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Examining the relationship of empathy, social support, and prosocial behavior of adolescents in China: a structural equation modeling approach

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Prosocial behavior acting as a precondition for shaping ideal interpersonal relationships, is curial in the development of a person's social competence. This study examined the association between empathy and prosocial behavior in a sample of 1171 adolescents in China. An empathy questionnaire, social support rating scale, and helping attitude scale were applied in the study. Empathy had an influence on prosocial behavior through social support as a mediating factor. The mediating effect of social support between empathy and prosocial behavior was mainly manifested through perceived social support. The current findings imply that cultivating the empathy of adolescents and promoting their perceived social support may be effective to enhancing their prosocial behavior.

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Introduction

Prosocial behavior is a wide range of behaviors that voluntarily benefit others, social groups, or important parts of society and meet social expectations, including helping, sharing, donating, mutual aid, cooperation, and volunteering (Penner et al., 2005). It helps individuals to build positive relationships, allowing them to gain a sense of meaning and value (Klein, 2017; Zhao et al., 2017). Moreover, it can promote the positive social adaptation of individuals and has a positive significance for the survival and development of them (Lay & Hoppmann, 2015). Adolescence is a period of rapid social and moral development, and adolescent prosocial behavior has been found to be associated with a variety of positive outcomes, such as harmonious peer relationships and higher self-esteem (Fu et al., 2017; Zhang & Kou, 2011). Thus, prosocial behavior is an important developmental component of an individual's pre-adulthood (Lin & Li, 2005).

Empathy and prosocial behavior

Positive psychology believes that a person's positive qualities and behaviors should be cultivated in order to help individuals gain the opportunity and ability to experience happiness (Carr, 2013). The development of individual prosocial behavior is inseparable from the role of internal factors and the support of external factors. Empathy and social support are internal and external factors that have a positive effect on the development of individual prosocial behavior. In China, there are many empathy sayings in Confucian culture (Li et al., 2017), "Ji Suo Bu Yu, Wu Shi Yu Ren" (don't do to others what you don't want others to do to you). This proverb widely circulated in China has become an important rule of interpersonal interaction today, because it not only reflects the most basic respect between people, but more importantly, is the value of emotional education behind it. Empathy is considered to be an important civic quality (Li et al., 2017) and professional quality such as teachers (Bouton, 2016), doctors (Imran et al., 2013), and social workers (Zaleski, 2016). It is important for the development of each person's emotional functioning and is necessary for the maintenance and intimacy of individual social relationships. The lack of an individual's ability to empathize may lead to certain mental health and behavioral problems, which are not conducive to the development of their prosocial behavior.

A positive correlation between empathy and prosocial behavior has been found in the studies of different groups or age groups (Li et al., 2017; Pang et al., 2022; Van der Graaff et al., 2018). Empathy can predict an individual's willingness to help others (Bohns & Flynn, 2021). When empathy becomes an individual's pursuit of meaningful value (Betzler, 2019), empathy is more likely to lead to the occurrence of individual prosocial behaviors, such as donations, giving up seats, volunteering, and other helping behaviors (Persson & Kajonius 2016; Ramey et al., 2017). Moreover, when empathy is perceived by individuals as an emotional depletion, individuals tend to exhibit lower levels of empathy, tend to be self-centered, and develop selfishness values (Kashirskaya, 2020). Therefore, paying attention to and cultivating empathy ability from an early stage of individual growth will lay a good foundation for the individual's future social adaptation (Simon & Nader-Grosbois, 2021). Supporting children from an empathic perspective may promote their prosocial behaviors.

Social support and prosocial behavior

The development of prosocial behavior often requires individuals to grow up in a positive growth environment. In daily interactions, if individuals can often feel the support from society, such

as from teachers, peers, and others, they can show higher prosocial motivation with social support (Guo, 2017; Li et al., 2019). When individuals perceive a good and intimate interpersonal environment, they have a strong sense of belonging and promote altruistic behavior (Guzman et al., 2012; Twenge et al., 2007). Children who lack social support will have problems in their emotions and behaviors. They tend to put "self" at the center of interpersonal relationships, and give priority to their own thoughts and feelings in the process of interpersonal communication. When there is a lack of a certain emotional resonance with society and others (Liu et al., 2012), it is difficult to show altruistic motives, and it will show a lack of sharing behavior and cooperative spirit.

Empathy and social support

Since empathy has the value of maintaining interpersonal relationships, individuals with high empathy ability can more actively understand the care and support from others (Betzler, 2019). That is, they have a stronger ability to actively obtain support and can more actively understand the care and support from others. Emotionally competent individuals have sensitivity to care and support from the outside world. On the contrary, people of low empathy may not care about others' support and concern for them. This may further affect their attitude towards others. The relationship between empathy, social support, and prosocial behavior has attracted much attention recently (Nieblas et al., 2021). People with high empathy are more likely to perceive support and then exhibit higher prosocial behavioral tendencies (Hu et al., 2020). In particular, research has found that teacher support increases prosocial behavior toward bullied individuals through teacher empathic support (Nieblas et al., 2021).

The current study

Although some studies have focused on the influencing factors of prosocial behavior, existing studies have some limitations. First, previous studies have mostly explored the relationship between two variables, such as empathy and prosociality, or social support and prosociality, but less overall analysis from the internal and external factors of prosocial behavior, therefore, it was worthwhile to explore the three relationships and mechanism of action. Based on the biological emotion theory of prosocial behavior, this paper explored the influence of the two on prosocial behavior from the perspective of interpersonal emotion (Xiao et al., 2014). This study has attempted to understand the relationship of the intra-personal factors (e.g., empathy)—prosocial behavior, extra personal factors (e.g., social support), and prosocial behavior. Second, the existing research studies were mainly carried out in Western countries and related research in China is relatively rare. Prosocial behavior, as an individual behavior in a social context, is affected by the social and cultural environment, and the exploration in China will help enrich relevant research from a multicultural perspective. Third, although some studies have paid attention to the role of social support, they usually only focus on a certain dimension of social support or general social support, and do not examine the influence of subjective support, objective support, and support utilization in detail. The role of the three dimensions of social support between empathy and prosocial behavior may be different. The research questions of this study were:

- (1) What is the relationship between empathy and prosocial behavior?
- (2) Does social support play a mediating role? Does the sub-dimension of social support play a mediating role?

Methods

Participants and procedures. Students ($N = 1171$) from nine elementary schools in Henan Province in mainland China participated in the study. The survey was supported by the principals and teachers in the participating schools. Informed content was provided to the participants. The students were told they had joined the study voluntarily and could quit at any time they wanted. The head teachers explained the questionnaire guidance, distributed, and collected the questionnaires. After screening and eliminating the questionnaires with complete repeated answers and missing answers of more than one third, 1171 valid questionnaires were obtained, and the effective rate of the questionnaire was 94.06%. The demographic information of the participants is shown in Table 1. The average age of the students was 12.61 years old, and the standard deviation was 2.431, including 552 boys, accounting for 47.1%; and 619 girls, accounting for 52.9%. There were 599 students who were boarding at school, accounting for 51.2%, and 572 students who did not live on campus, accounting for 48.8%.

Measures

Empathy questionnaire. The Chinese version of the empathy questionnaire prepared by Richaud et al. (2017) was adopted (Richaud et al., 2017). The scale was applicable to adolescents with 15 items, including five dimensions: emotional contagion (e.g., “When I see someone crying who I do not know, I feel like crying”), self-awareness (e.g., “I immediately notice when someone feels bad”), perspective talking (e.g., “When I argue with someone, I try to understand what he or she is thinking”), emotional regulation (e.g., “I have fits of anger”), and empathic action (e.g., “If a child forgets his/her pencil case, I should lend him/her my school things”). A 4-point Likert scale was adopted from “1” = “never” to “4” = “always”. The higher the score, the stronger the empathy ability of the participants. In this study, the Cronbach’s α coefficient of the scale was 0.735, and the fitting index of CFA was acceptable ($\chi^2/df = 2.801$, $GFI = 0.976$, $AGFI = 0.962$, $RMSEA = 0.039$), indicating that the scale had good reliability and validity.

Social support. The social support rating scale for adolescents revised by Wang et al. (2002) was used to reflect the social support received by the adolescents. The questionnaire included 10 items, of which, the number of items in the three dimensions of subjective support (e.g., “How many close friends you have who can help and support you”), objective support (e.g., “What has been a source of comfort and concern for you in the past when you have encountered difficulties or emergencies”), and utilization of support (e.g., “What do you turn to for help when you are

in trouble”) were 4, 3, and 3, respectively. Subjective support was the emotional satisfaction of teenagers to be respected, supported, and understood. Objective support was the number of spiritual and material support sources obtained by teenagers from family members, relatives, and friends. The utilization of support was the utilization of teenagers’ social support. The total scores of all dimensions and all items of the scale as the indicators corresponding to the measured items were calculated. The higher the score, the better the social support the adolescents obtained. In this study, the Cronbach’s α coefficient of the scale was 0.635, and the fitting index of CFA was good ($\chi^2/df = 2.681$, $GFI = 0.989$, $AGFI = 0.975$, $RMSEA = 0.038$), indicating that the scale had good reliability and validity.

Help attitude scale. The helping attitude scale (HAS) compiled by Nickell (1998) was used in the prosocial behavior scale. The scale was used to measure prosocial behavior in a single dimension (e.g., “Helping others is usually a waste of time”). A 5-point Likert scale was adopted from “1” for “completely disagree” to “5” for “fully agree”. The content included positive and negative statements, of which 1, 5, 8, 11, 18, and 19 were negative statements and the rest were positive statements. The items related to negative expression were scored in reverse, and the average score of the scale was calculated as the indicator of prosocial behavior. The higher the score, the more prosocial behavior the participants had. In this study, the Cronbach’s α coefficient of the scale was 0.803, representing a good reliability, and the goodness of fit ($\chi^2/df = 2.841$, $GFI = 0.966$, $AGFI = 0.951$, $RMSEA = 0.040$) demonstrated a good validity.

Statistical analysis. This study used SPSS26.0 software to input and sort out the data, and carry out the descriptive statistics and correlation analysis on each variable. Amos26.0 software was used to conduct confirmatory factor analysis on each scale to test the structural validity, construct a structural equation model, and test the goodness of fit of the model for the three variables of empathy, social support, and prosocial behavior. Mplus8.3 software was further adopted to test the mediating effect of social support between empathy and prosocial behavior.

Results

Common method bias test. Owing to the study adopting the questionnaire method and the data being obtained by the subjects’ self-report, may have led to the common method bias effect. Therefore, this study used the Harman single factor test to test the common method bias. Exploratory factor analysis was carried out on all items of the scale; the principal component method was used to extract the common factor, and the partial correlation was obtained by separating the first common factor (Zhou & Long, 2004). The results showed that the variance explanation rate of the first factor without rotation was 15.515%, less than 40%. Therefore, there was no serious common method bias in the data of this study.

Descriptive statistics and correlational analysis of variables.

Descriptive statistics and Pearson correlation analysis were conducted on the three variables of empathy, social support, and prosocial behavior. The average, standard deviation, and correlation coefficient of each variable are shown in Table 2. The results showed that there was a significant positive correlation between empathy and social support ($r = 0.164$, $p < 0.01$) and prosocial behavior ($r = 0.333$, $p < 0.01$), and there was a significant positive correlation between social support and prosocial behavior ($r = 0.206$, $p < 0.01$). Further, Pearson correlation analysis was conducted on the three dimensions of social support,

Table 1 Demographics of the participants (N = 1171).

Students' information	n	100%
Gender		
Male	552	47.1
Female	619	52.9
Grade		
Grade 3-6	404	34.5
Grade 7-9	90	7.7
Grade 10-12	677	57.8
Boarding at school or not		
Yes	599	51.2
No	572	48.8
Whether your parents work outside the home		
Yes	758	64.7
No	413	35.3

Table 2 Mean, standard deviation, and correlation analysis of empathy, social support, and prosocial behavior.

	1	2	3
1 Empathy	1		
2 Social support	0.164**	1	
3 Prosocial behavior	0.333**	0.206**	1
M	2.629	37.500	3.968
SD	0.430	5.997	0.533

M mean, SD standard deviation.
** $p < 0.01$.

Table 3 Mean, standard deviation, and correlation analysis of empathy, subjective support, objective support, utilization of support, and prosocial behavior.

	1	2	3	4	5
1 Empathy	1				
2 Subjective support	0.126**	1			
3 Objective support	0.096**	0.138**	1		
4 Utilization of support	0.116**	0.421**	0.011	1	
5 Prosocial behavior	0.333**	0.206**	-0.005	0.159**	1
M	2.629	22.136	7.418	7.944	3.968
SD	0.430	3.677	2.760	2.233	0.533

M mean, SD standard deviation.
** $p < 0.01$.

empathy, and prosocial behavior. The mean, standard deviation, and correlation coefficient of each variable are shown in Table 3. The results showed that adolescents' empathy was significantly positively correlated with subjective support ($r = 0.126, p < 0.01$), objective support ($r = 0.096, p < 0.01$), utilization of support ($r = 0.116, p < 0.01$), and prosocial behavior ($r = 0.333, p < 0.01$). Subjective support was positively correlated with objective support ($r = 0.138, p < 0.01$), utilization of support ($r = 0.421, p < 0.01$), and prosocial behavior ($r = 0.206, p < 0.01$). Objective support was not significantly correlated with the utilization of support and prosocial behavior. There was a significant positive correlation between the utilization of support and prosocial behavior ($r = 0.159, p < 0.01$).

The mediation of social support between empathy and prosocial behavior. There was a significant correlation between adolescents' empathy, social support, and prosocial behavior, which could further test the mediating effect of social support. Amos26.0 software was used to build a structural equation model to analyze the mediating effect (Fig. 1). The model fitting adopted the variance maximum likelihood method to estimate the parameters (the data were standardized). The results showed that the fitting indexes were acceptable ($\chi^2/df = 2.434, GFI = 0.985, IFI = 0.977, TLI = 0.962, CFI = 0.977, RMSEA = 0.035$); the specific model and path coefficient are shown in Fig. 1. The bootstrap program in Mplus8.3 software was further used to test the significance of mediation effect (bootstrap = 5000), and the 95% confidence intervals were calculated. The results showed that the 95% confidence interval of "empathy → social support → prosocial behavior" path was [0.008, 0.130], and the confidence interval did not include 0, indicating that the mediating effect of social support was significant. The value of the mediating effect was 0.053, and the mediating effect accounted for 7.64%. The direct effect of empathy on prosocial behavior was 0.629,

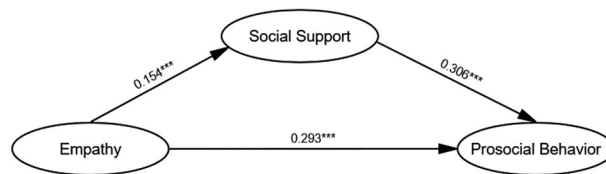


Fig. 1 The mediating role of social support. This figure shows the mediating role of social support. SEM applied to examine the relationship among empathy, social support, and prosocial support. It found empathy had a positive association with adolescents' prosocial behavior and social support played a mediating role between the relationship of empathy and prosocial behavior.

accounting for 92.36%. Therefore, social support had some mediating effects between empathy and prosocial behavior; that was, teenagers' empathy ability could not only directly affect their prosocial behavior, but also, could indirectly affect their prosocial behavior through the mediating effect of social support.

The same method was further used to test the parallel mediating effect of the different dimensions of social support between empathy and prosocial behavior (Fig. 2). The SEM results showed that the fitting indexes were acceptable ($\chi^2/df = 2.932, GFI = 0.964, IFI = 0.944, TLI = 0.929, CFI = 0.944, RMSEA = 0.041$). However, among the three dimensions, only the subjective support dimension played a mediation role between empathy and prosocial behavior. The specific model and path coefficient are shown in Fig. 2. In addition, according to the bootstrap test results, the 95% confidence interval of "empathy → subjective support → prosocial behavior" path was [0.015, 0.051], and the confidence interval did not include 0, indicating that the mediating effect of subjective support was significant. The mediating effect value was 0.030, and the mediating effect accounted for 7.24%. The direct effect of empathy on prosocial behavior was 0.384, accounting for 92.75%. Therefore, adolescents' empathy could not only directly affect their prosocial behavior, but also indirectly affect their prosocial behavior through social support, especially the subjective support in the dimension of social support.

Discussion

This study aimed to examine the relationship among adolescents' empathy, social support, and prosocial behavior by the structural equation model approach in the Chinese context, which could provide insight to promote adolescents' prosocial behavior. This study verified the results of previous studies, and also had some new findings.

This study found a significant positive correlation between empathy and prosocial behavior, indicating that empathy positively predicted the prosocial behavior of adolescents. This was consistent with previous research results (An et al., 2018; Carrizales et al., 2021; Ding & Lu, 2016; Pang et al., 2022; Roberts et al., 2014; Zhang et al., 2021). Ding and Lu (2016) found that empathy and prosocial behavior had a moderately positive correlation. Empathy is dynamically composed of three subsystems: cognition, emotion, and behavior. Prosocial behavior is also based on individual emotion and cognition, and the two are closely related. Carrizales et al. (2021) used a cross-lagged panel model to examine the bidirectional relations of empathy and prosocial behavior, and it was also found that adolescents with higher empathy tended to report higher prosocial behavior (Carrizales et al., 2021). Brain scientific evidence suggests that empathy can be used as an effective strategy to regulate emotions and increase prosocial behavior (Stevens & Taber, 2021). The Empathy Altruism Hypothesis holds that empathy for another person will produce a kind of empathic concern yielding altruistic motivation

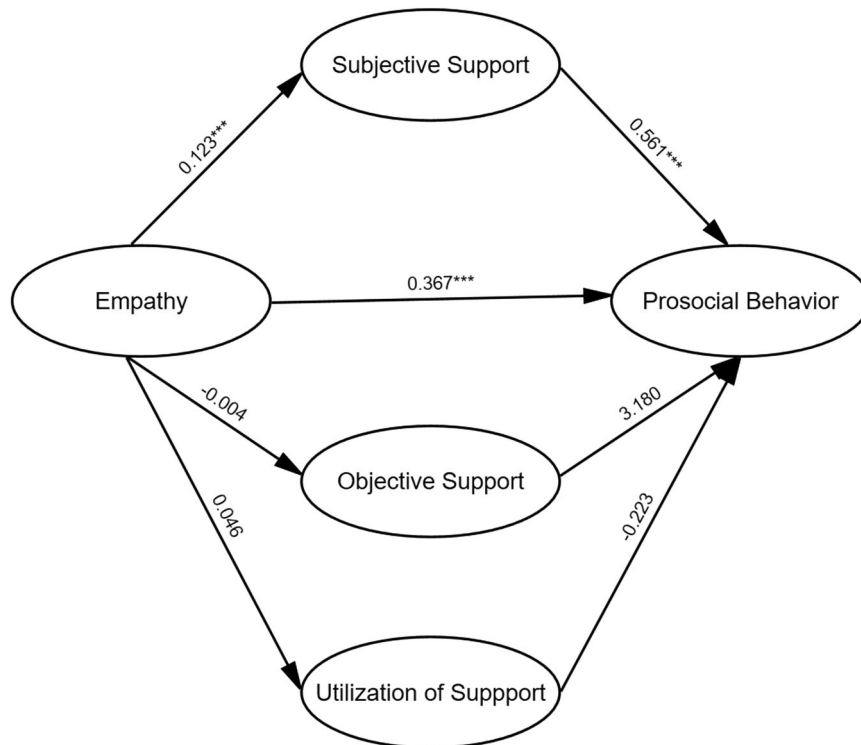


Fig. 2 The parallel mediating role of social support sub dimension. This figure shows the mediating role of sub-dimensions of social support between social support and prosocial support. SEM applied to examine the relationship among them. It found only the subjective support played a partial mediating role between the relationship of empathy and prosocial behavior.

to increase the welfare of the person (Batson, 1991). Therefore, when individuals perceive and share the misfortune of others, emotions such as empathy, sympathy, and compassion will occur (Batson et al., 1981). The stronger the emotion, the more motivated the individual is to help others out of their difficulties. The stronger the motivation, the more likely the individual is to engage in helpful and altruistic behavior.

This study further explored the influence mechanism of empathy on adolescents' prosocial behavior. Firstly, empathy was positively correlated with social support, which was consistent with previous studies (Miller et al., 2019; Song et al., 2019). Individuals with empathy ability can perceive others' feelings and give feedback, which can positively predict their interpersonal skills (Cano & de C Williams, 2010; Chen et al., 2011; de Waal, 2008). Adolescents with high empathy are more likely to perceive the emotions and feelings of others and make others feel friendly and warm, thus, shortening the distance between people (Zhang et al., 2019), establishing a good interpersonal relationship with others. Good interpersonal relationships mean more social support to a certain extent (Jordan & Foster, 2016), so adolescents with high empathy can perceive more social support.

Secondly, social support positively predicted prosocial behavior, which was consistent with relevant research results (Guo, 2018; Haller et al., 2022; Li et al., 2021; Ye, 2014; Zhu et al., 2016). Social support can make individuals believe that they are cared for and accepted (Dreyer & Schwartz-Attias, 2014). According to a meta-analysis conducted by Lee et al. (2014), teachers' support, parents' encouragement, and peer support were protective factors for children's and young people's prosocial behaviors. Individuals who receive good social support (support from family members, praise from teachers, encouragement from classmates, etc.) are more confident (Baumeister et al., 2003) and have a higher level of hope (Li & Yin, 2015), thus, promoting individuals to produce more prosocial behaviors (Hu et al., 2021).

Thirdly, this study found that social support played a partial mediating role in the relationship between empathy and prosocial behavior. Adolescents with high empathy tended to perceive more social support and further showed more prosocial behaviors, which was consistent with previous studies (Hameed et al., 2018; Ju, 2019; Wang & Wu, 2020; You et al., 2022). Studies have shown that empathy enables individuals to have good interpersonal relationships and, thus, obtain more social support (Stephan & Finlay, 1999). According to the buffer effect hypothesis (Cohen & Wills, 1985), social support helps adolescents to form positive cognition, effectively cope with stressors in various aspects of life, reduce the impact of negative life events, and form adaptive social networks, laying the foundation for the generation of prosocial behaviors. Therefore, adolescents' perception of more social support will help to increase the formation of their prosocial behavior.

It is worth noting that the parallel mediating effect of this study further indicated that the mediating effect of social support between empathy and prosocial behavior was mainly manifested through subjective support. Subjective support refers to individuals' subjective perceived emotional satisfaction of being respected, supported, and understood (Wang et al., 2002). Perceived support, compared to received support, has been more consistently found to have stress buffering effects (Guo, 2018; Norris & Kaniasty, 1996; Tak & Mccubbin, 2002). Subjective support requires the participation of individual cognition and emotion, consistent with the internal systems involved in empathy and prosocial behavior (Hobfoll, 1988). When individuals received subjective support, they would be embedded in a social system believed to provide love, caring, or sense of attachment to a valued social group (Guo, 2018; Hobfoll, 1988). Sufficient subjective support promotes adolescents to have a strong sense of security and values, which is conducive to the improvement of their prosocial behavior (Memmott-Elison et al., 2020). Therefore, if individuals perceive enough support, they

will be encouraged and guaranteed to externalize their internal cognition and emotional state into altruistic behavior towards others. In other words, adolescents' empathy can have a positive influence on their prosocial behavior indirectly through social support, especially subjective support.

Practical implication. In view of the value of empathy and social support for individual prosocial performance, the future education of adolescents should focus on cultivating the empathy ability of children and adolescents, especially for adolescents learning in boarding schools. School administrators and teachers should dig out stories and learning content in Chinese culture that can cultivate children and adolescents' empathy ability, and teach their empathy perception ability. Improving the development of children's socio-emotional abilities and promoting the development of their civic character, may help them in their future studies or in some pro-social or dedicated careers. At the same time, school administrators should strengthen the construction of the school's support system for children and adolescents, so that students can feel a positive school psychological and cultural atmosphere. Creating a good peer support and teacher support environment promote students to be more actively involved in their learning. Moreover, it contributes to adolescents' altruistic behavior and willingness to help others.

Limitations and further research. There are also some limitations in this study. First, the research participants in this study were only from one province in China. The empathy and prosocial behavior of individuals may have been influenced by the specific education and culture characteristics of the area, and may have shown a certain collective tendency. Future studies should extend the sample to different areas-provinces in China to examine whether there are regional differences in the performance of children and adolescents on their empathy and prosocial behavior. The second limitation is that the report of the empathy and prosocial behavior in this study only investigated one performance of the participants at the same fixed time node, which would be considered to be a cross-sectional study. Follow-up studies should be carried out in future research to test whether changes in the participants' empathy ability and social support perception have a persistent effect on prosocial behavior. Third, the evaluation of the three variables in this study was carried out by means of questionnaires, which were obtained through children's self-reports. Future studies can try to use different research methods, such as simultaneously collecting variables for teachers, parents, and students in terms of empathy or prosocial behaviors, or assessing children's empathy ability and prosocial level through simple experiments or tests. Through these improvements, the research conclusions of this study could be tested or related research topics expanded. Fourth, the study focused on examining the relationship between empathy and prosocial behavior. Empathy toward others also enhances emotional well-being, interpersonal relationships, and life success (Shanafelt et al., 2005; Tkach, 2006). Further studies should explore the related associations to obtain a more comprehensive understanding.

Data availability

The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

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Competing interests

The authors declare no competing interests.

Ethical approval

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of Beijing Normal University.

Informed consent

Written informed consent was obtained from the participants by the help of their teachers, which was delivered and collected with the questionnaire together.

Additional information

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