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ORIGINAL RESEARCH

Competitive Attitudes and Depression Among Chinese College Students: Mediating Roles of Sleep Quality and Peer Relationships

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Video abstract

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Introduction: Competitive attitudes among college students in highly competitive academic environments have attracted increasing scholarly attention, yet the mechanisms linking competitiveness to depressive symptoms remain insufficiently understood. This study addresses this gap by examining the association between competitive attitudes and depressive symptoms among Chinese engineering college students, with a particular focus on the mediating roles of sleep quality and peer relationships.

Methods: The study employed a multi-stage stratified random sampling method to distribute electronic questionnaires to 692 undergraduate students from one of the top universities in China. Pearson correlation and regression analyses were conducted to assess these associations, and structural equation modeling was employed to test the proposed mediating effects.

Results: Descriptive statistics show that students reported mild levels of depressive symptoms and poor sleep quality on average, with males demonstrating significantly stronger competitive attitudes across all three dimensions compared to females. Path analysis shows that feelings for competition were positively associated with depression, with sleep quality serving as a significant mediator that accounted for 39.15% of the total effect. In contrast, beliefs about competition were negatively associated with depression, with peer relationships acting as a significant mediator and explaining 17.09% of the total effect. No significant association was found between behavioral tendencies of competition and depression.

Conclusion: In general, feelings for competition exacerbated depressive disorders by negatively affecting their sleep quality. Conversely, beliefs about competition, which emphasizes personal development, alleviated depression by promoting positive peer relationships among students. These findings suggest that higher education institutions should encourage personal development-oriented competitive attitudes while implementing targeted interventions to reduce excessive competitive feelings, thereby promoting students' psychological well-being.

Keywords: competitive attitudes, depressive symptoms, sleep disturbances, interpersonal relationships, emerging adults

Introduction

Depression has become a prevalent mental health issue, characterized by prolonged feelings of sadness, diminished interest, and slowed responses. For college students transitioning from late adolescence to early adulthood, they face a higher risk of depression in the competitive environment.[1] Studies have found the prevalence of depression in adolescents to be between 4% and 24%,[2] with a high occurrence of mild depression.[3] The average onset age of severe depression is around 20 years old, with nearly 40% experiencing their first episode before the age of 20,[4] highlighting the vulnerability of late adolescence and early adulthood. College students, in particular, are at heightened risk. In the United States, over 60% of college students experienced one or more mental health issues between 2020 and 2021, representing an increase of nearly 50% compared to 2013.[5] A study from Germany reported that 37% of German college students suffered from depression,[6] while a literature

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review on Southeast Asian countries found a median point prevalence of depression of 29.4% among college students.[7] In China, growing competition in the job market and rising expectations from employers have placed increasing pressure on college students, leading to higher rates of academic burnout and triggering mental health issues. Research indicates that college students in China have faced significant psychological challenges, with over 20% suffering from depression.[8] Against this backdrop, individual differences in how students perceive and respond to competition have become increasingly relevant. Competitive attitudes, as a psychological disposition toward competition, may shape students' emotional experiences and coping strategies in high-stakes academic environments.[9,10] Given the rising prevalence of depression and its far-reaching consequences across different cultural and national contexts, it is essential to identify and understand potential influencing factors such as competitive attitudes. This study aims to examine the association between competitive attitudes and depressive symptoms among Chinese engineering college students, with a particular focus on the mediating roles of sleep quality and peer relationships.

Literature Review

Conceptualization and Dimensional Structure of Competitive Attitudes

Previous studies utilized the competitive attitude to describe individual competitiveness, defining it as an aspect of personality.[11] A review of the definitions of different dimensions of competitive attitudes reveals the evolution of the conceptualization of competitiveness over time. In the earlier stages of research, scholars focused primarily on psychological tendencies, emphasizing affective, cognitive, and behavioral aspects of competitiveness. For instance, Ryckman et al introduced the concept of hyper-competitiveness, which refers to individuals whose primary goal is to defeat others at any cost, rather than aiming for personal excellence.[12] He later developed the personal development competitiveness scale, defining it as individuals who focus on self-improvement and personal growth through competition, rather than trying to outdo others.[9] These early distinctions highlighted two main forms of competitive attitudes: hyper-competitiveness and personal development competitiveness. In more recent studies, the focus shifted to a more detailed categorization of competitiveness within the personality framework.[13,14] They developed the Cooperative and Competitive Personality Scale (CCPS), which divides competitiveness into three dimensions: feelings for competition, beliefs about competition, and behavioral tendencies of competition. Feelings for competition refer to individuals consciously suppressing and manipulating others to achieve victory. Beliefs about competition indicate individuals focusing on their own achievements and striving to excel. Behavioral tendencies of competition involve individuals comparing themselves with others and hoping to perform better. In this way, feelings for competition align closely with the characteristics of hyper-competitiveness, while beliefs about competition are more closely related to personal development competitiveness. The conceptualization of competitive attitudes has evolved from a focus on the intensity of competitive behaviors in the early studies to a more nuanced understanding that includes both psychological tendencies and behavioral traits.

Building on the refined understanding of competitive attitudes, researchers have also examined how these traits vary across demographic groups, particularly gender. Gender differences in competitive attitudes have also been widely documented. A large body of research has shown that men generally exhibit stronger competitive attitudes and behaviors than women. Studies suggest that in competitive contexts, men are more likely to form a positive self-concept based on culturally reinforced expectations of being "more competent", whereas women, having internalized gender roles that emphasize warmth and agreeableness, tend to avoid competition. Moreover, in the absence of objective indicators of individual ability, gender often serves as a proxy for assessing competitiveness, leading men to display greater confidence and initiative, while women are more prone to self-restriction.[15] From an economic perspective, experimental studies have likewise found that men are more inclined to choose competitive incentive schemes and demonstrate more significant performance gains within them, whereas women tend to prefer non-competitive compensation structures.[16] In addition, several studies have also shown that through cross-cultural experiments, where males tend to be more competitive than females.[17] At the University of Maine, male students scored higher than females in personal development competitive orientation, although no significant gender difference was observed in hyper-competitiveness.[18] Consistently, males have been shown to display stronger competitive preferences than females across educational and

career domains.[19] Field and laboratory studies further revealed that although competitive incentives improve performance in both genders, the effect is markedly smaller for females, indicating a lower willingness among women to engage in competitive settings.[20,21]

The Relationship Between Competitive Attitudes and Mental Health

Existing literature suggests a significant relationship between competitive attitudes and mental health issues. The characteristics of hyper-competitiveness may lead individuals to experience more psychological distress.[22] These individuals tend to exhibit high levels of neuroticism and low self-esteem,[9] and often seek external validation. Failure to meet their expectations may result in goal abandonment, potentially leading to depression.[12] Additionally, some research has found that hyper-competitiveness among women is associated with higher levels of depression, anxiety, and loneliness, as well as poorer peer relationships.[23] In Asian cultures, hyper-competitiveness may lead to more distress as it conflicts with values of collectivism.[22] Conversely, a substantial body of research indicates that personal development competitiveness leads to positive mental health outcomes. For instance, it is positively correlated with self-esteem, personal and social self-efficacy, and negatively correlated with neuroticism.[9,24] However, the mechanisms through which competitive attitudes influence depression have not been thoroughly studied, making it an important area for further research.

Mediating Roles of Sleep Quality and Peer Relationships

Competitive attitudes may influence depression through multiple psychological and behavioral pathways. Among these, sleep quality and peer relationships have emerged as two key mediating mechanisms, particularly in the context of college students.

First, sleep quality plays a crucial role in regulating emotions and recovering from stress, which are essential for psychological well-being. Disruptions in sleep can impair the brain's executive functioning, undermining individuals' ability to recognize and manage emotions, thereby increasing vulnerability to depressive symptoms.[25,26] This vulnerability aligns with the diathesis-stress model, which posits that psychological disorders emerge from the interaction between a stable internal predisposition, such as competitive personality traits, and external stressors like sleep deprivation.[27–29] In the high-pressure environment of university campuses, students with strong competitive tendencies often sacrifice rest to pursue external goals such as achievement and recognition. From a social-cognitive perspective, triadic reciprocal determinism suggests that repeated exposure to competition and comparison can reinforce psychological strain, prompting maladaptive coping behaviors, such as reduced rest, which further elevate depressive risk. To measure sleep-related functioning, researchers commonly use the Pittsburgh Sleep Quality Index (PSQI), developed by Buysse et al, which allows individuals to self-evaluate their sleep quality over the past month.[30] A considerable body of research indicates that poor sleep quality increases the risk of depression in adults.[31] Additionally, both hypercompetitive attitudes and personal development competitive attitudes negatively predict sleep quality through anxiety, but hyper-competitive attitudes directly impact sleep quality; whereas personal development competitive attitudes have only an indirect effect.[32] Overall, given the significant role of sleep quality in mental health, it is essential to further explore its mediating role in the relationship between competitive attitudes and depression, as this aspect has yet to be adequately addressed in current research.

In parallel, peer relationships may also mediate the effects of competitive attitudes on depression, particularly through the quality of interpersonal connections and individuals' perceived sense of belonging. Interpersonal theory provides a useful framework for understanding these dynamics, as it emphasizes the role of interpersonal relationships, social development, and culture in shaping personality, which is expressed in social contexts rather than in isolation.[33] With the growing attention to depression, researchers have increasingly drawn on interpersonal theory to explore its underlying causes. Specifically, the interpersonal theory of depression focuses on how problematic interpersonal interactions contribute to the onset of depression. According to this perspective, dysfunctional interpersonal relationships play a crucial role in the onset and maintenance of depression.[34] Studies have shown a significant positive correlation between interpersonal stress and self-reported depression among college students,[35] suggesting that the influence of college students' peer relationships on their psychological health should be considered. From the perspective of

belongingness, Goal Contents Theory suggests that competitive attitudes, especially hypercompetitive tendencies, in the high-pressure university environment often drive individuals to prioritize external goals like achievement and social status, while neglecting intrinsic goals such as building close interpersonal relationships.[9] This focus may foster utilitarian and hostile interpersonal behaviors, undermining trust and emotional bonds with peers, and lowering relationship quality. Prolonged unmet belonging needs can lead to loneliness and rejection, increasing depression risk. Social Comparison Theory explains that frequent upward comparisons common in competitive settings can trigger negative emotions like jealousy and inferiority, damaging intimacy, trust, and cooperation, and causing interpersonal alienation. Persistent disadvantage in comparisons and difficulty maintaining positive self-evaluation reduce belonging and self-worth, contributing to loneliness, distress, and higher depression likelihood. Early series of studies have found that hyper-competitiveness disrupts interpersonal relationships, with individuals high in hyper-competitiveness tendencies being perceived as difficult to get along with.[9] Hyper-competitiveness positively predicts interpersonal conflict, control, possessiveness, aggressiveness, and dominance, while negatively predicting intimacy, trust, forgiveness, sense of belonging, and the quality of friendships.[9,12,18,36,37] By contrast, personal development competitiveness positively predicts forgiveness and sense of belonging, while negatively predicting aggressiveness, control, and dominance.[9,18,23] Research has found that personal development competitiveness is either unrelated to or positively correlated with friendship development.[37] Competitors with personal development competitive attitudes do not view others as obstacles in their path but rather as helpers providing opportunities for discovery and learning, enabling them to effectively collaborate with others.[9] Therefore, it is worth exploring whether peer relationships mediate the effect of competitive attitudes on depression among college students, as this area remains underexplored in existing research.

Other Influential Factors of Depression

In addition to competitive attitudes, sleep quality, and peer relationships, existing studies have shown that demographic characteristics, family background, and study experience also exert a significant influence on depression levels. First, demographic characteristics such as age, gender, ethnicity, and political status have been widely linked to individual differences in mental health. Taking gender as an example, numerous studies have consistently shown that female students tend to report higher levels of depression than their male counterparts, a pattern observed across various age groups and cultural contexts.[38] However, Gao et al found male college students tend to have higher levels of depression than female college students in China.[8] Second, family background plays a crucial role in shaping students' mental health. This includes such as home location, only child status, father's education level, and especially family socio-economic status (SES). Research shows that students from lower-SES backgrounds face more psychological stress and helplessness, increasing depression risk.[39] Third, students' study experience, including school satisfaction, learning engagement after class, number of published papers, competition awards, and student leader status, are also important predictors of depression. Among them, school satisfaction has been extensively studied as a proxy for campus adaptation and subjective well-being.[40] To accurately isolate the effect of competitive attitudes on depression, it is essential to control for these confounding variables in the empirical analysis, which ensures that the observed relationships are not spuriously driven by other underlying factors.

Research Hypotheses

In general, although existing studies have explored the relationship between competitiveness and depression to some extent, several important gaps remain. First, while prior research has established correlations between the two constructs, few studies have examined the underlying mechanisms linking competitiveness to depression. Second, despite the significance of this research topic, empirical evidence from the Chinese context remains scarce. Therefore, the present study aims to expand the literature by exploring the relationship between competitive attitudes and depression among Chinese college students. In particular, drawing on theoretical frameworks such as the diathesis-stress model and interpersonal theory, it explores the potential mediating roles of sleep quality and interpersonal relationships in order to better understand the mechanisms underlying this association.

Competitiveness is widely regarded as a necessary condition for success. However, not all forms of competitiveness are equally beneficial. Hypercompetitive attitudes are associated with heightened psychological distress, low self-esteem,

and increased vulnerability to depression.[9,12] Conversely, personal development competitive attitudes tend to be linked with higher self-efficacy and better mental health outcomes.[24] Nevertheless, behavioral tendencies of competition, due to their context-dependent and multidimensional nature, may not exhibit a consistent association with depression. Based on the premise, the study proposes the following hypotheses:

Hypothesis I: Feelings for competition among college students are significantly positively correlated with their depression levels.

Hypothesis II: Beliefs about competition are significantly negatively correlated with depression.

Hypothesis III: There is no significant correlation between behavioral tendencies of competition and depression.

Furthermore, sleep quality and peer relationships have emerged as important mediating mechanisms linking competitive attitudes to mental health. Sleep problems are known to impair emotion regulation and increase depression risk,[25] while peer relationship difficulties may reduce individuals' sense of belonging and exacerbate psychological distress.[35] In light of existing empirical evidence, this study hypothesizes as follows:

Hypothesis IV: Sleep quality and peer relationships mediate the relationship between competitive attitudes and depression.

Materials and Methods

Participants

This study analyzed data from a survey involving 692 undergraduate students aged 18 to 24 from one of the top universities in China. Participants were selected with a multistage stratified random sampling method. Five engineering schools were first randomly selected from the 25 engineering schools in the university. Subsequently, participants were randomly recruited from each selected school in proportion to the size of the school and the distribution of students across different academic years. Data were collected via an online survey distributed through electronic questionnaire links. All participants were informed of the purpose of the study and provided informed consent. Those were included if they voluntarily consented to the study via the initial screening question and successfully completed all questionnaire items; conversely, individuals who declined participation were automatically excluded from the survey, and the system settings prevented the submission of any incomplete responses. Consequently, all 692 participants included in the final sample participated on a voluntary basis. Each student was assigned a unique link, which became inactive automatically after the questionnaire was submitted. According to Memon et al's guidelines for structural equation modelling (SEM), a minimum sample size of 200 is recommended to ensure adequate statistical power and model stability.[41] Given that our study includes 692 participants, the sample size is well above this threshold and is therefore considered more than sufficient for the present analysis.

The final sample consisted of 153 female (22.11%) and 539 male (77.89%) participants, among which 608 identified as Han ethnicity (87.86%) and 84 as belonging to ethnic minorities (12.14%). Additionally, 439 participants were only children (63.44%), while 253 had siblings (36.56%). In terms of residence, 122 participants were from rural areas (17.63%), while 570 were from urban areas (82.37%). Furthermore, 343 participants (49.57%) stated that their fathers have received higher education, while 349 participants (50.43%) reported their fathers had not.

Measures

Depression

Depression among students was measured using the Patient Health Questionnaire-9 (PHQ-9) developed by Spitzer et al and later translated into Chinese by Wang et al, a component of the broader Patient Health Questionnaire (PHQ).[42,43] The PHQ-9 is a self-administered tool designed to measure depressive symptoms. The four-point rating scale consists of nine items, each scored on a scale from 0 (not at all) to 3 (nearly every day), yielding a total score ranging from 0 to 27. Higher scores indicate greater severity of depression. In practice, the PHQ-9 scores are commonly interpreted as 0–4,

5–9, 10–14, 15–19, and 20–27, representing none/minimal, mild, moderate, moderately severe, and severe levels of depression, respectively.[44] The reliability coefficient of the Patient Health Questionnaire-9 was 0.905.

Competitive Attitudes

Students' competitive attitudes in this study were measured using the Competitive Personality Scale, part of the Cooperation and Competition Personality Scales (CCPS) developed by Lu et al in Chinese and later translated into English.[13] The CCPS is a self-reported questionnaire, with the competitiveness module comprising ten items assessing competitive personality. The Competitive Personality Scale rated on a scale from 1 (completely disagree) to 5 (completely agree). Items 1–4 measure participants' feelings for competition (total scores ranging from 4 to 20), items 5–7 evaluate participants' beliefs about competition (total scores ranging from 3 to 15), and items 8–10 assess participants' behavioral tendencies of competition (total scores ranging from 3 to 15). To make the different dimensions of competitive attitudes comparable, this study further averaged the items for feelings of competition, beliefs about competition, and behavioral tendencies of competition, with the three averaged dimensions scoring from 1 to 5. Higher scores reflect stronger tendencies of the corresponding competitive personality.[13] The reliability coefficient of the Competitive Personality Scale was 0.885.

Sleep Quality

In this study, sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), a questionnaire designed for participants by Buysse et al to self-evaluate their sleep over the past month.[30] The PSQI self-rated questions were used in this study, which measure sleep quality across seven dimensions: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each dimension is four-point rated on a scale of 0–3, with the PSQI global score ranging from 0 to 21. Higher scores indicate more severe sleep difficulties, with a total score greater than 5 suggesting poor sleep quality.[30] The reliability coefficient of the Pittsburgh Sleep Quality Index was 0.628.

Peer Relationships

In Chinese universities, dormitories serve as key spaces for student interactions, where students often engage in academic and recreational activities together, forming close social units. Given the importance of these relationships, this study used students' dormitory interpersonal relationships as a proxy for peer relationships. Specifically, students were asked to self-assess their relationships with their dormitory roommates by responding to "Overall, how are your relationships with your dormitory roommates during the four academic years?" Responses were seven-point rated on a scale from 1 (not close at all) to 7 (extremely close), with higher scores indicating stronger relationships with dormitory roommates.

Control Variables

Based on previous literature examining factors associated with depression among college students, we selected the following control variables for inclusion in our regression models: demographic characteristics (age, gender, ethnicity, political status), family background (home location, only child status, father's education level, family socioeconomic status), and study experience (school satisfaction, learning engagement after class, number of published papers, competition awards, and student leader status).

Statistical Analysis

Descriptive statistics were used to present an overview of students' competitive attitudes, sleep quality, peer relationships, and depression. Subsequently, *t*-tests were performed to compare mean differences between gender subgroups, with Pearson correlation analysis and multiple linear regression employed to explore the relationships among competitive attitudes, sleep quality, peer relationships, and depression. Finally, a structural equation model was constructed to examine the impact of competitive attitudes on depression among college students and the mediating role of sleep quality and peer relationships on the link between competitive attitudes and depression. We used AMOS 28 to conduct the structural equation model analysis. The significance level was set at $p < 0.05$. The assumptions tested within the SEM included normality, linearity and multicollinearity.

Results

Exploratory Analysis

Table 1 presents the means and standard deviations of depression, the three dimensions of competitive attitudes, overall sleep quality, and peer relationships. The average score for depression among college students in China is 5.082 (±4.971). When examined by gender, the average score for females is 5.425 (±4.656), and for males, it is 4.985 (±5.056). The gender difference in the average depression scores is not statistically significant. Notably, the overall mean score exceeded the threshold of 5, which represents the lower bound for mild depressive symptoms.

The average score for feelings for competition is 2.517 (±0.917), with females scoring an average of 2.325 (±0.835) and males scoring an average of 2.571 (±0.932). For beliefs about competition, the average score is 2.959 (±1.067), with females scoring an average of 2.627 (±1.105) and males scoring an average of 3.053 (±1.037). Behavioral tendencies of competition have an average score of 2.601 (±0.973), with females scoring an average of 2.198 (±0.891) and males scoring an average of 2.715 (±0.966). Significant gender differences are observed in all three dimensions of competitive attitudes ($P < 0.01$).

Moreover, the average score for sleep quality among Chinese college students is 5.496 (±2.827), with females scoring an average of 5.856 (±3.023) and males scoring an average of 5.393 (±2.763), all exceeding the cutoff value of 5 and indicating generally poor sleep quality. The average score for peer relationships is 5.886 (±1.227), with females scoring an average of 5.882 (±1.235) and males scoring an average of 5.887 (±1.226). There are no significant gender differences in either sleep quality or peer relationships. Overall, 49.86% of students were classified as having poor sleep quality, including 52.94% of females and 48.98% of males.

Correlation analysis in Table 2 reveals significant positive correlations between depression and both feelings for competition ($r = 0.271$, $P < 0.01$) and behavioral tendencies of competition ($r = 0.149$, $P < 0.01$). Additionally, depression shows significant positive correlation with poor sleep quality ($r = 0.503$, $P < 0.01$), and significant negative correlation with intimate peer relationships ($r = -0.257$, $P < 0.01$). Among the dimensions of competitive attitudes, feelings for competition exhibit significant positive correlation with poor sleep quality ($r = 0.135$, $P < 0.01$) and significant negative

Table 1 Descriptive Statistics of Depression, Competitive Attitudes, Sleep Quality and Peer Relationships (n = 692)

Variables	All		Female		Male		t-Value	P-Value
	Mean	SD	Mean	SD	Mean	SD		
Depression	5.082	4.971	5.425	4.656	4.985	5.056	−0.966	0.335
Feelings for competition	2.517	0.917	2.325	0.835	2.571	0.932	2.949	**0.003**
Beliefs about competition	2.959	1.067	2.627	1.105	3.053	1.037	4.409	**<0.001**
Behavioral tendencies of competition	2.601	0.973	2.198	0.891	2.715	0.966	5.940	**<0.001**
Sleep quality	5.496	2.827	5.856	3.023	5.393	2.763	−1.790	0.074
Peer relationships	5.886	1.227	5.882	1.235	5.887	1.226	−0.040	0.968

Notes: Results in bold represents statistically significant.

Table 2 Correlation Analyses Among Depression, Competitive Attitudes, Sleep Quality and Peer Relationships (n = 692)

No.	Variable	1	2	3	4	5	6
1	Depression	1					
2	Feelings for competition	0.271***	1				
3	Beliefs about competition	−0.055	0.332***	1			
4	Behavioral tendencies of competition	0.149***	0.614***	0.546***	1		
5	Sleep quality	0.503***	0.135***	−0.088**	0.012	1	
6	Peer relationships	−0.257***	−0.121***	0.097**	−0.077**	−0.137***	1

Notes: ***P < 0.01, **P < 0.05.

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correlation with close peer relationships ($r = -0.121$, $P < 0.01$). Beliefs about competition demonstrate significant negative correlation with poor sleep quality ($r = -0.088$, $P < 0.05$) and significant positive correlation with intimate peer relationships ($r = 0.097$, $P < 0.05$). Behavioral tendencies of competition exhibit a significant negative correlation with close peer relationships ($r = -0.077$, $P < 0.05$). Furthermore, significant correlations are observed among the three dimensions of competitive attitudes, highlighting the need to include all three dimensions in the regression model to examine their impact on depression while mitigating the potential effects of multicollinearity.

To examine the potential influence of common method bias, Harman's single-factor test and variance inflation factor (VIF) analysis were conducted. The first unrotated factor accounted for 35.1% of the total variance, below the recommended 40% threshold, indicating that common method bias was not a serious concern. Additionally, all VIF values were below 2 (mean VIF = 1.46), suggesting that multicollinearity was unlikely to affect the results. Subsequently, a three-step hierarchical regression analysis was conducted with depression as the dependent variable. Model 1 included control variables (demographics, family background, and study experience). Model 2 added the three dimensions of competitive attitudes (Feelings, Beliefs, and Behaviors). Model 3 further incorporated the mediators: sleep quality and peer relationships.

Model 1 displays the influence of demographic characteristics, family features, and certain factors regarding study experience on depression among Chinese college students ($R^2 = 0.078$). Model 2 expands on this by including competitive attitudes alongside the control variables ($R^2 = 0.162$). Specifically, for each additional point increase in scores of feelings for competition, the average depression score significantly increases by 1.573 points; whereas each additional point increase in scores of beliefs about competition results in a significant decrease of 0.640 points in the average depression score. Model 3 further incorporates sleep quality and peer relationships as mediators ($R^2 = 0.364$). In this model, sleep quality and peer relationships significantly affect students' depressive symptoms. A one-point increase in poor sleep quality results in a significant increase of by 0.786 points in the average depression scores, while a one-point increase in close peer relationships leads to a significant decrease of 0.411 points in depression score. Moreover, the regression coefficients of feelings for competition and beliefs about competition on depression are smaller in Model 3

Table 3 Multiple Linear Regression of Depression on Competitiveness (n = 684)

Dimension	Variables	Model 1	Model 2	Model 3
Competition attitudes	Feelings for competition		1.573***	1.073***
			(6.40)	(4.94)
	Beliefs about competition		−0.640***	−0.408**
			(−3.19)	(−2.32)
	Behavioral tendencies of competition		0.196	0.273
			(0.75)	(1.20)
Study Experience	Sleep quality			0.786***
				(14.10)
	Peer relationships			−0.411***
				(−2.79)
	School satisfaction	−1.218***	−0.936***	−0.359*
		(−6.57)	(−5.12)	(−1.94)
	Learning engagement after class	0.011	−0.000	−0.013
		(0.52)	(−0.00)	(−0.74)
	Published paper	−0.091	−0.196	−0.087
		(−0.16)	(−0.36)	(−0.19)
	Competition awards	−0.579	−0.453	−0.592*
		(−1.41)	(−1.15)	(−1.72)
	Student leader	0.174	0.126	−0.051
		(0.42)	(0.31)	(−0.15)

(*Continued*)

Table 3 (Continued).

Dimension	Variables	Model 1	Model 2	Model 3
Demographic characteristics	Age	−0.191	−0.206	−0.057
		(−1.12)	(−1.26)	(−0.40)
	Gender	−0.429	−0.706	−0.368
		(−0.97)	(−1.63)	(−0.97)
	Nationality	−0.774	−0.810	−0.313
		(−1.37)	(−1.50)	(−0.66)
	Political status	−0.420	−0.281	−0.213
		(−1.61)	(−1.12)	(−0.97)
Family characteristics	Home location	0.144	−0.003	0.024
		(0.89)	(−0.02)	(0.18)
	Only child	−0.429	−0.307	−0.163
		(−1.08)	(−0.80)	(−0.49)
	Father's education	0.011	−0.001	0.033
		(0.13)	(−0.01)	(0.48)
	Family socioeconomic status	−0.297	−0.364**	−0.188
		(−1.55)	(−1.98)	(−1.16)
	Constant	20.724***	17.880***	7.727**
		(4.83)	(4.33)	(2.09)
	Observations	684	684	684
	R-squared	0.078	0.162	0.364

Notes: t-statistics in parentheses; ***P < 0.01, **P < 0.05, *P < 0.1.

than in Model 2, suggesting that feelings for competition and beliefs about competition may indirectly influence depression through their effects on sleep quality and peer relationships (Table 3).

Path Analysis

The study further establishes a structural equation model (Figure 1) to examine the mediating effects of sleep quality and peer relationships on the link between competitive attitudes and depression, building on findings from correlation and regression analyses. First, to validate the model design, structural validity was tested using AMOS. The overall model fit

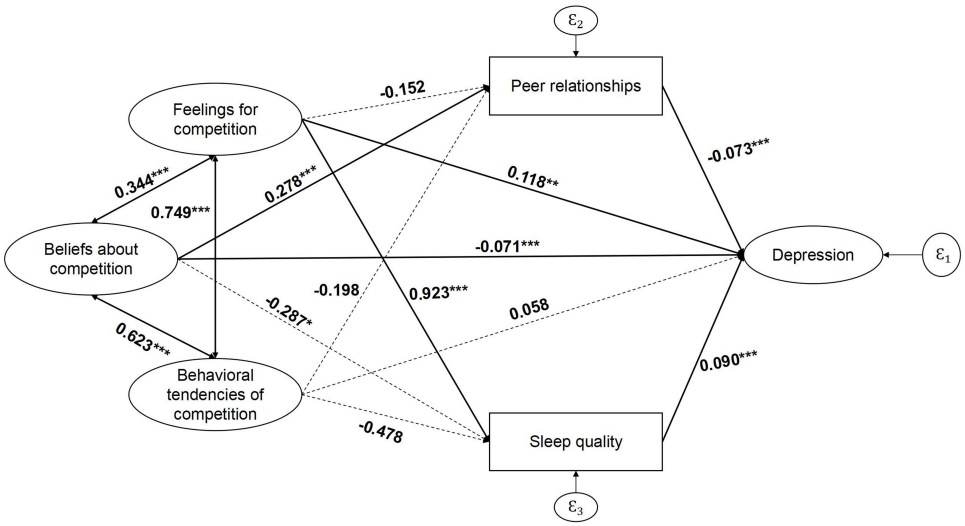

Figure 1 Structural Equation Model of the Mediating Roles of Sleep Quality and Peer Relationships in the Association Between Competitive Attitudes and Depression.
Notes: Solid lines indicate significant paths; dashed lines indicate non-significant paths; ***P < 0.01, **P < 0.05, *P < 0.1.

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Table 4 Bootstrapping Indirect Effect and 95% Confidence Interval for the Mediation Model (n = 692)

Effect Path	Estimated Effect	*P* value	Standard Errors	95% CI
Total effects (**Feelings for competition**)	0.212	**0.001**	0.058	[0.100, 0.336]
Feelings for competition-depression	0.118	**0.023**	0.054	[0.016, 0.233]
Feelings for competition-peer relationships/sleep quality-depression	0.094	**0.002**	0.028	[0.040, 0.154]
Feelings for competition-peer relationships-depression	0.011	0.116	0.008	[−0.003, 0.031]
Feelings for competition-sleep quality-depression	0.083	**0.001**	0.025	[0.035, 0.134]
Total effects (**Beliefs about competition**)	−0.117	**0.001**	0.030	[−0.176, −0.061]
Beliefs about competition-depression	−0.071	**0.007**	0.027	[−0.125, −0.019]
Beliefs about competition-peer relationships/sleep quality-depression	−0.046	**0.005**	0.016	[−0.079, −0.016]
Beliefs about competition-peer relationships-depression	−0.020	**0.001**	0.007	[−0.037, −0.010]
Beliefs about competition-sleep quality-depression	−0.026	0.078	0.015	[−0.054, 0.003]
Total effects (**Behavioral Tendencies of competition**)	0.030	0.648	0.070	[−0.105, 0.173]
Behavioral tendencies of competition-depression	0.058	0.369	0.065	[−0.071, 0.190]
Behavioral tendencies of competition-peer relationships/sleep quality-depression	−0.028	0.365	0.034	[−0.100, 0.035]
Behavioral tendencies of competition-peer relationships-depression	0.014	0.084	0.010	[−0.003, 0.039]
Behavioral tendencies of competition-sleep quality-depression	−0.043	0.117	0.030	[−0.108, 0.013]

Notes: Results in bold represents statistically significant. 95% CI stands for 95% confidence interval.

indices demonstrate a satisfactory fit: the chi-square to degrees of freedom ratio ($\chi 2/df$) is 3.0, while both the RMSEA (0.054) and RMR (0.050) fall well below the acceptable threshold of 0.08. The incremental fit indices further support the model's adequacy. Specifically, the GFI (0.926), AGFI (0.903), and NFI (0.934) all exceed the commonly recommended threshold of 0.90. Similarly, the TLI reaches 0.946, while both the CFI and IFI attain values of 0.955, indicating a consistently high level of model fit across multiple indicators. Moreover, the parsimonious fit indices: PGFI (0.710), PNFI (0.787), and PCFI (0.805), exceed the standard threshold of 0.50. Collectively, these metrics confirm that the measurement model possesses strong structural validity and that the overall model achieves an excellent level of fit. As shown in Table 4, the total effect of feelings for competition on depression was 0.212 ($P < 0.01$; 95% CI: 0.100~0.336), with a direct effect of 0.118 ($P < 0.05$; 95% CI: 0.016~0.233), accounting for 55.66% of the total effect. The mediating effect was 0.094 ($P < 0.01$; 95% CI: 0.040~0.154), primarily driven by sleep quality (0.083, $P < 0.01$; 95% CI: 0.035~0.134), while peer relationships did not show a significant mediating role. For beliefs about competition, the total effect on depression was −0.117 ($P < 0.01$; 95% CI: −0.176~-0.061), with a direct effect of −0.071 ($P < 0.01$; 95% CI: −0.125~-0.019), contributing to 60.68% of the total effect. The mediating effect was −0.046 ($P < 0.01$; 95% CI: −0.079~-0.016), with peer relationships being the primary mediator (−0.020, $P < 0.01$; 95% CI: −0.037~-0.010), while sleep quality did not significantly mediate this relationship. Behavioral tendencies of competition did not exhibit a significant influence on depression.

Discussion

This study investigated the relationship between competitive attitudes and depression among Chinese college students to address existing gaps in understanding the psychological mechanisms involved. The descriptive statistical results reveal significant gender differences across all three dimensions of competitive attitudes among Chinese college students ($P < 0.01$). Male students scored significantly higher than female students on the dimensions of feelings for competition, beliefs about competition, and behavioral tendencies of competition. This finding is consistent with previous studies, such as the experimental study by Gneezy et al, which found that the performance of males significantly improves when the competitive environment is heightened, while females do not exhibit the same pattern.[16] Andersen et al also highlighted through a review of literature and comparative experimental results that males tend to be more competitive than females in India.[17] Additionally, male college students had lower average scores for depression and sleep quality compared to female college students, which aligns with previous research. Depression has long been more prevalent in females than in males, with studies indicating that females are approximately twice as likely as males to experience

depression over the course of their lives.[3,45] Moreover, research suggests that females may have poorer sleep quality compared to males, despite exhibiting a more positive attitude towards sleep.[46]

Associations Between Dimensions of Competition and Depression

Based on the results of path analysis, feelings for competition were significantly positively associated with depression, suggesting that stronger emotional involvement in competition may exacerbate depressive symptoms among college students. This result supports Hypothesis I. Conversely, beliefs about competition have a significant negative correlation with depression, indicating that holding beliefs about competition may alleviate depressive symptoms, thus confirming Hypothesis II. This result aligns with the majority of previous studies,[9,12,23] which have consistently found a positive correlation between hypercompetitive attitudes and depression, and a negative correlation between personal development attitudes and depression among high school students in the United States. Although the correlation analysis showed a positive association between behavioral tendencies of competition and depression, this relationship was not significant in the multiple linear regression model and the structural equation model, thereby confirming Hypothesis III. According to the existing literature, the correlation between competitive attitudes and depression can be explained through its effects on physiological health and interpersonal relationships. Hypercompetitive attitudes have a direct impact on sleep quality, with poor sleep quality increasing sensitivity to emotional stimuli, amplifying psychological stress, and consequently leading to mental health issues such as depression.[32,47] Furthermore, according to the interpersonal theory of depression,[34] individuals with personal development competitive attitudes may have more harmonious interpersonal relationships,[9,18] thereby effectively reducing the occurrence of depression.

Sleep Quality Between Feelings for Competition and Depression

The path analysis confirmed that sleep quality mediates the relationship between feelings for competition and depression, supporting part of Hypothesis IV. The research findings are consistent with extant studies, indicating that hypercompetitive attitudes have a direct impact on sleep quality, while personal development competitive attitudes only have an indirect effect among Chinese college students.[32] Moreover, the finding that poor sleep quality was positively correlated with depression aligns with earlier research. For instance, Ford & Kamerow reported a cross-sectional association between sleep disorders and severe depression.[48] Livingston et al also reiterated findings regarding the relationship between sleep disorders and future depression among London community-dwelling older adults in the United Kingdom.[49] In fact, poor sleep quality increases sensitivity to emotional stimuli as well as psychological stress. Conversely, good sleep quality makes it relatively difficult for increased levels of stress to elicit significant emotional reactions, even in the presence of certain levels of illness or discomfort.[47]

Peer Relationships Between Beliefs About Competition and Depression

The analysis also showed that peer relationships mediate the association between beliefs about competition and depression, further confirming part of Hypothesis IV. Specifically, students who hold personal development beliefs about competition are more likely to develop harmonious interpersonal relationships, which in turn serve as a protective factor against depression. This mediating role is supported by a body of research demonstrating the importance of social interactions in mental health. Studies have shown that individuals with personal development attitudes have greater needs for social interaction, while those with hypercompetitive attitudes do not.[9] Furthermore, dysfunctional interpersonal relationships positively predict individual depressive symptoms.[50] For example, Schneider et al pointed out that interpersonal trust can affect individuals' mental health among couples in North Carolina community of the United States, with high levels of trust inhibiting anxiety and depression.[51] For adolescents, as their time spent with peers significantly increases, peer relationships play a crucial role in shaping their social relationships.[52] A study conducted on French-Canadian children shows that individuals with low peer acceptance tend to experience deeper feelings of loneliness and face a greater risk of depression.[53]

The interplay between competitive attitudes, sleep quality, and peer relationships in influencing depression may be intricate. Existing literature has suggested that competitive attitudes can indirectly affect depression not only through social relationships (eg. peer relationships, teacher support, parental support) but also by physiological health (eg. sleep quality, emotional regulation, psychological stress). Poor sleep quality may increase the risk of depressive disorders by

disrupting the brain's executive function system, increasing sensitivity to emotional stimuli, and psychological stress. Dysfunctional interpersonal relationships may similarly exacerbate the risk of depressive disorders by enhancing students' feelings of loneliness and distrust among peers.

Taken together, the study suggests that universities might reduce depression by fostering students' personal development competitive attitudes, mitigating hypercompetitive attitudes, and promoting conducive sleep environments and harmonious peer relationships. Educators can encourage students to focus more on self-growth than competition outcomes and view peers as support rather than comparison.[10,32] High-quality friendships form the foundation of good peer relationships. To improve sleep quality, measures such as sleep hygiene courses and self-regulation training can reduce sleep procrastination and smartphone addiction.[54] Regular physical exercise also effectively improves sleep and reduces depression risk, with studies showing its significant though small effect on adolescent depression.[55]

The originality of this study lies in three aspects: Firstly, it addresses the dual challenge of rising depression levels and intense competitive pressure among Chinese college students, offering culturally specific insights into how educational contexts shape mental health. Secondly, by differentiating competitive attitudes into feelings, beliefs, and behaviors, it reveals that while hyper-competitive feelings exacerbate depression, development-oriented beliefs may serve as a protective factor. Thirdly, it explores the underlying mechanisms by identifying sleep quality and peer relationships as potential mediators. The results demonstrate that competitive feelings impair mental health via sleep deterioration, whereas positive beliefs foster resilience through enhanced peer connections. This framework offers theoretical insights and practical guidance for addressing the mental health challenges associated with competitive environments among college students.

Limitations

This study has three limitations. Firstly, the data used in this research are cross-sectional, thus preventing the determination of causal relationships between competitive attitudes and depression. Future studies may employ panel data to better investigate the directionality of this relationship. Secondly, the study utilized a sample from a single institution with a higher proportion of male students. Therefore, while the proposed model is supported by our data and theory, its generalizability to more gender-balanced populations or different cultural contexts remains to be fully established in future research. Thirdly, as the variables were assessed by self-reported data from students, the potential for common method bias remains; thus, future studies using multi-source data are warranted to further validate these findings. Additionally, the measure of peer relationships focused solely on dormitory interactions, while practical, may not fully capture the construct's complexity. Future studies employing multi-dimensional scales would offer a more comprehensive perspective.

Conclusion

This study investigated the relationship between competitive attitudes and depression among Chinese college students, while examining the mediating effects of sleep quality and peer relationships. On average, college students experienced mild levels of depression and poor sleep quality, with males demonstrating significantly stronger competitive attitudes across all three dimensions compared to females. The study further examined how different aspects of competitive attitudes relate to depression. Firstly, feelings for competition were found to be positively correlated with depression disorders among college students, while beliefs about competition were negatively correlated with depression disorders. In addition, there was no significant correlation between behavioral tendencies of competition and depression. Secondly, sleep quality and peer relationships were found to mediate the relationship between competitive attitudes and depression. Specifically, sleep quality mediated the relationship between feelings for competition and depression, while peer relationships mediated the relationship between beliefs about competition and depression. Thus, colleges and universities should encourage the development of a self-growth-oriented competitive mindset among students, while also providing support to mitigate competitive feelings.

Data Sharing Statement

The datasets analyzed in the present study are available from the corresponding author on reasonable request.

Ethical Approval and Informed Consent

This study was performed in accordance with the principles of the Declaration of Helsinki. The ethical approval was acquired from the Ethics Committee of Beihang University (Approval No.: BM20240341). All participants provided informed consent prior to the commencement of the study. Before participation, participants were fully informed about the purpose of the research, the voluntary nature of participation, the assurance of anonymity and confidentiality, how their data would be used, and any potential risks associated with their participation. Informed consent was obtained electronically at the beginning of the online questionnaire. Participants who did not agree to participate were automatically exited from the survey.

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Disclosure

The authors declare no competing interests.

References

1. Ibrahim AK, Kelly SJ, Adams CE, Glazebrook C. A systematic review of studies of depression prevalence in university students. *J Psychiatr Res*. 2013;47(3):391–400. doi:10.1016/j.jpsychires.2012.11.015
2. Avenevoli S, Knight E, Kessler RC, Merikangas KR. Epidemiology of depression in children and adolescents. In: Abela JRZ, Hankin BL, editors. *Handbook of Depression in Children and Adolescents*. New York, NY: Guilford Press; 2008:6–32.
3. Herrman H, Patel V, Kieling C, et al. Time for united action on depression: a Lancet-World Psychiatric Association Commission. *Lancet*. 2022;399 (10328):957–1022. doi:10.1016/S0140-6736(21)02141-3
4. Nihalani N, Simionescu M, Dunlop BW. Depression: phenomenology, epidemiology, and pathophysiology. In: *Depression*. Boca Raton, FL: CRC Press; 2009:13–33.
5. Lipson SK, Zhou S, Abelson S, et al. Trends in college student mental health and help-seeking by race/ethnicity: findings from the national healthy minds study, 2013-2021. *J Affect Disord*. 2022;306:138–147. doi:10.1016/j.jad.2022.03.038
6. Kohls E, Baldofski S, Moeller R, Klemm SL, Rummel-Kluge C. Mental health, social and emotional well-being, and perceived burdens of university students during COVID-19 pandemic lockdown in Germany. *Front Psychiatry*. 2021;12:643957. doi:10.3389/fpsyt.2021.643957
7. Dessauvagie AS, Dang HM, Nguyen TAT, Groen G. Mental health of university students in SouthEastern Asia: a systematic review. *Asia Pac J Public Health*. 2022;34(2–3):172–181. doi:10.1177/10105395211055545
8. Gao W, Ping S, Liu X. Gender differences in depression, anxiety, and stress among college students: a longitudinal study from China. *J Affect Disord*. 2020;263:292–300. doi:10.1016/j.jad.2019.11.121
9. Ryckman RM, Hammer M, Kaczor LM, Gold JA. Construction of a personal development competitive attitude scale. *J Pers Assess*. 1996;66 (2):374–385. doi:10.1207/s15327752jpa6602_15
10. Posselt JR, Lipson SK. Competition, anxiety, and depression in the college classroom: variations by student identity and field of study. *J Coll Stud Dev*. 2016;57(8):973–989. doi:10.1353/csd.2016.0094
11. Kelley HH, Stahelski AJ. Social interaction basis of cooperators' and competitors' beliefs about others. *J Person Soc Psychol*. 1970;16(1):66–91. doi:10.1037/h0029849
12. Ryckman R, Hammer M, Kaczor L, Gold J. Construction of a Hypercompetitive Attitude Scale. *J Personality Assess*. 1990;55(3):630–639.
13. Lu S, Au WT, Jiang F, Xie X, Yam P. Cooperativeness and competitiveness as two distinct constructs: validating the Cooperative and Competitive Personality Scale in a social dilemma context. *Int J Psychol*. 2013;48(6):1135–1147. doi:10.1080/00207594.2012.743666
14. Gao W, Tang W, Wang J. Relationship between career adaptability and competitive attitudes among Chinese college students. *J Adolesc*. 2025;97 (4):1026–1033. doi:10.1002/jad.12475
15. Gërxhani K, Brandts J, Schram A. Competition and gender inequality: a comprehensive analysis of effects and mechanisms. *Am J Sociol*. 2023;129 (3):715–752. doi:10.1086/727822
16. Gneezy U, Niederle M, Rustichini A. Performance in competitive environments: gender differences. *Q J Econ*. 2003;118(3):1049–1074. doi:10.1162/00335530360698496
17. Andersen S, Ertac S, Gneezy U, List JA, Maximiano S. Gender, competitiveness, and socialization at a young age: evidence from a matrilineal and a patriarchal society. *Rev Econ Stat*. 2013;95(4):1438–1443. doi:10.1162/rest_a_00312

18. Collier SA, Ryckman RM, Thornton B, Gold JA. Competitive personality attitudes and forgiveness of others. *J Psychol*. 2010;144(6):535–543. doi:10.1080/00223980.2010.511305
19. Flory JA, Leibbrandt A, List JA. Do competitive workplaces deter female workers? A large-scale natural field experiment on job entry decisions. *Rev Econ Stud*. 2014;82(1):122–155. doi:10.1093/restud/rdu030
20. Price J. Gender differences in the response to competition. *ILR Rev*. 2008;61(3):320–333. doi:10.1177/001979390806100303
21. Ors E, Palomino F, Peyrache E. Performance gender gap: does competition matter? *J Labor Econ*. 2013;31(3):443–499. doi:10.1086/669331
22. Chan JY, Gerstein LH, Kinsey R, Fung AL. Asian adults' hypercompetitiveness and distress: the mediating role of a negative problem-solving orientation. *Curr Psychol*. 2016;37(1):188–197. doi:10.1007/s12144-016-9502-7
23. Hibbard DR, Buhrmester D. Competitiveness, gender, and adjustment among adolescents. *Sex Roles*. 2010;63(5–6):412–424. doi:10.1007/s11199-010-9809-z
24. Gao W, Luo Y, Cao X, Liu X. Gender differences in the relationship between self-esteem and depression among college students: a cross-lagged study from China. *J Res Personality*. 2022;97:104202. doi:10.1016/j.jrp.2022.104202
25. Gruber R, Cassoff J. The interplay between sleep and emotion regulation: conceptual framework empirical evidence and future directions. *Curr Psychiatry Rep*. 2014;16(11):500. doi:10.1007/s11920-014-0500-x
26. O'Leary K, Bylsma LM, Rottenberg J. Why might poor sleep quality lead to depression? A role for emotion regulation. *Cogn Emot*. 2017;31(8):1698–1706. doi:10.1080/02699931.2016.1247035
27. Walker EF, Diforio D. Schizophrenia: a neural diathesis-stress model. *Psychol Rev*. 1997;104(4):667–685. doi:10.1037/0033-295x.104.4.667
28. Zuckerman M. Diathesis-stress models. In: *Vulnerability to Psychopathology: A Biosocial Model*. American Psychological Association; 1999:3–23. doi:10.1037/10316-001
29. Elwood LS, Hahn KS, Olatunji BO, Williams NL. Cognitive vulnerabilities to the development of PTSD: a review of four vulnerabilities and the proposal of an integrative vulnerability model. *Clin Psychol Rev*. 2009;29(1):87–100. doi:10.1016/j.cpr.2008.10.002
30. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The pittsburgh sleep quality index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1989;28(2):193–213. doi:10.1016/0165-1781(89)90047-4
31. Gao WJ, Hu Y, Ji JL, Liu XQ. Relationship between depression, smartphone addiction, and sleep among Chinese engineering students during the COVID-19 pandemic. *World J Psychiatry*. 2023;13(6):361–375. doi:10.5498/wjp.v13.i6.361
32. Ou K, Ma N. More competition in mind, better sleep at night? The mediating role of anxiety between competitive attitude and sleep quality. *Int J Environ Res Public Health*. 2023;20(4):3495. doi:10.3390/ijerph20043495
33. Sullivan HS. *The Interpersonal Theory of Psychiatry*. London, England: Routledge; 2013. doi:10.4324/9781315014029
34. Stewart JG, Harkness KL. Testing a revised interpersonal theory of depression using a laboratory measure of excessive reassurance seeking. *J Clin Psychol*. 2017;73(3):331–348. doi:10.1002/jclp.22338
35. Coiro MJ, Bettis AH, Compas BE. College students coping with interpersonal stress: examining a control-based model of coping. *J Am Coll Health*. 2017;65(3):177–186. doi:10.1080/07448481.2016.1266641
36. Ryckman RM, Libby CR, van den Borne B, Gold JA, Lindner MA. Values of hypercompetitive and personal development competitive individuals. *J Pers Assess*. 1997;69(2):271–283. doi:10.1207/s15327752jpa6902_2
37. Schneider BH, Woodburn SS, Pilar Sotera Del Toro MD, Udvari SJ. Cultural and gender differences in the implications of competition for early adolescent friendship. *Merrill-Palmer Quart*. 2005;51(2):163–191. doi:10.1353/mpq.2005.0013
38. Salk RH, Hyde JS, Abramson LY. Gender differences in depression in representative national samples: Meta-analyses of diagnoses and symptoms. *Psychol Bull*. 2017;143(8):783–822. doi:10.1037/bul0000102
39. Jiang P, Wen Y. The relationship between family socioeconomic status and depression among college freshmen. *Campus Psychol*. 2021;19(2):152–155. doi:10.19521/j.cnki.1673-1662.2021.02.015
40. Zhang L, Wei R. Parenting styles and adolescent depression: the multiple mediating roles of school satisfaction and subjective well-being. *Psychol Bull*. 2024;7(2):114–121.
41. Memon MA, Ting H, Cheah JH, Thurasamy R, Chuah F, Cham TH. Sample size for survey research: review and recommendations. *J Appl Struct Equation Model*. 2020;4(2):1–20.
42. Spitzer RL, Williams JB, Kroenke K, Hornyak R, McMurray J. Validity and utility of the PRIME-MD patient health questionnaire in assessment of 3000 obstetric-gynecologic patients: the PRIME-MD patient health questionnaire obstetrics-gynecology study. *Am J Obstet Gynecol*. 2000;183(3):759–769. doi:10.1067/mob.2000.106580
43. Wang W, Bian Q, Zhao Y, et al. Patient Health Questionnaire-9; Chinese Version. *PsycTESTS Dataset*. doi:10.1037/t77190-000
44. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16(9):606–613. doi:10.1046/j.1525-1497.2001.016009606.x
45. World Health Organization. Depression and other common mental disorders: global health estimate. 2017. Available from: https://iris.who.int/handle/10665/254610. Accessed March 9, 2025.
46. Zendels P, Ruggiero A, Gaultney JF. Gender differences affecting the relationship between sleep attitudes, sleep behaviors and sleep outcomes. *Cogent Psychol*. 2021;8(1). doi:10.1080/23311908.2021.1979713
47. Hamilton NA, Affleck G, Tennen H, et al. Fibromyalgia: the role of sleep in affect and in negative event reactivity and recovery. *Health Psychol*. 2008;27(4):490–497. doi:10.1037/0278-6133.27.4.490
48. Ford DE, Kamerow DB. Epidemiologic study of sleep disturbances and psychiatric disorders. An opportunity for prevention? *JAMA*. 1989;262(11):1479–1484. doi:10.1001/jama.262.11.1479
49. Livingston G, Blizard B, Mann A. Does sleep disturbance predict depression in elderly people? A study in inner London. *Br J Gen Pract*. 1993;43(376):445–448.
50. Rudolph KD, Flynn M, Abaied JL. A developmental perspective on interpersonal theories of youth depression. In: Abela JRZ, Hankin BL, editors. *Handbook of Depression in Children and Adolescents*. New York, NY: Guilford Press; 2008:79–102.
51. Schneider IK, Konijn EA, Righetti F, Rusbult CE. A healthy dose of trust: the relationship between interpersonal trust and health. *Personal Relationships*. 2011;18(4):668–676. doi:10.1111/j.1475-6811.2010.01338.x
52. Youniss J, Haynie DL. Friendship in Adolescence. *J Dev Behav Pediatr*. 1992;13(1):59–66. doi:10.1097/00004703-199202000-00013

53. Boivin M, Hymel S, Bukowski WM. The roles of social withdrawal, peer rejection, and victimization by peers in predicting loneliness and depressed mood in childhood. *Dev Psychopathol*. 1995;7(4):765–785. doi:10.1017/s0954579400006830
54. Al-Kandari S, Alsalem A, Al-Mutairi S, Al-Lumai D, Dawoud A, Moussa M. Association between sleep hygiene awareness and practice with sleep quality among Kuwait University students. *Sleep Health*. 2017;3(5):342–347. doi:10.1016/j.sleh.2017.06.004
55. Larun L, Nordheim LV, Ekeland E, Hagen KB, Heian F. Exercise in prevention and treatment of anxiety and depression among children and young people. *Cochrane Database Syst Rev*. 2006;(3):CD004691. doi:10.1002/14651858.CD004691.pub2

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