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How Growth Mindset Shapes Depressive Symptoms Among Chinese Junior High School Students: A Parallel Mediating Roles Involving Self-Efficacy alongside Social Support

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Abstract. This research seeks to explore the pathways by which growth mindset (GM) influences adolescent depressive mood, focusing on concurrent mediating impacts of self-efficacy (SE) and social support (SS). A total of 129 adolescents were investigated and data were analyzed via SPSS 26.0, while PROCESS Model 4 was used. The results showed that: (1) The GM of adolescents was significantly negatively correlated with depressive symptoms (DS). (2) The relationship between GM and DS is mediated by SE. (3) SS serves as a mediator between GM and DS. (4) SE and SS are parallel mediators connecting GM and DS. These findings illustrate how GM affects DS. They also combined SE and SS to broaden the research perspective and provide practical enlightenment for the intervention of DS in early junior high school adolescents. Future research should employ longitudinal or experimental designs, multi-source data, and bigger, more varied samples. Teachers and parents should reduce adolescents' DS by cultivating GM, strengthening SE, and providing stable emotional and practical support.

Keywords: Self-efficacy, depressive symptoms, social support, growth mindset

1. Introduction

Adolescent mental health (MH) is increasingly important in society. Chinese middle school students exhibit a high prevalence of depression. As a crucial stage of one's physical and mental development, junior high school is facing multiple challenges such as academic pressure, interpersonal adaptation, and self-identity construction. The high incidence of DS in this period poses a serious threat to the healthy growth of teenagers. Since 2025, the Chinese government has repeatedly launched a series of policies aimed at boosting teenage mental health services. The Ministry of Education introduced the "Ten Measures" for bolstering MH among primary and secondary students. Concurrently, a cross-departmental initiative involving the National Health Commission and 12 other agencies issued the "Five Health" Promotion Action Plan for Children and Adolescents (2026–2030), designating mental health as a key focus. In this context, it has important theoretical value and practical significance to detect the protective factors and mechanism of adolescent DS.

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Growth mindset (GM), which has its roots in Dweck's implicit theory of intelligence, is the belief that one's skills and intelligence can be improved. Individuals with a GM focus on the learning process, are unafraid of making mistakes, and respond to challenges with composure, as opposed to a fixed mindset [1]. According to Dweck and Master, individuals with a GM tended to report higher self-efficacy (SE) compared to those with a fixed mindset [2]. Building on the GM literature, accumulating evidence shows that a positive association between GM and early MH of adolescents. According to Zhu and Zheng, GM is a positive predictor of life satisfaction in early adolescence, mediated sequentially by perceived social support (SS) and learning motivation [3]. A close association between GM and academic SE among junior high school students was established by Luo [4]. As the embodiment of SE in the academic field, academic SE reflects the impact of GM on SE. Zhao et al. showed that general SE had a positive predictive effect on junior high school students' psychological resilience, and SS played a partial intermediary role between the two [5]. These studies reveal the important role of general SE as a mediator in the development of junior high school students' mental health from different levels, but there is still a lack of direct empirical test on the mediating role of general SE between GM and DS, so it is necessary to undertake a targeted empirical validation.

SE is the ability of individuals to believe that they have the ability to complete specific tasks or deal with a specific situation. GM is closely related to SE. Individuals with malleability belief are more likely to maintain confidence and maintain high SE in the face of difficulties; Conversely, individuals with low SE could be be helpless in the face of pressure, which increases the risk of DS. Wang's research shows that general SE plays a mediating role between peer attachment and academic burnout of early adolescents, indicating that SE plays an important mediator in junior high school students' psychological development [6]. Therefore, one may infer that a comparable mediating effect exists for SE in the relationship between GM and DS.

SS refers to the material, emotional and information support that individuals obtain from their families and friends, which has a protective effect on teenagers' mental health. Lu pointed out that GM affects junior high school students' self-esteem, coping style and MH [7]. Individuals with high level of GM are more active in seeking social support, good at establishing and maintaining interpersonal relationships, so as to obtain more social support resources and relieve DS. Gao and Fang found that perceived SS negatively predict DS among similar age groups, and this relationship was achieved by enhancing cognitive reappraisal and weakening nonadaptive strategies (expression inhibition), respectively, and then explained the internal mechanism of SS in alleviating DS from the cognitive level [8]. Zhao's research also shows that understanding SS positively impact students' learning engagement, and GM and future time insight play a chain mediating role, which further confirms the close association between GM and SS [9]. In conclusion, SS may play as a mediator in the process of GM affecting DS.

Building on the preceding discussion, this research intends to construct a parallel mediation model to detect the parallel mediation effect of SE and SS between GM and DS. This study chose the parallel mediation model rather than the chain mediation or regulatory mediation model, mainly based on the following theoretical considerations: on the one hand, previous studies have shown that SS and SE may not only play an independent mediating role in the process of psychological adaptation, but also jointly affect mental health indicators such as DS through collaborative pathways; On the other hand, from the conceptual level, SE is more reflected in the individual's internal beliefs and confidence in their own abilities, while SS reflects the relationship resources and assistance perception that individuals obtain from the external environment. The two have different functional positioning in the mechanism of protecting individuals from DS - the former exerts its

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influence by strengthening individuals' sense of control and coping confidence, whereas the latter works through offering a protective buffer against adversity, facilitating cognitive reappraisal, and bolstering emotional regulation. Therefore, this study uses a parallel mediation model to test two independent mediation paths at the same time, so as to more clearly show the mediation contributions of the two protective factors. Thus, the following hypotheses are proposed (See Figure 1):

H1: Junior high school students' GM negatively predicts DS.

H2: The effect of GM on DS is mediated by SE.

H3: SS mediates the association linking GM to DS.

H4: SE and SS jointly function as parallel mediators in the association between GM and DS.

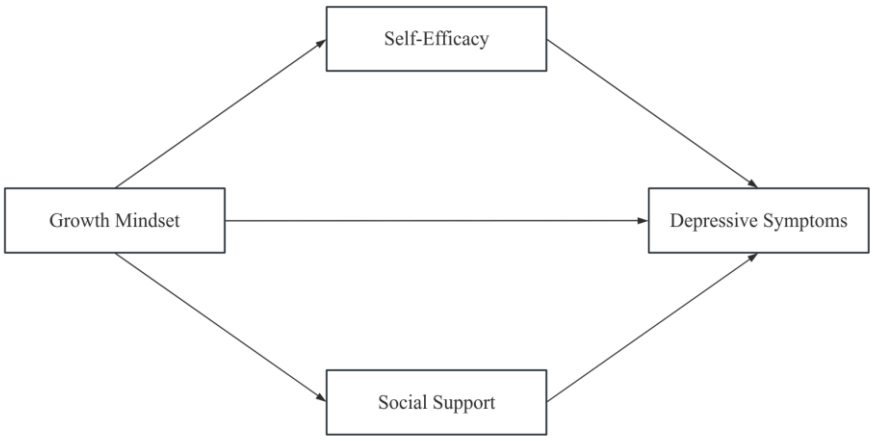

Figure 1. The relationship model between SE, SS, GM and DS

2. Research methods

2.1. Subjects and data collection screening

A convenience sampling approach was adopted to select middle and junior high school students from Beijing and Hunan Province as the research participants. The online questionnaire platform (questionnaire star) was used to distribute the survey. The subjects completed the questionnaire independently after informed consent. During data cleaning, questionnaires were removed if they contained more than ten consecutive identical answers or incorrect responses to lie detection items. Only valid data were kept for further analysis. 150 questionnaires were distributed. After excluding responses with obvious repetitive patterns or missing information, 129 valid questionnaires remained, indicating that response rate (86%) is effective. Their age range is from 12 years old and below to 15 years old and above, and the average age (M ± SD) was 13.2 ± 0.80 years.

2.2. Measurement

2.2.1. Growth mindset scale (GMS)

GMS includes six items: the first three tap fixed thinking, and the last three tap GM. Use 6-point scoring (1 = totally disagree, 6 = totally agree), and calculate the total score after scoring the first 3 questions in reverse. Scores rise as GM becomes stronger. The scale's *Cronbach's α* was found to be 0.784 in this study.

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2.2.2. General self-efficacy scale (GSES)

The scale has a one-dimensional structure with 10 items. It was scored with 4 points (1 = completely incorrect, 4 = completely correct). The higher the total score, the stronger the SE. Reliability analysis gave a *Cronbach's α* of 0.923 for the scale used here.

2.2.3. Perceived social support scale (PSSS)

PSSS consists of three dimensions—family support, friend support, and other support—and includes 12 items. As the total score rises, so does the level of perceived SS. The scale yielded a *Cronbach's α* of 0.952.

2.2.4. Center for epidemiological studies depressive symptoms scale (CES-D)

CES-D has 20 items, which are scored by 4 points (1 = occasional or none, 4 = most of the time or persistence). The positive emotion dimension items are scored in reverse. The findings of this study reveal that as the total score rises, the DS become more severe. Moreover, the scale employed in this research attained a *Cronbach's α*of 0.92.

2.3. Data analysis

Descriptive statistics, reliability and validity tests, and correlation analyses were conducted using SPSS 26.0. Harman's single - factor test was performed to evaluate the extent of common method variance. The mediating effects of SE and SS were assessed through the PROCESS macro (Model 4), and the analysis used a 95% confidence interval (CI).

3. Research results

3.1. Common method bias verification

Harman single - factor test was used to test for common method deviation. Results showed that ten factors with eigenvalues greater than l were obtained, and the largest factor explained 33.45% of the total variation, which was less than 40% of the previous standard. Therefore, it can be concluded that this study does not suffer from significant common method bias.

3.2. Descriptive statistics and correlational analysis

According to Tables 1 and 2, a significant positive relationship emerged between GM and SE, whereas a significant negative relationship emerged between GM and DS. SE and DS displayed a significant negative link. Additionally, SS demonstrated significant positive associations with GM and SE, contrasted with a significant negative association with DS.

Table 1. Description statistics (N = 129)

	Min	Max	*M*	*SD*
DS	20	70	34.12	11.22
GM	11	36	22.47	5.65
SE	11	40	26.51	6.64

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Table 1. (continued)

SS	19	84	60.22	14.82

Note. M = Mean; SD = Standard Deviation; Min = Minimum; Max = Maximum.

Table 2. Correlation analysis of variables

	DS	GM	SE	SS
DS	1			
GM	-.207*	1		
SE	-.556**	.236**	1	
SS	-.606**	.211*	.502**	1

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

3.3. Parallel mediating effects of SE and SS

Here, the PROCESS macro (Model 4) was employed to test whether SE and SS parallelly mediate the relationship from GM to DS. A bias-corrected bootstrap procedure with 5,000 resamples was used to obtain the CIs for the indirect effects.

Regression analyses indicated that GM served as a significant positive predictor of SE ($\beta = .277$, $p < .01$) as well as SS ($\beta = .553$, $p < .05$); When GM, SE and SS were included in the regression equation, SE ($\beta = -.552$, $p < .001$) and SS ($\beta = -.613$, $p < .001$) were significantly negative predictors of depression, while the direct effect of GM on DS was not significant ($\beta = -.007$, $p > .05$) (See Table 3).

The outcomes derived from the bootstrap analysis demonstrated that SE exerted a mediating effect with a value of -0.111, corresponding to a 95% CI ranging from -0.114 to -0.011;The mediating effect value of SS was -.181, and the 95% CI was [-.368, -.026], which did not include 0. The total mediation effect value was -.336, accounting for 81.6% of the total effect. Findings revealed that SE and SS served as complete parallel mediators in the link from GM to DS (See Table 4).

The relationship model between SE, SS, GM and DS was shown in Figure 2

Table 3. Regression analysis: SE & SS as parallel mediators between GM and DS in junior high students

Regression Equation		Fitting Indices			Coefficient Significance	
Outcome Variable	Predictor Variable	*R*	R^2	*F*	β	*t*
SE	GM	0.236	0.056	7.500**	0.277	2.739**
SS	GM	0.211	0.044	5.901*	0.553	2.429*
DS	GM (Direct Effect)	0.613	0.379	42.450***	-0.007	-0.057***
	SE	-	-	-	-0.552	-7.329***
	SS	-	-	-	-0.613	-8.836***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

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Table 4. Bootstrap estimation of significance for path effects

Effect Type	Path	Effect	Percentage (%)	95% CI	
				Lower Limit	Upper Limit
Direct effect	GM→DS	-.076	18.40	-.345	.193
Mediating effect	GM→ SE→DS	-.155	37.60	-.334	-.019
	GM→SS→DS	-.181	44.00	-.364	-.026
Total Indirect Effect		-.336	81.60	-.604	-.092
Total Effect		-.412	100	-.345	.193

Note. CI = Confidence Interval.

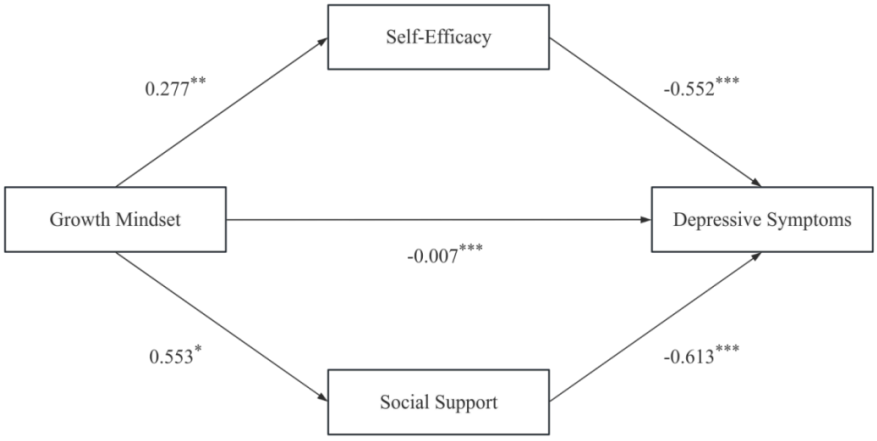

Figure 2. The relationship model between SE, SS, GM and DS

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

4. Discussion

4.1. Summaries and comparison

Among junior high school pupils, a notably pronounced negative association emerged between GM and DS. Specifically, a higher GM was associated with lower DS. This result echoes previous studies that GM, as a positive psychological trait, has a far-reaching impact on individual psychological state [7].

Further analysis shows that SE and SS play a parallel mediating role between GM and DS, and the influence of GM on DS is mostly realized through these two paths. Chang et al. also found that GM can alleviate the adverse effects of low family socioeconomic status on DS, and adolescents with high level of GM have significantly reduced the risk of DS, which further confirmed the protective effect of GM on DS [10]. These findings are consistent with prior research showing that SE facilitates individual emotion regulation and that SS exerts a positive effect on mental health, highlighting the mediating roles of these two factors [9, 11].

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4.2. Descriptive statistics and correlational analysis

First, the data were collected at a single point in time, and the results can not accurately explain the causal relationship between variables. In future studies, longitudinal experimental designs can be used to further verify this result. For example, data on GM, SE, SS and DS are collected from grade one to grade three, and how the change trajectory of GM affects the subsequent DS level is analyzed, so as to provide more sufficient evidence for causal inference. Second, all the data in this study are from the self-report questionnaire of adolescents, which may have common methodological bias. The follow-up research can try to include external evaluation data such as teachers' evaluation of students' emotional and behavioral performance in school, parents' feedback on children's psychological state, or measure physiological indicators such as heart rate and skin electricity, which can be mutually verified by multi-source information to reduce the measurement error caused by a single information source. Third, the effective sample size of this study is 129 people. Although it met the basic requirements for testing mediation effects, this may still affect statistical power. Future studies may benefit from a larger and more diverse sample, which can improve the stability and generalizability of the research results. Fourth, this study only selected students from two schools as the research object, and the results have limitations and low external validity. In the future, relevant research should try to expand the scope of the survey sample and increase the schools and regions where the sample is distributed, so as to improve the accuracy of the research results.

5. Conclusion

The study focused on GM and DS among junior high schoolers. A questionnaire survey was administered to these students. Reliability/validity checks, correlation analyses, and regression analyses were then carried out to systematically examine how GM influences DS. The results showed that more GM meant fewer DS. Separate mediation by SE and SS was observed, and the two variables together functioned as parallel mediators.

The findings lead to several multi-level educational recommendations. Both teachers and parents can help reduce depressive symptoms among students by fostering a GM, improving SE, and creating stronger support systems. In schools, courses on GM can help students develop positive cognitive patterns. Teachers should adopt encouraging evaluation methods to promote students' GM.

Specifically, in the school environment, teachers should guide students to realize that learning ability is not fixed, but can be gradually developed through efforts, appropriate strategies and repeated practice. Teachers can give more feedback to students' progress, persistence and problem-solving process. When students make mistakes or perform poorly, teachers can help them reframe frustration as part of learning, rather than as evidence of personal failure. It is also useful to arrange moderately difficult tasks so that students can gradually gain successful experience and enhance their confidence in coping with challenges. Teachers should create an inclusive classroom atmosphere and pay attention to students who are anxious, withdrawn or emotionally unstable. At the same time, parents need to create an inclusive family environment and pay attention to their children's MH.

For parents, emotional companionship and stable family support are particularly important. Parents should avoid labeling their children as "talented" or "incompetent", but encourage their children to believe that their abilities will improve over time. They also need to listen carefully to their children's academic pressure and interpersonal problems, provide patient guidance, and help

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them set achievable goals. Warm and supportive family environment can increase adolescents' perception of support, enhance their confidence in coping, and protect them from depression.

The present findings extend earlier work on the determinants of adolescent depression. This provides an empirical basis for MH education. As a result, the study has value for preventing and alleviating depression among junior high school students, and for advancing adolescent mental well-being more broadly.

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