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Relationship between positive emotion and learning motivation: The mediating role of resilience and the moderating role of social support

Yun Teng[1,2], Fengjun Qi[1], Xianhua Liu[3*]
[1]Department of Education, International College, Krirk University, Bangkok 10220, Thailand;
[2]The Center for Mental Health Counseling, Jiangsu College of Nursing, huai'an 223300, China;
[3]College of Educational Science, Hengyang Normal University, Hengyang, Hunan 421002, China; xianhua_liu@hynu.edu.cn (X.L.).

Abstract: College students exhibit a phenomenon of decreased academic motivation due to excessive use of mobile internet communication in interpersonal interactions. This study uses college students as a sample and collects data from 1,295 college students through an online questionnaire survey for empirical analysis. It explores the potential relationship between positive emotions and learning motivation and examines the mediating role of resilience and the moderating role of social support. The results show that: (1) Positive emotions have a significant positive impact on enhancing learning motivation and can effectively prevent the decline in learning motivation; (2) Resilience plays a partial mediating role between positive emotions and learning motivation, becoming an important factor in protecting learning motivation; (3) Social support has a moderating effect between positive emotions and learning motivation, playing a role in motivating learning motivation. Based on these results, the study provides valuable theoretical and practical insights for enhancing college students' resilience, improving social support, and cultivating positive emotions to prevent the decline in learning motivation.

Keywords: *College students, Learning motivation, Positive emotions, Resilience, Social support.*

1. Introduction

In today's hyper-connected world, digital technology and social media are highly embedded in our daily lives, as we become an increasingly "digital society" [1]. The rapid development of Internet technology has ushered in a new era of cyberspace which affects not only cultural exchanges between individuals, but also the relationship between humanity and nature [2]. As boundaries between the online virtual world and reality continue to become more blurred, it becomes increasingly difficult to distinguish between the "virtual" online world from the "real" physical world [3]. On a University Campus, due to the convenience and accessibility of network resources, college students have become increasingly active and passively dependent on mobile networks, engaging in a wide variety of types of entertainment and socializing, including social communication, virtual games, uploading pictures, and sharing videos through social networks [4]. Research has suggested that excessive social network use is a specific manifestation of Internet addiction [5], Some scholars also regard it as a type of impulse control disorder [6].

Addiction to online communication and neglecting the maintenance and development of real-life interpersonal relationships can impair psychological and social functions [7]. Internet addiction has been shown to have adverse effects on college students' physical health, academic performance, and social adaptation [8, 9]. Furthermore, excessive use of online social networks by college students can severely disrupt classroom instruction, affect their studies and daily life, and even endanger their

* Correspondence: xianhua_liu@hynu.edu.cn

physical and mental health. All these may ultimately have a serious impact on social order [7]. Therefore, it is particularly urgent to understand the impact of college students' excessive network communication on their academic motivation.

The increasing reliance on social networks has transcended mere psychological needs, leading to significant negative impacts such as heightened stress, anxiety, and depression, particularly among students [10, 11]. As face-to-face communication shifts online due to smart mobile devices, students develop a dependency on social networks to satisfy their need for positive interactions, often resulting in withdrawal symptoms when they fail to control this usage [9]. This shift has affected learning environments, as the lack of direct communication with teachers and the absence of effective physical learning spaces have further eroded students' motivation [12, 13].

Many students, faced with academic challenges and low motivation, turn to their mobile phones for comfort, which can lead to dependency or addiction [14]. This dependency negatively impacts their health, learning efficiency, and academic performance, creating a vicious cycle of declining motivation and increased mobile phone use [15]. Conversely, positive emotions have been shown to enhance academic achievement and learning engagement [16, 17]. When students feel emotionally supported, they can better resist the negative impacts of excessive online social interactions, leading to improved academic performance [18, 19]. Seligman [20] believes that positive emotions encourage people to have a more optimistic outlook on life, stronger resilience, and higher learning motivation. Resilience acts as a protective mechanism, mediating the psychological impact of risk factors on health and reducing the effects of these risks on learning outcomes. Positive emotions and resilience are crucial in helping students overcome smartphone addiction, enhancing their focus, motivation, and ability to cope with stress and challenges [21, 22].

Eccles and Wigfield their expectancy–value theory, the results of their related Learning Motivation Scale reveal that positive emotions can effectively predict participants' learning motivation variables [23]. Meanwhile, Numerous empirical studies have concluded that perceived social support is positively correlated with academic achievement [24]. This study adopts the expectancy-value theory as a framework to enhance college students' perception of social support, thereby stimulating their intrinsic positive emotions and reducing their excessive reliance on mobile internet. This change contributes to a sustained increase in students' learning motivation and confidence. Unlike previous studies that primarily focused on the role of social support in regulating negative emotions, this research specifically explores how social support moderates the relationship between positive emotions and learning motivation in the stressful environment caused by dependence on mobile internet. Despite these findings, however, limited research exists on the relationship between social support and learning motivation. Furthermore, the degree of interconnectedness between these two factors remains unclear. Therefore, there is a need for further extensive research to expand our understanding of the interplay of social support and learning motivation.

2. Literature Review

2.1. Positive Emotions and Learning Motivation

Positive emotions can broaden various dimensions of human resources, including intelligence, emotional well-being, and social adaptation, and can also increase one's ability to draw upon these reserves when faced with threats or opportunities [25]. Aspinwall [26] demonstrated through extensive experimentation that individuals experiencing positive emotions are better equipped to comprehend and overcome negative information in their lives than those experiencing negative emotions. Positive emotions play a constructive role in interpersonal relationships, emotional well-being, and learning motivation, with high levels of positive emotions contributing to improved individual performance in cooperative learning contexts [27]. In a study on positive emotions and learning motivation, it was found that individuals experiencing positive emotions tend to have better interpersonal relationships and higher scores in positive thinking, with a significant positive between positive emotions and learning motivation. Positive emotions (e.g., interest, self-confidence, optimism,

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hope, etc.) can ignite one's curiosity and strong desire for knowledge, consequently fostering an interest in learning, and stimulating their learning motivation [28]. Based on the above discussion, the current study proposed hypothesis:

H_1: Positive emotions have a positive effect on learning motivation among college students.

2.2. Resilience, Positive Emotions and Learning Motivation

Fredrickson [29] postulated that positive emotions serve five functions: broadening thought and action, undoing negative emotions, enhancing psychological resilience, building personal psychological resources, and fostering psychological and physiological well-being. Positive emotions enable individuals to restore normal functioning after exposure to stressors. Luthans et al. [28] have advocated for the use of positive emotions to bolster confidence (i.e., self-efficacy) in tackling challenging tasks, to attribute events positively in the present and future (i.e., optimism), to exhibit the necessary willpower to reach their desired goals through practical strategies (i.e., hope), and to swiftly regain normal functioning after setbacks (i.e., resilience). Positive emotions can enhance individuals' emotional and physical well-being, and individuals with positive emotions tend to exhibit greater resilience in the face of severe threats, which has been validated as a protective predictor of mental health. Positive emotions can lead to individuals demonstrating positive coping mechanisms, including resilience in the face of adversity and challenging experiences, which can enhance their psychological resilience. Tugade and Fredrickson [30] noted a potential hypothetical relationship between positive emotions and resilience which may contribute to increased individual resilience. Resilience can act as a protective factor, reducing individuals' negative responses to events and tapping into and utilizing their inherent potential [31], enhancing their intrinsic motivation, and positively influencing their academic outcomes. Resilience has also been shown to reliably predict various variables related to students' learning motivation [32]. As a positive psychological orientation, resilience is closely linked to one's learning motivation. Individuals with higher levels of resilience tend to possess increased perseverance in overcoming learning challenges, a more concrete focus on their goals, and a progressively stronger degree of learning motivation with individuals also exhibiting sustained focus during learning, which can then lead to improved learning efficiency and higher academic achievement. Positive emotions can influence learning motivation both directly and indirectly through resilience. Resilience acts as a mediating variable to reduce or offset the impacts of internal factors on learning motivation, resulting in college students adjusting their learning attitudes and attributing events internally [14]. In consideration of these findings, the current study proposed hypothesis:

H_2: Positive emotions have a positive effect on the resilience of college students.

H_3: Resilience plays a positive effect on the learning motivation of college students.

H_4: Resilience plays a mediating role between positive emotions and learning motivation among college students.

2.3. Social Support, Positive Emotions and Learning Motivation

College students who engage in prolonged and excessive use of mobile Internet for social interactions are prone to experiencing negative emotions such as anxiety, frustration, and disappointment, and the emergence of these negative emotions further influences their learning motivation. Individuals exhibiting smartphone dependency often dedicate a significant amount of time to mobile phone usage and tend to demonstrate poorer self-control and self-management abilities, which are negatively correlated with their pursuit of learning motivation. Research indicates that social support has a preventive effect on the adverse influences associated with academic achievement, and perceived social support has been shown to act as a buffering variable, reducing negative academic emotions and functioning as a moderating factor on student learning motivation [33] . A low sense of academic achievement often develops in response to the accumulation of long-term negative emotions, and excessive emotional exhaustion can hinder the enhancement of learning motivation. Therefore, perceived social support effectively moderates the relationship between emotions and learning

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motivation, utilizing positive emotions to counteract the impact of learning difficulties, while receiving social support alleviates such challenges with higher levels of perceived social support correlating with stronger learning motivation, and perceived social support coming primarily from teachers, family, and friends. Nelson and Debacker [34] have pointed out that students who feel valued in school, who have trusted and caring friendships, and who receive multidimensional behavioral support that provides them with emotional, instrumental, informational, and evaluative support can effectively moderate the relationship between emotions and learning motivation. In light of these findings, the current study proposed hypothesis:

H_5: Perceived social support plays a moderating role between positive emotions and learning motivation among college students.

2.4. Hypothesis Model

Based on existing research and theories, a hypothesis model was constructed for the current study. This study proposed that positive emotions are positive predictive factors for learning motivation. Furthermore, we hypothesized that resilience serves as a mediating variable between positive emotions and learning motivation, while social support acts as a moderating variable between positive emotions and learning motivation. Figure 1 depicts an illustration of our hypothetical model.

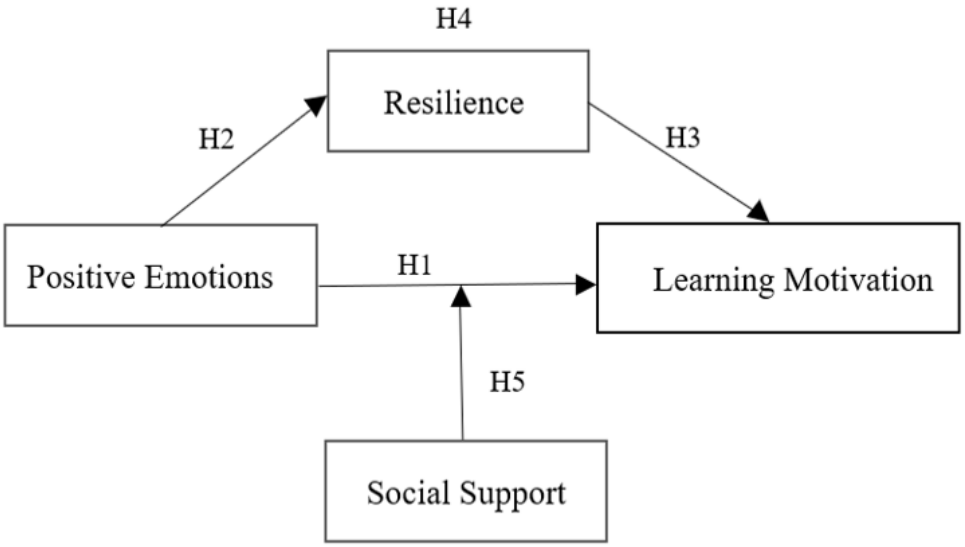

Figure 1.
Research model.

3. Research Design and Methods

3.1. Sample and Data Collection

The current study employed a convenient random sampling method, College students from North China's Beidaihe City in Hebei Province and Huai'an City in Jiangsu Province were selected as the sampling population. Questionnaires were distributed to the college student participants with various study majors from four public higher vocational colleges (each with a three-year study program). Each of the selected institutions have established counseling departments and pay attention to the psychological well-being of their students. All data was collected using an online questionnaire, and was conducted from February to May 2024, inclusive. A total of 1,341 college students submitted questionnaires. After removing 46 invalid responses, 1,295 valid questionnaires were retained. Among

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these respondents, 595 were males (45.9%) and 700 were females (54.1%), with a higher participation rate among females. Relevant demographic statistics are presented in Table 1.

3.2. Measurement

All measurement scales used in this study demonstrated good reliability and validity, accurately representing positive emotions regulation, learning motivation, resilience, and social support among college students. The measurement tools used for data collection are outlined below.

3.2.1. Positive Emotions Scale

The Positive Emotions Scale was designed specifically for this study by adapting and combining the Chinese version of the Cognitive Emotion Regulation Questionnaire [35] and the Positive Emotions Scale [36]. The scale is used primarily to assess respondents' levels of positive thinking and emotion regulation. It measures four dimensions using a total of 16 items, and the Cronbach's α value was 0.96 in the current study, indicating good reliability.

3.2.2. Learning Motivation Scale

The Learning Motivation Scale was adapted from the Learning Motivation Scale developed by Jacobson and Harris [37]. It was derived from the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich et al. [38] and is used primarily to assess respondents' interest in learning and their self-evaluation of competence. It measures two dimensions using a total of eight items, and the Cronbach's α value was .94 in the current study, indicating good reliability.

Table 1.
Sample demographics (N=1295).

Characteristic	***N***	***%***
Gender		
Male	595	45.9
Female	700	54.1
Grade		
Grade 1	373	28.8
Grade 2	452	34.9
Grade 3	470	36.3
Family background		
Two-parent family	1151	88.9
Single family	71	5.5
Divorced family	33	2.6
Combination of family	25	1.9
Other	15	1.1
Family economic status		
Advantageous	19	1.4
Fine	237	18.3
General	818	63.2
Difficulty	221	17.1
Family education		
Democracy	1114	86.0
Authority	88	6.8
Laissez-faire	84	6.5
Neglect	9	0.7

Note: The data source is this study.

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3.2.3. Resilience Scale

The Resilience Scale was adapted from the Connor-Davidson Resilience Scale (CD-RISC) [39]. In environments where stress and symptoms of anxiety are prevalent, individuals with high resilience demonstrate better adaptability when facing crisis events. The Resilience Scale is used to measure respondents' level of adaptation to stressors, with two dimensions measured using a total of six items. The Cronbach's α value was 0.91 in this study, indicating good reliability.

3.2.4. Social Support Scale

The Perceived Social Support Questionnaire (F-SozU) developed by Sommerlad et al. [40] was adapted for the context of this study. The questionnaire measures the perceived social support experienced by respondents in the context of smartphone-based online social interactions [41], and measures three dimensions using a total of 15 items. The Cronbach's α value for the scale in this study was .95, indicating good reliability.

All research instruments used in this study were scored using a five-point Likert scale, ranging from 1 (highly disagree) to 5 (highly agree). Higher scores indicate higher degrees of positive emotions, learning motivation, resilience, or social support, respectively.

3.3. Data Analysis

IBM SPSS25.0 and AMOS24.0 software were used to analyze the collected samples, and structural equation modeling was used to construct the measurement and structural models and the measurement model was assessed using confirmatory factor analysis. Sample data used for analysis should follow a normal distribution, and the measurement model should exhibit high reliability and validity [42]. Therefore, descriptive statistics were conducted using SPSS software to assess the sample data's normal distribution, and the Mardia's coefficients for the data collected from each of the four scales were all less than P(P+2). Maximum likelihood estimation was performed using AMOS software to validate the measurement model, obtaining model fit, factor loadings, and various model parameters. Eight fit indices were used to assess model fit: χ^2, χ^2/df, root mean square error of approximation (RMSEA), comparative fit index (CFI), normed fit index (NFI), goodness of fit index (GFI), Tucker Lewis index (TLI), and parsimony normed fit index (PNFI) [43]. The factor loadings were set to be greater than .70, and no negative variances were found. Furthermore, all of these parameters were statistically significant [44]. Finally, the 95% confidence intervals (CI) for the indirect effects were calculated, and bootstrap methods were used to establish discriminant validity [45]. When the CI for the indirect effect does not include zero, it indicates a significant mediation effect ($p < .05$). A multi-group structural equation modeling approach was employed to test the moderation effect by examining the equality of path coefficients and assessing whether the difference in χ^2 values between the baseline and moderation models was significant ($p < .05$), indicating a moderation effect [46, 47].

4. Results Analysis

4.1. Results of the Research Model

Based on the results of the factor loading in the measurement model (Fig. 2), four items measuring intrinsic motivation (L1) and four items measuring external motivation (L2) were retained to assess learning motivation; four items measuring pleasure (P1), four items measuring autonomy (P2), four items measuring appreciation (P3), and four items measuring love (P4) were retained to assess positive affect; three items measuring tolerance (R1) and three items measuring buffering capacity (R2) were retained to assess resilience; and five items measuring family support (S1), five items measuring friend support (S2), and five items measuring other supports (S3) were retained to assess social support, resulting in a total of 45 items. The standardized factor loading of the four variables ranged from .62 to .95. Bogozzi and Yi [48] have suggested that the factor loading of potential variables should be between .50 to .95, so all question items were retained in the current study. Furthermore, all items

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reached statistical significance for factor loading, and no negative error variance nor statistically significant *t*-values for any variances were detected Table 2.

Table 2.
The mean (*M*), standard deviation (*SD*), standardized regression coefficient (*SRC*), and *t*-value of the aggregation of each question item of the model (*N*=1295).

Variable	NO.	Dimension	M	SD	SRC	t
LM	L1	Intrinsic motivation	3.925	0.823	0.877	15.088***
	L2	Extrinsic motivation	4.069	0.818	0.929	9.199***
R	RR1	Rebound ability	3.951	0.857	0.951	12.683***
	RR2	Buffer ability	3.984	0.839	0.958	11.063***
PE	P1	Pleasant	4.065	0.876	0.854	20.195***
	P2	Autonomous	3.738	0.779	0.819	21.543***
	P3	Appreciated	3.469	0.729	0.615	24.325***
	P4	Loving	4.153	0.768	0.835	21.018***
SS	S1	Family support	3.891	0.863	0.742	22.478***
	S2	Friend support	3.941	0.841	0.874	17.302***
	S3	Other support	3.996	0.793	0.878	16.977***

Note: * p < 0.05, ** p < 0.01, *** p < 0.001, same below.

The sample as a whole satisfied unique and multiple variable normality with absolute values of skewness (SK) ranging from .05 to .65, kurtosis (KU) ranging from .22 to 1.08, and both with absolute values less than 1.96, indicating good model fit to the sample: $\chi^2 = 797.55$ ($p < .001$), $\chi^2/df = 2.98$, RMSEA = .06, CFI = .94, NFI = .93, GFI = .90, TLI = .91, and PNFI = .64 [49, 50]. Table 3.

The Cronbach's α composite reliability (CR), and average variance extracted (AVE) values among the variables ranged from .914 to .962, .569 to .694, and .797 to .872, respectively Table 4.

Table 3.
Summary table of the model-fitting index (*N=1295*).

Index	Statistical test name	Index value	Reference value	Result note
Absolute fit index	χ^2	797.55		
	df	380		
	χ^2/df	2.10	≦3.0	The model fits well
	GFI	0.90	≧0.9	The model fits well
	AGFI	0.82	≧0.8	The model fits well
	RMSEA	0.06	≦0.08	The model fits well
Relative fit index	NFI	0.93	≧0.9	The model fits well
	CFI	0.94	≧0.9	The model fits well
	RFI	0.91	≧0.9	The model fits well
	IFI	0.94	≧0.9	The model fits well
Parsimony fit index	PNFI	0.64	≧0.5	The model fits well
	PCFI	0.65	≧0.5	The model fits well

Source: Statistical analysis and organization for this study.

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Table 4.
Cronbach's α, CR and AVE (*N*=1295).

Index	Positive emotions	Learning motivation	Resilience	Social support
Cronbach's α	0.962	0.942	0.914	0.948
CR	0.868	0.797	0.814	0.872
AVE	0.624	0.569	0.579	0.694

Source: Reference indicators: CR > 0.6, AVE > 0.5 (Fornell & Larcker [51]). The measurement model has reasonable reliability and validity.

The main effect indicated a significant positive correlation between positive emotions and learning motivation (r = .69, p < .001). In the mediation effect, there was a significant positive correlation between positive emotions and resilience (r = .82, p < .001), and resilience was significantly positively correlated with learning motivation (r = .66, p < .001). Additionally, the moderating effect showed a significant positive relationship between social support and learning motivation (r = .67, p < .001). Table 5.

Table 5.
Correlation between variables (*N*=1295).

Variables	M	SD	1	2	3	4
Learning motivation	3.99	0.78	1			
Resilience	3.96	0.83	0.66***	1		
Positive emotions	3.85	0.67	0.69***	0.82***	1	
Social support	3.94	0.73	0.67***	0.77***	0.78***	1

Source: Statistical analysis and organization of this study.

4.2. Main Effect Analysis

The main effects were based on positive emotions and learning motivation. The standardized regression coefficients for the main effects ranged from .63 to .94, and the fit of the main effects to the sample data was reasonable: χ^2 = 288.99 (p < .001), χ^2/df = 36.12, RMSEA = .06, GFI = 0.93, CFI = .95, NFI = .93, TLI = .89, and PNFI = .51. Positive emotions explained 48% of the variance in learning motivation (γ = 0.69, p < .01). Thus, Hypothesis H1 was supported. Shown in Figure 2.

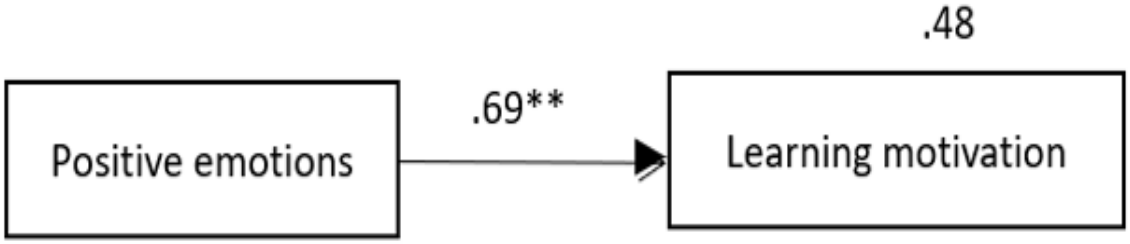

Figure 2.
Main effect analysis.

4.3. The Mediating Role of Resilience

The structural model placed resilience as a mediating model between positive emotions and learning motivation, and as the standardized regression coefficients of the structural model ranged from .32 to .81, the structural model was considered to have reasonable fit: χ^2 = 510.89 (p < .001), χ^2/df = 17.00, RMSEA = .05, GFI = .91, CFI = .93, NFI = .94, TLI = .91, and PNFI = .57 [52]. Furthermore, in the structural model, positive emotions explained 67% of the variance in resilience (γ = .82, p < .01), and

both positive emotions ($\gamma = .45$, $p < .001$) and resilience ($\gamma = .30$, $p < .01$) together explained 51% of the variance in learning motivation. Thus, Hypothesis H2 and H3 was supported. Results of the data analysis of the mediation structural model are shown in Figure 3.

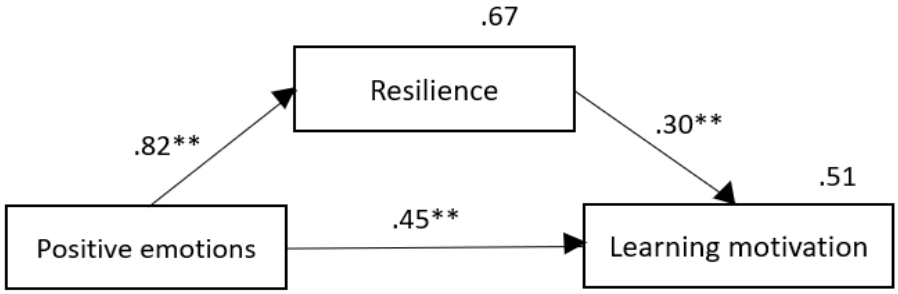

Figure 3.
Mediating model analysis.

Using the bootstrap repeated sampling estimation method (n = 2,000), in the absence of the moderating variable of resilience, the direct effect of positive emotions on learning motivation is .69 (t = 34.61, $p < .001$). When resilience was included as the mediating variable between positive emotions and learning motivation, the indirect effect of positive emotions on learning motivation decreased to .45 (t = 13.31, $p < .001$), with $Z = 8.74$ (reference value $|Z| > 1.96$), indicating that the mediating model effect was significant [53, 54]. This suggests that resilience partially mediates the relationship between positive emotions and learning motivation. The total, direct, and indirect effects of the structural model can be seen in Table 6, and show that resilience partially moderated the relationship between positive emotions and learning motivation, indicating that the model parameters still had statistical significance. Therefore, Hypothesis H4 was supported.

Table 6.
Bootstrap method estimates 95% confidence interval (*N=1295*).

Total, direct, and indirect effect	Path coefficient	Bias-corrected		Percentile	
		Lower	Upper	Lower	Upper
Total effect PE→LM）	0.69***	0.53	0.73	0.56	0.76
Direct effect PE→LM）	0.45***	0.39	0.56	0.41	0.58
Indirect effect PE→R→LM）	0.24***	0.18	0.31	0.17	0.31

Source: Statistical analysis and organization of this study.

4.4. The Regulation Effect of Social Support

In this study, social support was used as a moderating variable, and multi-group analysis was employed to investigate the moderating effect of perceived social support on the relationship between excessive dependence on online social networks and positive emotions among college students. The moderation analysis results indicated that perceived social support among college students strengthened the association between positive emotions and learning motivation. Following the structural equation modeling practices of Paulssen and Roulet [55] , after confirming the good reliability and validity of the model through confirmatory factor analysis, the K-means clustering method was used to categorize the social support variable into either a low group or a high group. In the end, low group included 624 respondents, while the high group had 671.

Next, both low and high groups were imported into the multiple analysis models, and the path coefficient values of the dependent variables outside the low and high groups on the endogenous variables were estimated freely according to the mode, which was unrestricted. Then, for the

independent variables, the low and high groups were also imported into the multiple analysis models, and the path coefficient values of the independent variables outside the low and high groups on the endogenous variables were specified to be equal, that is, a restricted mode.

Finally, the cardinal difference values between the unrestricted and restricted models were compared. Significance was achieved if there was a difference of 1 in degrees of freedom and a difference of $\chi^2 = 13.22$ ($p < .001$) between the baseline and moderated models (Table 7). The cardinal difference values of social support between positive emotions and learning motivation achieved significance, confirming a moderating effect [56] . Therefore, Hypothesis H5 was supported.

Table 7.
Summary table for comparing χ^2 -values between the unrestricted and restricted models (*N=1295*).

Model	Category	χ^2	*df*	χ^2 difference values
Benchmark model	Unrestricted mode	372.87	15	13.22***
Modulation model	Restricted mode	386.09	16	

Note: *** $p < 0.001$, social support reached a significant level of χ^2difference value between positive emotions and motivation to learn.

5. Discussion

Coming from the perspective of positive psychology, this study investigated the predictive role of positive emotions on learning motivation. Our results indicate that, within the era of mobile social networks, positive emotions can effectively guide college students to engage in introspective self-examination, explore their own positive qualities and potential, improve their personal overuse of mobile network social behaviors, reduce the risks associated with negative emotions, and effectively enhance internal learning motivation. This is consistent with the findings of Aspinwall, Rebecca and Melody, and others.

The study empirically illustrates the positive correlations among positive emotions and resilience, resilience and learning motivation, and positive emotions and learning motivation. It also confirms that resilience plays a mediating role in the relationship between positive emotions and learning motivation within the college student population. In the structural equation model, considering resilience as a mediating effect led to a significant decrease in the main effect of positive emotions on learning motivation. Resilience improves the negative response of college students to events, and learning motivation also experiences a certain degree of recovery, which is consistent with the findings of Pitzer and Skinner, Pitzer and Skinner, and others.

This study also found that helping college students break free from excessive reliance on online social networking would help them establish a positive self-value orientation, encourage them to actively seek social support resources, and guide them in rekindling their goals and interests in learning. The stronger college students' perception of social support, the stronger the moderating effect between positive emotions and learning motivation, with students with high levels of social support performing better in terms of the effect on learning motivation compared to students with low levels of social support, which is consistent with the findings of Nelson, Trepte, Tennant, and others.

It is worth noting that some studies have observed either weak or non-existent moderating effects of social support. This might be attributed to the fact that merely offering interpersonal resources may not suffice to prevent negative psychological outcomes related to crises; conversely, social support could prove more apparent in specific stressful situations. [57, 58].

6. Conclusion

This study was conducted in consideration of the context of widespread Over-reliance on mobile internet socializing among college students, and aimed to reveal the psychological regulatory mechanisms in this population under these stressful and crisis conditions. This finding holds significant implications for understanding the dynamics within the field of psychology.

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6.1. Implications

First, the college students benefit from the support they perceived as provided by their schools, families, and friends. This support can help them maintain good psychological resilience, even in those who are in high-risk online social situations [18]. Schools are advised to establish relevant mental health counseling programs and psychological counseling courses for students. Furthermore, they should establish centers for resilience training to enhance college students' adaptability in online environments, and to improve their resilience in coping with negative events.

Second, in the face of the current trend of high levels of Internet addiction, it is essential to establish effective online communication channels with family, friends, and classmates using modern communication methods. However, it is equally important to emphasize real-life, face-to-face communication. Furthermore, efforts should be made to enhance students perceived social support and cultivate positive emotions. Improving college students' emotional regulation strategies through various means is crucial in addressing the adverse effects of negative events on their motivation to learn.

6.2. Limitations and Future Research

Like other studies, certain limitations in this research must be acknowledged.

First, this study focused on college students from developed regions, with limited representation of students from underdeveloped areas or other countries. Future research should consider regional disparities and expand the scope to assess other different types of populations.

Second, this study employed a cross-sectional design, which cannot be used to establish causality. Future research could utilize longitudinal research designs to track changes within the same group of college students over time, providing a better understanding of the causal relationships which exist between positive emotions, resilience, social support, and learning motivation.

Third, this study employed a self-report method to collect data, and respondents' answers may have been be influenced by subjective factors, posing a risk of self-report bias. Future research could consider using more objective data collection methods, such as physiological measures or behavioral observations, to enhance the objectivity of research results.

References

[1] G. Stratton, A. Powell and R. Cameron, "Crime and Justice in Digital Society: Towards a 'Digital Criminology'?" *International Journal for Crime, Justice and Social Democracy*, vol. 6, pp. 17-33, 2017.

[2] A. Lavorgna and A. Antonopoulos Georgios, "Criminal markets and networks in Cyberspace," *Trends in Organized Crime*, vol. 25, pp. 145-150, 2022.

[3] A. Lavorgna, *Cybercrimes: Critical issues in a global context*. London: Palgrave Macmillan/Red Press, 2020.

[4] K. A. Allen, T. Ryan, D. L. Gray, D. M. McInerney, and L. Waters, "Social media use and social connectedness in adolescents: The positives and the potential pitfalls," *The Australian Educational and Developmental Psychologist*, pp. 18-31, 2014.

[5] C. Schou Andreassen and S. Pallesen, "Social network site addiction-an overview," *Current pharmaceutical design*, vol. 20, pp. 4053-4061, 2014.

[6] B. Park and K. C. Lee, "The effect of users' characteristics and experiential factors on the compulsive usage of the smartphone," in *Ubiquitous Computing and Multimedia Applications: Second International Conference, UCMA 2011, Daejeon, Korea, April 13-15, 2011. Proceedings, Part II 2*, 2011, pp. 438-446.

[7] Q. X. Liu, L. L. Zhang, Y. Lin, and Z. E. Ding, "Negative Family Representation and Adolescent Internet Relationship Addiction: The Mediating Roles of Belongingness Needs and Social Sensitivity," *Psychological Development and Education*, vol. 11, pp. 546-555, 2022.

[8] C. S. Andreassen, M. D. Griffiths, S. R. Gjertsen, E. Krossbakken, S. Kvam, and S. Pallesen, "The relationships between behavioral addictions and the five-factor model of personality," *Journal of behavioral addictions*, vol. 2, pp. 90-99, 2013.

[9] Y. Jiang, H. Wang, H. Jing, and Y. Liu, "The influence of neuroticism on the excessive use of mobile social networks in adolescents: the dual mediating effects of impulsive and interpersonal disturbance," *Studies of Psychology and Behavior.*, vol. 16, p. 272, 2018.

[10] A. L. Eden, B. K. Johnson, L. Reinecke, and S. M. Grady, "Media for coping during COVID-19 social distancing: Stress, anxiety, and psychological well-being," *Frontiers in psychology*, vol. 11, p. 577639, 2020.

[11] S. Chan, S. Maneewan and R. Koul, "An examination of the relationship between the perceived instructional behaviours of teacher educators and pre-service teachers' learning motivation and teaching self-efficacy," *Educational Review*, vol. 75, pp. 264-286, 2023.

[12] M. J. J. Gumasing and F. M. F. Castro, "Determining ergonomic appraisal factors affecting the learning motivation and academic performance of students during online classes," *Sustainability*, vol. 15, p. 1970, 2023.

[13] C. J. Roseth, A. J. Saltarelli and C. R. Glass, "Effects of face-to-face and computer-mediated constructive controversy on social interdependence, motivation, and achievement.," *Journal of educational psychology*, vol. 103, p. 804, 2011.

[14] J. Wang, D. Zhang and M. A. Zimmerman, "Resilience theory and its implications for Chinese adolescents," *Psychological Reports*, vol. 117, pp. 354-375, 2015.

[15] A. Lepp, J. E. Barkley and A. C. Karpinski, "The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students," *Computers in human behavior*, vol. 31, pp. 343-350, 2014.

[16] M. Carmona-Halty, M. Salanova, S. Llorens, and W. B. Schaufeli, "Linking positive emotions and academic performance: The mediated role of academic psychological capital and academic engagement," *Current psychology*, vol. 40, pp. 2938-2947, 2021.

[17] M. R. Reyes, M. A. Brackett, S. E. Rivers, M. White, and P. Salovey, "Classroom emotional climate, student engagement, and academic achievement.," *Journal of educational psychology*, vol. 104, p. 700, 2012.

[18] M. B. Jacobs and E. W. Harville, "Long-term mental health among low-income, minority women following exposure to multiple natural disasters in early and late adolescence compared to adulthood," in *Child & youth care forum*, 2015, pp. 511-525.

[19] Z. ZHANG, X. YANG, X. MU, and L. WANG, "A Study on the Influence of Student Engagement and Learning Opportunity on Junior Middle School Students' Mathematics Achievement: Based on Estimates of Multilevel Models," *Journal of Southwest University Natural Science Edition*, vol. 43, pp. 18-26, 2021.

[20] J. Fleming and R. J. Ledogar, "Resilience, an evolving concept: A review of literature relevant to Aboriginal research," *Pimatisiwin*, vol. 6, p. 7, 2008.

[21] E. I. Kim, "Mediating Effect of Academic Self-efficacy in the Relationship between the Grit of Teens and Self-directed Learning," *Journal of the Korea Academia-Industrial cooperation Society*, vol. 21, pp. 665-674, 2020.

[22] S. Chiu, "The relationship between life stress and smartphone addiction on Taiwanese university student: A mediation model of learning self-efficacy and social self-efficacy," *Computers in human behavior*, vol. 34, pp. 49-57, 2014.

[23] J. S. Eccles and A. Wigfield, "From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation," *Contemporary educational psychology*, vol. 61, p. 101859, 2020.

[24] L. Tian, B. Liu, S. Huang, and E. S. Huebner, "Perceived social support and school well-being among Chinese early and middle adolescents: The mediational role of self-esteem," *Social indicators research*, vol. 113, pp. 991-1008, 2013.

[25] B. L. Fredrickson, M. M. Tugade, C. E. Waugh, and G. R. Larkin, "What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001.," *Journal of personality and social psychology*, vol. 84, p. 365, 2003.

[26] B. L. Fredrickson, "The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions.," *American psychologist*, vol. 56, p. 218, 2001.

[27] Rebecca and Melody, "Dispositional mindful awareness and savoring positive experiences: A prospective test of cognitive reappraisal as a mediator," *Personality and Individual Differences*, vol. 163, p. 110050, 2020.

[28] F. Luthans and C. M. Youssef, "Human, social, and now positive psychological capital management: Investing in people for competitive advantage," *Organizational Dynamics*, vol. 2, pp. 143-160, 2004.

[29] B. L. Fredrickson, "Cultivating positive emotions to optimize health and well-being.," *Prevention & treatment*, vol. 3, p. 1a, 2000.

[30] D. Tuck, J. Wiley, L. Patlamazoglou, and E. Berger, "Positive affect and resilience in tertiary education students," *Stress*, vol. 26, p. 2245484, 2023.

[31] Zheng, J., Li, Z., & Su, J. Error management atmosphere, employee career resilience and employee innovation behavior: The mediating role of psychological empowerment. Edelweiss Applied Science and Technology, vol.8, no.6, pp.134-151, 2024.

[32] J. Pitzer and E. Skinner, "Predictors of changes in students' motivational resilience over the school year: The roles of teacher support, self-appraisals, and emotional reactivity," *International Journal of Behavioral Development*, vol. 41, pp. 15-29, 2017.

[33] S. Trepte, T. Dienlin and L. Reinecke, "Influence of social support received in online and offline contexts on satisfaction with social support and satisfaction with life: A longitudinal study," *Media Psychology*, vol. 18, pp. 74-105, 2015.

Edelweiss Applied Science and Technology
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[34] J. E. Tennant, M. K. Demaray, C. K. Malecki, M. N. Terry, M. Clary, and N. Elzinga, "Students' ratings of teacher support and academic and social–emotional well-being.," *School psychology quarterly*, vol. 30, p. 494, 2015.
[35] F. Jermann, M. Van der Linden, M. D'Acremont, and A. Zermatten, "Cognitive emotion regulation questionnaire (CERQ)," *European Journal of Psychological Assessment*, vol. 22, pp. 126-131, 2006.
[36] R. E. Lucas, E. Diener and R. J. Larsen, "Measuring positive emotions.," 2003.
[37] R. R. Jacobson and S. M. Harris, "Does the type of campus influence self-regulated learning as measured by the motivated strategies for learning questionnaire (MSLQ)?" *Education*, vol. 128, 2008.
[38] T. G. Duncan and W. J. McKeachie, "The making of the motivated strategies for learning questionnaire," *Educational psychologist*, vol. 40, pp. 117-128, 2005.
[39] K. M. Connor and J. R. Davidson, "Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC)," *Depression and anxiety*, vol. 18, pp. 76-82, 2003.
[40] A. Sommerlad, L. Marston, J. Huntley, G. Livingston, G. Lewis, A. Steptoe, and D. Fancourt, "Social relationships and depression during the COVID-19 lockdown: longitudinal analysis of the COVID-19 Social Study," *Psychological medicine*, vol. 52, pp. 3381-3390, 2022.
[41] S. Kliem, T. Mößle, F. Rehbein, D. F. Hellmann, M. Zenger, and E. Brähler, "A brief form of the Perceived Social Support Questionnaire (F-SozU) was developed, validated, and standardized," *Journal of clinical epidemiology*, vol. 68, pp. 551-562, 2015.
[42] R. A. Peterson and J. E. Cavanaugh, "Ordered quantile normalization: a semiparametric transformation built for the cross-validation era," *Journal of applied statistics*, 2020.
[43] R. M. Baron and D. A. Kenny, "The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations.," *Journal of personality and social psychology*, vol. 51, p. 1173, 1986.
[44] R. P. Bagozzi and Y. Yi, "Specification, evaluation, and interpretation of structural equation models," *Journal of the academy of marketing science*, vol. 40, pp. 8-34, 2012.
[45] G. Torkzadeh, X. Koufteros and K. Pflughoeft, "Confirmatory analysis of computer self-efficacy," *Structural Equation Modeling*, vol. 10, pp. 263-275, 2003.
[46] D. P. MacKinnon, M. S. Fritz, J. Williams, and C. M. Lockwood, "Distribution of the product confidence limits for the indirect effect: Program PRODCLIN," *Behavior research methods*, vol. 39, pp. 384-389, 2007.
[47] J. FANG, Z. WEN, J. OUYANG, and B. CAI, "Methodological research on moderation effects in China's mainland," *Advances in Psychological Science*, vol. 30, p. 1703, 2022.
[48] R. P. Bagozzi and Y. Yi, "On the evaluation of structural equation models," *Journal of the academy of marketing science*, vol. 16, pp. 74-94, 1988.
[49] K. A. Bollen, "A new incremental fit index for general structural equation models," *Sociological methods & research*, vol. 17, pp. 303-316, 1989.
[50] R. E. Schumacker and R. G. Lomax, *A beginner's guide to structural equation modeling*: psychology press, 2004.
[51] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," *Journal of marketing research*, vol. 18, pp. 39-50, 1981.
[52] K. A. Bollen and R. H. Hoyle, "Latent variables in structural equation modeling," *Handbook of structural equation modeling*, vol. 1, pp. 56-67, 2012.
[53] P. M. Bentler and D. G. Bonett, "Significance tests and goodness of fit in the analysis of covariance structures.," *Psychological bulletin*, vol. 88, p. 588, 1980.
[54] M. J. Daniels and M. Pourahmadi, "Bayesian analysis of covariance matrices and dynamic models for longitudinal data," *Biometrika*, vol. 89, pp. 553-566, 2002.
[55] M. Paulssen, R. Roulet and S. Wilke, "Risk as moderator of the trust-loyalty relationship," *European Journal of Marketing*, vol. 48, pp. 964-981, 2014.
[56] H. W. Marsh, Z. Wen and K. Hau, "Structural equation models of latent interactions: evaluation of alternative estimation strategies and indicator construction.," *Psychological methods*, vol. 9, p. 275, 2004.
[57] Z. Ye, X. Yang, C. Zeng, Y. Wang, Z. Shen, X. Li, and D. Lin, "Resilience, social support, and coping as mediators between COVID-19-related stressful experiences and acute stress disorder among college students in China," *Applied Psychology: Health and Well-Being*, vol. 12, pp. 1074-1094, 2020.
[58] A. J. Dirkzwager, I. Bramsen and H. M. Van Der Ploeg, "Social support, coping, life events, and posttraumatic stress symptoms among former peacekeepers: A prospective study," *Personality and Individual Differences*, vol. 34, pp. 1545-1559, 2003.

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