support and mental health. Overall, the findings supported the proposed mediation model.

Table 8. Summary of Hypothesis Testing

Research Hypotheses	Results
Ha_1:Perceived autonomy support has a positive effect on cognitive reappraisal.	Supported
Ha_2:Cognitive reappraisal has a positive effect on mental health.	Supported
Ha_3:Perceived autonomy support has a positive effect on mental health.	Supported
Ha_4:Cognitive reappraisal mediates the relationship between perceived autonomy support and mental health.	Supported

5. Discussion

The present study investigated the relationships among PAS, CR, and MH among vocational college students in Shanghai, and further examined whether CR mediated the relationship between perceived autonomy support and mental health. Guided by SDT (Deci & Ryan, 2000) and the process model of emotion regulation (Gross, 1998; 2015), the findings provide new insights into how perceived autonomy support and students' use of cognitive reappraisal interactively influence mental health among vocational college students.

5.1. Relationships Among Perceived Autonomy Support, Cognitive Reappraisal, and Mental Health

RQ1: What are the relationships between Perceived Autonomy Support, Cognitive Reappraisal, and Mental Health among vocational college students in Shanghai?

For RQ1, perceived autonomy support, reflecting support from parents, friends, school peers, and teachers, was positively associated with mental health among vocational college students in Shanghai, China. Specifically, perceived autonomy support showed a significant positive correlation with mental health ($r = .645$, $p < .01$), suggesting that students who reported higher levels of autonomy support also tended to report better emotional, psychological, and social well-being. This finding is consistent with self-determination theory, which posits that autonomy-supportive environments facilitate the satisfaction of basic psychological needs for autonomy, competence, and relatedness, thereby promoting psychological functioning and well-being (Ryan & Deci, 2024). Empirical studies further indicate that college students who perceive higher autonomy support tend to report greater intrinsic motivation and life satisfaction, and related evidence has also linked autonomy-supportive contexts to positive motivational and adaptive outcomes in higher education (Black & Deci, 2000; Lozano-Jiménez et al., 2021; Vasconcellos et al., 2020).

However, the relatively strong association between perceived autonomy support and mental health should also be interpreted cautiously. In addition to reflecting a substantively meaningful relationship, the correlation may partly capture shared variance arising from the use of self-report measures, common method bias, or some conceptual proximity between supportive interpersonal experiences and positive psychological functioning. Even so, the measurement results provide preliminary support for treating these constructs as empirically distinguishable in the present study.

The findings also showed that cognitive reappraisal was positively associated with both perceived autonomy support and mental health. Cognitive reappraisal was significantly correlated with mental health (r = .582, p < .01), while perceived autonomy support was significantly correlated with cognitive reappraisal (r = .481, p < .01). These results are consistent with Gross's (2015) emotion regulation framework, which identifies cognitive reappraisal as an adaptive strategy associated with reduced distress and greater life satisfaction. Recent evidence similarly indicates that reappraisal may protect adolescents from stress, anxiety, and depressive symptoms (Gee & Cohodes, 2023). Taken together, the findings suggest that autonomy-supportive environments may be linked to better mental health both directly and through their positive association with adaptive emotion-regulation processes (Ryan & Deci, 2024).

5.2. Mediating Role of Cognitive Reappraisal

RQ2: Does CR mediate between PAS and MH among vocational college students?

For RQ2, mediation analysis revealed that cognitive reappraisal significantly mediated the association between perceived autonomy support and mental health. Specifically, perceived autonomy support positively predicted cognitive reappraisal (β = 0.544, p < .001), cognitive reappraisal positively predicted mental health (β = 0.323, p < .001), and the indirect effect of perceived autonomy support on mental health through cognitive reappraisal was significant (β = 0.176, 95% CI [0.098, 0.259]). Because the bootstrap confidence interval did not include zero, the mediating effect of cognitive reappraisal was considered statistically significant. At the same time, the direct effect of perceived autonomy support on mental health remained significant after cognitive reappraisal was included in the model (β = 0.464, p < .001), indicating partial mediation rather than full mediation.

These findings are consistent with theoretical expectations. Autonomy support is thought to promote flexible thinking, volitional engagement, and adaptive coping, all of which may facilitate cognitive reappraisal (Ryan & Deci, 2024). Adolescents who perceive support from significant others may feel psychologically safer and more able to reinterpret stressors in constructive ways, thereby enhancing emotional competence and reducing vulnerability to distress. Empirical studies likewise suggest that autonomy-supportive environments are positively associated with social emotional competence and adaptive emotion regulation related skills, including cognitive reappraisal (Collie et al., 2024). Consistent with these perspectives, the present findings suggest that perceived autonomy support may be associated with better mental health partly through more adaptive emotion-regulation processes among vocational college students.

Importantly, the finding of partial mediation indicates that cognitive reappraisal represents one meaningful pathway, but not the only pathway, through which perceived autonomy support may be associated with mental health. The remaining direct effect suggests that other mechanisms may also be involved. Within the self-determination theory framework, these mechanisms may include basic psychological need satisfaction, perceived competence, relatedness, or broader forms of social support. Thus, autonomy-supportive environments may be linked to mental health both indirectly, through adaptive emotion regulation, and directly, through broader motivational and relational processes.

Overall, the findings extend previous literature by showing that cognitive reappraisal plays a significant, but partial, mediating role in the association between perceived autonomy support and mental health in a vocational college context. This is particularly relevant in TVET settings, where students often face concurrent academic, interpersonal, and career-related pressures.

5.3. Implications

The present findings carry several practical implications. First, they underscore the importance of fostering autonomy-supportive environments across both family and school contexts. Recent work has shown that practices such as taking students' perspectives, providing explanatory rationales, using less controlling language, and supporting meaningful choice are characteristic of autonomy-supportive instruction and are associated with stronger motivation, need satisfaction, and well-being-related outcomes (Kong et al., 2024; Zachariou et al., 2024). Accordingly, training initiatives for teachers and parents may benefit from explicitly incorporating autonomy-supportive interaction strategies. This implication is further supported by intervention and review evidence showing that autonomy-supportive practices can be intentionally cultivated and can produce beneficial effects on students' motivational and adaptive outcomes (Su & Reeve, 2011; Reeve & Cheon, 2021).

Second, the significant mediating role of cognitive reappraisal suggests that interventions aimed at strengthening emotion-regulation capacities may be especially relevant for vocational college students. Meta-analytic evidence indicates that reappraisal-based training, mindfulness-based programs, and cognitive-behavioral approaches can improve psychological well-being and resilience among adolescents and young adults (Gee & Cohodes, 2023; Dunning et al., 2019). Embedding structured emotional skills training within vocational education may therefore help students cope more effectively with academic and transitional stressors. In practice, this may include integrating modules on stress appraisal, emotional awareness, and adaptive cognitive reframing into student support services and mental health promotion programs.

Third, the findings suggest that vocational colleges should consider strengthening autonomy-supportive pedagogy and student-support systems at the institutional level. Educational practices that encourage student voice, support self-initiation, and communicate in non-controlling ways may help promote both adaptive emotion regulation and better mental health. Professional development focused on relational pedagogy and supportive communication may therefore be particularly valuable in TVET settings. This implication is also consistent with recent educational scholarship indicating that autonomy-supportive teaching is malleable,

beneficial, and capable of improving students' engagement, motivation, and broader adaptive functioning (Reeve & Cheon, 2021).

Finally, the present findings are consistent with recent national policy trends in China that emphasize strengthening school mental health systems, enhancing teacher training, and integrating emotion regulation education into the curriculum (MOE, 2023). In this respect, the study provides empirical support for coordinated approaches that combine interpersonal support with psychological skill-building in vocational and higher education contexts. Recent review evidence from China further indicates that national attention to school mental health has been accompanied by a growing body of prevention and intervention efforts across educational settings, including colleges and universities (Qu et al., 2024).

5.4. Limitations and Future Research

The reliance on self-report measures may introduce response biases and shared method variance, which may have inflated the observed associations among perceived autonomy support, cognitive reappraisal, and mental health. Future studies could integrate behavioral, peer-reported, teacher-reported, or physiological indicators of emotion regulation to enhance validity and reduce common method bias (Podsakoff et al., 2024).

In addition, the present findings should be interpreted with caution because the data were cross-sectional. Although the hypothesized mediation model was theoretically grounded, cross-sectional mediation analysis cannot establish definitive causal or temporal ordering among the variables. Therefore, the mediating role of cognitive reappraisal should be understood as a statistical association rather than conclusive evidence of causal mediation. Future studies could adopt longitudinal, cross-lagged, or experimental designs to provide stronger evidence regarding the temporal relationships among perceived autonomy support, cognitive reappraisal, and mental health (Maxwell & Cole, 2007; Maier et al., 2023).

The sample was drawn from a single city, which may limit generalizability to other vocational or higher education contexts. In addition, participants were recruited through convenience sampling and teacher-mediated distribution of the survey link, which may have introduced selection bias. Comparative studies across multiple institutions, encompassing both vocational and academic tracks, would provide a more nuanced understanding of contextual and cultural variations in autonomy support and mental health outcomes.

Another limitation concerns the validation strategy. Although the adapted instruments demonstrated acceptable psychometric properties, the measurement model was evaluated within a single sample. This provides weaker evidence than validation based on independent samples or split-sample procedures. Future research should therefore seek to replicate the factor structure in separate samples or use equivalent split-sample methods to strengthen evidence for construct validity (Lorenzo-Seva, 2022).

In addition, a formal back-translation procedure was not implemented during the translation and adaptation of the instruments. Because cross-language adaptation requires careful attention to linguistic and conceptual equivalence, this omission should also be acknowledged as a limitation. Future studies should incorporate more rigorous translation and validation procedures when adapting psychological scales for use in Chinese vocational education

contexts (Kunst et al., 2023; Gouveia et al., 2024). Future research could further investigate additional mediating and moderating mechanisms, particularly basic psychological need satisfaction, perceived competence, relatedness, academic stress, and institutional support, to clarify how autonomy support relates to mental health in vocational college contexts.

6. Conclusion

This study found that perceived autonomy support was positively associated with both cognitive reappraisal and mental health among vocational college students in Shanghai, China. In addition, cognitive reappraisal partially mediated the relationship between perceived autonomy support and mental health, suggesting that autonomy-supportive environments may be linked to student well-being both directly and indirectly through adaptive emotion-regulation processes. These findings highlight the importance of supportive interpersonal environments and emotional skills development in promoting psychological well-being within TVET settings.

The study also offers practical implications for educators, parents, and policymakers. By fostering autonomy-supportive learning and social environments, vocational colleges may help strengthen students' capacity for cognitive reappraisal and support their overall mental health. Overall, the study extends the literature by providing evidence from an underrepresented vocational education population in China and highlights the value of integrating interpersonal support with psychological skill-building in mental health promotion.

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Appendix

Part A: Mental Health Continuum- Short Form (MHC-SF)

Items	Code	Factor Loading
1. happy	EWB 1	0.611
2. interested in life	EWB 2	0.631
3. satisfied with life	EWB 3	0.609
4. that you had something important to contribute to society	SWB 1	0.659
5. that you belonged to a community (like a social group, your school, or your neighborhood)	SWB 2	0.699
6. that our society is a good place, or is becoming a better place, for all people	SWB 3	0.682
7. that people are basically good	SWB 4	0.648
8. that the way our society works made sense to you	SWB 5	0.671
9. that you liked most parts of your personality	PWB 1	0.653
10. good at managing the responsibilities of your daily life	PWB 2	0.710
11. that you had warm and trusting relationships with others	PWB 3	0.657
12. that you had experiences that challenged you to grow and become a better person	PWB 4	0.769
13. confident to think or express your own ideas and opinions	PWB 5	0.632
14. that your life has a sense of direction or meaning to it	PWB 6	0.726

Part B: Emotional Regulation Questionnaire (ERQ)

Items	Code	Factor Loading
1.When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.	ERQ 1	0.763
2.When I want to feel less negative emotion (such as sadness or anger), I change what I am thinking about.	ERQ 2	0.823
3.When I am faced with a stressful situation, I make myself think about it in a way that helps me stay calm.	ERQ 3	0.813
4.When I want to feel more positive emotion, I change the way I'm thinking about the situation.	ERQ 4	0.850
5.I control my emotions by changing the way I think about the situation I am in.	ERQ 5	0.709
6.When I want to feel less negative emotion, I change the way I am thinking about the situation.	ERQ 6	0.785

Part C: Autonomy Support Questionnaire (ASQ)

Items	Code	Factor Loading
1.I feel that my family provides me with choices and options.	ASQP 1	0.704
2.I believe that my family is very understanding of me.	ASQP 2	0.612
3.My family conveys confidence in my abilities.	ASQP 3	0.570
4.I feel that my family accepts me.	ASQP 4	0.661
5.I believe that my family trusts me.	ASQP 5	0.663
6.My family listens to my thoughts and ideas.	ASQP 6	0.714
7.My family encourages me to express my true emotions.	ASQP 7	0.717
8.I feel that my family cares about me as a person.	ASQP 8	0.661
9.My family tries to understand how I see things.	ASQP 9	0.675
10.I feel able to share my feelings with my family.	ASQP 10	0.588
Perceived Friends Autonomy Support		
1.I feel that my friends provide me with choices and options.	ASQF 1	0.630
2. I believe that my friends are very understanding of me.	ASQF 2	0.615
3. My friends convey confidence in my abilities.	ASQF 3	0.623
4. I feel that my friends accept me.	ASQF 4	0.641
5. I believe that my friends trust me.	ASQF 5	0.768
6. My friends listen to my thoughts and ideas.	ASQF 6	0.766
7. My friends encourage me to express my true emotions.	ASQF 7	0.655
8. I feel that my friends care about me as a person.	ASQF 8	0.685
9. My friends try to understand how I see things.	ASQF 9	0.679
10. I feel able to share my feelings with my friends.	ASQF 10	0.695
Perceived School Peers Autonomy Support		
1.I feel that my school peers provide me with choices and options.	ASQSP 1	0.595
2.I believe that my school peers are very understanding of me.	ASQSP 2	0.711
3.My school peers convey confidence in my abilities.	ASQSP 3	0.626
4.I feel that my school peers accept me.	ASQSP 4	0.606
5.I believe that my school peers trust me.	ASQSP 5	0.623
6.My school peers listen to my thoughts and ideas.	ASQSP 6	0.540
7.My school peers encourage me to express my true emotions.	ASQSP 7	0.646
8.I feel that my school peers care about me as a person.	ASQSP 8	0.665
9.My school peers try to understand how I see things.	ASQSP 9	0.650
10.I feel able to share my feelings with my school peers.	ASQSP 10	0.651

Part D: The Learning Climate Questionnaire (LCQ)

Items	Code	Factor Loading
1.I feel that my teacher provides me choices and options.	LCQ 1	0.708
2.I feel understood by my teacher.	LCQ 2	0.776
3.I am able to be open with my teacher during class.	LCQ 3	0.737
4.My teacher conveyed confidence in my ability to do well in the course.	LCQ 4	0.803
5.I feel that my teacher accepts me.	LCQ 5	0.778
6.My teacher made sure I really understood the goals of the course and what I need to do.	LCQ 6	0.723
7.My teacher encouraged me to ask questions.	LCQ 7	0.727
8.I feel a lot of trust in my teacher.	LCQ 8	0.716
9.My teacher answers my questions fully and carefully.	LCQ 9	0.800
10.My teacher listens to how I would like to do things.	LCQ 10	0.750
11.My teacher handles people's emotions very well.	LCQ 11	0.736
12.I feel that my teacher cares about me as a person.	LCQ 12	0.754
13.I don't feel very good about the way my teacher talks to me. *	LCQ 13	0.584
14.My teacher tries to understand how I see things before suggesting a new way to do things.	LCQ 14	0.750
15.I feel able to share my feelings with my teacher.	LCQ 15	0.712