

Resilience and Prosocial Behavior Among Chinese University Students During COVID-19 Mitigation: Testing Mediation and Moderation Models of Social Support

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Purpose: Suffering during events such as the COVID-19 pandemic threatens university students' physical and psychological health. Given the literature indicating the protective role of resilience and social support, the current study explored the mediating and moderating roles of social support in the association between resilience and prosocial behavior among university students in mainland China during COVID-19 mitigation.

Methods: We conducted an online survey using convenience sampling from 23rd February to 3rd March 2020 among Chinese university students who had encountered home-quarantine due to the COVID-19 pandemic. Self-report scales were used to measure levels of resilience (Connor-Davidson Resilience Scale), social support (the Social Support Scale), and prosocial behavior (Prosocial Tendencies Measure). A total of 313 university students participated in this online survey. Hayes PROCESS macro for SPSS was used to test the hypothesized mediating and moderating effects of social support in the relationship between resilience and prosocial behavior.

Results: Pearson's correlations analysis showed that all outcomes of interest were positively associated. Importantly, social support (subjective support, objective support, and support utilization) mediated the indirect link of resilience with prosocial behavior. Furthermore, moderation analyses indicated that support utilization played a moderating role in this link. Support utilization may reduce the negative influence of COVID-19 on university students' prosocial behavior and serve as a protective factor between resilience and prosocial behavior in highly stressful contexts.

Conclusion: Our findings enrich research on prosocial behavior by investigating the potential internal and external variables that influence such behavior during periods of suffering. Findings also provide evidence for the need to promote university students' prosocial behavior.

Keywords: COVID-19, resilience, social support, prosocial behavior, mediation and moderation

Introduction

As the most important global health crisis and the biggest challenge faced globally since the Second World War, the COVID-19 pandemic has posed a serious threat to human beings' physical and psychological health.¹⁻³ Physically, the virus resulted in problems such as fever, musculoskeletal symptoms, and dyspnea.³ Psychologically, the pandemic caused anxiety, posttraumatic stress disorder, and depression in college students,⁴ medical workers,⁵ and general populations⁶ alike.

At the beginning of COVID-19 crisis, Chinese governments issued the highest-level public health alert and implemented a series of strict self- or forced-quarantine measures and travel restrictions to diminish transmission.

These long-term and mandatory isolation measures triggered a series of profound changes in people's lives. University students were no exception, as they encountered school terminations, peer separation, and a switch to online learning at home.⁷ Moreover, unlike university students in the US who have various living arrangements, and due to the collectivism of Chinese culture and traditional family-oriented norms, university students in China generally live with their parents during university holidays before they get married.⁸ Therefore, during the COVID-19 home-quarantine period, university students were forced to continue living with their parents for their online study. Consequently, the fear and uncertainty caused by COVID-19, such as dealing with online-based academic challenges, renegotiating parent-child relationships, and fear of bleak job prospects, has dramatically changed university students' mental health and associated behaviors.^{9–11} A high prevalence of mental, psychiatric, and behavioral health problems, such as PTSD, depressive symptoms, and sleep disturbances has been reported among this community.^{4,12} Although the COVID-19 outbreak has been effectively controlled in mainland China, recent outbreaks in South and Southeast Asia, such as India¹³ and Indonesia¹⁴ and the rise in the delta variant have continued to challenge governments and medical institutions. This is especially obvious in middle- and low-income nations, showing the persist influence of the COVID-19 pandemic.^{15,16}

Prosocial Behavior and Resilience as Ways to Alleviate Suffering

Prosocial behavior has been heralded as a potential factor in alleviating the negative impact of suffering.¹⁷ As a key aspect of social competence, prosocial behavior represents a broad category of behavior that refers to some important segment of society and/or one's social group as generally beneficial to others, such as helping, cooperating, donating, and/or sharing.¹⁸ Studies have found elevated prosocial behavior transpired in the aftermath of traumatic events such as the 9/11 terrorist attacks in the US,¹⁹ earthquakes,²⁰ and the COVID-19 pandemic.²¹ For example, one recent study demonstrated that prosocial behavior, such as donating money, blood, and sharing personal protection equipment, significantly increased during the COVID-19 pandemic compared with the period before the outbreak.²² Engaging in prosocial behavior can protect individuals against a myriad of adverse outcomes and in turn predict positive outcomes in well-being, such as harmonious peer relationships and higher self-esteem.²³ Therefore, it is vital to explore positive factors that can promote prosocial behavior among university students, especially in view of the complete upheaval of their lives caused by the temporary closing of higher education institutions as a result of the COVID-19 pandemic.

Resilience is regarded as a comparatively stable personality trait, which is characterized by the ability to recover from passive events and flexibly adapt to changing life needs.²⁴ COVID-19 pandemic-related policies may lead to increased loneliness and anxiety, but they also provide an opportunity for building the capacity for resilience.^{25,26} Thus, individuals with high levels of resilience may be more flexible in coping with stressful situations and may be able to turn negative perceptions into positive action (eg, pleasant emotion and altruistic behavior).²⁷ The theory of altruism born of suffering posed by Staub points out that resilient individuals who encounter adverse and traumatic experiences are more likely than others to exhibit altruistic behavior in order to return the help they received from others.²⁸ As an important positive personal resource, resilience enables people to deal with traumatic events by strengthening their self-efficacy, problem coping skills, and adjustment, which can thereby facilitate greater altruistic behavior.²⁹ A study in northern Uganda showed there is a positive relationship between resilience and prosocial behavior among adolescents.³⁰ Moreover, a recent study conducted in Italy found that high levels of resilience are essential for the social and emotional development of children, which may help them strengthen their psychological resources to promote the development of prosocial behavior.³¹ Until now, no study has explored the relationship between resilience and prosocial behavior under the COVID-19 pandemic context, especially among the university students community.

Social Support as a Mediator

Social support has been recognized as an important interpersonal factor accounting for prosocial behavior.³² Social support is defined as an individual's network of psychological and material assets intended to improve one's ability to cope with adversity and is generally categorized as emotional, informational, and instrumental support.³³ The sudden and unprecedented COVID-19 pandemic likely contributed to a chaotic and hectic living environment for many people, where individuals may have actively sought coping strategies and felt a more urgent need to rely on support from their families, reliable friends, and faculty to help them keep psychological distress at a minimum.³⁴ Based on social support

resource theory, as an external and protective resource, social support is closely correlated to the quality and function of interpersonal relationships.³⁵ When interpersonal relationships are healthy and meaningful, they can bring positive changes to one's life and improve psychological wellbeing and ultimately facilitate positive behavioral responses.³⁶ From this theoretical perspective, when individuals perceive higher levels of social support, they are more inclined to show better adjustment against traumatic events and gain more positive changes,³⁷ resulting in more prosocial behavior. Additionally, previous research has shown positive links between social support and individuals' prosocial behavior.^{34,38}

Various studies have demonstrated that resilience is positively related with social support, which may help trauma-exposed individuals protect against adverse environmental pressure and improve one's psychosocial function.^{39,40} For example, in a cross-sectional study, Pietrzak et al found that resilience is positively associated with increased social support in a sample of American veterans.³⁹ A positive, robust association between resilience and social support was also found in trauma-exposed individuals.⁴⁰ More recently, a study regarding COVID-19 found that resilience was positively associated with social support, both of which can mediate the link between COVID-19-related trauma and PTSD among university students.⁴¹ To the best of our knowledge, there is no prior research on how social support mediates the relationship between resilience and prosocial behavior.

Social Support as a Moderator

As previously mentioned, social support and resilience are important interpersonal and intrapersonal resources that maintain an individual's psychological health in painful or stressful contexts. According to the stress-buffering model, social support acts as a buffer to reduce the negative impact of stress on well-being.⁴² Positive relationships with others not only help individuals bounce back from stressful experiences, but also play a role in increasing individuals' inner motivation and potential to positively perceive the external environment and act benevolently,⁴³ thereby contributing to prosocial behavior. For example, one study showed that social support is key to resilience when it is considered to be a process/outcome.⁴⁴ Additionally, a study from China indicated that during COVID-19 mitigation, social support served as a buffer to prevent the negative influence of low resilience on individuals' psychological health of different age stages.⁴⁵ Although previous studies have indicated that social support serves as an important interpersonal resource to promote positive outcomes, few studies have taken into account the moderating role of social support in the relationship between resilience and prosocial behavior.

Gender Differences in Resilience and Prosocial Behavior

Studies also indicate that gender is an important variable associated with resilience and prosocial behavior. Several studies on resilience have shown that males were more resilient than females,^{46,47} whereas other studies have failed to report similar gender differences.⁴⁸ In regard to prosocial behavior among adolescents, studies indicate that girls are more altruistic and show higher prosocial behavior than boys because care-oriented concerns are stereotypically female-typed, with the tendency for girls to be socialize towards prosocial behaviors.^{49,50} However, some studies show no gender differences or that males endorse greater prosocial behavior than females.^{51,52} Hence, there are no clear gender differences in resilience and prosocial behavior evident in the literature. However, little information is currently available for gendered analyses on resilience and prosocial behavior in the context of COVID-19 mitigation.^{47,53}

The Current Study

Despite the serious threat to human mental health and well-being, little research has focused on the suffering that the COVID-19 outbreak has brought to human beings' prosocial behavior and its social and individual protective factors and/or mechanisms. To address this gap, this study explored the link between resilience and prosocial behavior among university students in mainland China, a community particularly vulnerable to mental distress during COVID-19 mitigation. Further, this study aimed to improve understanding of the multifaceted relationship between resilience and prosocial behavior by examining the possible mediation and moderation role of social support (subjective support, objective support, and support utilization) in this link. Based on the literature and previous discussion, it was hypothesized that resilience and prosocial behavior would be positively associated among Chinese university students (Hypothesis 1). In addition, it was expected that social support would have mediating effects in the association between resilience and prosocial behavior (Hypothesis 2). Moreover, it was expected that social support would moderate the

relationship between resilience and prosocial behavior, such that the association between resilience and prosocial behavior would be strengthened in the context of higher levels of social support (Hypothesis 3). The proposed theoretical model is illustrated in Figure 1.

Materials and Methods

Participants

An online survey using convenience sampling was conducted in mainland China from 23rd February to 3rd March 2020, the same time period in which university students encountered school closures and a switch to online learning as a result of COVID-19.⁵⁴ All questionnaires were anonymous, and informed consent was given by all participants on the first page of the questionnaire. This study was approved by the Ethics Committee of Sichuan University. In total, 325 respondents were initially recruited. The eligibility criteria were undergraduate or postgraduate student, willing to provide informed consent, and living in mainland China. A total of 12 questionnaires were excluded due to not meeting these criteria. The final data set included 313 eligible university students from 25 provinces of mainland China; 60% were females ($n = 188$), and 40.0% were male ($n = 125$); 37.7% were freshmen to juniors ($n = 118$), 39.3% were seniors ($n = 123$), and 23.0% were postgraduates (master or doctoral students; $n = 72$); 47.28% were only children ($n = 148$), and 52.72% had siblings ($n = 165$).

Regarding the sample size and its sufficiency, we conducted a priori power analysis using G*Power 3.1 to calculate the required sample size.⁵⁵ For the mediation analysis, we used the statistical test of linear multiple regression: fixed model, R^2 deviation from zero in the F -tests. Results showed that a minimum of 107 participants was needed to achieve sufficient power (95%) in detecting a medium effect size ($f^2 = 0.15$).⁵⁶ For the moderation analysis, we selected the statistical test of linear multiple regression: fixed model, R^2 increase. A minimum of 89 participants was required to achieve sufficient power (95%) to detect a small effect at $\alpha = 0.05$.⁵⁶ Thus, with the study sample size $N = 313$, the research design had more than sufficient power.

Measures

Demographic variables included gender, grade (freshman, sophomore, junior, senior, or postgraduate), only child or not, and province.

Measurement of Resilience

The Chinese version of the Connor-Davidson Resilience Scale was used to assess an individual's psychological flexibility and capacity to maintain their psychological health.⁵⁷ The scale contains 25 items belonging to 3 factors: tenacity, strength, and optimism. A sample scale item is, "I consider myself as a strong person." Each item was rated on a 5-point Likert scale ranging from 1 (never) to 5 (always), with higher scores indicating higher levels of resilience. This scale has shown good psychometric characteristics with Chinese samples.⁵⁴ Cronbach's α in the current study was 0.93. Furthermore, confirmatory factor analysis (CFA) indices demonstrated a satisfactory fit: $\chi^2/df = 2.36$, CFI = 0.90, TLI = 0.89, SRMR = 0.05, and RMSEA = 0.07.

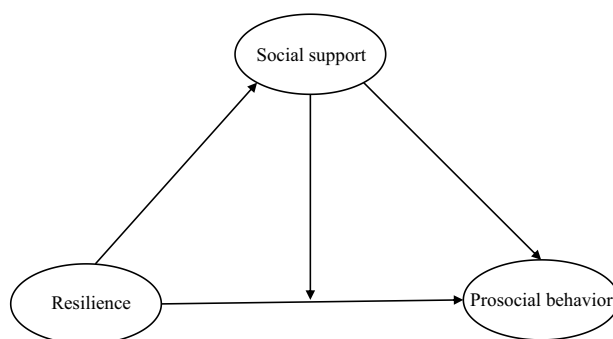


Figure 1 The proposed mediation and moderation model.

Measurement of Prosocial Behavior

Prosocial behavior was measured using the Prosocial Tendencies Measure (Chinese version).⁵⁸ It contains 23 items belonging to 6 factors: compliant, public, altruistic, dire, emotional, anonymous. A sample scale item is, “When others are present, I am more likely to help people in need.” Responses to each item were provided on a 5-point Likert scale ranging from 1 (completely inconsistent) to 5 (completely consistent), with higher scores indicating higher levels of prosocial behavior. Cronbach’s α in this study was 0.78. The CFA indices showed a reasonable fit: $\chi^2/df = 2.42$, CFI = 0.93, TLI = 0.90, SRMR = 0.07, RMSEA = 0.07.

Measurement of Social Support

Social support was measured using the Social Support Scale (Chinese version).⁵⁹ The scale contains 17 items belonging to 3 factors: objective support, subjective support, and support utilization. A sample scale item is, “When faced with a dilemma, I will take the initiative to seek help from others.” Responses to each item were provided on a 5-point Likert scale ranging from 1 (completely inconsistent) to 5 (completely consistent), with higher scores indicating higher levels of social support. This scale has been used in the context of the COVID-19 pandemic and showed satisfactory reliability and validity in Chinese university students.⁶⁰ The Cronbach’s α in the current study was 0.94. The CFA indices showed a reasonable fit: $\chi^2/df = 2.53$, CFI = 0.95, TLI = 0.94, SRMR = 0.05, RMSEA = 0.07.

Statistical Analysis

Before conducting the analyses, all variables of interest were inspected for missing data, normality, and potential outliers. Then, descriptive statistics including means and standard deviations were calculated for study variables using SPSS 22.0. The differences were assessed for significance using an independent-sample *t*-test and ANOVA. Second, Pearson’s correlation analyses were run in order to explore the relationship between variables. Third, the regression-based mediation analysis was conducted to test whether social support (subjective support, objective support, and support utilization) mediated the link between resilience and prosocial behavior. Fourth, in order to explore the moderating role of social support in the relationship between resilience and prosocial behavior, the interaction between resilience and social support (subjective support, objective support, and support utilization) was calculated using PROCESS Model 1.⁶¹ To increase the robustness of the standard errors for parameter estimation, the bootstrapping method was applied to examine the significance of all the effects⁶² using 95% bias-corrected confidence intervals of these effects based on 5000 bootstrapped samples, and confidence intervals without zero indicating the effect was statistically significant.

Results

Preliminary Analyses

There were no missing data in the current study since a forced response was used during data collection for participants to be able to move to the next item. For the normally distributed data, the findings from the preliminary analyses indicated the skewness scores ranged between -0.87 and 0.62 , and the kurtosis scores ranged between -0.37 and 0.91 . No univariate or multivariate outliers were detected. Results of Pearson’s correlations (Table 1) demonstrated that resilience has a small positive association with dimensions of social support (r ranged from 0.23 to 0.27 , $p < 0.01$), and a strong positive association with prosocial behavior ($r = 0.65$, $p < 0.01$). Also, dimensions of social support were found to have a small positive association with prosocial behavior (r ranged from 0.25 to 0.33 , $p < 0.01$). Therefore, variance inflation factors (VIF) were calculated to check for multicollinearity. VIF values ranged from 1.077 to 2.751 , and these are all lower than the upper limit of 5 .⁶³ Conclusively, there was no issue of multicollinearity in the model.

Scores on measures of resilience, social support, and prosocial behavior by gender are presented in Table 2. Men scored significantly higher than women on resilience ($t = 2.33$, $p < 0.05$). Women scored significantly higher than men on social support ($t = -3.78$, $p < 0.001$), as well as subscales of subjective support ($t = -2.86$, $p < 0.01$), objective support ($t = -2.86$, $p < 0.01$), and support utilization ($t = -4.21$, $p < 0.001$). However, no significant differences were found for prosocial behavior by gender, grade, or provincial categories. Given the significant gender differences on resilience and social support, we included gender as a covariate in subsequent analyses.

Table 1 Correlations Between Variables

Variables	1	2	3	4	5	6
1. Resilience	1					
2. Social support	0.27**	1				
3. Subjective support	0.24**	0.90**	1			
4. Objective support	0.23**	0.88**	0.72**	1		
5. Support utilization	0.25**	0.91**	0.74**	0.68**	1	
6. Prosocial behavior	0.65**	0.33**	0.31**	0.25**	0.33**	1
Skewness	-0.33	-0.50	-0.48	-0.87	-0.59	0.62
Kurtosis	0.91	-0.31	-0.37	0.29	-0.20	0.44

Note: ** $p < 0.01$.

Table 2 Psychological Characteristics by Gender Among Chinese College Students

Variables	M	SD	Men (M±SD)	Women (M±SD)	t
Resilience	66.84	14.9	69.23±16.09	65.26±13.87	2.33*
Social support	66.52	13.23	62.99±14.52	68.87±11.75	-3.78***
Subjective support	19.22	4.28	18.36±4.48	19.79±3.97	-2.86**
Objective support	25.06	4.76	24.08±5.37	25.71±4.20	-2.86**
Support utilization	22.25	5.66	20.55±6.36	23.37±4.85	-4.21***
Prosocial behavior	79.73	13.94	80.52±15.37	79.20±12.92	0.79

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Mediating Role of Social Support

Mediation analyses were conducted to test any possible mediation effect of social support in the link between resilience and prosocial behavior (Table 3 and Figure 2). Three factors of social support were used as mediators in the analysis. In the first mediation model, subjective support partially mediated the link between resilience and prosocial behavior. Specifically, resilience was positively correlated with subjective support ($b = 0.08$, $SE = 0.02$, $p < 0.001$). Subjective support was positively related to prosocial behavior ($b = 0.49$, $SE = 0.10$, $p < 0.001$). After taking into account the mediation effect of subjective support, the residual direct effect of mediation was still significant ($b = 0.35$, $SE = 0.03$, $p < 0.001$). Further, results revealed a significant indirect effect ($b = 0.04$, $SE = 0.01$, 95% CI 0.02, 0.07), and the indirect effect accounted for 9.9% of the total effect ($b = 0.39$, $SE = 0.03$, 95% CI 0.33, 0.44) of resilience on prosocial behavior.

Similar to subjective support's mediation mechanism between resilience and prosocial behavior, objective support partially mediated the relationship between resilience and prosocial behavior (indirect effect = 0.03, $SE = 0.01$, 95% CI 0.01, 0.05). The indirect effect accounted for 7.5% of the total effect of resilience on prosocial behavior. Similarly, support utilization partially mediated the relationship between resilience and prosocial behavior (indirect effect = 0.03, $SE = 0.01$, 95% CI 0.01, 0.06). The indirect effect accounted for 7.6% of the total effect of resilience on prosocial behavior.

Moderating Role of Social Support

We also examined whether social support moderated the link between resilience and prosocial behavior. Resilience was posited as a predictor, gender as a covariate, three dimensions of social support as subsequent moderators respectively, and prosocial behavior as the outcome variable. Results showed that only support utilization, but not subjective support

Table 3 Mediation Analyses Between Resilience, Social Support, and Prosocial Behavior

Path	Effect	SE	95% CI
Resilience(X)→subjective support(M)→prosocial behavior(Y)			
Total effect of X on Y	0.39	0.03	[0.33, 0.44]
Direct effect of X on Y	0.35	0.03	[0.29, 0.40]
Indirect effect of X on Y	0.04	0.01	[0.02, 0.07]
X→M	0.08	0.02	[0.05, 0.11]
M→Y	0.49	0.10	[0.30, 0.68]
Resilience(X)→objective support(M)→prosocial behavior(Y)			
Total effect of X on Y	0.39	0.03	[0.33, 0.44]
Direct effect of X on Y	0.37	0.03	[0.30, 0.41]
Indirect effect of X on Y	0.03	0.01	[0.01, 0.05]
X→M	0.08	0.02	[0.05, 0.12]
M→Y	0.35	0.09	[0.17, 0.52]
Resilience(X)→support utilization(M)→prosocial behavior(Y)			
Total effect of X on Y	0.39	0.03	[0.33, 0.44]
Direct effect of X on Y	0.36	0.03	[0.30, 0.41]
Indirect effect of X on Y	0.03	0.01	[0.01, 0.06]
X→M	0.11	0.02	[0.07, 0.15]
M→Y	0.27	0.08	[0.12, 0.43]

or objective support, moderated the link between resilience and prosocial behavior. There was no significant main effect of gender on prosocial behavior ($b = 0.27, p > 0.05$). A significant and positive interaction effect of resilience $\times$ support utilization on prosocial behavior existed ($F = 5.99, p < 0.05$). The adjusted R^2 for the entire model was 0.41. For descriptive purposes, this study plotted resilience on prosocial behavior, separately for low, middle, and high levels of support utilization (-1 SD, 0 SD, and 1 SD, respectively; Figure 3). Analyses revealed that resilience was positively related to prosocial behavior for low ($b_{simple} = 0.30, t = 9.00, p < 0.001$), middle ($b_{simple} = 0.37, t = 12.69, p < 0.001$), and high ($b_{simple} = 0.42, t = 10.91, p < 0.001$) levels of support utilization, indicating that support utilization significantly strengthened the association between resilience and prosocial behavior.

Discussion

Using a sample of university students in mainland China, this study examined the relationship among resilience, social support, and prosocial behavior during COVID-19 mitigation. Findings showed that university students' resilience had a positive association with their prosocial behavior. To date, this is the first study to explore the internal mechanism between resilience and university students' prosocial behavior during COVID-19 mitigation. Most importantly, findings indicated that social support (subjective support, objective support, and support utilization) partially mediated the link between resilience and university students' prosocial behavior; additionally, support utilization had a moderating role in this link. As such, these findings provide a substantial contribution to better understand the potential mediating and moderating effects of social support between resilience and prosocial behavior among Chinese university students during COVID-19 mitigation.

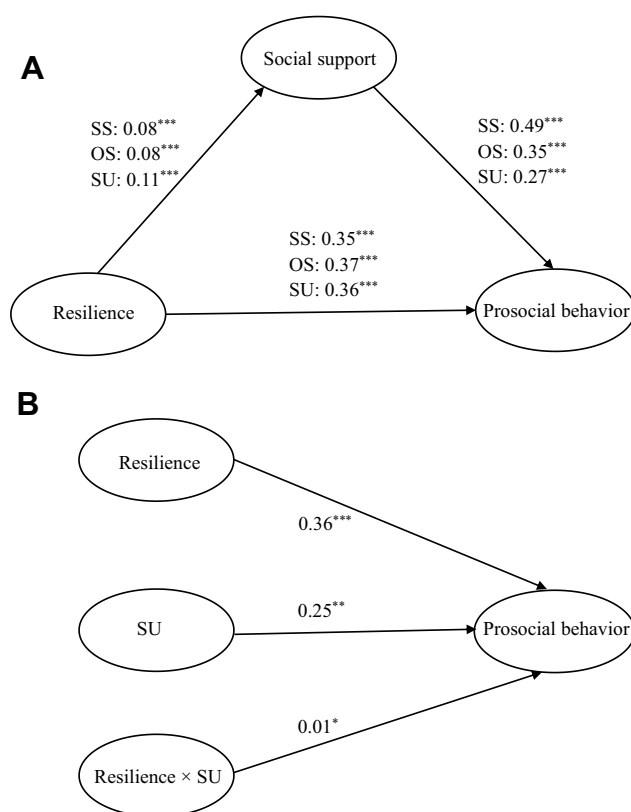


Figure 2 Mediation and moderation models of social support. **(A)** Mediating role of social support (subject support, objective support, support utilization) in the association between resilience and prosocial behavior. **(B)** Moderating role of support utilization in the association between resilience and prosocial behavior.

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Abbreviations: SS, subjective support; OS, objective support; SU, support utilization.

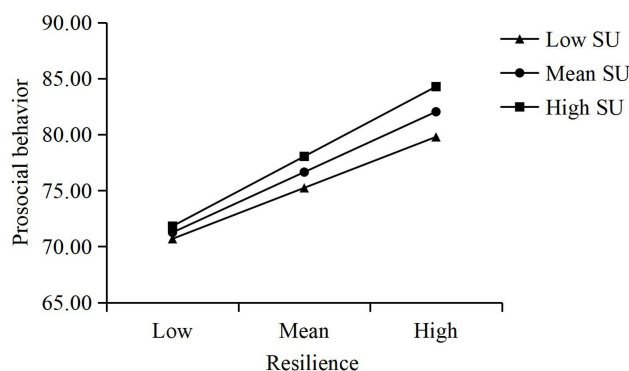


Figure 3 Moderating role of support utilization on the link between resilience and prosocial behavior.

In this study, men endorsed greater resilience than women, which is consistent with previous literature.^{46,47} In addition, there was no significant gender difference in prosocial behavior, which is identical to a study conducted in the US, which found no significant differences between genders on all types of prosocial behavior among adolescents.⁵¹ This may be due to the concept of “altruism as hedonism”,⁶⁴ with both men and women being more likely to engage in prosocial behavior to relieve their own distress or sadness during the COVID-19 pandemic. Further, the current study found that, under the Chinese context, university students’ resilience level positively predicted their willingness to show prosocial behavior during COVID-19 mitigation, which is consistent with prior studies conducted in Western contexts.^{30,31} As a vulnerable community during COVID-19 mitigation, Chinese university students suffered from home-

quarantine, employment obstruction, and fear of uncertainty about the future. Consistent with the theory of altruism born of suffering,²⁸ our results showed that resilience may provide Chinese university students with the resources they need to cope with ongoing stressors and thus exhibit greater prosocial behavior. Further, due to Chinese culture emphasizing collectivistic orientations, prosocial behavior is an essential goal for the socialization of individuals, as it contributes to an integrated and harmonious society.⁶⁵ Thus, it is possible that during the COVID-19 pandemic, resilient students are more likely to actively take on social responsibilities and thus engage in more prosocial behaviors.

Next, our results contribute a new finding that university students' levels of social support partially mediated the positive relationship between their resilience and prosocial behavior. Previous empirical studies have documented a positive association between resilience and perceived social support.^{39,40} Additionally, previous studies have shown that high levels of social support positively predict individuals' willingness to show prosocial behavior.^{32,38} In line with prior findings, the current study indicated that university students' resilience, social support, and prosocial behavior were significantly intercorrelated.^{30,32,39} Our findings also make significant contributions by signifying resilience as a key predictor of subjective and objective support and support utilization in university students. This provides further evidence of resilience and social support as effective interpersonal and intrapersonal protective factors that can improve prosocial behavior under difficult life circumstances or suffering. The theorized mechanism behind this association is that individuals with higher levels of resilience are more capable of handling stressors related to the pandemic, which in turn experience more positive perceptions, and seek the necessary social support from family members, friends, and even teachers. When they feel stable about their own support and access to resources in the context of COVID-19, they are more inclined to engage in prosocial behavior in order to give back to others and society.

In addition to a mediating role, analyses revealed the moderating role of support utilization in the association between resilience and prosocial behavior, such that the path from resilience to prosocial behavior was strengthened in the context of higher levels of support utilization. Theoretically, the stress-buffering model suggests that social support acts as a buffer to reduce the adverse impact of stress on an individual's well-being.⁴² Consistent with this model, our findings affirmed that social support served as a buffer when individuals were confronted with the COVID-19 pandemic, which, accordingly, protects youth's mental health. Previous literature supports the moderating role of social support under a context of suffering.^{45,66} Holt and Espelage, for instance, verified the moderating role of social support in the relationship between child maltreatment histories and psychological outcomes in adolescents.⁶⁷ Moving beyond these models, the current research supported the buffer role of support utilization in the relationship between resilience and prosocial behavior in the context of COVID-19 mitigation. It is possible that high levels of support utilization could protect individuals from COVID-19-related distress by allowing individuals to view the situation as manageable, further facilitating resilient students' adaptive development including prosocial behaviors. This is first study to date to reveal direct and moderating effects of social support with resilience in predicting prosocial behavior, and these findings should be further explored by future researchers.

Taken together, these findings are consistent with prior studies,^{30,32,39,42} and more specifically demonstrate that social support (subjective support, objective support, and support utilization) mediated the relationship between resilience and prosocial behavior in the context of COVID-19 outbreak. The moderating role of support utilization in the relationship between resilience and prosocial behavior was also demonstrated in this pandemic context. This study has several theoretical and practical contributions. First and foremost, it addresses a major gap in the current trauma psychology literature, suggesting that as critical intrapersonal and interpersonal resources, resilience and social support play important roles in building positive interpersonal relationships by encouraging more prosocial behavior, ultimately contributing to the alleviation of people's psychological trauma. In addition, considering the adverse influence of the COVID-19 pandemic on young adults' psychological health, university administrators or supervisors are advised to make more programmatic efforts to build an institutional atmosphere that is supportive of improving students' ability to cope with setbacks and suffering. This will likely have substantial implications for university students' prosocial behavior post-pandemic. Finally, given the endurance of COVID-19 in low- and middle-income countries, current study findings provide guidance for improving the prosocial behavior of university students in countries with serious epidemics.

Limitations and Future Directions

There are several limitations that should be addressed in future studies. First, the study was cross-sectional. The sample size may be not comprehensive and could not include all the correlations between variables, which would increase the chance for error in measured data. Future research needs to expand the scope and number of samples. Furthermore, a longitudinal approach should also be considered to better understand the protective and buffering effects of social support. Second, participants were comprised of university students that were recruited using convenience sampling, which is considered to be a limitation of the study's generalizability. Therefore, further literature is needed to explore the moderation and mediation role of social support using various samples of participants experiencing some form of suffering. Third, this study only examined the mediation and moderation effects of social support between resilience and prosocial behavior. In the future, other personal characteristics such as age, family factors such as family social-economic status, quality of interpersonal relationships, and cultural factors could be considered to improve research in this area.

Conclusions

This study investigated the mediating and moderating role of different dimensions of social support in the relationship between resilience and prosocial behavior among Chinese university students. Study results showed that, during COVID-19 mitigation in mainland China, university students who reported higher level of resilience had high willingness to engage in prosocial behavior. Moreover, social support (subjective support, objective support, and support utilization) acted as a partial mediator in the association between resilience and prosocial behavior. In addition, to improve understanding of the interplay of social support with resilience on prosocial behavior, this study examined the potential moderating role of social support in this relationship. Results showed that support utilization, rather than subjective or objective support, could also moderate the relationship between resilience and prosocial behavior, such that the positive effect of resilience on prosocial behavior was strengthened with increasing levels of support utilization. These findings have important implications for beneficial interventions targeting the psychosocial pathway linking resilience with prosocial behavior in the post-pandemic period.

Data Sharing Statement

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

Ethics Approval and Informed Consent

This study was performed according to the Declaration of Helsinki for Medical Research involving Human Subjects. Ethics approval was obtained from the Ethics Committee of Sichuan University. The participants provided their informed consent to participate in this study.

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Disclosure

The authors report no conflicts of interest in this work.

References

1. Abbott A. COVID's mental-health toll: how scientists are tracking a surge in depression. *Nature*. 2021;590:194–195. doi:10.1038/d41586-021-00175-z
2. Huckins JF, DaSilva AW, Wang W, et al. Mental health and behavior of college students during the early phases of the COVID-19 pandemic: longitudinal smartphone and ecological momentary assessment study. *J Med Internet Re*. 2020;22:e20185. doi:10.2196/20185

3. Shanbehzadeh S, Tavahomi M, Zanjari N, Ebrahimi-Takamjani I, Amiri-Arimi S. Physical and mental health complications post-COVID-19: scoping review. *J Psychosom Res.* **2021**;147:110525. doi:10.1016/j.jpsychores.2021.110525
4. Tang W, Hu T, Hu B, et al. Prevalence and correlates of PTSD and depressive symptoms one month after the outbreak of the COVID-19 epidemic in a sample of home-quarantined Chinese university students. *J Affect Disorders.* **2020**;274:1–7. doi:10.1016/j.jad.2020.05.009
5. Zhang WR, Wang K, Yin L, et al. Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. *Psychother Psychosom.* **2020**;89:242–250. doi:10.1159/000507639
6. Zhong B, Huang Y, Liu Q. Mental health toll from the coronavirus: social media usage reveals Wuhan residents' depression and secondary trauma in the COVID-19 outbreak. *Comput Human Behav.* **2021**;114:106524. doi:10.1016/j.chb.2020.106524
7. Sun S, Lin D, Goldberg S, et al. A mindfulness-based mobile health (mHealth) intervention among psychologically distressed university students in quarantine during the COVID-19 pandemic: a randomized controlled trial. *J Couns Psychol.* **2022**;69:157–171. doi:10.1037/cou0000568
8. Ng T. The impact of culture on Chinese young people's perceptions of family responsibility in Hong Kong, China. *Intellect Discourse.* **2019**;27:131–154.
9. Zhang Y, Zhao J, Xi J, et al. The prevalence and determinant of PTSD symptoms among home-quarantined Chinese university students during the COVID-19 Pandemic. *Healthcare.* **2021**;9:1383. doi:10.3390/healthcare9101383
10. Wen FF, Zhu JL, Ye HX, et al. Associations between insecurity and stress among Chinese university students: the mediating effects of hope and self-efficacy. *J Affect Disorders.* **2021**;281:447–453. doi:10.1016/j.jad.2020.12.047
11. Noman M, Kaur A, Nafees N. Covid-19 fallout: interplay between stressors and support on academic functioning of Malaysian university students. *Child Youth Serv Rev.* **2021**;125:106001. doi:10.1016/j.childyouth.2021.106001
12. Zhou S, Wang L, Yang R, et al. Sleep problems among Chinese adolescents and young adults during the coronavirus-2019 pandemic. *Sleep Med.* **2020**;74:39–47. doi:10.1016/j.sleep.2020.06.001
13. Shukla J, Singh RM. Psychological health amidst COVID-19: a review of existing literature in the Indian Context. *Clin Epidemiol Glob Health.* **2021**;11:100736. doi:10.1016/j.cegh.2021.100736
14. Saputri RAM, Yumarni T, Yumarni T. Social media addiction and mental health among university students during the COVID-19 pandemic in Indonesia. *Int J Ment Health Addict.* **2021**;1–15. doi:10.1007/s11469-021-00582-3
15. Robertson T, Carter ED, Chou VB, et al. Early estimates of the indirect effects of the COVID-19 pandemic on maternal and child mortality in low-income and middle-income countries: a modelling study. *Lancet Glob Health.* **2020**;8:e901–e908. doi:10.1016/S2214-109X(20)30229-1
16. Walker PG, Whittaker C, Watson OJ, et al. The impact of COVID-19 and strategies for mitigation and suppression in low-and middle-income countries. *Science.* **2020**;369:413–422. doi:10.1126/science.abc0035
17. Vollhardt JR. Altruism born of suffering and prosocial behavior following adverse life events: a review and conceptualization. *Soc Justice Res.* **2009**;22:53–97. doi:10.1007/s11211-009-0088-1
18. Penner LA, Dovidio JF, Piliavin JA, Schroeder DA. Prosocial behavior: multilevel perspectives. *Annu Rev Psychol.* **2005**;56:365–392. doi:10.1146/annurev.psych.56.091103.070141
19. Wayment HA. It could have been me: vicarious victims and disaster-focused distress. *Pers Soc Psychol Bull.* **2004**;30:515–528. doi:10.1177/0146167203261892
20. Liu A, Wang W, Wu X. Self-compassion and posttraumatic growth mediate the relations between social support, prosocial behavior, and antisocial behavior among adolescents after the Ya' an earthquake. *Eur J Psychotraumatol.* **2021**;12(1):1864949. doi:10.1080/2008198.2020.1864949
21. Hu J, He W, Zhou K. The mind, the heart, and the leader in times of crisis: how and when COVID-19-triggered mortality salience relates to state anxiety, job engagement, and prosocial behavior. *J Appl Psychol.* **2020**;105:1218–1233. doi:10.1037/apl0000620
22. Varma MM, Chen D, Lin X, Aknin LB, Hu X. Prosocial behavior promotes positive emotion during the COVID-19 pandemic. *Emotion.* **2022**. doi:10.1037/emo0001077
23. Li J, Yao M, Liu H. From social support to adolescents' subjective well-being: the mediating role of emotion regulation and prosocial behavior and gender difference. *Child Indic Res.* **2021**;14(1):77–93. doi:10.1007/s12187-020-09755-3
24. Block J, Kremen AM. IQ and ego-resiliency: conceptual and empirical connections and separateness. *J Pers Soc Psychol.* **1996**;70:349–361. doi:10.1037/0022-3514.70.2.349
25. Yildirim M, Arslan G. Exploring the associations between resilience, dispositional hope, preventive behaviours, subjective well-being, and psychological health among adults during early stage of COVID-19. *Curr Psychol.* **2020**. doi:10.1007/s12144-020-01177-2
26. Chen S, Bonanno GA. Psychological adjustment during the global outbreak of COVID-19: a resilience perspective. *Psychol Trauma.* **2020**;12:S51–S44. doi:10.1037/tra0000685
27. Hu J, Ye B, Yildirim M, Yang Q. Perceived stress and life satisfaction during COVID-19 pandemic: the mediating role of social adaptation and the moderating role of emotional resilience. *Psychol Health Med.* **2022**;1–7. doi:10.1080/13548506.2022.2038385
28. Staub E, Vollhardt J. Altruism born of suffering: the roots of caring and helping after victimization and other trauma. *Am J Orthopsychiatry.* **2008**;78:267–280. doi:10.1037/a0014223
29. Fletcher D, Sarkar M. Psychological resilience: a review and critique of definitions, concepts, and theory. *Eur Psychol.* **2013**;18:12–23. doi:10.1027/1016-9040/a000124
30. Haroz EE, Murray LK, Bolton P, Betancourt T, Bass JK. Adolescent resilience in Northern Uganda: the role of social support and prosocial behavior in reducing mental health problems. *J Res Adolesc.* **2013**;23:138–148. doi:10.1111/j.1532-7795.2012.00802.x
31. Carelli E, Lizzori A, Zanetti MA. Resilience and prosocial behavior in Italian schools. *Resilience Sch.* **2020**;2020:127–140.
32. You S, Lee J, Lee Y. Relationships between gratitude, social support, and prosocial and problem behaviors. *Curr Psychol.* **2020**;1–8. doi:10.1007/s12144-020-00775-4
33. Cohen S. Social relationships and health. *Am Psychol.* **2004**;59:676–684. doi:10.1037/0003-066X.59.8.676
34. Mauer VA, Littleton H, Lim S, Sall KE, Siller L, Edwards KM. Fear of COVID-19, anxiety, and social support among college students. *J Am Coll Health.* **2022**;1–8. doi:10.1080/07448481.2022.2053689
35. Arslan G. Social exclusion, social support and psychological wellbeing at school: a study of mediation and moderation effect. *Child Indic Res.* **2017**;11:897–918. doi:10.1007/s12187-017-9451-1
36. Hobfoll SE, Freedy J, Lane C, Geller P. Conservation of social resources: social support resource theory. *J Soc Pers Relat.* **1990**;7:465–478. doi:10.1177/0265407590074004

37. Schweitzer R, Melville F, Steel Z, Lacherez P. Trauma, post-migration living difficulties, and social support as predictors of psychological adjustment in resettled Sudanese refugees. *Aust N Z J Psychiatry*. 2006;40:179–187. doi:10.1111/j.1440-1614.2006.01766.x
38. Kristofferson K, White K, Peloza J. The nature of slacktivism: how the social observability of an initial act of token support affects subsequent prosocial action. *J Consum Res*. 2014;40:1149–1166. doi:10.1086/674137
39. Pietrzak RH, Johnson DC, Goldstein MB, et al. Psychosocial buffers of traumatic stress, depressive symptoms, and psychosocial difficulties in veterans of Operations Enduring Freedom and Iraqi Freedom: the role of resilience, unit support, and post deployment social support. *J Affect Disorders*. 2010;120:188–192. doi:10.1016/j.jad.2009.04.015
40. Sippel LM, Pietrzak RH, Charney DS, Mayes LC, Southwick SM. How does social support enhance resilience in the trauma-exposed individual? *Ecol Soc*. 2015;20:10. doi:10.5751/ES-07832-200410
41. Ye Z, Yang X, Zeng C, et al. Resilience, social support, and coping as mediators between COVID-19-related stressful experiences and acute stress disorder among college students in China. *Appl Psychol Health Well Being*. 2020;12:1074–1094. doi:10.1111/aphw.12211
42. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Psychol Bull*. 1985;98:310–357. doi:10.1037/0033-2909.98.2.310
43. Aktar R, Sugiura Y, Hiraishi K. Associations between acceptance-rejection and adolescents' prosocial behavior in Japan: the mediating role of sense of authenticity. *Child Adolesc Social Work J*. 2021. doi:10.1007/s10560-021-00779-4
44. Gaffey AE, Bergeman CS, Clark LA, Wirth MM. Aging and the HPA axis: stress and resilience in older adults. *Neurosci Biobehav Rev*. 2016;68:928–945. doi:10.1016/j.neubiorev.2016.05.036
45. Li F, Luo S, Mu W, et al. Effects of sources of social support and resilience on the mental health of different age groups during the COVID-19 pandemic. *BMC Psychiatry*. 2021;21:1–14. doi:10.1186/s12888-020-03012-1
46. Portnoy GA, Relyea MR, Decker S, et al. Understanding gender differences in resilience among veterans: trauma history and social ecology. *J Trauma Stress*. 2018;31(6):845–855. doi:10.1002/jts.22341
47. Peyer KL, Hathaway ED, Doyle K. Gender differences in stress, resilience, and physical activity during the COVID-19 pandemic. *J Am Coll Health*. 2022;1–8. doi:10.1080/07448481.2022.2052075
48. Isaacs K, Mota NP, Tsai J, et al. Psychological resilience in US military veterans: a 2-year, nationally representative prospective cohort study. *J Psychosom Res*. 2017;84:301–309. doi:10.1016/j.jpsychires.2016.10.017
49. Van der Graaff J, Carlo G, Crocetti E, Koot HM, Branje S. Prosocial behavior in adolescence: gender differences in development and links with empathy. *J Youth Adolesc*. 2018;47(5):1086–1099. doi:10.1007/s10964-017-0786-1
50. Xiao SX, Hashi EC, Korous KM, Eisenberg N. Gender differences across multiple types of prosocial behavior in adolescence: a meta-analysis of the prosocial tendency measure-revised (PTM-R). *J Adolesc*. 2019;77:41–58. doi:10.1016/j.adolescence.2019.09.003
51. Barry CT, Lui JH, Anderson AC. Adolescent narcissism, aggression, and prosocial behavior: the relevance of socially desirable responding. *J Pers Assess*. 2017;99(1):46–55. doi:10.1080/00223891.2016.1193812
52. Eagly A. The his and hers of prosocial behavior: an examination of the social psychology of gender. *Am Psychol*. 2009;64(8):644–658. doi:10.1037/0003-066X.64.8.644
53. Carreras M, Vera S, Visconti G. Who does the caring? Gender disparities in COVID-19 attitudes and behaviors. *Politics Gend*. 2022;1–29. doi:10.1017/S1743923X21000386
54. Zhang X, Huang P, Li B, Xu W, Li W, Zhou B. The influence of interpersonal relationships on school adaptation among Chinese university students during COVID-19 control period: multiple mediating roles of social support and resilience. *J Affect Disord*. 2021;285:97–104. doi:10.1016/j.jad.2021.02.040
55. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007;39(2):175–191. doi:10.3758/BF03193146
56. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behav Res Methods*. 2009;41:1149–1160. doi:10.3758/BRM.41.4.1149
57. Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson resilience scale (CD-RISC). *Depress Anxiety*. 2003;18:76–82. doi:10.1002/da.10113
58. Carlo G, Randall BA. The development of a measure of prosocial behaviors for late adolescents. *J Youth Adolesc*. 2002;31:31–44. doi:10.1023/A:1014033032440
59. Ye Y, Dai X. Development of social support scale for university students. *Chin J Clin Psychol*. 2008;16:456–458.
60. Wang W, Sun J, Sun C, et al. Impact of COVID-19 on career outcome expectations of medical undergraduates in a university in Jilin Province. *Med Soc*. 2020;33(5):31–35. doi:10.13723/j.yxysh.2020.05.007
61. Hayes AF. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. Guilford publications; 2017.
62. Hayes AF, Montoya AK, Rockwood NJ. The analysis of mechanisms and their contingencies: PROCESS versus structural equation modeling. *Australas Mark J*. 2013;25(1):76–81. doi:10.1016/j.ausmj.2017.02.001
63. Hair JF, Black WC, Anderson RE, Babin BJ. *Multivariate Data Analysis*. 8th ed. London: Cengage Learning EMEA; 2018.
64. Raposa EB, Laws HB, Ansell EB. Prosocial behavior mitigates the negative effects of stress in everyday life. *Clin Psychol Sci*. 2016;4(4):691–698. doi:10.1177/2167702615611073
65. Zhou Z, Qu Y, Li X. Parental collectivism goals and Chinese adolescents' prosocial behaviors: the mediating role of authoritative parenting. *J Youth Adolesc*. 2022;51(4):766–779. doi:10.1007/s10964-022-01579-4
66. Wilks SE, Croom B. Perceived stress and resilience in Alzheimer's disease caregivers: testing moderation and mediation models of social support. *Aging Ment Health*. 2018;12:357–365. doi:10.1080/13607860801933323
67. Holt MK, Espelage DL. Social support as a moderator between dating violence victimization and depression/anxiety among African American and Caucasian adolescents. *School Psych Rev*. 2005;34:309–328. doi:10.1080/02796015.2005.12086289

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