


# Mediating effect of social support on the association between life events and depression

## A cross-sectional study of adolescents in Chongqing China

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### Abstract

Depression is one of the most common mental health problems in adolescents. The link between negative life events and depression has been well established. However, our understanding about the role of social support in the link, which is likely culture-dependent, is quite limited. This study aimed to determine the mediating effect of social support on the association between life events and depression in adolescents in Chongqing China.

A total of 1512 adolescents aged 12 to 17 years old in Chongqing of China were selected using a stratified cluster sampling strategy. Depression symptoms, negative life events, and perceived social support of the participants were measured using the Children's Depression Inventory, Adolescent Life Event Scale, and Child and Adolescent Social Support Scale, respectively. Pearson correlation analyses were performed to detect their associations. A multivariate linear regression model was established to determine the association between life events and depression after adjustment for variations in socio-demographic variables. The mediating effect of social support on the association between negative life events and depression was tested using the structural equation model.

About 16.8% of the participants were detected with depression. Depression was associated with negative life events and low levels of social support ( $P < .05$ ). Both frequency and perceived importance of social support showed a mediating effect on the association between life events and depression.

Social support has a mediating effect on the association between life events and depression. Strengthening social support may be considered as an effective interventional strategy on depression in adolescents.

**Abbreviations:** ASLEC = adolescent life event scale, CASSS = child and adolescent social support scale, CDI = children's depression inventory.

**Keywords:** depression, life events, mediator, social support

### 1. Introduction

China has the largest population in the world. Adolescents aged 10 to 19 years old account for just over 10% of the total

population in China.<sup>[1]</sup> Their health will determine the social and economic future of China. Psychological problems, especially depression, in adolescents became a serious public health issue in China.<sup>[2]</sup> According to a meta-analysis, the prevalence of depression in children and adolescents in China ranges from 4% to 41%, with 19.85% (95% confidence interval: 14.75%–24.96%) suffering from depressive symptoms.<sup>[3]</sup> Such psychological problems can seriously jeopardize the growth and development of children and adolescents, leading to poor academic performance, alcoholism, smoking, and even suicidal ideation and behaviors.<sup>[4]</sup> Depression symptoms are closely related to personality disorders,<sup>[5]</sup> loneliness,<sup>[6]</sup> anxiety,<sup>[7]</sup> cognitive dysfunction,<sup>[8]</sup> social disorders,<sup>[9]</sup> low self-esteem,<sup>[10]</sup> and sleep problems.<sup>[11]</sup>

Mental health problems such as depression in children and adolescents have attracted increasing attention from the Chinese government. Despite some progress, however, the government interventional policies have yet to achieve their full potential.<sup>[12]</sup> Empirical evidence shows that early detection and intervention on depressive symptoms of adolescents can help improve their mental health. The development of effective interventional strategies requires careful consideration of a wide range of factors associated with the development of depressive symptoms, such as gender,<sup>[13]</sup> age,<sup>[14]</sup> gene,<sup>[15]</sup> family, and education environments.<sup>[15,16]</sup>

Negative life events,<sup>[17]</sup> such as interpersonal strain and excessive pressure of study, are associated with the prevalence and severity of depression in Chinese adolescents.<sup>[18,19]</sup> Accord-

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ing to the diathesis-stress model,<sup>[20]</sup> negative life events, as external stimuli, can make susceptible people more prone to depression through some physical diatheses (such as genetic predispositions) or psychological diatheses (such as personality characteristics). It is believed that negative life events can also affect depressive symptoms indirectly through influencing other relevant factors.<sup>[21]</sup>

Although negative life events put individuals under pressure, the exposed individuals will not necessarily develop a depressive disorder. The mediators and moderators in the development process of depression have been the focus of recent studies.<sup>[22]</sup> Social support is likely to be a potential protecting factor on the development of depression,<sup>[23]</sup> reducing the impacts of negative life events.<sup>[24]</sup> Theoretically, social support can help adolescents cope with pressure in life and alleviate the depressive symptoms.<sup>[25]</sup> However, our understanding on the role of social support in the link between negative life events and depression is quite limited. Social support can be portrayed as emotional, informational, appraisal or instrumental assistance. It may come from a wide range of sources. In a recent systematic review, Gariépy and colleagues argued that the measurement heterogeneity of social support has left a big knowledge gap.<sup>[23]</sup> Adding to the complexity is the cultural dependency of the effect of social support. Certain sources of social support such as those coming from the charity bodies may be highly appreciated in some cultures, but not so much in other cultures due to stigmatization.<sup>[26]</sup> Even within a culture, individuals may adopt different strategies to cope with stressful life events. Therefore, a particular type and source of social support may not always be beneficial to everybody.<sup>[27]</sup> Previous research has also demonstrated varying roles of social support across life periods.<sup>[23]</sup>

This study aimed to fill the gap in the literature by exploring the mediating effect of social support on the association between life events and depression symptoms in middle school students in Chongqing of China. Most of the past studies were conducted in the western nations.<sup>[23]</sup> Findings of these studies are neither conclusive nor consistent, let alone to be extrapolable to the Chinese context. There is a dearth in the literature studying the mediating effect of social support on the association between life events and depression in Chinese adolescents. The study can add some new evidence and insights into the role of social support on mental health of adolescents, in particular under the Chinese cultural context.

## 2. Methods

A cross-sectional questionnaire survey of middle school students was conducted in Chongqing, 1 of the 4 municipalities directly overseen by the central government. Chongqing is located in the under-developed western region in China, with a population over 30 million. At the end of 2018, there were 1122 secondary schools (1,653,294 students) in Chongqing, including 866 junior middle schools (1,045,616 students) and 256 senior high schools (607,678 students).<sup>[28]</sup>

### 2.1. Sampling of study participants

A randomized cluster sampling strategy was adopted in selecting study participants. Chongqing consists of 9 administrative districts. One middle school from each district was randomly selected. From each participating school, 1 to 3 classes were selected to ensure a minimal of 200 participants from each

school. Eligible participants were aged between 10 and 19 years older.

### 2.2. Data collection

The study was performed in accordance with the institutional guidelines of the ethical standards of the World Medical Association's Helsinki Declaration and approved by Sichuan University. Permission from each participating school was granted. Informed consent was obtained from each participant before the survey with the help of the class teachers after detailed explanation of the research purpose and study protocol. The eligible participants were invited to self-complete the questionnaire in the class, which took less than 40 minutes. Return of the questionnaires was completely anonymous and voluntary. A total of 1800 questionnaires were distributed and 1512 were completed without missing data and used for data analyses.

### 2.3. Measurements

Depression symptoms of the participants were measured by the Children's Depression Inventory (CDI).<sup>[29]</sup> The CDI is the most widely-used self-rating scale for children's depression, which was adapted by Kovacs based on the Beck's Depression Inventory for adults. The Chinese version of CDI has demonstrated high reliability and validity, with a Cronbach  $\alpha$  coefficient of 0.88 and an intra-class correlation coefficient of 0.89 in repeated tests.<sup>[30,31]</sup> The CDI contains 27 items, each being measured on a 3-point scale (scored from 0 to 2). The respondents were asked about their "thoughts and feelings in the past week" in relation to each item (such as anhedonia, negative emotion, low self-esteem, ineffectiveness, and interpersonal problems). A higher score indicates a more serious depression symptom. The score of each item was summed up, generating a total score ranging from 0 to 54. A score of higher than 20 was deemed as depression.<sup>[32]</sup>

Negative life events were measured by the Adolescent Life Event Scale (ASLEC) developed by Liu et al.<sup>[33]</sup> The ASLEC has been widely used in China,<sup>[34,35]</sup> with a Cronbach coefficient of 0.85 and confirmed high validity.<sup>[33]</sup> The ASLEC contains 27 items measuring life events over 1 year that may cause psychophysiological reactions in adolescents, which include interpersonal relation, learning pressure, punishment, bereavement, health and adaptation, and others. Each item was rated on a 5-point Likert scale (0–5) for its perceived importance. A higher score indicates higher perceived importance, while 0 indicates absence of the event. A summed score on life events (ranging from 0 to 135) and the 6 subscales regarding interpersonal relation (ranging from 0 to 25), learning pressure (ranging from 0 to 25), punishment (ranging from 0 to 35), bereavement (ranging from 0 to 15), health and adaptation (ranging from 0 to 20), and others (ranging from 0 to 15), respectively, was calculated.

Social support was measured by the Child and Adolescent Social Support Scale (CASSS) developed by Malecki et al.<sup>[36]</sup> The CASSS has been validated in China, with a test-retest reliability coefficient of 0.83 and internal consistency of 0.96.<sup>[37,38]</sup> It measures 4 types of perceived support (emotional, informational, appraisal, and instrumental) derived from 5 different sources (teachers, parents, classmates, close friends, and schools). Recruited individuals were asked to report how frequently they gained support from these sources and to rate their relative importance. The CASSS contains 60 items, each being rated on a

6-point scale for frequency (ranging from 1 = never to 6 = always) and a 3-point scale for perceived importance (ranging from 1 = “not important” to 3 = “very important”). A summed score for frequency (60–360) and perceived importance (60–180) was calculated, respectively.

#### 2.4. Statistical analysis

The statistical analyses were performed using SPSS17.0 and AMOS17.0, with  $P < .05$  being considered statistically significant.

Means and standard deviations of the CDI, ASLEC, and CASSS scores were presented. Their correlations were tested with Pearson correlation analyses. A multivariate linear regression model was established to determine the association of life events with depression after adjustment for variations in socio-demographic characteristics of the respondents. The mediating effect of social support on the association between life events and depression was tested through structural equation modeling. The maximum likelihood method was used for parameter estimation of the covariance matrix. The fitness of data into the structural equation model was assessed using the following indexes: Chi-square to degrees-of-freedom ratio ( $\chi^2/df \leq 3$ ), root mean square error of approximation ( $\leq 0.08$ ), goodness-of-fit index ( $\geq 0.90$ ), adjusted GFI ( $\geq 0.90$ ), comparative fit index ( $\geq 0.90$ ), normed fit index ( $\geq 0.90$ ) and Tucker–Lewis index ( $\geq 0.90$ ).<sup>[39]</sup>

### 3. Results

#### 3.1. Characteristics of respondents

The respondents had an average age of 15.1 years (ranging from 12 to 17 years). Less than half (46.2%) were male. Han was the major ethnicity, compared with 18.7% of other ethnicities. About 63.3% of the respondents came from urban areas. The majority (84.1%) lived with married parents, while 15.9% lived with a divorced parent. Most respondents (61.4%) did not have a sibling and 64.0% attended a boarding school.

#### 3.2. Prevalence of depression symptoms

The respondents had an average CDI score of 13.86 (standard deviations = 7.20) and 16.8% were considered with depression. The CDI score was moderately correlated with life events ( $r = 0.35$ ) and the frequency of social support ( $r = -0.35$ ), but weakly correlated with the perceived importance of social support ( $r = -0.06$ ) (Table 1).

#### 3.3. Factors associated with depression symptoms – findings from multivariate linear regression analysis

Life events were significant predictors of depression symptom scores after adjustment for variations in socio-demographic

variables ( $P < .001$ ) (Table 2). More than 20% of the variations in depression symptoms were explained by life events. Multivariate linear regression analysis indicated that ethnicity was significantly associated with depression symptoms in 3 models ( $P < .001$ ), while other socio-demographic variations were not significant predictors of depression symptoms in model 2 and model 3.

#### 3.4. Mediating effect of social support on the association between life events and depression symptoms

Good fitness of data into the proposed structural equation model was evident as demonstrated by the indexes after adjustment of residue error (Table 3).

The structural equation model (Fig. 1) further confirmed the association between life events and depression symptoms, with a standardized path coefficient of 0.35 ( $P < .001$ ). Negative life events were positively correlated with the perceived importance of social support ( $b = 0.15$ ,  $P < .001$ ), but negatively correlated with the frequency of social support ( $b = -0.10$ ,  $P < .001$ ). Higher perceived importance of social support was correlated with higher levels of depression symptoms ( $b = 0.08$ ,  $P < .001$ ). Whereas, higher frequency of social support was correlated with lower levels of depression symptoms ( $b = -0.41$ ,  $P < .001$ ). Both frequency and perceived importance of social support had a significant mediating effect on the association between life events and depression symptoms: perceived importance of social support contributed 3.31% of the total effect, compared with 10.49% contributions from the frequency of social support.

### 4. Discussion

Depression is one of the most common mental health problems of adolescents. This study revealed that 18.6% of adolescents in Chongqing had depression according to the CDI scores, which sits in the middle range of findings reported in previous studies.<sup>[40,41]</sup> Despite variations in reported prevalence of depression in adolescents in China, there is a consensus that depression is highly prevalent in Chinese adolescents.<sup>[42]</sup> The variations in study design, such as age, gender, and health of study participants and their family and social environments can explain much of the difference in research findings. Researchers have called for enhanced measures for early detection and intervention of depressive symptoms in adolescents.<sup>[18]</sup> Multivariate linear regression analysis indicated that ethnicity was significantly associated with depression, which is consistent with previous study.<sup>[43]</sup> There was no significant correlation between depression and age, gender, urban residency, parental married status. This requires a better understanding of the socio-demographic determinants of depression in adolescents.

**Table 1**

**Correlations between depression symptoms, social support and life events.**

	Mean $\pm$ SD	Pearson correlation coefficient			
		Depression	Frequency of social support	Importance of social support	Life events
Depression symptoms	13.86 $\pm$ 7.20	–			
Frequency of social support	197.02 $\pm$ 36.07	–0.35*	–		
Importance of social support	125.77 $\pm$ 21.92	–0.06**	0.52**	–	
Life events	37.35 $\pm$ 22.01	0.35**	–0.10**	–0.14**	–

\*\*  $P < .01$ .

**Table 2**  
**Factors associated with depression symptoms – findings from multivariate regression analysis.**

	<i>B</i>	<i>b</i>	<i>t</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>
Model 1				0.02	0.02	4.34
Age (yr)	0.05	0.01	0.37			
Sex	−0.54	−0.04	−1.44			
Ethnicity	−1.94	−0.10	−3.57***			
Urban residency	0.80	0.05	1.94			
married status of parents	0.77	0.04	1.52			
Having no sibling	0.80	0.05	2.02*			
Boarding school	−0.88	−0.06	−2.05*			
Model 2 (adding life events variable to Model 1)				0.15	0.14	32.18
Age (yr)	0.23	0.05	1.90			
Sex	−0.61	−0.04	−1.76			
Ethnicity	−2.89	−0.15	−5.66***			
Urban residency	0.18	0.01	0.46			
married status of parents	0.26	0.01	0.56			
Having no sibling	0.38	0.03	1.02			
Boarding school	−0.47	−0.03	−1.18			
Total score of life events	0.12	0.37	14.92***			
Model 3 (adding subscales of life events to model 1)				0.21	0.20	29.77
Age (yr)	0.13	0.03	1.06			
Sex	−0.27	−0.02	−0.79			
Ethnicity	−3.09	−0.17	−5.91***			
Urban residency	0.30	0.02	0.81			
married status of parents	0.32	0.02	0.69			
Having no sibling	0.18	0.01	0.51			
Boarding school	−0.42	−0.03	−1.09			
Interpersonal relationship	0.39	0.28	8.95***			
Study pressure	0.27	0.16	4.93***			
Punishment	−0.09	−0.09	−2.35*			
Bereavement	−0.20	−0.10	−3.47**			
Health and adaptation	0.15	0.07	2.17*			
Other life events	0.36	0.15	4.82***			

\*\*\**P* < .001, \*\**P* < .01, \**P* < .05.

Negative life events were found to be associated with depression symptoms in adolescents in this study, which is consistent with studies conducted in other populations.<sup>[44]</sup> Adolescents are highly susceptible to various health risks as they experience dramatic physical, psychological, and social changes.<sup>[45]</sup> Arguably, they also start to confront some of the most challenging and unique life events, which can often shape their entire life and career. Similar to findings of other studies,<sup>[46]</sup> this study confirmed that negative life events regarding interpersonal relation and learning pressure are associated with

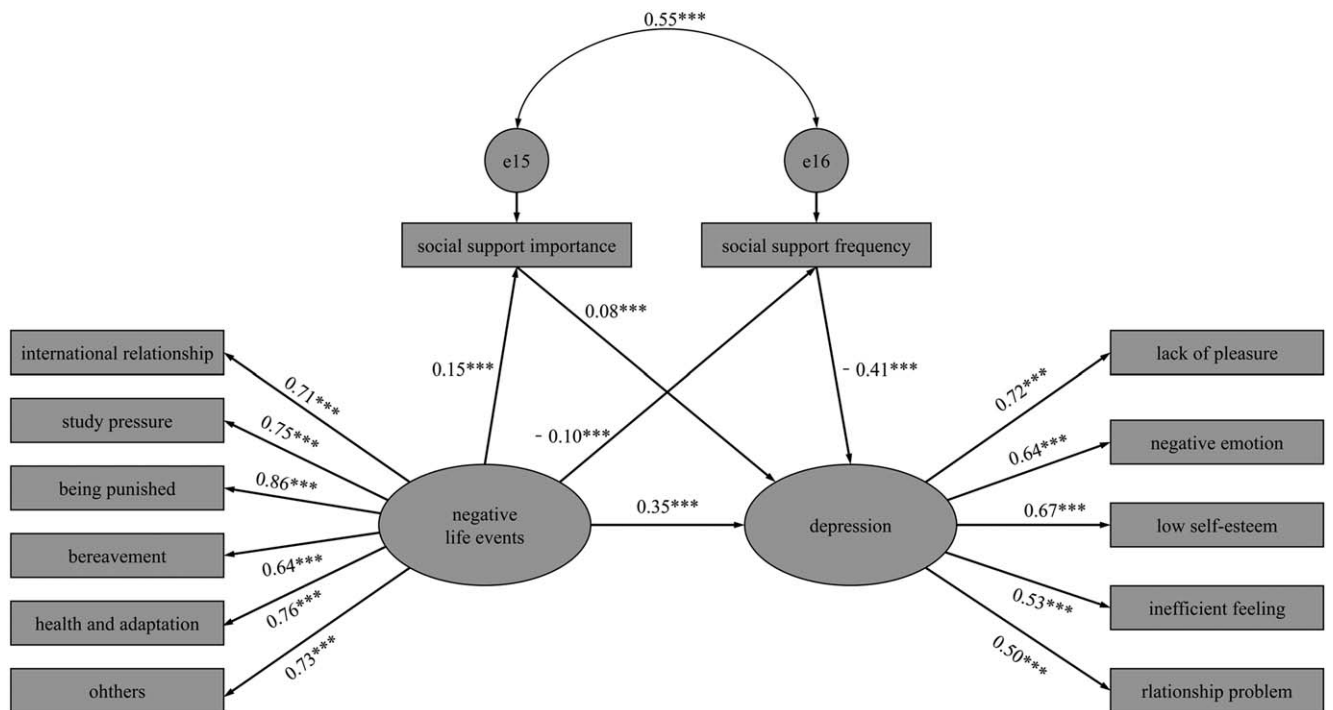
depression symptoms in adolescents. The cultural pressure for educational excellence imposed on adolescents is worthy of increasing attention. Both parents and school teachers put high study pressures on adolescents to fulfill their own cultural obligations. Due to the scarcity of quality educational resources in China, selected schooling has attracted fierce competition. Adolescents are subject to high and often unrealistic expectations in almost all aspects of their life whether at home, school or community. Punishment is deemed culturally appropriate if they fail to meet these expectations.<sup>[47]</sup> It is too difficult for an adolescent who is still mentally immature to handle and adapt to the various pressures. Empirical evidence shows that students with academically poor performance are more prone to depression.<sup>[31,48]</sup> Often, interpersonal relationship problems arise as a result of the pressures, which can even lead to rebellion. A stressful relationship with parents, teachers, and classmates can eventually result in depression in adolescents.<sup>[49]</sup>

The pressure experienced by adolescents in China shows little sign, if any, of abating. However, social support may help alleviate some of the impacts of negative life events. This study shows that the adolescents who experienced higher levels of negative life events rated higher in the importance of social support. Meanwhile, more frequent social support was associated with lower levels of negative life events. Although no causal inference can be drawn from this study, it is likely that negative life events are more likely to occur when social support is

**Table 3**  
**Fitness of data into the structural equation model.**

Model fitness index	Before adjustment of residual error	After adjustment of residual error
CMIN/DF	16.92	6.47
GFI	0.91	0.97
AGFI	0.87	0.94
CFI	0.86	0.96
NFI	0.85	0.95
TLI	0.82	0.94
RMSEA	0.10	0.06

AGFI = adjusted goodness-of-fit index, CFI = comparative fit index, CMIN/DF = Chi-square to degrees-of-freedom ratio, GFI = goodness-of-fit index, NFI = normed fit index, RMSEA = root mean square error of approximation, TLI = Tucker–Lewis index.



**Figure 1.** Structural equation model—mediating effect of social support on the association between negative life events and depression symptoms. The number on lines or arrows is standardized path coefficient. Arrows indicate the interaction between the variables. The symbol “\*\*\*” indicate  $P < .001$ .

weak.<sup>[50]</sup> Previous studies showed that an absence of social support can trigger depression.<sup>[51]</sup> Whereas, strong social support can prevent the progression of distress into mental disorders and abate depressive symptoms.<sup>[52–54]</sup>

High-quality social interaction can ease depression.<sup>[55]</sup> Indeed, this study showed that social support is associated with less serious depression symptoms. Social support has been proved to be beneficial in mitigating the risk of depression associated with stressful life events.<sup>[56]</sup> Social support may alleviate the effect of negative life events on depression through a moderating effect.<sup>[57]</sup> Social support also has a mediating effect on the association between life events and depression symptoms. The effect of social support on depression depends on its frequency and perceived importance. It is important to note that these 2 measures evaluate different constructs of social support.<sup>[58]</sup> The frequency of social support reflects the actual support obtained by an individual, which is negatively associated with depression symptoms. By contrast, perceived importance of social support reflects the subjective need of an individual for social support, which is positively associated with depression symptoms. It is likely that the adolescents with more severe symptoms in China may hold a higher expectation on social support, which calls for a more individualized approach to interventions. Theoretically, individuals can better cope with pressure with the buffer effect of social support, thereby reducing the impact of negative life events on mental health.<sup>[59]</sup>

Findings of this study have some policy implications. There is an urgent need for a change of policy in order to promote mental health among Chinese adolescents. Although there is no doubt that social support should be strengthened,<sup>[60,61]</sup> careful considerations about the appropriateness of various types and sources of support need to be taken.<sup>[62,63]</sup> Priorities should be

given to those who desire stronger social support but have limited access to it. Educational strategies alone may not necessarily be effective given that the negative life events experienced by the adolescents are unlikely to be totally avoidable. Targeted social support would likely alleviate the impact of negative life events on the mental health of adolescents, especially focusing on those who desire social support but have limited access to it.

This study has several strengths and limitations. Unlike previous studies, this study decomposed the construct of social support into 2 distinctive components: frequency and perceived importance, and explored the mediating effect of social support on the association between life events and depression in Chinese adolescents. However, the cross-sectional design of this study prevents us from drawing causal conclusions. The study was conducted in Chongqing of China and the findings of this study is very culture specific. Any attempts to generalize the findings to other populations, especially those with different cultural characteristics, should be cautious. Data collected in this study are also subject to measurement bias. For example, depression was measured using a questionnaire without clinical confirmation. In addition, these measurements have never been “static”. Future studies are needed to overcome these limitations. The modern information technology may offer an opportunity to explore the dynamic relationships between life events, social support, and depression.<sup>[64]</sup>

## 5. Conclusion

This study revealed that negative life events are associated with depressive symptoms in adolescents in Chongqing, China. The frequency and perceived importance of social support have a mediating effect on the association between life events and

depression. Strengthening social support may be considered as an effective interventional strategy for depression in adolescents. The priority should be given to those who desire stronger social support but have limited access to it. Further studies are needed to determine the causal and dynamic relationship between social support and depression.

### Author contributions

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**Writing – original draft:** Liang Liu.

**Writing – review & editing:** Liang Liu, Caojie Liu.

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