Current Psychology (2024) 43:14567–14580
https://doi.org/10.1007/s12144-023-05444-w

Relationship between perceived social support and postgraduate students' general self-efficacy: a mediated model with moderation

Yan Zhang[1] · Xiaochen Cao[1] · Guanghui Lei[1,2] · Huifen Wu[1,3]

Accepted: 12 November 2023 / Published online: 28 November 2023

Abstract

Perceived social support is an essential factor influencing the mental health of individuals. To investigate the mechanisms of social support and general self-efficacy, this study investigated 485 graduate students using the Perceived Social Support Scale, the Perceived Stress Scale, the General Self-efficacy Scale, and the 10-item Connor–Davidson Resilience Scale. Results of the study indicated that the mechanism of students' perceived social support on general self-efficacy is very complex: perceived social support can significantly affect graduate students' general self-efficacy through the mediating effect of stress perception, and psychological resilience can significantly moderate the first half of the mediating effect and the direct effect during the influence of social support on general self-efficacy, according to which, this study constructed a mediated model with moderation.

Keywords Perceived social support · General self-efficacy · Stress perception · Psychological resilience · Mediated model with moderation

Introduction

Research on social support originated in the 1960s and 1970s in psychiatry, and researchers have generally agreed that social support is an essential factor in influencing individuals' intrapersonal psychology. Researchers have explored the mental health and academic functioning of adolescents and found that adolescents with high levels of perceived social support show higher mental health and academic performance (Chan et al., 2022; Galindo-Domínguez & Iglesias, 2023; Huang et al., 2021). At the same time, perceived social support also plays a significant mediating role in the influence of neurotic personality traits on loneliness (Jakimovski et al., 2022). In other words, perceived social support can reduce the loneliness of neuro-sensitive people to some extent and help establish their good psychological state. This function of perceived social support is even more prominent during public health events, as researchers have surveyed college students during the COVID-19 pandemic and found that their level of perceived social support is significantly and positively associated with life satisfaction and positive mood (Huang & Zhang, 2022). That is, social support is effective in reducing the level of negative emotions when humans face external threats, and stress is counted as an external threat for graduate students. Thus, this study introduces the variable of stress perception, and social support is a buffer for stress (Thoits, 2011). Some studies have shown that the more social support individuals receive, the less stress individuals perceive (Leonard et al., 2020), and stress perception can mediate the effect of social support on other variables (Cohen et al., 1983; Panteli et al., 2021).

Self-efficacy was first introduced by American psychologist Bandura, who defined it as "the degree of confidence people have in their ability to use the skills they have to perform a task." Bandura (1977) believed self-efficacy is closely tied to specific domains, so no general self-efficacy exists (pp.191–215). However, some scholars still believe in the existence of general self-efficacy. General self-efficacy is the belief in competence to cope with a broad range of stressful or

Yan Zhang and Xiaochen Cao contributed equally to this work.

✉ Huifen Wu
Wuhuifen@hust.edu.cn

[1] School of Education, Huazhong University of Science and Technology, Luoyu Road No. 1037, Hongshan, Wuhan 430074, People's Republic of China

[2] Center of Mental Health Education, Huazhong University of Science and Technology, Wuhan 430074, China

[3] School of Education, Hubei Engineering University, Xiaogan, China

challenging demands (Luszczynska et al., 2005). Schwarzer et al. (1997) defined general self-efficacy as the overall self-efficacy of individuals to face challenges in different domains and face new events. This study introduces the variable of general self-efficacy instead of specific academic self-efficacy because firstly, we consider self-efficacy as a positive psychological resource to face all events in life, and postgraduate students do not only face events in the academic environment but also many other events, so domain-specific self-efficacy cannot meet the requirements of this study; secondly, the other variables in this study, such as social support, stress perception and psychological resilience are not domain-specific variables but general, so it is more appropriate to select general self-efficacy as the research variable in this study. Psychological resilience is an important variable that can maintain a sense of self-efficacy (Rutter, 1987). It can help individuals emerge from negative emotions soon (Tugade & Fredrickson, 2004). Therefore, psychological resilience was added as a moderating variable in this study.

Numerous empirical studies have shown that self-efficacy contributes to physical and mental health (Bandura et al., 2003; Zee & Koomen, 2016). Postgraduate students, as research talents, are under great physical and mental stress, and self-efficacy is crucial for postgraduate students to accomplish difficult tasks and to achieve their academic goals (Ferla et al., 2010); on the other hand, self-efficacy is an important psychological resource in the process of academic completion (Imus et al., 2017; Munoz, 2021). According to social cognitive theory (Bandura, 2012), an individual's self-efficacy is influenced by the expectations, guidance, and social support given by significant others, and good interpersonal relationships will promote the development of self-efficacy (Feng et al., 2022; Hong et al., 2023; Lent, 2016; Lent & Lopez, 2002). For postgraduate students, recognition of their work efforts by their supervisors promotes the development of their general self-efficacy even more (Pajares, 2008). Therefore, it is vital to explore the mechanism of the role of social support on the self-efficacy of postgraduate students to promote their physical and mental health.

Relationship between social support and general self-efficacy

In an objective sense, social support can help individuals improve their ability to perform a certain work behavior at a tangible level, thereby increasing their confidence that they can perform the work behavior and improving their sense of self-efficacy. In a subjective sense, the support perceived and experienced by individuals can also increase self-confidence because they are cared for, respected, and recognized through social support. An earlier study investigated self-efficacy and social support among women who terminated their pregnancies, and it showed that the social support women received from their family, friends, and partners increased their self-efficacy in coping with the events (Major et al., 1990). In a study of abused African American women, self-efficacy was explained by the partial mediating role of social support from friends and family and the effectiveness of access to resources (Thompson et al., 2002); thus, their perception of social support is an important factor in effectively increasing their self-efficacy. A review of other literature revealed that most of the researchers' findings reflect that social support and self-efficacy are significantly and positively correlated, whether the study was conducted on adolescents (Cicognani, 2011), middle-aged (Haslam et al., 2006), or seniors (Li, 2021). Social support and self-efficacy are inextricably linked. Some studies have examined perceived social support and self-efficacy as mediating variables (Amir et al., 1999; Karademas, 2006) or as independent variables to explore their effects on other variables (Adejumo, 2010; Huang & Xu, 2004; Jaguaco et al., 2022). Other studies have examined the effect of perceived social support on general self-efficacy. Thus, the current study investigates the relationship between perceived social support and general self-efficacy and whether other influences exist.

Mediating role of stress perception

There exist three hypotheses for the mechanism of social support on physical and mental health, including the main effect model (Cohen & Wills, 1985), the buffering model (Kawachi & Berkman, 2001), and the dynamic model (Cornwell, 2003). The buffering model suggests that social support can act as a buffer against the negative effects of stress on individuals' physical and mental health. According to the buffering model, social support serves as a buffer by mitigating the adverse effects of stressful events and acts as a buffer through individuals' cognitive system (Kawachi & Berkman, 2001). Conversely, the dynamic model denies the main effect model and the buffer effect model, and it argues that social support and stress should be treated as independent variables simultaneously and that there exists a complex interaction between the two that affects and interacts with each other (Cornwell, 2003). Many studies have shown that social support can buffer human perceived stress and thus reduce the adverse effects of stress on physical and mental health (Cassel, 1976; Cohen & Wills, 1985; Thoits, 1995, 2011; Uchino, 2006). According to the Yerkes–Dodson law, the relationship between individuals' stress perception and their performance on a task can be expressed as an "inverted U-shaped" curve, in which an increase in stress perception motivates individuals and improves their performance on the task; however, when stress perception exceeds a certain level, individuals' performance no longer increases but decreases. Some researchers have investigated the relationship between adolescent self-efficacy and interpersonal stress and found that general self-efficacy is significantly and negatively related to stress (Matsushima & Shiomi, 2003).

Furthermore, researchers exploring self-efficacy and stress in the academic context have also proposed that academic stress can inversely predict academic self-efficacy (Ye et al., 2018). Many studies have made a similar argument that stress perception is significantly and negatively related to self-efficacy (Burger & Samuel, 2017; Sharma & Kumra, 2022; Zhao et al., 2015). Therefore, the present study used stress perception as a mediating variable between social support and self-efficacy. And it hypothesized that social support could alleviate stress perception and thus increase self-efficacy through its buffering effect.

Moderating effect of psychological resilience

To reveal the mechanism of the effect of social support on general self-efficacy, this study further introduced moderating variables (psychological resilience) to construct a model of the conditioning process based on the mediating effect model of stress perception.

Psychological resilience is a dynamic process by which individuals quickly recover their state, adapt well to adversity, and successfully cope with stress when they encounter difficult events (Luthar et al., 2000). The system theory model of psychological resilience (Mandleco & Peery, 2000) proposed that psychological resilience arises from a combination of internal and external factors of the individual, with family support and social support being the main external resources. In the study of protective factors against stress in children, researchers suggested that family support significantly predicted individuals' subjective well-being and enhanced their psychological resilience (Masten & Garmezy, 1985), and psychological resilience can achieve a protective process of mental health by enhancing self-efficacy (Rutter, 1987).

In addition, with the continuous development of psychological resilience theory, many psychologists have proposed different models of psychological resilience. For example, the integrative model of coping proposes that psychological resilience results from coping processes (e.g., assimilation and adaptation) and is an important part of coping and adaptation to stress events (Leipold & Greve, 2009). The hypothesized model of resilience suggests that social support and psychological resilience play a crucial role in how individuals cope with stress events (Mancini & Bonanno, 2009). Based on these theories, psychological resilience has many positive effects, including helping individuals adapt to or overcome adversity and promoting individual development (Heron, 2012). Although researchers have not yet reached a consensus on the mechanism of resilience, in practical research, the resilience mechanism is defined as the result of protective factors that can reduce the adverse effects of difficult events on individuals. Research on social support and psychological resilience showed that social support can effectively improve the psychological resilience of left-behind children, and psychological resilience plays a moderating role in the influence of social support on the loneliness of left-behind children (Ai & Hu, 2016). In exploring the mental health of migrant seniors in China, Kong et al. (2021) found that the psychological resilience of the seniors partially mediated the effect of social support on their mental health. Other studies' results are similar to this (Jose & Novaco, 2016; Kleine & Muschalla, 2021; Swanson et al., 2018; Yan et al., 2022).

Through the literature review, it can be seen that individuals with high psychological resilience are more able to adapt and regulate their emotions and states when encountering stressful events(Jose & Novaco, 2016; Mancini & Bonanno, 2009), therefore, individuals with high psychological resilience have relatively high self-efficacy and are able to regulate and adapt on their own and the support of other people becomes less important in this case. In contrast, individuals with low psychological resilience are unable to self-regulate and adapt to stressful situations and need the encouragement and support of others to grow their internal resources, which means that for individuals with low psychological resilience, social support may be more important for their general self-efficacy.

Although different researchers or schools of research have different understandings of psychological resilience, the psychological resilience scale used by our research team is based on the trait theory. The trait theory suggests that psychological resilience reflects a personal quality that a person develops well in the adversity. This trait is multidimensional and varies with environment, time, age, gender, and cultural background, as well as with the different life circumstances in which the individual (Connor & Davidson, 2003). Psychological resilience is generally considered to be a combination of four other forms (mental, emotional, social, and physical resilience), which would seem to imply that it is not different from the other constructs, but the present study places more emphasis on the dynamic and multidimensional nature of psychological resilience and is not a simple combination of several forms.

Furthermore, researchers have focused on stress perception and found that the level of psychological resilience can affect individuals' stress perception (Cuhadar et al., 2023; Garrido-Hernansaiz & Alonso-Tapia, 2017; Hou et al., 2017). Other researchers have found that psychological resilience can also act as a stress buffer to prevent the occurrence of cardiovascular and cerebrovascular diseases (Lehrer et al., 2020). And they can reduce the pain caused by stress for medical students, which comes from psychological and physical aspects (Bacchi & Licinio, 2017).

Research objectives

According to previous studies, the relationship between social support and self-efficacy, as well as the role of psychological resilience and stress perception, has yet to be clarified. Also,

the pathways and models of their influence have yet to be clarified, especially for postgraduate students. We hope this study will propose a theoretical model that fills a gap in this research area. In addition, we hope this study can help universities better understand the influencing factors and mechanisms of postgraduate students' self-efficacy, so that they can better guide mental health interventions. The purpose of this study is to investigate the relationship between social support and self-efficacy of postgraduate students and to verify the mechanisms of psychological resilience and stress perception.

The innovation of this study lies in constructing a new theoretical model of graduate students' social support and self-efficacy, and the innovative selection of the postgraduate student group as the research object, which fills the gap in this research field.

Hypotheses

In summary, this study aims to explore the effect of social support on general self-efficacy and its mechanism. It is expected to construct a moderated mediation model (Fig. 1), focusing on the mediating role of stress perception in the relationship between the two and the moderating role of psychological resilience in the relationship between social support, general self-efficacy, and stress perception. Some researchers have also proposed the enabling hypothesis of social support for self-efficacy (Benight & Bandura, 2004), which suggests that social support reduces stress-related arousal and thus provides a source of increased self-efficacy. According to the transactional stress theory (Lazarus & Folkman, 1984), social support is a resource factor that influences an individual's stress assessment. In terms of its functional value, social support can have an impact on stress-producing outcomes or interact with stress perception. It has been hypothesized that social support may reveal its beneficial effects on health and emotion only during periods of individual distress, as it moderates the adverse effects of stressful events, the moderating effect known as the stress buffer effect (Kawachi & Berkman, 2001).

Based on a review of the literature and theoretical above, this study proposes the following hypotheses:

Hypothesis 1: Graduate student social support significantly and positively predicts general self-efficacy.

Hypothesis 2: Stress perception plays a significant mediating role in the influence of social support on self-efficacy.

Hypothesis 3: Psychological resilience significantly moderates the direct effect of social support on general self-efficacy.

Hypothesis 4: Psychological resilience significantly moderates the mediating role of stress perception between social support and general self-efficacy.

Methods

Participants

A convenience sampling method and web-based questionnaires were used to administer the test to the postgraduate group. 485 questionnaires were collected, age 23.48 ± 4.58. 387 (79.8%) were males, and 98 (20.2%) were females; 1 (0.2%) in Arts, 16 (3.3%) in Science and 468 (96.5%) in Engineering.

Measures

Perceived social support scale (PSSS)

This study used the PSSS introduced by Blumenthal et al. (1987) and compiled by Zimet et al. (1990). PSSS is a social support scale that emphasizes self-understanding and self-perception. It measures the degree of support perceived by individuals from family, friends, and others and reflects the total degree of social support perceived by individuals. The scale consisted of 12 self-evaluation items, each using the Likert 7-level scoring method. The scale's reliability in this study was good (Cronbach's $\alpha = 0.98$). In exploratory studies, a reliability of 0.70 is acceptable, a reliability between 0.70 and 0.98 is considered high, and a reliability below 0.35 is considered low and must be rejected (Cronbach, 2004).

Perceived stress scale (PSS)

This study used the PSS compiled by Cohen et al. (1983). The scale is used to test the participants' perceived stress level during a month and is divided into two dimensions:

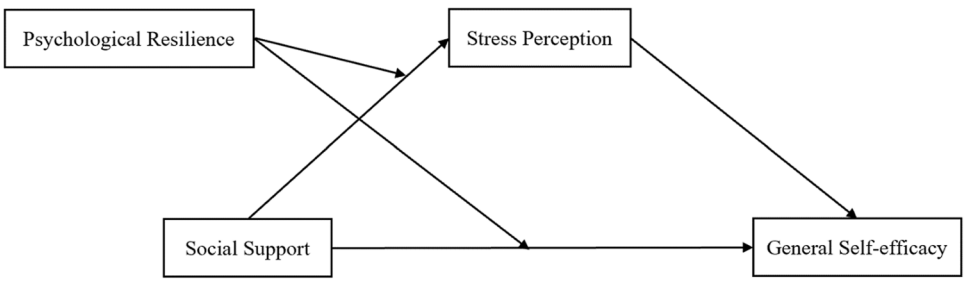

Fig. 1 Moderated Mediation Model Diagram

tension and loss of control. The scale is scored on a 5-point Likert scale, i.e., never, occasionally, sometimes, often, and always. The total score of the scale was 40, and the higher the score of the participants, the higher the perceived stress in the recent period. The reliability of the scale was good in this study (Cronbach's $\alpha = 0.74$).

General self-efficacy scale (GSES)

The GSES was first developed in German in 1981 by Professor Ralf Schwarzer, a leading clinical and health psychologist at the Free University of Berlin, Germany, and his colleagues, and began with 20 items, which were later refined to 10 items (Schwarzer & Born, 1997). The GSES is scored on the Likert 4-point scale. The scale's reliability in this study was good (Cronbach's $\alpha = 0.96$).

10-item connor–davidson resilience scale (CD-RSC-10)

The CD-RSC-10 was used to test the psychological resilience level of the respondents, which was translated and revised by Wang et al. (2010), with a total of 10 items. The scale uses the Likert 5-level scoring system. The higher the score, the higher the level of psychological resilience of the participants. The scale's reliability in this study was good (Cronbach's $\alpha = 0.97$).

Procedure

Measures were completed in a research university in central China at the beginning of the academic year 2022, in August–September 2022. Participants were informed that the study involved an analysis of social support and self-efficacy in life, as well as perceptions and experiences in the face of stress. Participants were assured that their responses would remain anonymous and would not be seen by others except researchers, and they were informed that there were no right or wrong answers to their questionnaire. After receiving these explanations, participants were invited to participate in the research. Participants received no incentives or rewards for their participation. The same measures were administered to all participants via web-based questionnaires. It took a mean time of 15 min to complete them. Each participant's response was anonymous, disinterested, and confidential. All the subjects signed informed consent forms prior to participating in the study. There were no exclusion criteria except for refusal to participate.

Data analysis

All analyses were conducted using SPSS version 26 software (Nie et al., 1975). We first analyzed the correlations of each variable, namely, perceived social support, stress perception, general self-efficacy, and psychological resilience. Second, the direct effect and the mediating effect were conducted by Process v4.0 plug-in (Hayes, 2022) in SPSS 26.0. Finally, psychological resilience was incorporated into the model to construct the mediated model with moderation and to test the effect values between the variables. The simple slope procedure was performed to interpret the moderating effect of resilience.

Results

Common method biases test

All the questionnaires in this study were completed anonymously, so the Harman single-factor test was used to test the common method bias (Podsakoff et al., 2003). The results showed that there were six factors with eigenvalues greater than 1, and the cumulative variation explained by the first factor accounted for only 24.95%, less than 40%, so there was no serious common method bias.

Correlation analysis of each variable

To investigate the relationship between the four main variables of social support, stress perception, general self-efficacy, and psychological resilience, descriptive statistics and correlation analysis were first conducted on these variables. The results showed that stress perception, social support, and psychological resilience correlated significantly. There was a significant negative correlation between social support and perceived stress, a significant positive correlation between social support and psychological resilience, and a significant negative correlation between psychological resilience and perceived stress. General self-efficacy was only significantly positively correlated with stress perception. The specific correlation coefficient, mean, and standard deviation of each variable are shown in Table 1. According to Hayes, the fact that the correlation results between the independent and dependent variables are not significant with the regression results does not indicate that there is no mediating effect between the two; however, instead, it may be that the mediating effect between the two makes the total effect insignificant, that is, the Suppression Effects (Hayes, 2009). This shows that, on the one hand, general self-efficacy increases with the increase of stress perception; on the other hand, the influence mechanism of social support on general self-efficacy is very complex.

The mediating role of stress perception

To test the mediating effects, the data were processed using Model 4 in the Process plug-in, and the results are

Table 1 Descriptive Statistics and Correlation Analysis Results of Each Variable

Variables	M	SD	1	2	3	4
1. Stress Perception	2.74	0.54	1			
2. Social Support	4.99	1.34	−0.37**	1		
3. Psychological Resilience	3.48	0.81	−0.43**	0.66**	1	
4. General Self-Efficacy	2.18	0.55	0.35**	0.03	−0.08	1

* $p<0.05$, ** $p<0.01$, *** $p<0.001$. Same below

Table 2 Mediation Model Test of Stress Perception

Predictive Variable	Model 1 General Self-efficacy			Model 2 Stress Perception			Model 3 General Self-efficacy		
	B	SE	t	B	SE	t	B	SE	t
Social Support	0.18	0.02	3.97***	−0.36	0.02	−8.61***	0.03	0.02	0.58
Stress Perception	0.42	0.05	9.3***						
R^2	0.15			0.13			0.001		
F	43.4***			74.08***			0.33		

***$p<0.001$

Table 3 Mediated Effect Values of Stress Perception

Effect Type	Effect Value	Boot SE	Boot LLCI	Boot ULCI
Direct Effect	0.07	0.02	0.04	0.11
Mediating Effect	−0.04	0.01	−0.06	−0.03
Total Effect	0.02	0.03	−0.03	0.06

presented in Table 2. Before putting the mediating variable stress perception (Models 2 and 3), the regression coefficient of social support on general self-efficacy is not significant (B = 0.03, t = 0.58, $p>0.05$), based on the results of the analysis, the null hypothesis that "social support has no significant effect on general self-efficacy" was accepted, which rejected Hypothesis 1. After adding the mediating variable stress perception (Model 4), the positive predictive effects of social support (B = 0.18) and stress perception (B = 0.42) on general self-efficacy reached a significant level ($p<0.001$). The bias-corrected percentile Bootstrap test shows that the mediating effect was − 0.04, and the 95% confidence interval was [− 0.06, − 0.03], while the direct effect was 0.07, and the 95% confidence interval was [0.04, 0.11] (Table 3). This shows that the mediating effect of stress perception is significant, and the null hypothesis that "there is no mediating effect of stress perception between social support and general self-efficacy" is rejected, and this well verifies Hypothesis 2. In addition, the mediating effect is opposite to the direct effect, and the absolute value of the mediating effect is larger than the total effect, which indicates that the mediating effect has a "Suppression Effects" on the total effect. And this also explains the insignificant correlation and regression coefficients of the independent and dependent variables in the previous section.

Moderated mediation model test

First, this study validated the moderating role of psychological resilience between social support and self-efficacy, model 1 in PROCESS was used to process it, the results showed that psychological resilience negatively predicted the direct effect of social support on self-efficacy (B = −0.09, t = −5.10, $p<0.001$). That is, the effect of social support on self-efficacy decreases when an individual's psychological resilience is high, which means that the self-efficacy of individuals with high psychological resilience is less likely to be affected by social support compared to those with low psychological resilience, the null hypothesis that "Psychological resilience cannot significantly moderate the direct effect of social support on general self-efficacy" is rejected, which verifies Hypothesis 3.

Next, to test the moderated mediation effects of stress perception and psychological resilience, model 8 in PROCESS was used to process it.

The results are also shown in Table 4. The predictive effect of social support on general self-efficacy was significant (B = 0.08, t = 3.37, $p<0.001$), and the predictive effect of the interaction between social support and psychological resilience on self-efficacy was significant (B = -0.05, t = -3.23, $p=<0.01$). The predictive effect of social support on stress perception was significant (B = -0.06, t = -2.98, $p<0.01$), the interaction of social support and psychological resilience had a significant negative predictive effect on mediating variable (perceived stress) (B = -0.09, t = -5.85, $p<0.001$), which indicates that resilience plays a significant moderating role in the first half of the mediating effect and the direct effect. In addition, the moderation mediation index was -0.03 with a 95% confidence interval of [-0.05, -0.02], and the confidence interval did not contain 0, which confirmed that the mediation

Table 4 Moderated Mediation Model Test

Predictive Variable	Stress Perception			General Self-Efficacy		
	B	SE	t	B	SE	t
Social Support	−0.06	0.02	−2.98**	0.08	0.02	3.37***
Stress Perception				0.38	0.05	7.7***
Psychological Resilience	−0.23	0.04	−6.48***	−0.04	0.04	−0.97
Social Support × Psychological Resilience	−0.09	0.01	−5.85***	−0.05	0.02	−3.23**
$_R^2$		0.25			0.17	
F		53.52***			24.83***	

**p< 0.01, ***p< 0.001

effect was moderated by psychological resilience. This rejects the null hypothesis that "Psychological resilience cannot significantly moderate the mediating role of stress perception between social support and general self-efficacy" and partly verifies Hypothesis 4, that psychological resilience moderates the first half of the mediating effect of stress perception on social support affecting self-efficacy. The above results show that compared with individuals with low resilience, the social support of individuals with high resilience has a less negative effect on stress perception, and the positive effect of social support on general self-efficacy is also minor.

To understand the essence of the moderating effect of psychological resilience between social support, stress perception, and general self-efficacy, psychological resilience was divided into high and low psychological resilience groups according to the mean plus or minus one standard deviation. The values of the mediating and direct effects and 95% Bootstrap confidence intervals of the subjects in the two groups are shown in Table 5. When the moderator variable psychological resilience was taken at the average level (-0.0239), the Bootstrap 95% confidence interval was [-0.0419, -0.0072], excluding 0, indicating that, at the average level, the stress perception mediates the effect of social support on self-efficacy; when the moderator variable psychological resilience was taken at the low level (0.0026), the Bootstrap 95% confidence interval was [-0.0168, 0.0228], including 0, suggesting that stress perception does not mediate the effect of social support on self-efficacy at low average levels; when the moderator variable psychological resilience was taken at a high level (-0.0504), the Bootstrap 95% confidence interval was [-0.0741, -0.0266], excluding 0, indicating that stress perception mediates the effect of social support on self-efficacy at high average levels.

Taken together, stress perception does not necessarily mediate when psychological resilience is taken at low, average, or high levels, suggesting that moderating mediators exist because the mediation is not consistent. At the same time, to make the presentation of the moderating effects more intuitive, the simple slope analysis of the two moderating effects was conducted according to the point selection method (Fig. 2 and Fig. 3). The results showed that the negative effect of social support on stress perception was greater in the high psychological resilience group compared to the low psychological resilience group. The positive effect of social support on general self-efficacy was greater in the low psychological resilience group compared to the high psychological resilience group. In addition, the mediating effect of stress perception was significant only in the M and M + 1SD groups; the direct effect of social support on general self-efficacy was significant only in the M-1SD and M groups.

However, the simple slope analysis using the point selection method cannot test the specific critical value of the regulatory effect more deeply. In order to solve this problem and more accurately clarify the critical value of the moderating effect of psychological resilience (that is, which value of psychological resilience makes social support have a significant impact on stress perception and general self-efficacy), the Johnson-Neyman method was used for simple slope analysis (Hayes & Matthes, 2009). The results showed that the negative predictive effect of social support on stress perception was no longer

Table 5 Mediating Effect and Direct Effect under Different Psychological Resilience Levels

Effect Type	Psychological Resilience	Effect Size	Boot SE	Boot LLCI	Boot ULCI
Mediating Effect	M-1SD	0.0026	0.01	−0.0168	0.0228
	M	−0.0239	0.0091	−0.0419	−0.0072
	M + 1SD	−0.0504	0.0123	−0.0741	−0.0266
Direct Effect	M-1SD	0.1207	0.0257	0.0702	0.1712
	M	0.0776	0.023	0.0324	0.1229
	M + 1SD	0.0346	0.0275	−0.0194	0.0886

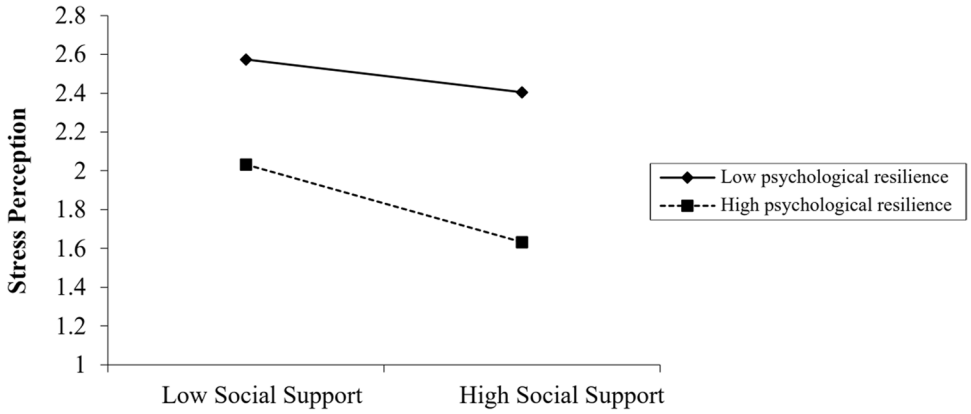

Fig. 2 Moderating Role of Psychological Resilience in the Relationship between Social Support and Stress Perception

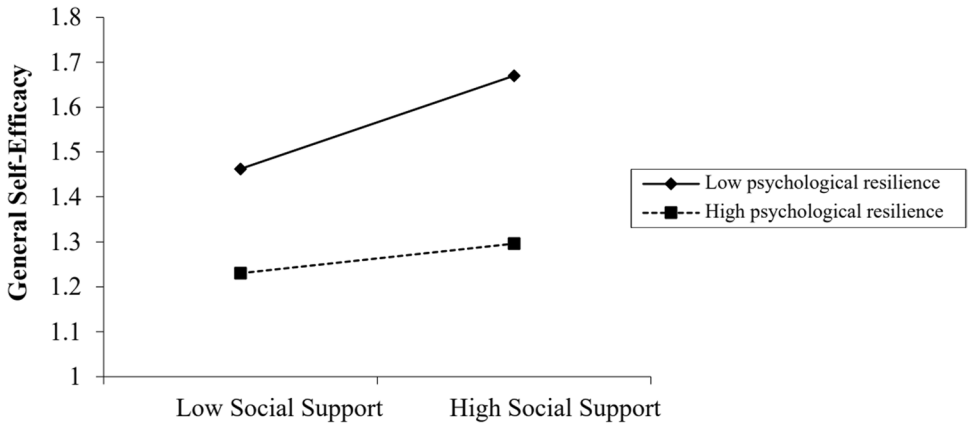

Fig. 3 Moderating Role of Psychological Resilience in the Relationship between Social Support and General Self-Efficacy

significant when the psychological resilience was in the range of [2.09, 3.23], and 42.3% of the subjects in this study were in this range, while the remaining 57.6% of the subjects were not in this range, i.e., the negative effect of social support on stress perception was only significant in 57.6% of the subjects. The positive effect of social support on general self-efficacy is no longer significant when the psychological resilience is greater than 4.01. 19.8% of the subjects in this study were in this range, and the remaining 80.2% were less than this threshold, i.e., the positive effect of social support on general self-efficacy was only significant in 80.2% of the subjects.

In summary, the mediating and moderating hypotheses proposed in this study were both empirically supported. Stress perception mediates between social support and general self-efficacy, and psychological resilience moderates the first half of the mediating effect and the direct effect, as shown in Fig. 4.

Discussion

The results of this study show that graduate students with high levels of perceived social support can feel more understanding and support from the outside world, such that they have a more positive understanding of themselves. The correlation analysis showed no significant correlation between perceived social support and general self-efficacy, which differs from other research results (Cicognani, 2011; Haslam et al., 2006; Holahan & Holahan, 1987). The result rejects the null hypothesis of Hypothesis 2 and verifies Hypothesis 2. This may be because they usually think they are valuable and in line with social expectations, so their general self-efficacy is higher. However, when the mediating variable (stress perception) was not in the model, navigating social support did not directly and significantly predict self-efficacy, which accepts the null hypothesis of Hypothesis 1. This result contradicts Hypothesis 1 and may be explained from the perspective of social cognitive theory. Social cognitive theory suggests that the source of self-efficacy is multidimensional, which comes from both external social support and is determined by an individual's physiological or emotional state. That is to say that whether external social support can have an impact on self-efficacy depends on individuals' psychological state. Therefore, social support does not significantly predict self-efficacy but can influence self-efficacy through the mediating effect of stress perception.

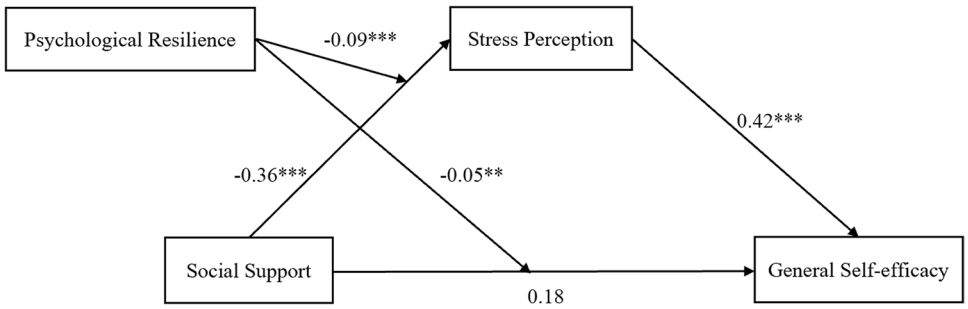

Fig. 4 Mediated Model with Moderation

Mediating role of stress perception

To clarify how perceived social support affects students' general self-efficacy, this study constructs a mediating role model of stress perception. The results showed that postgraduate students' general self-efficacy was significantly positively correlated with stress perception, and perceived social support was significantly negatively correlated with perceived stress; these findings are consistent with previous research results (Li & Tao, 2003; Ozer et al., 2021; Zhang et al., 2022). After stress perception was included in the structural equation model, stress perception significantly mediated the influence of students' perceived social support on general self-efficacy, which verified Hypothesis 2. Hence, students' perceived social support indirectly affects general self-efficacy through perceived stress.

The buffer model of social support mechanism can explain the results above (Kawachi & Berkman, 2001). Social support can buffer the negative effect of stress among graduate students, thereby strengthening their self-efficacy. In a study of ICU nurses during the COVID-19 epidemic, people with solid self-efficacy had lower stress perception (Penacoba et al., 2021), which is also similar to the results of this study. Perceived social support refers to individuals' material or spiritual help from the community, social networks, relatives, and friends (Cullen, 1994). Students with poor social support cannot perceive strength from the outside world, and their connection with family, friends, and society is not close enough, which increases their stress (Huang & Zhang, 2022).

The results of the present study showed that stress perception positively predicts general self-efficacy, which seemed to be different from previous studies (Chang et al., 2016; Emmons, 2022; Garcia et al., 2021). This may be explained by the self-determination theory (SDT) (Deci & Ryan, 1980) that human motivation comes from both intrinsic and extrinsic motivation and that sometimes pressure from the outside can turn into intrinsic motivation for individuals (Ryan & Deci, 2017). A sense of pressure and urgency can better motivate students' self-motivation. Increased motivation can lead to heightened motivation and potential for participation, leading to increased general self-efficacy. Students with strong perceived social support are likelier to perceive help, understanding, and support from family, friends, and the outside world. In such a situation, students feel less pressure from the outside world, indirectly increasing their self-efficacy.

Meanwhile, Bandura's social cognitive theory (Bandura, 1977) proposed that good interpersonal relationships can promote the development of self-efficacy, which has been verified by other researchers (Berdida et al., 2023; Donnellan et al., 2023). However, in this study, this promotion is mediated by stress perception, which, as a subjective feeling, belongs to the individual's perception of self, and only individuals with solid self-perception can form internal cognitive processing through social support, thus improving their self-efficacy. A low sense of pressure is not conducive to stimulating students' potential, resulting in students not correctly perceiving their abilities and social significance and perceiving their self-worth as low.

Moderating effect of psychological resilience

This study reveals the essence of students' perceived social support affecting their general self-efficacy. Based on the mediating effect model of stress perception, this study added the moderating effect of psychological resilience. Previous studies have shown that resilience is an intermediary between perceived social support and stress perception (Yalcin-Siedentopf et al., 2021), and psychological resilience moderates between stress perception and life well-being (Kim, 2020). And the present study's results are similar to theirs.

The analysis of the moderating effect of psychological resilience showed that the moderating effect among students' perceived social support, stress perception, and general self-efficacy was significant, which verified Hypothesis 3 and Hypothesis 4. According to the hypothesized model of resilience (Mancini & Bonanno, 2009), social support and psychological resilience together play a key role in individuals' coping with stressful events, which can well support the hypothesis of this study that psychological resilience plays a moderating role in the process of social support influencing

stress perception. Further Johnson–Neyman tests showed that the negative effect of perceived social support on stress perception was more significant as students' psychological resilience increased, and the negative effect of perceived social support on stress perception was not significant when students' psychological resilience was in the range of [2.09, 3.23]. By contrast, the positive predictive effect of perceived social support on general self-efficacy was no longer significant when students' psychological resilience was greater than 4.01. The inhibitory effect of different levels of social support on stress perception and the facilitative effect on general self-efficacy differed at various levels of psychological resilience.

For postgraduate students with lower levels of psychological resilience, the negative effect of social support on stress perception was minor, and the positive effect on general self-efficacy was larger; conversely, for students with higher levels of psychological resilience, the negative effect of perceived social support on stress perception was larger, and the positive effect on general self-efficacy was minor. The results of the study point to a significantly positive correlation between perceived social support and psychological resilience, with those who can perceive more social support tend to have higher levels of psychological adjustment (Yıldırım & Celik, 2020). At the same time, the system theory model of psychological resilience (Mandleco & Peery, 2000) suggests that psychological resilience arises from a combination of internal and external factors and that social support is the most important external factor in the generation of psychological resilience, which in turn can influence the effect of social support on other psychological factors, which can well support this study.

Students with a higher level of psychological resilience can reduce their stress perception by improving social support. At the same time, they can face the adverse effects of the outside world through self-regulation. Self-efficacy is the level of self-confidence within the person himself, and people with higher psychological resilience have higher self-efficacy (Karatepe et al., 2022; Liu et al., 2018). Changing the level of self-efficacy through social support is difficult, so the influence of social support on self-efficacy becomes minor. In comparison with the group with high perceived social support, those with low perceived social support tend to have low psychological resilience, and their psychological adjustment capacity cannot sufficiently cope with changes in the external social environment, and they do not feel the stress from the external world (Ruan et al., 2018; Sabouripour et al., 2021). However, an appropriate increase in their psychological resilience level can help increase their sense of self-stress urgency in the face of changes from the outside world; moreover, according to Yerkes–Dodson law, an appropriate sense of stress urgency is more likely to lead to a higher general self-efficacy (Penacoba et al., 2021).

Theoretical and practical implications

Theoretical implications

From a theoretical perspective, the results of this study have the potential to make a valuable contribution to the existing literature on general self-efficacy. The present study emphasizes the mediating role of stress perception between social support and self-efficacy rather than the direct role of social support on general self-efficacy, which reflects the indirect nature of the influence of the external environment on an individual's psychological resources. The introduction of psychological resilience makes the theoretical model of this study more complete, also, it helps to explain the internal mechanism of external factors affecting individual mental health indicators, which brings new ideas for future research and fills in the gaps of theories about general self-efficacy to a certain extent.

Practical implications

In the practical sense, this study first provides a tool for the postgraduate student group to understand their internal resources. Self-efficacy is crucial in the academic life of postgraduate students, this study can guide postgraduate students to pay attention to their psychological state in time and use social support reasonably to maintain good psychological balances and emotions at the low point. Secondly, for postgraduate student supervisors, postgraduate students are their best helpers. Understanding the formation mechanism of postgraduate students' self-efficacy will help supervisors connect with students emotionally and build an academic community, leading to greater academic achievements. For college administrators, paying attention to students' psychological health is a tedious and clueless task. This study helps college administrators learn about the mechanism of social support on postgraduate students' self-efficacy, which can help to detect students' psychological problems in time and intervene in psychological crises by improving students' psychological resilience.

Limitation and future direction

In addition to constructing a theoretical model and providing guidance, this study has limitations and provides directions for the future. Firstly, due to time and space constraints, although this study only selected a sample of graduate students from a university in central China, it has clarified the mechanisms of all variables. If there is an opportunity later, we will recruit more participants from different regions,

schools, and management models. Future research could reproduce the results in other settings.

Secondly, although this study explored the mediating role of stress perception and the moderating mechanism of psychological resilience, there may be other psychological and behavioral mechanisms that influence the mechanism of social support on postgraduate students' self-efficacy. Future research could explore other mediating or moderating variables, such as gender, coping styles, cognitive evaluations, and individual characteristics, to broaden the potential research horizon.

Conclusion

This study constructs a conditional process model, a mediated (stress perception) model with moderation (psychological resilience), to investigate the mechanisms influencing students' perceived social support and general self-efficacy. The results of the study initially responded to the question of the insignificantly positive effect of students' perceived social support on general self-efficacy. Then, the mediating role of stress perception was identified. Finally, this study clarified the extent to which psychological resilience makes the effect of perceived social support on stress perception and general self-efficacy significant. The psychological adjustment ability of students plays an essential role in their perception of personal competence. In addition, appropriate psychological counseling for different groups of students to equip them with high psychological resilience to cope with social and external changes can help stimulate students' general self-efficacy.

Funding This study was supported and granted by the fundamental Research Funds for the Central Universities, HUST: (2023WKFZZX109), the Key Project of Education Science Planning of Hubei Province (2019GA003) (2022GA004) and HUST Overseas training program for outstanding young teachers.

Data availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interest This manuscript has not been published or presented elsewhere in part or in entirety. All study participants provided informed consent, and the study design was approved by the appropriate ethics review boards. All the authors have approved the manuscript and agree with submission to your esteemed journal. There are no conflicts of interest to declare.

Institutional Review Board This study was performed in accordance Declaration of Helsinki and was approved by the Ethics Committee of School of Huazhong University of Science and Technology (IRB No. 20221027).

References

Adejumo, A. O. (2010). Influence of social support, self-efficacy, and personality on the general health of retirees in Lagos Nigeria. *Educational Gerontology, 36*(10–11), 907–918. https://doi.org/10.1080/03601271003744640

Ai, H., & Hu, J. (2016). Psychological resilience moderates the impact of social support on loneliness of "left-behind" children. *Journal of Health Psychology, 21*(6), 1066–1073. https://doi.org/10.1177/1359105314544992

Amir, M., Roziner, I., Knoll, A., & Neufeld, M. Y. (1999). Self-efficacy and social support as mediators in the relation between disease severity and quality of life in patients with epilepsy. *Epilepsia, 40*(2), 216–224. https://doi.org/10.1111/j.1528-1157.1999.tb02078.x

Bacchi, S., & Licinio, J. (2017). Resilience and Psychological Distress in Psychology and Medical Students. *Academic Psychiatry, 41*(2), 185–188. https://doi.org/10.1007/s40596-016-0488-0

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. https://doi.org/10.1037/0033-295x.84.2.191

Bandura, A. (2012). On the Functional Properties of Perceived Self-Efficacy Revisited. *Journal of Management, 38*(1), 9–44. https://doi.org/10.1177/0149206311410606

Bandura, A., Caprara, G. V., Barbaranelli, C., Gerbino, M., & Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child Development, 74*(3), 769–782. https://doi.org/10.1111/1467-8624.00567

Benight, C. C., & Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: The role of perceived self-efficacy. *Behaviour Research and Therapy, 42*(10), 1129–1148. https://doi.org/10.1016/j.brat.2003.08.008

Berdida, D. J. E., Lopez, V., & Grande, R. A. N. (2023). Nursing students' perceived stress, social support, self-efficacy, resilience, mindfulness and psychological well-being: A structural equation model. *International Journal of Mental Health Nursing*. https://doi.org/10.1111/inm.13179

Blumenthal, J. A., Burg, M. M., Barefoot, J., Williams, R. B., Haney, T., & Zimet, G. (1987). Social support, type A behavior, and coronary artery disease. *Psychosomatic Medicine, 49*(4), 331–340. https://doi.org/10.1097/00006842-198707000-00002

Burger, K., & Samuel, R. (2017). The Role of Perceived Stress and Self-Efficacy in Young People's Life Satisfaction: A Longitudinal Study. *Journal of Youth and Adolescence, 46*(1), 78–90. https://doi.org/10.1007/s10964-016-0608-x

Cassel, J. (1976). The contribution of the social environment to host resistance: The Fourth Wade Hampton Frost Lecture. *American Journal of Epidemiology, 104*(2), 107–123. https://doi.org/10.1093/oxfordjournals.aje.a112281

Chan, M.-K., Sharkey, J. D., Nylund-Gibson, K., Dowdy, E., & Furlong, M. J. (2022). Social support profiles associations with adolescents' psychological and academic functioning. *Journal of School Psychology, 91*, 160–177. https://doi.org/10.1016/j.jsp.2022.01.006

Chang, L.-C., Yu, P., & Chang, S.-Y. (2016). Longitudinal relationships between two self-efficacy types and stress in active older adults in Taichung City. *Taiwan. International Journal of Mental Health Promotion, 18*(2), 95–105. https://doi.org/10.1080/14623730.2016.1159596

Cicognani, E. (2011). Coping Strategies With Minor Stressors in Adolescence: Relationships With Social Support, Self-Efficacy, and Psychological Well-Being. *Journal of Applied Social Psychology, 41*(3), 559–578. https://doi.org/10.1111/j.1559-1816.2011.00726.x

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*(2), 310–357. https://doi.org/10.1037/0033-2909.98.2.310

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385–396. https://doi.org/10.2307/2136404

Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113

Cornwell, B. (2003). The dynamic properties of social support: Decay, growth, and staticity, and their effects on adolescent depression. *Social Forces, 81*(3), 953. https://doi.org/10.1353/sof.2003.0029

Cronbach, L. J. (2004). My current thoughts on coefficient alpha and successor procedures. *Educational and Psychological Measurement, 64*(3), 391–418. https://doi.org/10.1177/0013164404266386

Cuhadar, D., Bahar, A., Samancioglu Baglama, S., Kocak, H. S., & Ozkaya, M. (2023). Pshychological Resilience and Percieved Stress Level in Nurses: Experience of Nurses in Turkey. *Disaster Medicine and Public Health Preparedness, 17*, e324–e324. https://doi.org/10.1017/dmp.2022.294

Cullen, F. T. (1994). Social support as an organizing concept for criminology: Presidential address to the academy of criminal justice sciences. *Justice Quarterly, 11*(4), 527–559. https://doi.org/10.1080/07418829400092421

Deci, E. L., & Ryan, R. M. (1980). The Empirical Exploration of Intrinsic Motivational Processes11Preparation of this chapter was facilitated by Research Grant MH 28600 from the National Institute of Mental Health to the first author. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (13th ed., pp. 39–80). New York: Academic Press.

Donnellan, A., Bradshaw, D., & McMahon, J. (2023). Social support and self-efficacy serially mediate the association of strength of identification with text-based crisis support line volunteers' compassion fatigue and compassion satisfaction. *Journal of Community & Applied Social Psychology*. https://doi.org/10.1002/casp.2735

Emmons, J. (2022). *Exploring the Interconnections of Role Satisfaction, Self-Efficacy, Negative Affect, and Stress Among College Students*. Dekalb: Northern Illinois University.

Feng, Y., Zhou, X., Qin, X., Cai, G., Lin, Y., Pang, Y., . . . Zhang, L. (2022). Parental self-efficacy and family quality of life in parents of children with autism spectrum disorder in China: The possible mediating role of social support. *Journal of Pediatric Nursing*, *63*, 159–167. https://doi.org/10.1016/j.pedn.2021.10.014

Ferla, J., Valcke, M., & Schuyten, G. (2010). Judgments of self-perceived academic competence and their differential impact on students' achievement motivation, learning approach, and academic performance. *European Journal of Psychology of Education, 25*(4), 519–536. https://doi.org/10.1007/s10212-010-0030-9

Galindo-Domínguez, H., & Iglesias, D. L. (2023). Emotional intelligence and suicidal ideation in adolescents: The mediating and moderating role of social support. *Revista de Psicodidáctica (English ed.), 2*, 25–134. https://doi.org/10.1016/j.psicoe.2023.02.001

Garcia, A. S., Carotta, C. L., Brown, R., Da Rosa, P., Pravecek, B., & Carson, P. (2021). Parenting stress, self-efficacy and COVID-19 health risks as predictors of general stress among nurses. *International Journal of Nursing Practice, 27*(6), e13009. https://doi.org/10.1111/ijn.13009

Garrido-Hernansaiz, H., & Alonso-Tapia, J. (2017). Associations Among Resilience, Posttraumatic Growth, Anxiety, and Depression and Their Prediction From Stress in Newly Diagnosed People Living With HIV. *Janac-Journal of the Association of Nurses in Aids Care, 28*(2), 289–294. https://doi.org/10.1016/j.jana.2016.12.005

Haslam, D. M., Pakenham, K. I., & Smith, A. (2006). Social support and postpartum depressive symptomatology: The mediating role of maternal self-efficacy. *Infant Mental Health Journal, 27*(3), 276–291. https://doi.org/10.1002/imhj.20092

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium. *Communication Monographs, 76*(4), 408–420. https://doi.org/10.1080/03637750903310360. Article Pii 917285720.

Hayes, A. F., & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods, 41*(3), 924–936. https://doi.org/10.3758/brm.41.3.924

Hayes, A. F. (2022). *Introduction to Mediation, Moderation, and Conditional Process Analysis* (Third Edition ed.) http://www.guilford.com/p/hayes3

Héron, M. (2012). Resilience: from theory to practice. *Soins Psychiatrie, 282*, 5. https://doi.org/10.1016/j.spsy.2012.08.001

Holahan, C. K., & Holahan, C. J. (1987). Self-efficacy, social support, and depression in aging: A longitudinal analysis. *Journal of Gerontology, 42*(1), 65–68. https://doi.org/10.1093/geronj/42.1.65

Hong, M., Zhang, R., Zhu, J., & Tan, W. (2023). Social support and self-efficacy multiply mediate the relationship between medical coping style and resilience in patients with type A aortic dissection. *Frontiers in Psychiatry, 14*, 1174038. https://doi.org/10.3389/fpsyt.2023.1174038

Hou, X.-L., Wang, H.-Z., Guo, C., Gaskin, J., Rost, D. H., & Wang, J.-L. (2017). Psychological resilience can help combat the effect of stress on problematic social networking site usage. *Personality and Individual Differences, 109*, 61–66. https://doi.org/10.1016/j.paid.2016.12.048

Huang, W., & Xu, F. (2004). Relationship of college students' learning adaptability with general self-efficacy and social support. *Chinese Journal of Clinical Psychology, 12*(4), 369–370. https://doi.org/10.3969/j.issn.1005-3611.2004.04.015

Huang, Z., Zhang, L., Wang, J., Xu, L., Liu, Z., Wang, T., . . . Lu, H. (2021). Social support and subjective well-being among postgraduate medical students: the mediating role of anxiety and the moderating role of alcohol and tobacco use. *Heliyon*, *7*(12), e08621. https://doi.org/10.1016/j.heliyon.2021.e08621

Huang, L., & Zhang, T. (2022). Perceived Social Support, Psychological Capital, and Subjective Well-Being among College Students in the Context of Online Learning during the COVID-19 Pandemic. *The Asia-Pacific Education Researcher, 31*(5), 563–574. https://doi.org/10.1007/s40299-021-00608-3

Imus, F. S., Burns, S., & Weglarz, D. M. (2017). Self-efficacy and graduate education in a nurse anesthesia program: A pilot study. *AANA Journal*, *85*(3), 205–216.

Jaguaco, D., Turpo-Chaparro, J., Vasquez-Villanueva, S., & Apaza-Romero, A. (2022). Social support and general self-efficacy: Two predictors of quality of life at work in Ecuadorian teachers. *Frontiers in Education, 7*, 946723. https://doi.org/10.3389/feduc.2022.946723

Jakimovski, D., Kavak, K. S., Longbrake, E. E., Levit, E., Perrone, C. M., Bar-Or, A., . . . Weinstock-Guttman, B. (2022). Impact of resilience, social support, and personality traits in patients with neuroinflammatory diseases during the COVID-19 pandemic. *Multiple Sclerosis and Related Disorders*, *68*, 104235. https://doi.org/10.1016/j.msard.2022.104235

Jose, R., & Novaco, R. W. (2016). Intimate Partner Violence Victims Seeking a Temporary Restraining Order: Social Support and Resilience Attenuating Psychological Distress. *Journal of Interpersonal Violence, 31*(20), 3352–3376. https://doi.org/10.1177/0886260515584352

Karademas, E. C. (2006). Self-efficacy, social support and well-being - The mediating role of optimism. *Personality and Individual Differences, 40*(6), 1281–1290. https://doi.org/10.1016/j.paid.2005.10.019

Karatepe, H. K., Sen, H. T., & Turkmen, E. (2022). Predicting work performance and life satisfaction of nurses and physicians: The mediating role of social capital on self-efficacy and psychological

resilience. *Perspectives in Psychiatric Care, 58*(4), 2542–2551. https://doi.org/10.1111/ppc.13092

Kawachi, I., & Berkman, L. F. (2001). Social ties and mental health. *Journal of Urban Health-Bulletin of the New York Academy of Medicine, 78*(3), 458–467. https://doi.org/10.1093/jurban/78.3.458

Kim, M.-J. (2020). The Relationship between Stress Perception and Happiness in College Freshmen: the Moderated Mediation Effect of Ego-resilience through Social Support. *The Journal of Learner-Centered Curriculum and Instruction, 20*(12), 631–648. https://doi.org/10.22251/jlcci.2020.20.12.631

Kleine, B., & Muschalla, B. (2021). Correlations Between Self-Reported Resilience, Perceived Social Support and Well-Being Among Members of the Volunteer Fire Brigade. *Zeitschrift Fur Arbeits-Und Organisationspsychologie, 65*(2), 82–97. https://doi.org/10.1026/0932-4089/a000355

Kong, L.-N., Zhang, N., Yuan, C., Yu, Z.-Y., Yuan, W., & Zhang, G.-L. (2021). Relationship of social support and health-related quality of life among migrant older adults: The mediating role of psychological resilience. *Geriatric Nursing, 42*(1), 1–7. https://doi.org/10.1016/j.gerinurse.2020.10.019

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal and Coping*. Springer.

Lehrer, H. M., Steinhardt, M. A., Dubois, S. K., & Laudenslager, M. L. (2020). Perceived stress, psychological resilience, hair cortisol concentration, and metabolic syndrome severity: A moderated mediation model. *Psychoneuroendocrinology, 113*, 104510. https://doi.org/10.1016/j.psyneuen.2019.104510

Leipold, B., & Greve, W. (2009). Resilience A Conceptual Bridge Between Coping and Development. *European Psychologist, 14*(1), 40–50. https://doi.org/10.1027/1016-9040.14.1.40

Lent, R. W. (2016). Self-Efficacy in a Relational World: Social Cognitive Mechanisms of Adaptation and Development. *Counseling Psychologist, 44*(4), 573–594. https://doi.org/10.1177/0011000016638742

Lent, R. W., & Lopez, F. G. (2002). Cognitive ties that bind: A tripartite view of efficacy beliefs in growth-promoting relationships. *Journal of Social and Clinical Psychology, 21*(3), 256–286. https://doi.org/10.1521/jscp.21.3.256.22535

Leonard, K. S., Evans, M. B., Kjerulff, K. H., & Downs, D. S. (2020). Postpartum Perceived Stress Explains the Association between Perceived Social Support and Depressive Symptoms. *Women's Health Issues, 30*(4), 231–239. https://doi.org/10.1016/j.whi.2020.05.001

Li, S.-Y. (2021). The relationships among self-efficacy, social support, and self-care behavior in the elderly patients with chronic pain (a STROBE-compliant article). *Medicine, 100*(9), e24554. https://doi.org/10.1097/md.0000000000024554

Li, W., & Tao, S. (2003). The relationship between perceived stress and depression and anxiety in college students: the effect of social support. *Chinese Journal of Clinical Psychology, 11*(2), 108–110. https://doi.org/10.3969/j.issn.1005-3611.2003.02.009

Liu, N., Liu, S., Yu, N., Peng, Y., Wen, Y., Tang, J., & Kong, L. (2018). Correlations among Psychological Resilience, Self-Efficacy, and Negative Emotion in Acute Myocardial Infarction Patients after Percutaneous Coronary Intervention. *Frontiers in Psychiatry, 9*, 1. https://doi.org/10.3389/fpsyt.2018.00001

Luszczynska, A., Scholz, U., & Schwarzer, R. (2005). The general self-efficacy scale: Multicultural validation studies. *Journal of Psychology, 139*(5), 439–457. https://doi.org/10.3200/jrlp.139.5.439-457

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*(3), 543–562. https://doi.org/10.1111/1467-8624.00164

Major, B., Cozzarelli, C., Sciacchitano, A. M., Cooper, M. L., Testa, M., & Mueller, P. M. (1990). Perceived social support, self-efficacy, and adjustment to abortion. *Journal of Personality and Social Psychology, 59*(3), 452–463. https://doi.org/10.1037/0022-3514.59.3.452

Mancini, A. D., & Bonanno, G. A. (2009). Predictors and Parameters of Resilience to Loss: Toward an Individual Differences Model. *Journal of Personality, 77*(6), 1805–1832. https://doi.org/10.1111/j.1467-6494.2009.00601.x

Mandleco, B. L., & Peery, J. C. (2000). An organizational framework for conceptualizing resilience in children. *Journal of child and adolescent psychiatric nursing : official publication of the Association of Child and Adolescent Psychiatric Nurses, Inc, 13*(3), 99–111. https://doi.org/10.1111/j.1744-6171.2000.tb00086.x

Masten, A. S., & Garmezy, N. (1985). Risk, Vulnerability, and protective factors in developmental psychopathology. In B. B. Lahey, & A. E. Kazdin (Eds.), *Advances in Clinical Child Psychology* (8th ed., pp. 1–52). Springer.

Matsushima, R., & Shiomi, K. (2003). Social self-efficacy and interpersonal stress in adolescence. *Social Behavior and Personality, 31*(4), 323–332. https://doi.org/10.2224/sbp.2003.31.4.323

Munoz, L. R. (2021). Graduate student self-efficacy: Implications of a concept analysis. *Journal of Professional Nursing, 37*(1), 112–121. https://doi.org/10.1016/j.profnurs.2020.07.001

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K. & Bent, D. H. (1975). *SPSS-Statistical Package for the Social Sciences*. McGraw-Hill.

Ozer, O., Ozkan, O., Budak, F., & Ozmen, S. (2021). Does social support affect perceived stress? A research during the COVID-19 pandemic in Turkey. *Journal of Human Behavior in the Social Environment, 31*(1–4), 134–144. https://doi.org/10.1080/10911359.2020.1854141. Article 1854141.

Pajares, F. (2008). Motivational role of self-efficacy beliefs in self-regulated learning. In D. H. Schunk, & B. J. Zimmerman (Eds.), *Motivation and self-regulated learning: Theory, research, and applications* (1th ed., pp. 111–139). Erlbaum.

Panteli, M., Vaiouli, P., Leonidou, C., & Panayiotou, G. (2021). Perceived Stress of Cypriot College Students During COVID-19 The Predictive Role of Social Skills and Social Support. *European Journal of Psychology Open*. https://doi.org/10.1024/2673-8627/a000005

Penacoba, C., Catala, P., Velasco, L., Carmona-Monge, F. J., Garcia-Hedrera, F. J., & Gil-Almagro, F. (2021). Stress and quality of life of intensive care nurses during the COVID-19 pandemic: Self-efficacy and resilience as resources. *Nursing in Critical Care, 26*(6), 493–500. https://doi.org/10.1111/nicc.12690

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Ruan, X., Ye, Z., Cheng, M., Lu, Y., Tian, X., & Wei, Y. (2018). Mediating role of psychological resilience in relationship between self-efficacy and sense of coherence among nursing students in TCM Colleges. *Nursing Journal of Chinese People's Liberation Army, 35*(11), 13–17. https://doi.org/10.3969/j.issn.1008-9993.2018.11.003

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *The American Journal of Orthopsychiatry, 57*(3), 316–331. https://doi.org/10.1111/j.1939-0025.1987.tb03541.x

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness NY*. US: The Guilford Press. https://doi.org/10.1521/978.14625/28806

Sabouripour, F., Roslan, S., Ghiami, Z., & Memon, M. A. (2021). Mediating Role of Self-Efficacy in the Relationship Between Optimism, Psychological Well-Being, and Resilience Among Iranian Students. *Frontiers in Psychology, 12*, 675645. https://doi.org/10.3389/fpsyg.2021.675645

Schwarzer, R., Baessler, J., Kwiatek, P. J., Schroder, K. E. E., & Zhang, J. J. A. P. (1997). The assessment of optimistic self-beliefs : Comparison of the German. *Spanish, and Chinese Versions of the General Self-Efficacy Scale., 46*, 69–88.

Schwarzer R, & Born, A. (2020, June 30) Optimistic self-beliefs: assessment of general perceived self-efficacy in thirteen cultures. *World Psychology, 3*(1–2), 177–190. Retrieved September 7, 2022, from https://www.researchgate.net/publication/284758239

Sharma, P. K., & Kumra, R. (2022). Relationship between mindfulness, depression, anxiety and stress: Mediating role of self-efficacy. *Personality and Individual Differences, 186*, 111363. https://doi.org/10.1016/j.paid.2021.111363

Swanson, A., Geller, J., DeMartini, K., Fernandez, A., & Fehon, D. (2018). Active Coping and Perceived Social Support Mediate the Relationship Between Physical Health and Resilience in Liver Transplant Candidates. *Journal of Clinical Psychology in Medical Settings, 25*(4), 485–496. https://doi.org/10.1007/s10880-018-9559-6

Thoits, P. A. (2011). Mechanisms Linking Social Ties and Support to Physical and Mental Health. *Journal of Health and Social Behavior, 52*(2), 145–161. https://doi.org/10.1177/0022146510395592

Thoits, P. A. (1995). Stress, coping, and social support processes: where are we? What next? *Journal of Health and Social Behavior*, (Extra Issue), 53–79. https://doi.org/10.2307/2626957

Thompson, M. P., Kaslow, N. J., Short, L. M., & Wyckoff, S. (2002). The mediating roles of perceived social support and resources in the self-efficacy-suicide attempts relation among African American abused women. *Journal of Consulting and Clinical Psychology, 70*(4), 942–949. https://doi.org/10.1037/0022-006X.70.4.942

Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology, 86*(2), 320–333. https://doi.org/10.1037/0022-3514.86.2.320

Uchino, B. N. (2006). Social support and health: A review of physiological processes potentially underlying links to disease outcomes. *Journal of Behavioral Medicine, 29*(4), 377–387. https://doi.org/10.1007/s10865-006-9056-5

Wang, L., Shi, Z., Zhang, Y., & Zhang, Z. (2010). Psychometric properties of the 10-item Connor-Davidson Resilience Scale in Chinese earthquake victims. *Psychiatry and Clinical Neurosciences, 64*(5), 499–504. https://doi.org/10.1111/j.1440-1819.2010.02130.x

Yalcin-Siedentopf, N., Pichler, T., Welte, A. S., Hoertnagl, C. M., Klasen, C. C., Kemmler, G., . . . Hofer, A. (2021). Sex matters: stress perception and the relevance of resilience and perceived social support in emerging adults. *Archives of Womens Mental Health*, *24*(3), 403–411. https://doi.org/10.1007/s00737-020-01076-2

Yan, J., Wu, C., He, C., Lin, Y., He, S., Du, Y., . . . Lang, H. (2022). The social support, psychological resilience and quality of life of nurses in infectious disease departments in China: A mediated model. *Journal of Nursing Management*, *30*(8), 4503–4513. https://doi.org/10.1111/jonm.13889

Ye, L., Posada, A., & Liu, Y. Y. (2018). The Moderating Effects of Gender on the Relationship Between Academic Stress and Academic Self-Efficacy. *International Journal of Stress Management, 25*, 56–61. https://doi.org/10.1037/str0000089

Yıldırım, M., & Celik, F. (2020). Social Support, Resilience and Subjective Well-being in College Students. *Journal of Positive School Psychology, 5*, 127–135. https://doi.org/10.47602/jpsp.v5i2.229

Zee, M., & Koomen, H. M. Y. (2016). Teacher Self-Efficacy and Its Effects on Classroom Processes, Student Academic Adjustment, and Teacher Well-Being: A Synthesis of 40 Years of Research. *Review of Educational Research, 86*(4), 981–1015. https://doi.org/10.3102/0034654315626801

Zhang, L., Fu, B., Xu, Y., Zhang, Q., Peng, S., & Tan, X. (2022). Association Between Social Support and Perceived Stress: A Cross-Sectional Study on Staffs of the Epidemic Prevention During the Covid-19 Epidemic in China. *Frontiers in Public Health, 10*, 844139. https://doi.org/10.3389/fpubh.2022.844139

Zhao, F.-F., Lei, X.-L., He, W., Gu, Y.-H., & Li, D.-W. (2015). The study of perceived stress, coping strategy and self-efficacy of Chinese undergraduate nursing students in clinical practice. *International Journal of Nursing Practice, 21*(4), 401–409. https://doi.org/10.1111/ijn.12273

Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S., & Berkoff, K. A. (1990). Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 55*(3–4), 610–617. https://doi.org/10.1080/00223891.1990.9674095