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Perceived discrimination and poor children's executive function: the different roles of self-esteem and perceived social support

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ABSTRACT

The negative effect of poverty on children's cognitive development has been proven, but few studies have examined the potential role of perceived poverty discrimination on poor children's cognitive development. This study investigated the effect of perceived discrimination on executive function, the mediating effect of self-esteem and the moderating effect of perceived social support among 711 children aged 8–13 ($M = 9.97$ years, $SD = 1.19$ years, girls: 48.80%) from a Chinese impoverished county. The results indicated that (1) perceived discrimination was negatively associated with children's executive function; (2) self-esteem partially mediated this association; and (3) perceived social support moderated the relation between perceived discrimination and children's self-esteem: high levels of perceived social support increased self-esteem for poor children with more perceived discrimination. The results suggested that self-esteem is a mechanism underlying the negative association between perceived discrimination and children's executive function and perceived social support plays a protective moderating role.

Introduction

According to a report by the United Nations International Children's Emergency Fund (UNICEF, 2023), children are twice as likely as adults to suffer from extreme poverty, with an estimated 356 million globally living in grinding poverty and 1 billion children living in multidimensional poverty. Although China had eliminated absolute poverty in rural areas by the end of 2020, there were formerly over 40 million poor children, according to the General Office of the State Council (2014). Furthermore, children's implicit multidimensional relative poverty (e.g. little access to education and health care) and support policies for them will still be important issues in the future (Wang & Guo, 2022).

Poor children often struggle in a state of social material shortage due to their low family socioeconomic status (SES) (Li et al., 2011), which results in a developmental gap between them and children from more well-to-do or affluent families. This gap can manifest as stunted growth (Bradley & Corwyn, 2002), physical deprivation (Johnson et al., 2016), and mental and emotional problems (e.g., lower self-esteem, increased anxiety and depression) (Falci, 2011; Najman et al., 2010). Additionally, persistent poverty in early life has a cumulative negative impact on children's cognitive development, especially for executive function (Dickerson & Popli, 2016), owing to slower development of their frontal lobes (Hair, 2015), cognitive deprivation (Conger & Donnellan, 2007), pressure experience and impaired cognitive resources (Haushofer & Fehr, 2014). The negative effects of poverty on children's executive function last even into adulthood, causing intergenerational transmission of poverty (Evans & Fuller-Rowell, 2013).

Previous evidence has demonstrated that poverty impairs children's executive function (Lawson et al., 2018; Ming et al., 2021; Sarsour et al., 2011), which is reflected in their ability to complete goal-oriented behaviors (Banich, 2009). However, there is still several limitations. First, little research has explored whether perceived poverty discrimination predicts children's executive function. Perceived poverty discrimination may play a more negative role in children's development than poverty itself (Li et al., 2011),

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especially in terms of children's self-esteem, anxiety and depression (Han et al., 2020). Second, little is known about the potential mechanism underlying the association between perceived discrimination and children's executive function. Finally, few studies have explored the protective factors that buffer the negative effects of perceived discrimination on children's executive function. Therefore, the current study examined whether perceived discrimination is negatively associated with executive function among Chinese poor children and explored the mediating role of self-esteem and the moderating role of perceived social support on these adverse associations.

Perceived discrimination and poor children's executive function

Perceived discrimination is the different or inequitable treatment perceived due to membership in a specific group (Major et al., 1998). Poor children's perceived discrimination score is 2.65 points significantly higher than that of nonpoor children on average (Li et al., 2011), which leads to more behavioral problems (Flores et al., 2021), more psychological distress (Wang et al., 2018), lower academic achievement (Guerra et al., 2019; Mistry et al., 2009) and academic procrastination (Chao et al., 2012). Previous studies have found negative effects of perceived discrimination associated with age, race and body type on individuals' cognitive performance, especially for tasks related to executive function (Johnson et al., 2020; Sutin et al., 2020; Zahodne et al., 2021). Executive function refers to a series of advanced cognitive processes, consisting of working memory, cognitive flexibility and inhibition control (Lehto et al., 2003), that positively predict children's early adaptation at school (Blair, 2016) and academic performance (Diamond, 2013).

According to stereotype threat theory (Steele & Aronson, 1995; Stricker & Lewis, 2006), negative stereotypes related to children's perceived discrimination will awaken their psychological stress for fear of negative appraisal in accordance with the stereotype, leading to a corresponding impairment of cognitive operations and performance (Schmader et al., 2008), which is the stereotype threat. Poor children may be more likely to be labeled "untalented" since they often perform with lower executive function than their affluent counterparts (Lawson et al., 2018; Ming et al., 2021; Sarsour et al., 2011). The stereotype threat provides a framework for understanding the negative effects of perceived discrimination on poor children's prefrontal processing and executive function (Schmader et al., 2008). Moreover, previous studies focusing on racial, age and body type discrimination have also supported the hypothesis that perceived discrimination negatively predicts children's executive function. For example, Zahodne et al. (2021) found that less perceived racial discrimination can reduce cognitive disparities among different races. In addition, a longitudinal study on elderly individuals pointed out that cognitive health (e.g. episodic memory) was negatively associated with everyday perceived discrimination (Johnson et al., 2020). Even perceived discrimination based on an individual's body type (e.g. body mass index, BMI) can significantly increase the risk of worse performance on tasks related to executive function (Sutin et al., 2020). Based on stereotype threat theory and evidence related to various types of discrimination, the current study examined hypothesis 1: perceived discrimination is negatively associated with executive function among Chinese poor children.

The potential mediating role of self-esteem

Self-esteem reflects the judgment of one's own personal worth (Gray-Little & Hafdahl, 2000), including the sense of competence and worth (Branden, 1969). Yu et al. (2020) found that the self-esteem of children in Chinese poverty-stricken areas is significantly lower than that of children in urban areas. According to stereotype threat theory (Steele & Aronson, 1995), poor children are often exposed to negative stereotypes, which may reduce their self-efficiency and self-esteem. With the integration of self-liking, self-worth, respect and acceptance (Kernis, 2003), self-esteem may be the potential mechanism underlying the association between perceived discrimination and executive function. Therefore, the current study put forward hypothesis 2: self-esteem may play a mediating role in the impact of perceived discrimination on poor children's executive function.

Previous empirical evidence has supported the hypothesis. On the one hand, children's perceived poverty discrimination may negatively predict their self-esteem. For example, Jia et al. (2017) found that perceived discrimination can influence migrant children's personal self-esteem *via* the mediating effect of collective self-esteem. In addition, poor children in higher grades have a significantly higher group perception of discrimination and lower self-esteem, predicting more problematic behaviors (Weng & Shen, 2009). On the other hand, self-esteem may be positively associated with children's executive function. Based on self-affirmation theory, events threatening individuals' self-integrity will arouse stress and

self-protective defenses, which hamper children's growth (Cohen & Sherman, 2014), while vulnerable individuals' self-affirmation, which is related to self-esteem, may promote better health and academic performance while facing threats (Cohen & Sherman, 2014; Sherman & Cohen, 2006). Based on these two aspects, this study examined whether self-esteem mediates the negative association between perceived discrimination and poor children's executive function.

The possible moderating role of perceived social support

Perceived social support refers to an individual's emotional experience of feeling respected, supported and understood (Sarason et al., 1991) and emphasizes children's subjective perception that there is a reliable relation between them and others (Barrera, 1986). Social support provides disadvantaged children with psychological and physical resources when coping with stressful events and therefore plays a major role in children's psychological and cognitive development (Kennedy et al., 2010; Thoits, 2011; Wong et al., 2010). Children with high perceived social support are more likely to have higher levels of hope (Sahranç et al., 2018) as well as better social competence, which is a key characteristic of resilience (Miller-Graff et al., 2017). These findings suggest that perceived social support may buffer the negative effect of perceived discrimination and the psychological stress caused by stereotype threat. Therefore, this study examined hypothesis 3: perceived social support may moderate the associations between poor children's perceived discrimination, self-esteem and executive function.

Although few studies have directly supported the hypothesis, previous studies have found that perceived discrimination can be more destructive when there is less social support for disadvantaged children (Finch & Vega, 2003; Noh & Kaspar, 2003), especially for children's psychological and behavioral problems. Perceived social support of Chinese rural-to-urban migrant children can compensate for the deleterious impact of perceived discrimination on psychological distress (Wang et al., 2018). Additionally, unprivileged children's perceived social support can be a protective factor for their affective disturbance as well as behavioral problems in China (Li et al., 2019), which corresponds to the results of previous studies (Davidson et al., 2008; Hou et al., 2011). Based on these related studies, this study explored whether perceived social support can play a protective role in poor children's self-esteem and executive function.

In summary, previous studies have mainly focused on the effect of poverty on executive function, while the role of perceived discrimination related to poverty is still uncertain. The current study aims to fill the gap by uncovering whether perceived discrimination is negatively associated with executive function among Chinese poor children and the mediating role of self-esteem and the moderating role of perceived social support in these associations.

Method

Participants

Monte Carlo power analysis (Wang & Rhemtulla, 2021) indicates that when the statistical power is 0.90 and α is 0.05, at least 615 participants are needed to detect the mediating effect ($a^*b = 0.04$) in the current study. Researchers reached out to a local primary school at an impoverished county in Guizhou province[1], China, to obtain the samples. 722 children participated in the research. However, 5 children failed to complete the cognitive tasks and 6 children with ambiguous age information were removed. Ultimately, a total of 711 children aged 8 to 13 ($M = 9.97$ years, $SD = 1.19$ years) were included in the sample, indicating sufficient statistical power. 347 of the sample were girls (48.80%), and 8 children did not report their gender information.

Procedure

First, informed consent was obtained from the children and their parents. All children completed a questionnaire that investigated their perceived discrimination, self-esteem, perceived social support, and demographic information (e.g. gender and age). Second, each child individually completed three executive function tasks presented on an iPad under the instructions of trained examiners. Each child received some stationery as a gift for participating. Finally, the children's family SES and household type were reported by their parents. Approval of the investigation protocols was obtained from the Institutional Review Board of the authors' affiliated institution (No. 202004010035), the local educational departments, and the principals of each school.

[1]The county was registered as impoverished in the state system in 2020 when we conducted the experiment. According to National Bureau of Statistics of China (2020), the annual GDP per capita was 72,477 CNY in 2020, while the per capita GDP for the county was 22,235 CNY, only 30.68% of the national level.

Measures

Perceived discrimination

Perceived discrimination was measured by a 7-item subscale of the Junior School Students' Discrimination Scale (Cai, 2012), which focuses on children's perceptions of experienced inequity due to their own family background, such as "The teacher doesn't like my parents' jobs, so the teacher doesn't like me." The children indicated their responses on a 5-point scale, and the mean of the overall score was calculated, with a higher score representing a higher level of perceived discrimination. The perceived discrimination scale has been widely applied in research on Chinese children (Cui et al., 2022). In the current study, the Cronbach's α was .86.

Self-esteem

Self-esteem was measured by Self-Esteem Scale (Rosenberg, 1965), which was revised into a Chinese version by Sun (2007). The Chinese version of the scale consists of 10 items rated on a 4-point scale and measures children's self-worth as well as self-acceptance. An example item is "I feel that I am a worthy person, at least on the same level as others." Some of the items are scored in reverse. After recoding, the overall score was calculated, with a higher score indicating a higher level of self-esteem. The scale has shown high reliability and validity in studies on Chinese children and adolescents (Chen et al., 2018; Feng & You, 2013). In the current study, the Cronbach's α was .66.

Perceived social support

Perceived social support was measured by the Perceived Social Support Scale (Zimet et al., 1988), which was revised into a Chinese version by Jiang (1999). The children responded on a 5-point scale to 12 items in three dimensions: family support, friend support and support from important others. The average of each dimension reflects the corresponding specific social support that the children perceive. The average score of the three dimensions serves as the total score of the scale. A higher total score indicates more perceived social support. The scale has been widely used among Chinese children (Mo et al., 2018; Tian et al., 2020). In the current study, the Cronbach's α was .86.

Executive function

In this study, the children's executive function was measured by three indicators (i.e. cognitive flexibility, inhibition control, and working memory), which were assessed by the National Institutes of Health (NIH) toolbox Cognition Batteries (http://www.nihtoolbox.org), a clinically validated iPad-based application that has already established a standard approach to assessing cognitive function (Badaly et al., 2020; Hodes et al., 2013; Weintraub et al., 2013). This application has also been widely used in research on Chinese children and has shown good effectiveness (Jiang et al., 2019; Ren et al., 2023).

Cognitive flexibility. The Dimensional Change Card Sort Test was used to assess the children's cognitive flexibility. Two target images were presented in two different dimensions (shape and color), and the children matched a series of test images to the target image according to the required dimension. The images were first matched in one dimension (e.g. color) and then in the other (e.g. shape). Accuracy and response time for 30 trials were recorded to reflect the children's cognitive flexibility. Additionally, their age was considered to obtain an age-adjusted score.

Inhibition control. The Flanker Inhibition Control and Attention Test was used to assess the children's inhibition control. For each trial, five arrows were presented in a line on the screen, and the children had to choose the bottom-screen arrow matching the direction of the central one while ignoring other flanking arrows' direction, whether the flanking arrows were in the same direction as the central arrow or not. The accuracy and response time of 20 trials were recorded to obtain an age-adjusted score.

Working memory. The List Sorting Working Memory Test was used to assess the children's working memory. Different images and their names were presented on the screen in two groups of trials (1-list trial: only food or animals, 2-list trial: food and animals). The children were required to recall the images after the presentation and repeat the names in a specific order (1-list trial: from smallest to largest; 2-list trial: from food to animals and from smallest to largest). The experimenter used the keyboard to record the accuracy of the responses. As the child repeated the list correctly, the number of images increased gradually until the trial was failed twice in a row or seven objects were successfully named in a trial. The children's accuracy was calculated, and the age-adjusted score for working memory was then obtained.

Family SES

Family economic status indicators were reported by the children's parents. Household type in the national

poverty alleviation information system (i.e. formerly registered as poor, minimal assurance, or neither) reflected whether the family possessed an annual income below the national poverty line of ¥2,300 or received allowances. Parents' education level, parents' occupation (Shi & Shen, 2007), and monthly household income (Xu et al., 2010) were standardized, then used to assessed children's family SES (Bradley & Corwyn, 2013). The proportion of different household types and the percentages of each indicator's category reflecting the children's family SES is presented in the Supplementary Material (see Table S1).

Though 29.40% of the children's family were neither poor nor minimal assurance household registered in the state system, their family SES still represented relative poverty, embodied in the majority of poor or minimal-assurance households, higher rates of manual or unskilled labor among parents' occupations, parents' lower education levels and lower monthly household income. Overall, the children's family SES ($M = 0.21$, $SD = 1.99$) in the current study was significantly lower than that of children from large Chinese cities (e.g. Chongqing and Shanghai) in recent studies (Luo et al., 2021; Xia, 2020), all focusing on the same three indicators.

Analysis

First, means and correlations were obtained in SPSS 26.0. Second, the mediation model was established to test the mediation effect of self-esteem in Amos 26.0 and standardized coefficients were reported. The bootstrap method was also utilized to determine the mediation effect (MacKinnon et al., 2004). 95% Confidence Interval (95% C.I.) without 0 indicated a significant mediating role of self-esteem. The bootstrap method exhibits good power and the testing for confidence intervals is not affected by the distributional shape of the variables[2] (Fritz & MacKinnon, 2007; MacKinnon et al., 2004). SES and gender were both served as controlled variables, but finally excluded since their insignificance ($ps > 0.05$). Finally, a moderated mediation model was used to explore the moderating role of perceived social support. CFI, TLI, RMSEA and χ^2/df were selected to evaluate the model goodness of fit. CFI and TLI > 0.90 as well as RMSEA < 0.08 may denote a good model fit (Browne & Cudeck, 1992; Hu & Bentler, 1999). Additionally, standardized path coefficients were the results with which this study mainly concerned. A simple slope test was conducted *via* Johnson-Neyman method (Bauer & Curran., 2005) to further clarify the moderating effect of perceived social support.

[2]Perceived discrimination in current study represented a skewed distribution even after transformed (logarithmic transformation and square root transformation). Therefore, bootstrap method was used to explore the mediating effect. Additionally, this study also analyzed the data with transformed perceived discrimination scores, and the results still supported the moderated mediation model. The standardized coefficients using original perceived discrimination scores were reported as they are easier to interpret and more practical.

Results

Descriptive statistics

The correlations among the main variables are presented in Table 1. Perceived discrimination was negatively correlated with the three indicators of executive function ($rs = -0.16$–-0.12, $ps < 0.01$), which supported H1. However, self-esteem was positively associated with the three indicators of executive function ($r = 0.12$–0.17, $ps < 0.01$). Similarly, the children's perceived social support was associated with perceived discrimination ($r = -0.13$, $p < 0.001$) and self-esteem ($r = 0.36$, $p < 0.001$), and there was a significant negative correlation between perceived discrimination and self-esteem ($r = -0.30$, $p < 0.001$). The intercorrelations among the three dimensions of executive function ranged from 0.18 to 0.44 ($ps < 0.001$).

The mediating role of self-esteem

The mediation model was conducted to verify the mediating role of self-esteem. The results indicated good model fit ($\chi^2/df = 1.03$, CFI = 1.000, TLI = 0.999, RMSEA = 0.006). The children's perceived discrimination significantly predicted their self-esteem ($\beta = -0.28$, $t = -7.86$, $p < 0.001$), which then positively affected their executive function ($\beta = 0.18$, $t = 3.72$, $p < 0.001$). Moreover, the bootstrap method was utilized to determine the partial mediation effect of self-esteem, with the results showing that the mediation effect of self-esteem was significant (95% C.I. = [-0.068, −0.021]).

The directly negative effect of perceived discrimination on executive function was still significant ($\beta = -0.16$, $t = -3.47$, $p < 0.001$) when self-esteem was considered, which supported H2 because self-esteem partially mediated the negative effect of poor children's perceived discrimination on their executive function.

The moderating role of perceived social support

A moderated mediation model was used to further test the moderating effect of perceived social support.

Table 1. Correlations, means, and standard deviations for study variables.

Variables	*n*	1	2	3	4	5	6	7	8
1. Age	711	–							
2. Gender	703	0.12**	–						
3. Perceived discrimination	711	−0.16***	0.10*	–					
4. Self-esteem	709	−0.02	−0.05	−0.30***	–				
5. Perceived social support	709	−0.02	−0.09*	−0.13***	0.36***	–			
6. Cognitive flexibility	711	−0.14***	−0.11**	−0.16***	0.17***	0.13**	–		
7. Inhibition control	711	−0.07	0.05	−0.12**	0.12**	0.03	0.44***	–	
8. Working memory	711	−0.07	0.04	−0.13**	0.13**	0.12**	0.23***	0.18***	1
M		9.97	–	1.81	2.40	3.60	92.52	86.33	91.17
SD		1.19	–	0.88	0.48	0.80	12.88	13.01	11.21

Note: Gender (1 = boys, 0 = girls) is categorical variable. For the correlation between categorical and continuous variables, Spearman correlations are reported.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

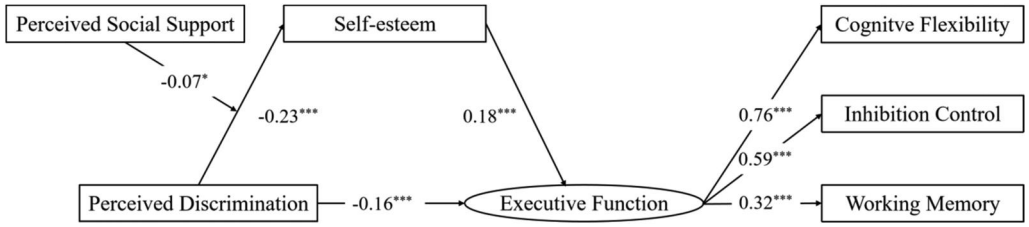

Figure 1. Standardized coefficients for the model of perceived discrimination, self-esteem, executive function and perceived social support. Solid lines in the figure represent significant paths.
*$p < .05$, ***$p < .001$.

The final model is shown in Figure 1. The results showed that the model had a good fit ($\chi^2/df = 1.72$, CFI = 0.984, TLI = 0.964, RMSEA = 0.032). The moderating effect of perceived social support was found only between perceived discrimination and self-esteem ($\beta = -0.07$, $t = -2.02$, $p = 0.043$).

The simple slope test was conducted to clarify the moderating effect of perceived social support (see Figure 2). For children with low perceived social support (below −1 *SD*), perceived discrimination significantly predicted self-esteem ($\beta = -0.16$, $t = -3.25$, $p = 0.001$), while for children with high perceived social support, the negative effect of perceived discrimination was much stronger ($\beta = -0.29$, $t = -6.64$, $p < 0.001$). Patterns of the results held the same when focusing on the three indicators of executive function separately.

Discussion

Previous studies have focused on the detrimental role of poverty on cognitive development (Evans et al., 2021; Raver et al., 2013), while little is explored from the perspective of perceived poverty discrimination. Exploration on the role of poor children's perceived discrimination helps to understand their disadvantaged circumstances and the obstacles to their future development. The results indicated self-esteem as a mediator between perceived discrimination and executive function. Additionally, perceived social support acts as a protective factor to moderate the detrimental link between perceived discrimination and children's self-esteem.

The negative effect of perceived discrimination on executive function supported stereotype threat theory (Steele & Aronson, 1995; Stricker & Lewis, 2006) and expanded the explanation of stereotype threat theory for perceived discrimination. The adverse impact of perceived discrimination in current study was also consistent with previous research on perceived discrimination related to race, age and body type (Keating et al., 2022; Sutin et al., 2020; Zahodne et al., 2021), which may imply the same essence of perceived discrimination: unfair treatments due to specific membership and related stereotype threat. These results added to the previous scope because previous studies have focused mainly on the effect of perceived discrimination on children's psychological or behavioral outcomes (Chao et al., 2012; Flores et al., 2021; Wang et al., 2018).

The mediation effect of self-esteem was also found in the current study. Compatible with stereotype threat theory and self-affirmation theory (Steele & Aronson, 1995; Stricker & Lewis, 2006), negative stereotypes related to perceived discrimination will lead to low self-efficiency, gradually resulting in lower self-esteem, which hamper children's performance on executive function tasks. In addition, based on self-determination

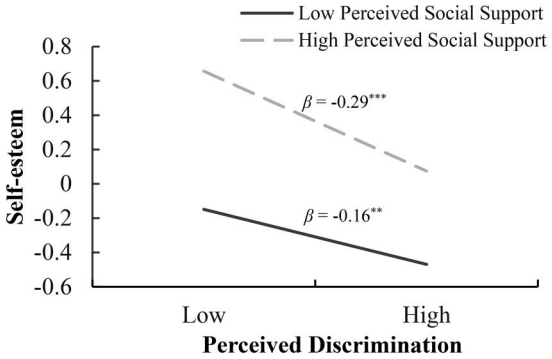

Figure 2. The moderating effect of perceived social support. $^{**}p < .01$, $^{***}p < .001$.

theory (SDT; Deci & Ryan, 1985), an individual's self-esteem can be divided into conditional self-esteem and unconditional self-esteem: Conditional self-esteem promotes individuals emphasizing issues related to self-esteem as well as self-value and encourages them to achieve certain goals so that their worth can be proven (Deci et al., 1994; Ryan & Brown, 2003). Therefore, it can be inferred that children with high self-esteem tend to be more motivated to perform well on tasks related to executive function as a defense against a threat to their self-esteem. Previous studies have focused mainly on stress and physiology to explain the negative effects of discrimination (Blair & Raver, 2016; Evans et al., 2013; Evans et al., 2021), while this study found that self-esteem may be an alternative approach or perspective. Self-esteem in childhood is less stable, highly sensitive to children's self-evaluation (Robins et al., 2002), and positively predicts children's self-efficiency (Yang et al., 2019) as well as their adjustment and school alienation (Kocayörük & Şimşek, 2016). Moreover, self-affirmation also benefits executive function (Hall et al., 2014; Harris et al., 2017). Therefore, self-esteem contributes to the literature to explain the detrimental effects of perceived discrimination on children's cognitive development.

The current study found that high levels of perceived social support can increase self-esteem for poor children with high levels of perceived discrimination. There are two potential explanations. First, perceived social support is a specific strength in conquering adverse environments and experiences. For example, the strength perspective has suggested that disadvantaged children's internal and external resources, such as perceived social support, morality and resilience, can be specific "strengths" that help them overcome adverse circumstances (Saleebey, 2018). Second, perceived social support is the experience of feeling respected, supported and understood by others and then promotes poor children's self-esteem. According to the "looking-glass self" theory, children's self-esteem is developed by the "looking-glass process" (Cooley, 1902); that is, their self-esteem will be influenced by others' attitudes and evaluations. Harter (1983) pointed out that children's self-esteem depends on the way others perceive and reflect their actions to a great extent. Therefore, poor children who report a high level of perceived social support may experience more understanding, comfort and help, which in turn increases their self-esteem. However, the protective effect of perceived social support in current study represented a protective-reactive pattern (Huang et al., 2019). That is, the benefit of perceived social support tends to diminish for children in high-risk situations compared with those in low-risk situations. Though the current results contributed to poor children's cognitive development, more specifically protective factors for children in high-risk environment remains to be explored.

Certain limitations of the current study need to be acknowledged. First, it measured all variables in the same year, which is a major limitation for the mediation analysis in current study because the process of mediation is longitudinal by definition. The diachronic influence between variables may be further clarified through longitudinal data, effectively avoiding the estimation deviation problems that may exist in the current cross section study. Second, the specifically protective factors in high-risk may be further explored in future study. It is beneficial to the development of children at risk to explore on whether there are protective factors that can eliminate developmental gap between children with high or low perceived discrimination. Finally, it remains unclear how poverty and perceived poverty discrimination jointly influence children's executive function and whether their effects are cumulative or interactive. Future studies may better explore the relation between poverty and perceived discrimination by priming children's sense of scarcity and stereotype threat.

Conclusion

Though existing evidence for the effect of poverty on executive function, little has been known about the role of perceived discrimination in poor children's cognitive development. The current study addressed the deficiency by exploring the adverse effect of perceived discrimination on children's executive function through self-esteem. The results indicated self-esteem as a mediator between perceived discrimination and executive function. Additionally, perceived social

support plays a protective moderating role for children's self-esteem. These results highlight the role of perceived discrimination and perceived social support in poor children's development and provide references for intervention on children's executive function.

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Authors' contributions

J.Z. conceived of the study, performed the statistical analysis, participated in the research design, data curation, and interpretation of the data results, and drafted the manuscript; Y.R. participated in data curation, and the interpretation of the data results, and commented on the manuscript; Y.D. participated in the interpretation of the data results, and commented on the manuscript; S.H. acquired the research funding, administrated and supervised the project, participated in the interpretation of the data, reviewed and edited the manuscript. All authors have read and agreed to the published version of the manuscript.

Ethics approval statement

Approval of the investigation protocols was obtained from the Institutional Review Board of the authors' affiliated institution (No. 202004010035), the local educational departments, and the principals of each school. All participants signed the informed consent on the first page of the questionnaire.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Data availability statement

Date available on request from the authors.

References

Badaly, D. J., Wallace, V., Lee, S., Beers, & Panigrahy, A. (2020). Deficits in inhibitory control are associated with social and emotional difficulties among children with congenital heart defects. *Archives of Clinical Neuropsychology*, *35*(6), 847–847. https://doi.org/10.1093/arclin/acaa068.057

Banich, M. T. (2009). Executive function: The search for an integrated account. *Current Directions in Psychological Science*, *18*(2), 89–94. https://doi.org/10.1111/j.1467-8721.2009.01615.x

Barrera, M. (1986). Distinctions between social support concepts, measures, and models. *American Journal of Community Psychology*, *14*(4), 413–445. https://doi.org/10.1007/BF00922627

Bauer, D. J., & Curran, P. J. (2005). Probing interactions in fixed and multilevel regression: inferential and graphical techniques. *Multivariate Behavioral Research*, *40*(3), 373–400. https://doi.org/10.1207/s15327906mbr4003_5

Blair, C. (2016). Executive function and early childhood education. *Current Opinion in Behavioral Sciences*, *10*, 102–107. https://doi.org/10.1016/j.cobeha.2016.05.009

Blair, C., & Raver, C. C. (2016). Poverty, stress, and brain development: New directions for prevention and intervention. *Academic Pediatrics*, *16*(3 Suppl), S30–S36. https://doi.org/10.1016/j.acap.2016.01.010

Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual Review of Psychology*, *53*, 371–399. https://doi.org/10.1146/annurev.psych.53.100901.135233.11752490

Bradley, R. H., & Corwyn, R. (2013). From parent to child to parent: Paths in and out of problem behavior. *Journal of Abnormal Child Psychology*, *41*(4), 515–529. https://doi.org/10.1007/s10802-012-9692-x

Branden, N. (1969). *The psychology of self–esteem: New concept of man's psychological nature*. Nash Publishing.

Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, *21*(2), 230–258. https://doi.org/10.1177/0049124192021 002005

Cai, M. (2012). *A study on educational discrimination of junior high school students and its correlation with self–esteem* [Unpublished master's thesis]. Liaoning Normal University. https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201402&filename=1013159077.nh

Chao, R. C.-L., Mallinckrodt, B., & Wei, M. (2012). Co-occurring presenting problems in African American college clients reporting racial discrimination distress. *Professional Psychology: Research and Practice*, *43*(3), 199–207. https://doi.org/10.1037/a0027861

Chen, F., Zhu, S., & Bi, C. (2018). The development of self-esteem and the role of agency and communion: A longitudinal study among Chinese. *Journal of Child and Family Studies*, *27*(3), 816–824. https://doi.org/10.1007/s10826-017-0942-y

Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self–affirmation and social–psychological intervention. *Annual Review of Psychology*, *65*(1), 333–371. https://doi.org/10.1146/annurev-psych-010213-115137

Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology*, *58*(1), 175–199. https://doi.org/10.1146/annurev.psych.58.110405.085551

Cooley, C. H. (1902). *Human nature and social order*. C. Scribner's Sons.

Cui, L., Bu, W., Gao, Q. L., Wu, Q., Huang, Y., Han, X., & Luo, J. (2022). The effect of perceived discrimination on cooperative tendency and behavior of junior high school

students. *Acta Psychologica Sinica*, *54*(3), 259–269. https://doi.org/10.3724/SP.J.1041.2022.00259

Davidson, L. M., Demaray, M. K., Malecki, C. K., Ellonen, N., & Korkiamäki, R. (2008). United States and Finnish adolescents' perceptions of social support: A cross-cultural analysis. *School Psychology International*, *29*(3), 363–375. https://doi.org/10.1177/0143034308093675

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, *19*(2), 109–134. https://doi.org/10.1016/0092-6566(85)90023-6

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality*, *62*(1), 119–142. https://doi.org/10.1111/j.1467-6494.1994.tb00797.x

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*(1), 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Dickerson, A., & Popli, G. K. (2016). Persistent poverty and children's cognitive development: Evidence from the UK millennium cohort study. *Journal of the Royal Statistical Society Series A: Statistics in Society*, *179*(2), 535–558. https://doi.org/10.1111/rssa.12128

Evans, G. W., & Fuller-Rowell, T. E. (2013). Childhood poverty, chronic stress, and young adult working memory: The protective role of self-regulatory capacity. *Developmental Science*, *16*(5), 688–696. https://doi.org/10.1111/desc.12082

Evans, G. W., Farah, M. J., & Hackman, D. A. (2021). Early childhood poverty and adult executive functioning: Distinct, mediating pathways for different domains of executive functioning. *Developmental Science*, *24*(5), E13084. https://doi.org/10.1111/desc.13084

Falci, C. D. (2011). Self-esteem and mastery trajectories in high school by social class and gender. *Social Science Research*, *40*(2), 586–601. https://doi.org/10.1016/j.ssresearch.2010.12.013

Feng, K., & You, X. (2013). Loneliness and self-esteem as mediators between social support and life satisfaction in late adolescence. *Social Indicators Research*, *110*(1), 271–279. https://doi.org/10.1007/s11205-011-9930-6

Finch, B. K., & Vega, W. A. (2003). Acculturation stress, social support, and self–rated health among Latinos in California. *Journal of Immigrant Health*, *5*(3), 109–117. https://doi.org/10.1023/A:1023987717921

Flores, J., Caqueo–Urízar, A., Quintana, L., Urzúa, A., & Irarrázaval, M. (2021). Perceived discrimination and contextual problems among children and adolescents in northern Chile. *PloS One*, *16*(2), E0246998. https://doi.org/10.1371/journal.pone.0246998

Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, *18*(3), 233–239. https://doi.org/10.1111/j.1467-9280.2007.01882.x

General Office of the State Council. (2014, December). National Development Plan for Children in Poor Areas. (2014–2020). https://www.gov.cn/gongbao/content/2015/content_2809133.htm

Gray-Little, B., & Hafdahl, A. R. (2000). Factors influencing racial comparisons of self-esteem: A quantitative review. *Psychological Bulletin*, *126*(1), 26–54. https://doi.org/10.1037/0033-2909.126.1.26

Guerra, R., Rodrigues, R., Aguiar, C., Carmona, M., Alexandre, J., & Lopes, R. C. (2019). School achievement and well-being of immigrant children: The role of acculturation orientations and perceived discrimination. *Journal of School Psychology*, *75*, 104–118. https://doi.org/10.1016/j.jsp.2019.07.004

Hair, N. L., Hanson, J. L., Wolfe, B. L., & Pollak, S. D. (2015). Association of child poverty, brain development, and academic achievement. *JAMA Pediatrics*, *169*(9), 822–829. https://doi.org/10.1001/jamapediatrics.2015.1475

Hall, C. C., Zhao, J., & Shafir, E. (2014). Self-affirmation among the poor: cognitive and behavioral implications. *Psychological Science*, *25*(2), 619–625. https://doi.org/10.1177/0956797613510949

Han, Y., Wen, H., Cheng, S., Zhang, C., & Li, X. (2020). A meta–analysis of the relation between perceived discrimination and mental health in migrant children. *Acta Psychologica Sinica*, *52*(11), 1313–1326. https://doi.org/10.3724/SP.J.1041.2020.01313

Harris, P. S., Harris, P. R., & Miles, E. (2017). Self-affirmation improves performance on tasks related to executive functioning. *Journal of Experimental Social Psychology*, *70*, 281–285. https://doi.org/10.1016/j.jesp.2016.11.011

Harter, S. (1983). Developmental perspective on the self system. In P. H. Mussen (Ed.), *Handbook of child development* (vol. *14*, pp. 275–385). John Wiley and Sons.

Haushofer, J., & Fehr, E. (2014). On the psychology of poverty. *Science (New York, NY)*, *344*(6186), 862–867. https://doi.org/10.1126/science.1232491

Hodes, R. J., Insel, T. R., & Landis, S. C., NIH Blueprint for Neuroscience Research. (2013). The NIH toolbox: Setting a standard for biomedical research. *Neurology*, *80*(11 Suppl 3), S1. https://doi.org/10.1212/wnl.0b013e3182872e90

Hou, S., Yuan, X., Liu, C., Lin, X., & Fang, X. (2011). The effect of social support and perceived discrimination on loneliness among migrant children: A longitudinal study. *Psychological Development and Education*, *4*, 401–411. https://doi.org/10.16187/j.cnki.issn1001-4918.2011.04.012

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Huang, S. L., Han, M., Sun, L., Zhang, H., & Li, H. (2019). Family socioeconomic status and emotional adaptation among rural-to-urban migrant adolescents in China: The moderating roles of adolescent's resilience and parental positive emotion. *International Journal of Psychology: Journal International de Psychologie*, *54*(5), 573–581. https://doi.org/10.1002/ijop.12499

Jia, X., Liu, X., & Shi, B. (2017). Perceived discrimination and subjective well-being in Chinese migrant adolescents: Collective and personal self-esteem as mediators. *Frontiers in Psychology*, *8*, 1213. https://doi.org/10.3389/fpsyg.2017.01213

Jiang, Q. (1999). Perceived social support scale. *Chinese Journal of Mental Health*, (Supplement), 131–133.

Jiang, Y., Fu, R., & Xing, S. (2019). The effects of fantastical television content on Chinese preschoolers' executive function. *PsyCh Journal*, *8*(4), 480–490. https://doi.org/10.1002/pchj.277

Johnson, K. E., Sol, K., Sprague, B. N., Cadet, T., Muñoz, E., & Webster, N. J. (2020). The impact of region and urbanicity on the discrimination-cognitive health link among

older blacks. *Research in Human Development*, *17*(1), 4–19. https://doi.org/10.1080/15427609.2020.1746614

Johnson, S. B., Riis, J. L., & Noble, K. G. (2016). State of the art review: Poverty and the developing brain. *Pediatrics*, *137*(4), e20153075. https://doi.org/10.1542/peds.2015-3075

Keating, L., Kaur, A., Mendieta, M., Gleason, C., Basello, G., Roth, A., & Brondolo, E. (2022). Racial discrimination and core executive functions. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *38*(3), 615–621. https://doi.org/10.1002/smi.3116

Kennedy, A., Bybee, D., Sullivan, M., & Greeson, M. (2010). The impact of family and community violence on children's depression trajectories: Examining the interactions of violence exposure, family social support, and gender. *Journal of Family Psychology: JFP: Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *24*(2), 197–207. https://doi.org/10.1037/a0018787

Kernis, M. H. (2003). Toward a conceptualization of optimal self-esteem. *Psychological Inquiry*, *14*(1), 1–26. https://doi.org/10.1207/S15327965PLI1401_01

Kocayörük, E., & Şimşek, Ö. F. (2016). Parental attachment and adolescents' perception of school alienation: The mediation role of self-esteem and adjustment. *The Journal of Psychology*, *150*(4), 405–421. https://doi.org/10.1080/00223980.2015.1060185

Lawson, G. M., Hook, C. J., & Farah, M. J. (2018). A meta-analysis of the relationship between socioeconomic status and executive function performance among children. *Developmental Science*, *21*(2), e12529. https://doi.org/10.1111/desc.12529

Lehto, J. E., Juujärvi, P., Kooistra, L., & Pulkkinen, L. (2003). Dimensions of executive functioning: Evidence from children. *British Journal of Developmental Psychology*, *21*(1), 59–80. https://doi.org/10.1348/026151003321164627

Li, H., Shen, J., Wang, X., & Zhang, L. (2011). Perceptions of discrimination deserve more attention than poverty in terms of their effects on poor and non–poor children's behavior. *Special Education in China*, *18*(2), 83–89.

Li, Y., Ma, Y., Wen, S., & Gao, Y. (2019). Research on the helping needs of adolescents in families with difficult life from the perspective of social support theory. *Chinese Youth Social Science*, *38*(2), 117–125. https://doi.org/10.16034/j.cnki.10-1318/c.2019.02.015

Luo, S., Zhang, D., & Liu, Y. (2021). The influence of family socioeconomic status on children's good behavior habits: The mediating role of parenting style and children's psychological quality. *Psychological Development and Education*, *37*(1), 26–33. https://doi.org/10.16187/j.cnki.issn1001-4918.2021.01.04

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*(1), 99–128. https://doi.org/10.1207/s15327906mbr3901_4

Major, B., Spencer, S., Schmader, T., Wolfe, C., & Crocker, J. (1998). Coping with negative stereotypes about intellectual performance: The role of psychological disengagement. *Personality and Social Psychology Bulletin*, *24*(1), 34–50. https://doi.org/10.1177/0146167298241003

Miller-Graff, L. E., Howell, K. H., Martinez-Torteya, C., & Grein, K. (2017). Direct and indirect effects of maltreatment and social support on children's social competence across reporters. *Child Psychiatry and Human Development*, *48*(5), 741–753. https://doi.org/10.1007/s10578-016-0698-4

Ming, H., Zhang, F., Jiang, Y., Ren, Y., & Huang, S. (2021). Family socio-economic status and children's executive function: The moderating effects of parental subjective socio-economic status and children's subjective social mobility. *British Journal of Psychology (London, England: 1953)*, *112*(3), 720–740. https://doi.org/10.1111/bjop.12490

Mistry, R. S., Tan, C. S., Benner, A. D., & Kim, S. Y. (2009). Family economic stress and academic well–being among Chinese–American youth. *Journal of Family Psychology: JFP: Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *23*(3), 279–290. https://doi.org/10.1037/a0015403

Mo, P. K. H., Chan, V. W. Y., Chan, S. W., & Lau, J. T. F. (2018). The role of social support on emotion dysregulation and internet addiction among Chinese adolescents: A structural equation model. *Addictive Behaviors*, *82*, 86–93. https://doi.org/10.1016/j.addbeh.2018.01.027

Najman, J. M., Hayatbakhsh, M. R., Clavarino, A., Bor, W., O'Callaghan, M. J., & Williams, G. M. (2010). Family poverty over the early life course and recurrent adolescent and young adult anxiety and depression: A longitudinal study. *American Journal of Public Health*, *100*(9), 1719–1723. https://doi.org/10.2105/ajph.2009.180943

Noh, S., & Kaspar, V. (2003). Perceived discrimination and depression: Moderating effects of coping, acculturation, and ethnic support. *American Journal of Public Health*, *93*(2), 232–238. https://doi.org/10.2105/AJPH.93.2.232

Raver, C. C., Blair, C., & Willoughby, M. (2013). Poverty as a predictor of 4–year–olds' executive function: New perspectives on models of differential susceptibility. *Developmental Psychology*, *49*(2), 292–304. https://doi.org/10.1037/a0028343

Ren, Y., Zuo, C., Ming, H., Jiang, Y., & Huang, S. (2023). Construal level among poor children: Executive function implications. *British Journal of Psychology (London, England: 1953)*, *114*(3), 638–661. https://doi.org/10.1111/bjop.12642

Robins, R. W., Trzesniewski, K. H., Tracy, J. L., Gosling, S. D., & Potter, J. (2002). Global self-esteem across the life span. *Psychology and Aging*, *17*(3), 423–434. https://doi.org/10.1037/0882-7974.17.3.423

Rosenberg, M. (1965). Self-esteem and the adolescent. (Economics and the social sciences: Society and the adolescent self–image). *New England Quarterly*, *148*(2), 177–196. https://doi.org/10.1353/tj.2015.0042

Ryan, R. M., & Brown, K. W. (2003). Why we don't need self–esteem: On fundamental needs, contingent love, and mindfulness: Comment. *Psychological Inquiry*, *14*(1), 71–76.

Sahranç, U., Çelik, E., & Turan, M. E. (2018). Mediating and moderating effects of social support in the relationship between social anxiety and hope levels in children. *Journal of Happiness Studies*, *19*(4), 1003–1019. https://doi.org/10.1007/s10902-017-9855-0

Saleebey, D. (2018). *The strengths perspective in social work practice* (L. Yawen, & D. Lijie Trans.). East China University of Science and Technology Press. (Original work published 2008).

Sarason, B. R., Pierce, G. R., Shearin, E. N., Sarason, I. G., Waltz, J. A., & Poppe, L. (1991). Perceived social support

and working models of self and actual others. *Journal of Personality and Social Psychology*, *60*(2), 273–287. https://doi.org/10.1037/0022-3514.60.2.273

Sarsour, K., Sheridan, M., Jutte, D., Nuru-Jeter, A., Hinshaw, S., & Boyce, W. T. (2011). Family socioeconomic status and child executive functions: The roles of language, home environment, and single parenthood. *Journal of the International Neuropsychological Society: JINS*, *17*(1), 120–132. https://doi.org/10.1017/s1355617710001335

Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review*, *115*(2), 336–356. https://doi.org/10.1037/0033-295X.115.2.336

Sherman, D. A., & Cohen, G. L. (2006). The psychology of self–defense: Self–affirmation theory. *Advances in Experimental Social Psychology*, *38*, 183–242. https://doi.org/10.1016/S0065-2601(06)38004-5

Shi, B., & Shen, J. (2007). The relationship between family socioeconomic status, intelligence, and internal motivation and creativity. *Psychological Development and Education*, *1*, 30–34.

Statistical Bulletin of the People's Republic of China on National Economic and Social Development in 2020. (2023). Retrieved August 10, 2023 from http://www.stats.gov.cn/xxgk/sjfb/zxfb2020/202102/t20210228_1814159.html

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*, *69*(5), 797–811. https://doi.org/10.1037/0022-3514.69.5.797

Stricker, L. J., & Lewis, D. (2006). Stereotype threat: A clarification. *Science*, *312*(5778), 1310–1312. https://doi.org/10.1126/science.312.5778.1310b

Sun, Q. (2007). *Revision of the self–esteem scale* [Unpublished doctorial dissertation]. Ji'nan.

Sutin, A. R., Stephan, Y., Gerend, M. A., Robinson, E., Daly, M., & Terracciano, A. (2020). Perceived weight discrimination and performance in five domains of cognitive function. *Journal of Psychosomatic Research*, *131*, 109793. https://doi.org/10.1016/j.jpsychores.2019.109793

Thoits, P. A. (2011). Perceived social support and the voluntary, mixed, or pressured use of mental health services. *Society and Mental Health*, *1*(1), 4–19. https://doi.org/10.1177/2156869310392793

Tian, Y., Ming, H., Huang, S., & Zhang, H. (2020). Discrimination increases the association between parental and adolescent allostatic load in Chinese rural-to-urban migrants. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, *66*(4), 499–505. https://doi.org/10.1016/j.jadohealth.2019.11.303

United Nations International Children's Emergency Fund. (2023, February). More than a billion reasons: The urgent need to build universal social protection. https://www.unicef.org/documents/urgent-need-for-universal-social-protection

Wang, J.-L., Hsieh, H.-F., Assari, S., Gaskin, J., & Rost, D. H. (2018). The protective effects of social support and engagement coping strategy on the relation between perceived discrimination and psychological distress among Chinese migrant children. *Youth & Society*, *50*(5), 593–614. https://doi.org/10.1177/0044118X15619804

Wang, Y. A., & Rhemtulla, M. (2021). Power analysis for parameter estimation in structural equation modeling: A discussion and tutorial. *Advances in Methods and Practices in Psychological Science*, *4*(1), 251524592091825. https://doi.org/10.1177/2515245920918253

Wang, Z., & Guo, Z. (2022). Standard Construction and multidimensional measurement of children's relative poverty: Based on a special survey in Liangshan Prefecture, Sichuan Province, China in 2021. *Rural Economy*, *40*(8), 1–11.

Weintraub, S., Dikmen, S. S., Heaton, R. K., Tulsky, D. S., Zelazo, P. D., Bauer, P. J., Carlozzi, N. E., Slotkin, J., Blitz, D., Wallner-Allen, K., Fox, N. A., Beaumont, J. L., Mungas, D., Nowinski, C. J., Richler, J., Deocampo, J. A., Anderson, J. E., Manly, J. J., Borosh, B., … Gershon, R. C. (2013). Cognition assessment using the NIH toolbox. *Neurology*, *80*(11 Suppl 3), S54–S64. https://doi.org/10.1212/wnl.0b013e3182872ded

Weng, J., & Shen, J. (2009). A comparative study of perceived discrimination self–esteem and problem behavior among disadvantaged children from different families. (Abstract). *A Collection of Abstracts of Papers from the 12th National Congress of Psychology*, *12*, 129.

Wong, D. F. K., Chang, Y., He, X., & Wu, Q. (2010). The protective functions of relationships, social support and self-esteem in the life satisfaction of children of migrant workers in Shanghai, China. *International Journal of Social Psychiatry*, *56*(2), 143–157. https://doi.org/10.1177/0020764009102755

Xia, X. (2020). The relation between family socioeconomic status and children's school readiness: The mediating role of parental involvement. *Contemporary Education Forum*, *19*(5), 64–73. https://doi.org/10.13694/j.cnki.ddjylt.20200612.002

Xu, F., Zhang, W., & Zhang, L. (2010). The Influence of family function on adolescents' sense of alienation: Moderated mediating effect. *Acta Psychologica Sinica*, *41*(12), 1165–1174. https://doi.org/10.3724/SP.J.1041.2009.01165

Yang, C., Zhou, Y., Cao, Q., Xia, M., & An, J. (2019). The relationship between self-control and self-efficacy among patients with substance use disorders: resilience and self-esteem as mediators. *Frontiers in Psychiatry*, *10*, 388–388. https://doi.org/10.3389/fpsyt.2019.00388

Yu, M., Zhou, Y., Liu, T., & Wang, W. (2020). A comparison of children's self–esteem in the poverty–stricken areas of "Han, Bu, Miao and Shui" in southern Guizhou. *Chinese Journal of Health Psychology*, *28*(10), 1523–1527. https://doi.org/10.13342/j.cnki.cjhp.2020.10.020

Zahodne, L. B., Sharifian, N., Kraal, A. Z., Zaheed, A. B., Sol, K., Morris, E. P., Schupf, N., Manly, J. J., & Brickman, A. M. (2021). Socioeconomic and psychosocial mechanisms underlying racial/ethnic disparities in cognition among older adults. *Neuropsychology*, *35*(3), 265–275. https://doi.org/10.1037/neu0000720

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2