ORIGINAL RESEARCH

Effect of Resilience on the Mental Health of Special Education Teachers: Moderating Effect of Teaching Barriers

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Purpose: The study intended to explore the effect of resilience on the mental health of special education teachers and the moderating effect of teaching barriers.

Methods: A sample of 681 special education teachers were recruited to complete the questionnaires of the Chinese Adult Resilience Scale, the Symptom Checklist (SCL-90) and the Teaching Barrier to Special Education Teacher Questionnaire.

Results: The study found that 1) there was a significant correlation between resilience and mental health symptoms of the special education teachers, and resilience and its different factors had significant negative predictive effects on mental health symptoms and its different factors; and 2) teaching barriers played a negative moderating role on the effect of resilience on mental health symptoms.

Conclusion: The results of the study demonstrated the significance of constructing the theoretical framework of promoting special education teachers' mental health, and it could enlighten researchers and educators to improve the mental health level of special education teachers by enhancing resilience and removing teaching barriers.

Keywords: resilience, teaching barrier, mental health, mental health symptom, special education teacher, moderating effect

Introduction

Shouldering the responsibility of promoting all-round development of the challenges, special education teachers and their mental health status have received growing attention, which not only affects individual quality of life but also directly affects the quality of special education. A large number of studies have shown that mental health levels of special education teachers was not optimistic, and the detection rate of mental health symptoms was higher than other professionals.[1,4] Some higher correlations were found between mental health levels of special education teachers and certain background variables such as gender and teaching experiences, as well as psychological variables such as social support and teaching efficacy.[5,7] Previous studies also showed that special education teachers have been under high occupational pressure, and that close relationships existed between their mental and physical health. Role conflicts, emotional needs and working hours could significantly predict emotional exhaustion of special education teachers, and role conflicts and emotional needs were the most important factors which could lead to low vitality and mental health levels.[8] Distinct career burnout can be spotted

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among special education teachers, which had significant correlations with personality traits; and personality traits may have significant predictive effects on burnout and its three dimensions.[9]

In recent years, resilience has become one of the core areas of positive psychology research.[10] Resilience was described as a developmental phenomenon in individuals who have experienced or were experiencing severe stress or adversity but have not been harmed by the adverse situation, or had even become stronger in spite oftheir experience.[11] Increasingly, researchers have turned their attention to the resilience of special education teachers and investigated features of resilience,[12,13] and have analyzed the newly-recruited special education teachers' training and development of resilience, the senior special education teacher's resilience and one's support system, and so on.[14,16] Some studies had developed special evaluation tools to evaluate special education teachers' professional resilience. Sotomayor, examined some antecedent variables of resilience such as care and support of school administrators, valuable participation opportunities, which would affect special education teachers' resilience,[17] and the outcome variable of resilience such as occupational psychology.)[12,18]

The research has also pointed out that resilience would help individuals to recover from the stressing state when experiencing major stressful events or suffering from psychological trauma),[19] and a large number of studies have also confirmed the close relationship between resilience and mental health, showing that resilience had significant negative predictive effects on mental health symptom such as loneliness, depression, anxiety, and fear .[20,23] In the specific special education teaching practice, special education teachers might not experience major stressful events, but they might experience some intractable events or situations during teaching routines, such as lack of situational classrooms, outdated textbooks; ineffective classroom organization and management; students' misbehaviors, such as drooling, lying and attacking and so forth. All of the factors above that hinder normal teaching are called teaching barriers. Several relevant studies have also confirmed that barrier factors such as teaching conditions, teaching ability and student's heterogeneity could lead to work stress and reduce subjective well-being,[24] reducing teaching effectiveness and hinder ing the development of teachers' professional ability,[25] negative affects on teachers' self-esteem and self-efficacy, which would result in teaching anxiety.[26]

Although a lot of related researches have shown that there were close relationships between resilience and

mental health, or between teaching barriers and mental health,there has been a lack of discussion on the relationship between resilience and mental health of special education teachers, and a lack of discussion on the relationships and interaction mechanism s underpinning special education teacher's resilience, mental health and teaching barriers. In this study, we designed a rigorous and detailed research to explore the relationships and interaction mechanisms underpinning special education teachers' resilience, mental health and teaching barriers, and proposed the following hypothesis, ie, teaching barriers play a moderating role on resilience affecting special education teachers' mental health. We used the Chinese Adult Resilience Scale,[19] the Symptom Checklist[27] and the self-developed questionnaire of Teaching Barrier to Special Education Teacher Questionnaire to explore the effect of resilience on mental health symptoms of special education teachers, and also to explore the possible role of teaching barriers in the relationships between resilience and mental health symptoms.

Methods
Participants
A respondent-driven sampling (RDS) method was used to survey the special education teachers from most of the provinces and cities in mainland People's Republic of China. A total of 726 questionnaires were distributed and collected online using the "Questionnaire Star" online survey platform which was linked to QQ or WeChat, and 681 valid questionnaires were collected (IP addresses showed that the 681 participants were from all provinces and subordinate cities in mainland People's Republic of China except Tibet, Hainan and Liaoning provinces). The response rate of the online questionnaire was 93.80%. There were 119 male teachers and 562 female teachers. Among these teachers, 351 of them had 0–5 years of working experience, 127 of them 6–15 years, and 203 of them 15 years or more. The study was in accordance with the Declaration of Helsinki, and was approved by the Institutional Review Board of the College of Education at Huaibei Normal University of China, and all participants signed an informed consent form and were paid for their participation.

Research Instruments
Chinese Adult Resilience Scale
The scale consisted of 30 items, including internal control, coping style, optimism, personality preference, and

acceptability. All of the five dimensions had good reliability and validity indicators. The scale used a four-level scoring method to keep score (1 - complete non-conformity to 4 - complete conformity). Higher scores meant higher resilience. In this study, Coefficients α of the total scale and each factor were 0.92, 0.76, 0.84, 0.81, 0.67, and 0.87, respectively.

Symptom Checklist (SCL-90)

The scale consisted of 90 items, including somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, horror, paranoia, psychosis, and the "other" factor, rated on a scale of 1–5 (1 - never to 5 - serious) (the "other" factor is not scored). Higher score meant more obvious symptoms of self-reported and more serious psychological problems. In this study, Coefficients α of the total scale and each factor were 0.99, 0.92, 0.89, 0.90, 0.92, 0.91, 0.87, 0.88, 0.86, and 0.90, respectively.

Teaching Barrier to Special Education Teacher Questionnaire

As a self-developed questionnaire, the tool was prepared by the open-ended question for participants, i.e., "What events or situations may cause difficulties or barriers during your teaching routine?" Overall, 90 participants were required to answer at least more than three obstructive events or situations, according to their own experiences. Content analysis and frequency data were collected, and 33 representative phrases and short sentences were extracted (the frequency of each answer was not less than 5, $p>0.05$). Based on the data, a special education teachers' teaching barrier questionnaire with 33 items (a1 to a33) was compiled. The study randomly divided 681 participants into two equal samples (sample 1, n=340; sample 2, n=341). Project analysis and exploratory factor analysis were performed on sample 1.The results of project analysis showed that the t values of items were greater than 3.00 ($p<0.001$) which implied higher discrimination except for a1 ($t=2.506$, $p=0.013$), and the correlation significances of other items between the total score of the questionnaire were all higher than 0.40 except for a1 ($r=0.173$, $p<0.001$), so a1 was removed from the questionnaire. By applying the factor retaining methods,[28] the results of the remaining 32 projects' exploratory factor analysis showed that three factors were fully explored. The interpretation rate of the total variance of the three factors is 61.487%, and the variation of factor 1 explained was 27.33%, which was less than 40%, indicating that the

common deviation of the questionnaire was not obvious. Factor 1 was named as a barrier to teaching conditions, containing five items which were all related to the supports of the teaching condition provided by the school (eg, The teaching support provided by the school is limited). Factor 2 was named as a barrier to teaching ability, containing three items which were related to the teacher's individual teaching ability (eg, I cannot organize the class very well). Factor 3 was named as a barrier to teaching object, containing three items which were all related to the basic competence of students (eg, My students are weak in operational ability). In the study, the stable maximum likelihood estimation (MLR) was adopted as the estimation method, the results of confirmatory factor analysis (by sample 2, n=341) showed that fitting indexes of the questionnaire were very good (χ^2/df=2.55, CFI=0.909, TLI=0.901, RMSEA=0.067). At the same time, internal consistency reliability and discriminant validity of the formal questionnaire were investigated by sample 2. The results showed good internal consistency and reliability, with Cronbach α coefficient of the total questionnaire 0.82, and the Cronbach α coefficients of the three factors 0.80, 0. 70 and 0.65, respectively. The total score of the questionnaire was highly correlated with the scores of the three factors ($r = 0.690.87$), and the scores of the three factors were moderately correlated ($r = 0.38–0.48$), indicating that the questionnaire had good discriminant validity.

In this questionnaire, each item was based on a 4-point Likert scale (1 - not a barrier, 2 - somewhat of a barrier, 3 - moderate barrier, 4 - extreme barrier)[29] and high scores suggested high levels of teaching barriers.

Statistical Analysis

The data were analyzed by SPSS 19. 0 for correlation, regression and reliability. The data collected by the self-developed questionnaire were also processed by SPSS 19. 0 for project analysis, exploratory factor analysis, and were processed by Mplus7.4 for confirmatory factor analysis.

Results
Correlation Analysis Between Resilience and Mental Health Symptoms of Special Education Teachers

Correlation analysis was performed on the scores of special education teachers' resilience and its five factors, the scores of special education teachers' mental health

symptoms and its nine factors. It can be see in Table 1 that there are significant negative correlations between resilience and mental health symptoms, and between each of the five factors of resilience and each of the nine factors of mental health symptoms ($r=-0.14\sim-0.39$). (See Table 1). The results show that mental health symptoms of special education teachers have a significant negative correlation with resilience.

Effect of Resilience on Mental Health Symptoms of Special Education Teachers

In this study, regression analysis by enter method was used to examine the effect of resilience on mental health symptoms of special education teachers. The results show that resilience has a significant negative predictive effect on mental health symptoms ($\beta=-0.194$, $p<0.001$), meaning that resilience can reduce mental health symptoms of special education teachers. In other words, resilience can improve mental health levels of special education teachers (see Table 2).

In order to further examine the possible effects of all factors of resilience on special education teachers' mental health symptoms, the study took all five factors of resilience as predictors of mental health symptoms and each factor as a dependent variable, and regression analysis by stepwise method was used to examine the effects. The results show that the five factors of resilience have significant negative predictive effects on mental health symptoms and it's various factors (see Table 3). Specifically, the factors of acceptability, relationship ability and optimism had significant negative predictive effects successively on overall mental health symptoms ($\beta=-0.291$, $p<0.001$; $\beta=-0.142$, $p<0.01$;

$\beta=-0.093$, $p<0.05$) and terror ($\beta=-0.261$, $p<0.001$; $\beta=-0.100$, $p<0.05$; $\beta=-0.097$, $p<0.05$). The factors of acceptability and personality preference have significant negative predictive effects successively on somatization ($\beta=-0.181$, $ps<0.001$; $\beta=-0.165$, $p<0.001$), interpersonal sensitivity ($\beta=-0.329$, $p<0.001$; $\beta=-0.208$, $p<0.001$) and psychosis ($\beta=-0.287$, $p<0.001$; $\beta=-0.208$, $p<0.001$).The factors of acceptability and internal control have significant negative predictive effects successively on obsessive-compulsive disorder ($\beta=-0.311$, $p<0.001$; $\beta=-0.153$, $p<0.001$). The factors of acceptability, personality preference and optimism have significant negative predictive effects successively on depression ($\beta=-0.298$, $p<0.001$; $\beta=-0.171$, $p<0.001$;$\beta=-0.092$, $p<0.05$), anxiety ($\beta=-0.289$, $p<0.001$; $\beta=-0.108$, $p<0.05$; $\beta=-0.098$, $p<0.05$), hostility ($\beta=-0.281$, $p<0.001$; $\beta=-0.110$, $p<0.05$; $\beta=-0.096$, $p<0.05$) and paranoia ($\beta=-0.285$, $p<0.001$; $\beta=-0.128$, $p<0.01$; $\beta=-0.106$, $p<0.05$).

Moderating Role of Teaching Barriers in Resilience Affecting Mental Health Symptoms of Special Education Teachers

The results of correlation analysis show that there are significant correlations ($ps<0.01$) between the scores of resilience and teaching barriers ($r=-0.24$), and between the scores of teaching barriers and mental health symptoms ($r=0.29$), but they lack theoretical significance because of low correlation ($r<0.3$), indicating that the relationship between the two variables is of no substantial theoretical significance. But the relationship between resilience and mental health symptoms is approximately medium correlation ($r=-0.37$), indicating that there is a certain

Table 1 Correlations Between Resilience and Mental Health Symptom

Main Variable	Somatization	Obsessive-Compulsive Disorder	Interpersonal Sensitivity	Depression	Anxiety	Hostility	Terror	Paranoia	Psychosis	Mental Health Symptoms
Internal control	−0.14**	−0.22**	−0.24**	−0.23**	−0.19**	−0.21**	−0.18**	−0.19**	−0.20**	−0.22**
Coping style	−0.15**	−0.21**	−0.24**	−0.23**	−0.21**	−0.22**	−0.19**	−0.21**	−0.21**	−0.22**
Optimism	−0.20**	−0.27**	−0.32**	−0.32**	−0.29**	−0.28**	−0.27**	−0.31**	−0.29**	−0.30**
Personality preference	−0.22**	−0.23**	−0.31**	−0.32**	−0.26**	−0.26**	−0.24**	−0.27**	−0.30**	−0.29**
Acceptability	−0.23**	−0.34**	−0.39**	−0.39**	−0.36**	−0.36**	−0.33**	−0.37**	−0.35**	−0.37**
Resilience	−0.25**	−0.34**	−0.39**	−0.39**	−0.36**	−0.35**	−0.32**	−0.36**	−0.35**	−0.37**

Note: **$p<0.01$.

Table 2 Regression Results of Resilience for Mental Health Symptoms

Dependent Variable	Predictor Variable	B	β	t
Mental Health Symptoms	Resilience	−0.194	−0.354	−9.86***

Note: ***p<0.001.

theoretical relationship between the two variables. The results show that teaching barriers may play a moderating role on resilience affecting mental health symptoms.

After centralizing the data, with the teaching barriers as a moderating variable, the resilience as an independent variable, and the mental health symptom as a dependent variable, the stratified regression method was used to test the moderating effect of teaching barriers on the relationship between resilience and mental health symptoms. The results show that the interaction term of independent variable and moderating variable has a significant effect on the increase of interpretation rate of model 3 (ΔF=14.989, p<0.001), and regression coefficient of the interaction term of teaching barrier and resilience is extremely significant (β=−0.342, p<0.001), indicating that the teaching barrier has a very significant negative moderating effect on the relationship between resilience and mental health symptoms (see Table 4).

Compared with high teaching barriers, low teaching barriers have a more obvious moderating effect on resilience affecting mental health symptoms, which could significantly reduce self-assessment scores of mental health symptoms and improve mental health levels. The diagram of moderating effect is shown in Figure 1.

Discussion
Relationship Between Resilience and Mental Health Symptoms of Special Education Teachers

In this study, resilience of special education teachers was significantly negatively correlated with mental health symptoms. The results of stepwise regression analyses showed that various factors of resilience had significant regression effects on mental health symptoms and its various factors; and the four factors of resilience (ie, acceptability, relationship ability, personality preference and optimism) had the most significant predictive effects on mental health symptoms and its various factors. Among the predictions of mental

Table 3 Regression Results of Factors of Resilience for Mental Health Symptoms and Each of its Factors

Dependent Variable	Predictor Variable	B	β	t
Mental Health Symptom	Acceptability	−4.429	−0.291	−7.55***
	Relationship ability	−3.008	−0.142	−3.18**
	Optimism	−1.708	−0.093	−1.98*
Somatization	Acceptability	−0.398	−0.181	−4.67***
	Personality preference	−0.506	−0.165	−4.27***
Obsessive-compulsive disorder	Acceptability	−0.587	−0.311	−8.53***
	Internal control	−0.376	−0.153	−4.20***
Interpersonal sensitivity	Acceptability	−0.579	−0.329	−9.10***
	Personality preference	−0.511	−0.208	−5.76***
Depression	Acceptability	−0.750	−0.298	−7.85***
	Personality preference	−0.6–1	−0.171	−3.90***
	Optimism	−0.280	−0.092	−1.99*
Anxiety	Acceptability	−0.524	−0.289	−7.43***
	Personality preference	−0.272	−0.108	−2.39*
	Optimism	−0.214	−0.098	−2.07*
Hostility	Acceptability	−0.313	−0.281	−7.19***
	Personality preference	−0.172	−0.110	−2.43*
	Optimism	−0.130	−0.096	−2.03*
Terror	Acceptability	−0.332	−0.261	−6.60***
	Relationship ability	−0.178	−0.100	−2.20*
	Optimism	−0.149	−0.097	−2.02*
Paranoia	Acceptability	−0.318	−0.285	−7.74***
	Personality preference	−0.172	−0.128	−2.72**
	Optimism	−0.166	−0.106	−2.38*
Psychosis	Acceptability	−0.501	−0.287	4.61***
	Personality preference	−0.507	−0.208	3.20***

Notes: *p<0.05; **p<0.01; ***p<0.001.

health symptoms and its nine factors, acceptability was the first and the most predictive factor to enter the regression equation. Except for mental health symptoms and the two factors of obsessive-compulsive disorder and terror, personality preference had significant regression effects on the other seven factors, and optimism had significant regression effects on mental health symptoms and their five factors (ie, depression, anxiety, hostility, terror, and paranoia).
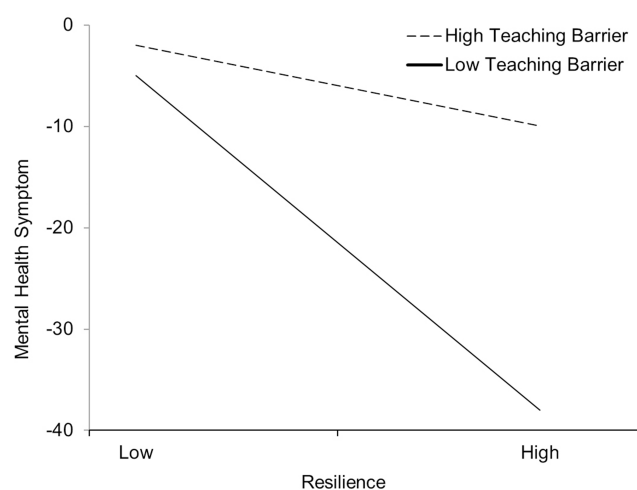
Table 4 The Moderating Effect of Teaching Barriers on the Association Between Resilience and Mental Health Symptoms

Model	Variable	R^2	ΔR^2	ΔF	B	β	t
1	Resilience	0.136	0.136	106.500***	−1.762	−0.368	−10.32**
2	Resilience Teaching barrier	0.177	0.041	34.128***	−1.522 2.025	−0.318 0.210	−8.86*** 5.84***
3	Resilience Teaching barrier Resilience×teaching barrier	0.195	0.018	14.989***	−1.636 2.113 −0.102	−0.342 0.219 −0.136	−9.48*** 6.15*** −3.87***

Notes: **$p<0.01$; ***$p<0.001$.

The results of this study indicated that as a relatively stable personality trait, resilience had a close negative relationship with mental health, and had an important effect on mental health symptoms. The results were consistent with previous research results.[30,31] The results also fully demonstrated that resilience was an important protective factor for individual mental health, and the four factors of acceptability, relationship ability, personality preference and optimism of resilience played particularly important roles in the process of promoting special education teachers' mental health. Some researchers have confirmed that self-awareness and acceptance of attitudes could enhance the flexibility of an individual's psychological responses to daily life, improve his/her mental symptoms effectively such as anger, sadness, fear, and anxiety, and improve his/her life quality.[32] It was also found in previous research that social support had a significant negative correlation with mental health symptoms, and

could affect mental health by regulating and managing individual's emotions, cognition, and behavior, the higher the level of social support, the higher the level of mental health.[33] It was very important to maintain an individual's mental health by improving the level of social support, especially the understanding of social support.[34] Mental health was also significantly related to optimism, which could affect the different factors of mental health: the highest correlation with self-esteem in positive factors of mental health, and the highest correlation with depression in negative factors of mental health were found; and the goal of improving mental health and social adaptation could be achieved through interfering with optimism.[35] All of these results of relevant researches revealed that the mental health of special education teachers could be improved by effectively training resilience, especially the four key factors (ie, acceptability, relationship ability, personality preference, and optimism).

Moderating Role of Teaching Barriers in Resilience Affecting Mental Health Symptoms of Special Education Teachers

Moderating variables explain the effects of independent variables on dependent variables under certain conditions (when or how the influence was exerted); while mediating variables would explain the substantive, intrinsic mechanism by which independent variables affected dependent variables. If a variable had little correlation with independent variables and dependent variables, it could not be a mediating variable, but may be a moderating variable. The research has shown that individual background variables such as gender and age were not affected by independent variables, so they could be considered as moderating variables in many cases.[36] In this study, we firstly analyzed the possible situations as to whether there were moderating effects of gender and age on the relationships in teaching

Figure 1 Graphical presentation of the interaction terms.
Notes: The graphical presentation of interaction terms and the influence of resilience on mental health symptoms with respect to the different levels of teaching barriers.

barriers, resilience or mental health symptoms of special education teachers, with no moderating effects being found.

In this study, the results of the relevant analyses showed that the resilience of special education teachers was closely medium related to mental health symptoms; the results of the regression analyses also demonstrated that certain factors of resilience could significantly predict various factors of mental health symptoms, showing that there was a certain causal relationship between resilience and mental health symptoms. The result of the relevant analyses also indicated that correlation coefficients between teaching barriers and resilience or between teaching barriers and mental health symptoms were relatively low ($r<0.3$), indicating that teaching barriers could not be a mediating variable but may be a moderating variable. The hypothesis (ie, teaching barriers as a moderating variable) was verified by the result of hierarchical regression analysis, which showed that teaching barriers played a significant negative moderating role between resilience and mental health symptoms. It could be seen from the mode of moderating effect of teaching barriers (Figure 1). Although higher resilience would alleviate mental illness symptoms for teachers with high teaching barriers, the amplitude of alleviation was relatively small compared with teachers who had lower teaching barriers. By contrast, mental health symptoms of special education teachers who had low teaching barriers could be alleviated obviously by increasing their levels of resilience. According to the above, various teaching barriers in the practice of special education teaching could negatively moderate the effect of resilience on mental health symptoms, by reducing barrier factors in the process of teaching, mental health symptoms could be alleviated to enhance the positive effect of resilience on the mental health of special education teachers. Therefore, in order to improve special education teachers' mental health levels, in addition to resilience training, we could also try to break through and decrease teaching barriers through improving teaching conditions, strengthening special education teachers' teaching ability training, and guiding teachers to master more teaching strategies and approaches.

Limitations and Future Research

The study explored the moderating role of teaching barriers in resilience affecting on mental health symptoms of special education teachers, and found some valuable results, but there were also some limitations: Firstly, limitations on application of research instruments. Although the two other scales have been widely used in the studies of special education teachers, our self-developed questionnaire, the Teaching Barrier to Special Education Teacher Questionnaire was just a preliminary application in our study. So, in the future, relevant studies are needed to further verify its effectiveness using this questionnaire. Secondly, limitations on statistical analysis of research data. The study mainly examined the relationships among the three psychological variables by using the total scores of three tools, which could reveal some mechanisms, but the operability and applicability of research results needed to be strengthened. Future researches need to further explore the relationships among three psychological variables through their dimensions, and also need to dig deeper into these three psychological variables for more specific and valuable information, which would effectively promote special education teachers' mental health.

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