



Exploring the relationship between mental health literacy and psychological distress in adolescents: A moderated mediation model

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ABSTRACT

Previous studies on the relationship between mental health literacy and psychological distress were rich, but little was known about the influence mechanism between them, and almost no research was found on the role of psychological resilience and subjective socio-economic status in the relationship between them. This study used a moderated mediation model to test the mediating effect of psychological resilience on the relationship between mental health literacy and psychological distress, and the moderating effect of subjective socioeconomic status in Chinese adolescents. We investigated 700 junior high school students in Inner Mongolia, China through online survey. The results are as follows: (1) Mental health literacy is a negative predictor of adolescents' psychological distress; (2) psychological resilience mediated the association between mental health literacy and psychological distress; (3) The first half of the model, that is, the relationship between mental health literacy and psychological resilience, is moderated by subjective socioeconomic status. Specifically, for adolescents with low subjective socioeconomic status, the positive predictive effect of mental health literacy on psychological resilience is obviously enhanced. The current findings would contribute to a deep understanding of the relationship among adolescents' mental health literacy, psychological resilience, subjective socioeconomic status and psychological distress, which may be of great significance to the prevention of adolescents' psychological distress.

1. Introduction

In recent years, adolescent mental health has become an urgent problem in the global public health field, which has aroused widespread concern of the public and professionals. A lot of evidence shows that the mental health of adolescents is deteriorating year by year, including anxiety, depression, psychological stress and suicide (Keyes et al., 2019; Twenge et al., 2019). During the epidemic in COVID-19, with the implementation of isolation measures, the lack of outdoor sports, the reduction of interpersonal communication and the excessive use of the Internet, adolescents experienced a higher proportion of anxiety, depression and stress than before the epidemic (Jones et al., 2021; Magson et al., 2021). Psychological distress is an uncomfortable state of negative emotions such as anxiety and depression (Gebremedhin et al., 2020). Studies have shown that psychological distress is a risk factor for

adolescents' academic achievement, interpersonal relationships, self-injury and suicidal ideation (Hashim et al., 2012; Ibrahim et al., 2014; Kenny et al., 2013; McNicol and Thorsteinsson, 2017; You et al., 2012). Therefore, it is very necessary to explore the influencing mechanism of adolescents' psychological distress, which will help us find effective ways to intervene adolescents' psychological distress.

Mental health literacy refers to the knowledge and beliefs that help to identify, manage or prevent mental illness (Jorm, 2000). The level of mental health literacy is closely related to the mental health outcomes (Gorczynski et al., 2017; Lam, 2014; Riiser et al., 2020). Some studies have shown that mental health literacy is positively correlated with mental health level, positively correlated with happiness, and negatively correlated with psychological distress (Moss et al., 2021; Pehlivan et al., 2021). A randomized controlled experimental study found that improving mental health literacy is an effective measure to enhance

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mental health (Lam et al., 2019). As an economic and effective public health measure, improving the level of mental health literacy has been widely used in many countries to prevent and alleviate all kinds of psychological distress (Kelly et al., 2007a). Wang Yangming, an ancient philosopher in China, argued that knowledge is the beginning of action, and action is the result of knowledge, and the two are unified and inseparable (Dong, 2013; Lederman, 2022). Both this thought of the unity of knowledge and action and the western cognitive behavior theory emphasize the positive effect of the change of cognitive concept on human behavior. However, there is a long way to go from knowing to doing. Improving mental health literacy can be achieved in a short time through education, but it is a complicated and long-term process to be able to use the learned mental health concepts and methods to produce good mental health outcomes. Therefore, it is necessary to explore the psychological mechanism that mental health literacy affects psychological distress.

Psychological resilience is a trait or ability of an individual to adapt or even grow from adversity (Werner, 1995). On the one hand, the level of mental health literacy is a predictor of psychological resilience (Sun et al., 2021). A potential category analysis of 10,583 college students found that the level of mental health literacy will lead to differences in psychological resilience, and those college students with high mental health literacy have stronger psychological resilience (Jia et al., 2021). On the other hand, individuals with strong psychological resilience level have stronger mental health and less psychological distress (Ahmed and Julius, 2015; Ávila et al., 2018; Bacchi and Licinio, 2017; Lenzo et al., 2020; Samani et al., 2007). Similar results have been found among adolescents (Hjemdal et al., 2011; Khalid and Aslam, 2012). Another four-year cross-lag study found that psychological resilience can predict the mental health of college students in China within one year (Wu et al., 2020). Therefore, we speculate that psychological resilience plays an intermediary role between mental health literacy and psychological distress.

As a cognitive factor, the influence of mental health literacy on psychological resilience is probably regulated by the individual's subjective socioeconomic status. The research shows that compared with age, gender, urban and rural residents' status and other factors, socioeconomic status has a stronger explanatory power on mental health literacy (Holman, 2015; Jiang et al., 2021). Socioeconomic status mainly includes Subjective socioeconomic status and objective socioeconomic status, of which Subjective socioeconomic status has a greater impact on individuals (Kraus et al., 2009). Subjective socioeconomic status refers to an individual's subjective overall perception of his social class, which reflects not only socioeconomic status but also personality, appearance, academic performance, peer relationship and interpersonal characteristics (Sweeting et al., 2011). Compared with individuals with low subjective socioeconomic status, individuals with high subjective socioeconomic status have higher mental health literacy level (Huang, 2019). As one of the protective factors of mental health, it is not known whether mental health literacy has different influences on psychological resilience due to different subjective socioeconomic status. It is worth noting that previous studies have found that subjective socioeconomic status is also a predictor of psychological resilience, and individuals with high Subjective socioeconomic status have stronger psychological resilience level (Guo et al., 2019; Li, 2022). Accordingly, this study speculates that subjective socioeconomic status regulates the association between mental health literacy and mental resilience.

In the current research, the regulated mediation model (Fig. 1) is constructed to test the relationship between mental health literacy and psychological distress and the possible mediation mechanism. The hypotheses of this study are as follows: (1) Mental health literacy and psychological resilience are significantly related to psychological distress; (2) psychological resilience plays an intermediary role between mental health literacy and adolescents' psychological distress; (3) Subjective socioeconomic status plays a moderating role between mental health literacy and psychological resilience.

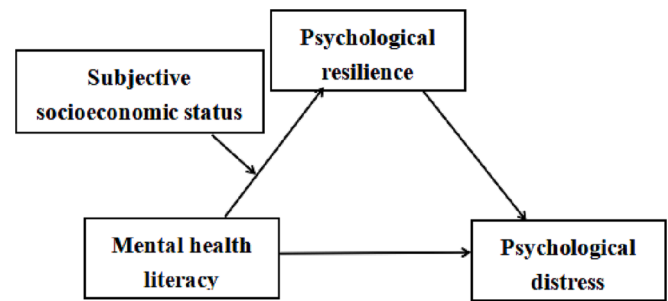


Fig. 1. The moderated mediation model.

2. Materials and methods

2.1. Participants and procedure

Using convenient sampling method, we conducted a cross-sectional survey among 700 junior high school students from three middle schools in Inner Mongolia, China from April 4, 2022 to April 15, 2022. Participants completed online questionnaires through social media (WeChat). After excluding the questionnaires with short answer time and similar answers, the final sample consists of 654 people, including 327 boys and 327 girls. All participants are mainly aged between 12 and 16, including 230 junior high school students, 236 junior high school students and 188 junior high school students.

This research was approved by the ethics committee of the author's institution. Before filling out the questionnaire, the parents of the participating students have already filled out the survey consent form. Informed that the investigation is anonymous, and the collected data is only used for scientific research and kept strictly confidential. They have the right to stop participating in the investigation at any time.

2.2. Measurements

2.2.1. Mental health literacy

Adolescent Mental health literacy Assessment Questionnaire (AMHLAQ) was developed by Li Danlin (Li et al., 2021). This scale contained 22 items, which can be divided into four dimensions: knowledge (6 items, e.g., "Increasing communication with others is conducive to mental health."), identify (5 items, e.g., "Patients with anxiety disorder often have unexplained worries and excessive nervousness and fear"), attitude (6 items, e.g., "If my relatives and friends suffer from mental illness, I will feel ashamed") and behavior (5 items, e.g., "I can control my bad emotions and behaviors"). The scale uses a Likert-type 5-point scale, ranging from "1 = strongly disagree" to "5 = strongly agree". The higher the score, the higher the level of mental health literacy. In the present study, the Cronbach's alpha of this scale was measured as 0.746.

2.2.2. Psychological distress

Psychological distress was measured by the simplified Chinese version of the Depression-Anxiety-Stress Scale (DASS-21) compiled by Lovibond et al. and introduced by Gong Xu et al. (Gong et al., 2010). The questionnaire includes 21 questions about expressing depression (7 items, e.g., "I don't seem to feel happy or comfortable at all"), anxiety (7 items, e.g., "I feel thirsty") and stress (7 items, e.g., "I find it hard to calm myself down"), measured across 4 grades (from 0 = nonconforming to 3 = always conforming). The higher a score is, the more serious psychological distress is. This measure has demonstrated good reliability among college students (Chen et al., 2020). In the present study, the Cronbach's alpha of this scale was measured as 0.917 respectively.

2.2.3. Psychological resilience

Psychological resilience was measured by the 10-item Conner-

Davidson Resilience Scale (CD-RISC-10). CD-RISC-10 was simplified from the 25-item psychological resilience Scale developed by Connor et al. (Connor and Davidson, 2003; Sils et al., 2007). This scale is a one-dimensional scale with good reliability and validity in Chinese population (e.g., “When things change, I can adapt.”) (Yu and Zhang, 2007). Items were scored on a five-point Likert scale ranging from “0 = never” to “4 = almost always”. The higher the score, the better the psychological resilience. In the present study, the Cronbach’s alpha of this scale was measured as 0.916.

2.2.4. Subjective socioeconomic status

Subjective socioeconomic status scale was compiled by Hu et al. (2012). It is a one-dimensional scale with two items (e.g., “According to the objective reality of the family, what level is your family at present in the whole society”). Each item is scored on a scale of 1–10 (1 representing the lowest subjective socioeconomic status, 10 representing the highest subjective socioeconomic status). The higher the score, the higher the subjective socioeconomic status. In this study, the Cronbach’s alpha of this scale was measured as 0.742.

2.3. Statistical analysis

SPSS22 statistical software was used to sort and analyze the data. The statistical methods used include descriptive analysis, Pearson correlation analysis, and mediation effect tests completed with Process plug-in (Model 7) (Hayes, 2017). Mediation hypotheses were tested with bootstrapping via a resampling of 5000 samples to calculate 95% confidence intervals (CIs). If the 95% CI did not contain zero and the p value was < 0.05, results were deemed statistically significant.

Using Harman single factor test method, non-rotating exploratory factor analysis was carried out on all measurement items. The results showed that 12 common factors with characteristic values greater than 1 were put forward, and the first common factor explained 21.91% of the total variance, which was less than the critical standard of 40% (Zhou and Long, 2004). It shows that there is no obvious common methodological deviation in this study.

3. Results

3.1. Descriptive statistics and correlation analysis

The descriptive statistics and zero-correlations for all the study variables are displayed in Table 1. As expected, mental health literacy was positively correlated with subjective socioeconomic status ($r = 0.09, p < 0.05$) and psychological resilience ($r = 0.34, p < 0.01$), and negatively correlated with psychological distress ($r = -0.18, p < 0.01$). Besides, for the individuals with higher levels of subjective socioeconomic status ($r = -0.13, p < 0.01$) and psychological resilience ($r = -0.50, p < 0.01$), they were less likely to be psychological distress. Subjective socioeconomic status was positively associated with psychological resilience ($r = 0.21, p < 0.01$). In addition, gender is negatively correlated with psychological resilience ($r = -0.20, p < 0.01$), but positively correlated

Table 1

Descriptive statistics and correlation analysis of adolescents’ gender, mental health literacy, subjective socio-economic status, psychological resilience and psychological distress, 2022 (n = 654).

	Mean	SD	1	2	3	4	5
1.Gender	1.50	0.50	1				
2.MHL	81.34	7.54	-0.03	1			
3.SSS	10.38	2.75	0.01	0.09*	1		
4.PR	27.10	7.71	-0.20**	0.34**	0.21**	1	
5.PD	11.04	9.97	0.08*	-0.18**	-0.13**	-0.50**	1

MHL, Mental health literacy; SSS, Subjective socioeconomic status; PR, Psychological resilience; PD, Psychological distress.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

with psychological distress ($r = 0.08, p < 0.05$). Therefore, in the follow-up regression analysis, gender is discussed as a control variable.

3.2. Moderated mediation analysis

Results as shown in Table 2, mental health literacy can positively predict psychological resilience ($\beta = 0.32, t = 8.65, P < 0.001$), and psychological resilience can also significantly positively predict psychological distress ($\beta = -0.65, t = -13.56, P < 0.001$), but mental health literacy cannot predict psychological distress ($\beta = -0.01$) The mediation effect of psychological resilience is significant, with the mediation effect of -0.22 and the relative effect value of 96%. psychological resilience plays a mediating role in the prediction of mental health literacy on mental distress.

Test whether subjective socioeconomic status has a moderating effect on the direct path and indirect path of the intermediary model. The results show (Table 2): The product of mental health literacy and subjective socioeconomic status has a significant positive predictive effect on psychological resilience ($\beta = -0.03, P < 0.05$), indicating that subjective socioeconomic status has a moderating effect on the first half of the intermediary chain, that is, the predictive effect of mental health literacy on psychological resilience decreases with the increase of junior high school students’ subjective socioeconomic status.

See Table 3 for the mediation effect values and 95% Bootstrap confidence interval of psychological resilience with different subjective socioeconomic status. Further simple slope test and simple effect analysis diagram (Fig. 2) are drawn. When exploring the influence of mental health literacy on psychological resilience, with the improvement of mental health literacy, junior high school students with high subjective socioeconomic status ($\beta = 0.40, t = 8.40, P < 0.001$) and junior high school students with low subjective socioeconomic status ($\beta = 0.23, t = 4.44, P < 0.001$) have significantly increased psychological resilience. However, compared with junior high school students with high scores of subjective socioeconomic status, junior high school students with low scores of subjective socioeconomic status have a relatively higher degree of psychological resilience enhancement.

4. Discussion

The relationship between mental health literacy and mental distress is not unified, and the intermediary mechanism behind them is not clear. The results of this study verify the research hypothesis: mental health literacy affects adolescents’ psychological distress through psychological resilience, and subjective socioeconomic status regulates the first

Table 2

Summary of psychological resilience’s Mediation Effect and Subjective Socio-economic Status’s Moderating Effect.

Regression Model		Goodness-of-Fit Indices			Regression Coefficient and Significance	
Outcome Variable	Predictor Variable	R	R ²	F	β	t
PR		0.43	0.19	37.80***		
	Gender				-2.90	-5.32***
	MHL				0.32	8.65***
	SSS				0.50	4.98***
	MHL × SSS				-0.03	-2.49*
PD		0.50	0.25	71.83***		
	Gender				-0.33	-0.47
	MHL				-0.01	-0.19
	PR				-0.65	-13.56***

MHL, Mental health literacy; SSS, Subjective socioeconomic status; PR, Psychological resilience; PD, Psychological distress.

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

Table 3
Results of conditional indirect effects.

Dependent variable	Adjustment variable	Effect	Bootstrapped SE	Bootstrapped 95% CI
Psychological resilience	<i>M - SD</i>	-0.26	0.04	[-0.33, -0.19]
	<i>M</i>	-0.20	0.03	[-0.26, -0.15]
	<i>M + SD</i>	-0.15	0.04	[-0.23, -0.08]

half of this intermediary model. The main findings are listed and discussed below.

4.1. The relationship between mental health literacy and psychological distress

The results reveal the positive influence of mental health literacy on adolescents' psychological distress, and support hypothesis 1. Adolescents with low mental health literacy experience more psychological distress, which is consistent with previous research results (Lam, 2014; Pehlivan et al., 2021). The reason may be that with the increasing academic pressure, the complexity of interpersonal communication, and the emotional fluctuations in adolescence, adolescents are facing enormous mental health challenges (Sun, 2022; Yu and Wang, 2022). At this time, adequate mental health knowledge and skills can provide more psychological resources to help them cope with challenges and maintain a good level of mental health (Du et al., 2019). On the contrary, adolescents with low mental health literacy have poor ability to deal with psychological distress, and are even more reluctant to seek professional help, so they feel more psychological distress (Kelly et al., 2007b).

4.2. The intermediary role of psychological resilience

The result of intermediary effect shows that psychological resilience has a completely intermediary role between mental health literacy and adolescent psychological distress. This is consistent with the research hypothesis 2. It can be seen that mental health literacy mainly affects adolescents' psychological distress through psychological resilience. As we all know, adolescents' mental health literacy level can be improved quickly through education and study. However, the solution of psychological distress is not an easy task, and it needs long-term and repeated efforts. After mastering rich knowledge and skills of mental health, adolescents are more likely to try a variety of coping styles when facing psychological difficulties (Jia et al., 2021; Sun et al., 2021).

Constantly trying will gain some sense of accomplishment, and the experience and ability to overcome difficulties are constantly strengthened. Therefore, these adolescents with higher psychological resilience level experience less psychological troubles such as anxiety and depression (Lenzo et al., 2020; Min et al., 2013).

To some extent, this result explains the mechanism that adolescents' mental health literacy affects their psychological distress, and suggests that mental health professionals should not only offer mental health courses for adolescents to improve their mental health literacy, but also pay attention to the cultivation and stimulation of individual inner psychological resilience. When the external psychological knowledge and skills are truly transformed into the inner ability of perseverance in the face of life difficulties, all kinds of psychological troubles of adolescents will be alleviated.

4.3. The regulating role of subjective socioeconomic status

The results verify hypothesis 3. Subjective socioeconomic status regulates the relationship between mental health literacy and psychological resilience. Specifically, compared with adolescents with high subjective socioeconomic status, adolescents with low subjective socioeconomic status are more affected by their mental health literacy in psychological resilience. This may be because subjective socioeconomic status indicators not only reflect social status, but also show adolescents' evaluation of their appearance, academic performance, interpersonal relationship (Sweeting et al., 2011). The research shows that family socioeconomic status can positively predict the level of self-efficacy, and adolescents with lower family socioeconomic status have lower self-confidence when facing challenges (Xu and Guo, 2020; Yuan et al., 2020). In this case, adolescents with low subjective socioeconomic status pay more attention to helping themselves cope with difficult situations through knowledge.

5. Limitations

This study has some limitations. First of all, although the model of this study was put forward on the basis of existing studies and theories, it was only verified by the sample of Inner Mongolia in China. Therefore, the research results need to be carefully interpreted and may not be extended to other countries and regions. In the future, I hope this model can be verified by research objects of different cultures. Secondly, this study adopts a cross-sectional survey, and the estimation of intermediary effect may be biased (O'Laughlin et al., 2018). In the future, the time series between variables can be explained by longitudinal method.

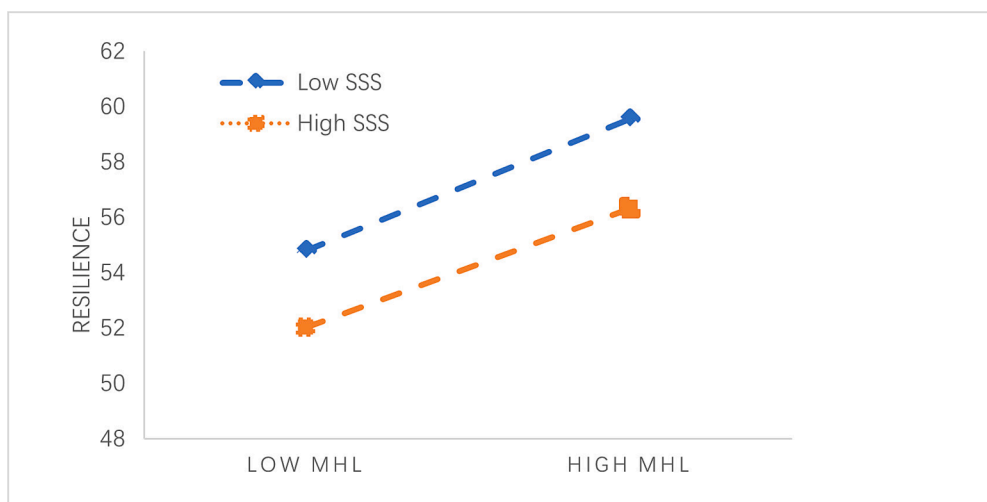


Fig. 2. Interaction effect between subjective socioeconomic status and mental health literacy for psychological resilience.

Finally, this study uses self-evaluation method to investigate the subjects, and the results may be affected by the deviation of the subjects' reaction.

6. Conclusion

To sum up, this study explores the interaction mechanism among mental health literacy, psychological resilience, psychological distress and subjective socioeconomic status. We find that mental health literacy has a negative impact on adolescents' psychological distress mainly through psychological resilience. In addition, subjective socioeconomic status plays a moderating role in the relationship between mental health literacy and psychological resilience. Specifically, for adolescents with low subjective socioeconomic status, mental health literacy has a stronger predictive effect on psychological resilience. This study reveals the internal mechanism of mental health literacy affecting adolescents' psychological distress through a regulated intermediary model. On the one hand, this research enriches the related theories of adolescent psychological distress; On the other hand, it provides a reference value for the intervention of adolescents' psychological distress, reminding professionals to provide more channels for students with lower subjective socioeconomic status to acquire psychological knowledge and skills while optimizing mental health education courses, and to pay attention to the improvement of adolescents' psychological resilience ability in practice.

CRedit authorship contribution statement

Xuemin Zhang: Writing – original draft. **Heng Yue:** Investigation. **Xia Hao:** Investigation. **Xiaohui Liu:** Investigation. **Hugejiletu Bao:** Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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