


# Evaluation of the Effect of Parental Participation on Chinese Adolescent Behavioral Development Through the Mediating Effect of Peers: A Moderated Mediation Model

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**Background:** With the rapid changes in the social environment, adolescents are facing increasing academic pressure and challenges to their physical and mental development in the socialization process. The purpose of this study was to investigate the influence mechanisms of parental participation on adolescent behavioral development (learning persistence, expressive language ability and knowledge absorption ability), revealing the mediation role of adolescent positive and negative peer interactions between parental participation and behavioral development, and whether differences in parents and children's educational expectations moderate this process.

**Methods:** This study was measured using the Parental Participation Questionnaire, Peer Interaction Questionnaire, Behavioral Development Scale, and Educational Expectancy Gap from the China Education Panel Survey. A total of 7730 seventh-grade students and their parents were invited to participate, to establish a moderated mediation model, and the significance of the mediation effect was tested using the bias-corrected percentile Bootstrap method.

**Results:** (1) High frequent parental participation has a significant positive effect on adolescent behavioral development, including behavioral participation, emotional participation, and educational participation all exerting varying degrees of positive influence, as well as positively influencing adolescents' peer interactions. (2) Positive and negative peer interactions play the mediation role of 12.3% and 2.5% respectively in the process of parental participation affecting adolescent behavioral development. (3) Comparing "educational expectation gap - equal", the "educational expectation gap - high" negatively moderates the effect of parental participation on adolescent behavioral development and positive peer interaction (inhibitory effect), the "educational expectation gap - low" positively moderates the effect of parental participation on negative peer interaction (facilitation effect), which meant that the "educational expectation gap - equal" between parents and children is a more desirable state.

**Conclusion:** These findings provide empirical support and effective operational suggestions to further promote positive adolescent behavioral development. Particularly for developing countries, it is recognized that positive parental participation and peer interaction, as well as equal educational expectation of parents and children, are protective factors for adolescent development.

**Keywords:** parental participation, positive peer interaction, negative peer interaction, educational expectation gap, behavioral development

## Introduction

International organizations have issued a series of publications to promote the development of adolescents. The United Nations Children's Fund (UNICEF) published in 2020 the "Worlds of influence: Understanding what shapes child well-being in rich countries", which assesses the material well-being, health, education, behavior, and living environment of children and adolescents in 29 countries with developed economies. This report focused on the positive or negative behavioral development of children and adolescents from subjective and objective family environments, and found that

behavioral developmental problems among adolescents are still prominent worldwide. For example, the 11–15 years old group is reported to have an alcohol abuse rate of about 20%.<sup>1</sup> The World Health Organization (WHO) and United Nations Educational Scientific and Cultural Organization (UNESCO) together published the “WHO guideline on school health services” and “Making every school a health-promoting school: global standards and indicators for health-promoting schools and systems”,<sup>2,3</sup> listing priorities for monitoring the physical, social, emotional, and psychological aspects of adolescent development. According to WHO data, about 200000 cases of homicide (including a range of behaviors from the use of more serious sexual and physical assaults to achieve bullying and physical combat to homicide) occur worldwide each year among young people aged 10–29 years old, accounting for 43% of the total number of homicides globally,<sup>4</sup> which shows that the development of adolescents worldwide is not optimistic. Based on this, high priority is given to the positive behavioural development of adolescents, which influences both the growth of individual and his or her ability to integrate into society, as well as contributing to the progress of human society and the blossoming of civilization.

Both the world of the child and the world around the child affect the learning persistence, self-efficacy, and social behavior of adolescents. Especially from childhood to adolescence, children mainly go back and forth between family and school peers, with the family as the main place for adolescents to realize socialization. In this setup, parental participation plays an irreplaceable role in the process of socialization of adolescents, when the time for adolescents to interact with peers of the same or similar age (peer interaction) is gradually increasing. Meanwhile, peer interaction in schools is increasingly affecting the positive or negative behavioral development of adolescents. Therefore, we put parental participation within the family and peer interaction in the school in the same framework, given the significance of further exploring the influence mechanism of adolescent behavioral development.

Adolescent behavioral development has always been an issue of close concern in the academe. Erikson’s psychosocial development theory emphasizes that continuous attention to the behavioral development of adolescents is the key to realizing their moral socialization.<sup>5</sup> Moreover, behavioral development in the adolescent stage reflects the development of the individual’s self-control, awareness, and evaluation of their developmental needs, as well as the overall state of self-regulation, or the individual’s ability to choose, understand, memorize, and use information in the environment to make judgments and decisions. Many studies have focused on adolescents’ academic performance and school behavior,<sup>6,7</sup> prosocial and problem behavior,<sup>8,9</sup> and social behavior development.<sup>10,11</sup> For example, research has found that parents’ cultural preferences, tastes, or reading tastes play a subtle role in their children’s disposition, emotions, and mentality, and strengthen their children’s cognitive, ethical, and other social activities.<sup>12</sup> Parents accompanying their children to museums, documenting daily activities, and communicating more with their children’s teachers can better foster affective and information literacy, improve math scores and reading skills, and directly stimulate the development of cognitive behaviors.<sup>13,14</sup> Meanwhile, perceived parental acceptance-rejection influences adolescents’ anxiety and aggressive behavior.<sup>15</sup> Parental psychological control, parental involvement, and family education also directly affect adolescents’ social adjustment, academic performance or social development,<sup>8,10,16,17</sup> suggesting that processual family factors dynamically influence adolescents’ behavioral development and that parental influence on children’s socialization continues from infancy through adulthood.

Peer interaction is another field that influences the development of adolescent behavior, encompassing social norms, social skills, values, and positive or negative cognitive attitudes. The relationships that adolescents establish within school influence their behavioral and cognitive development—adolescents’ social behavior or academic performance is influenced by the friendship quality,<sup>18</sup> friends gained and lost,<sup>19</sup> and peer personality.<sup>20</sup> When adolescents make friends with those whose behaviors do not conform to what is socially acceptable, their behavioral development is negatively affected; negative peer friendships increase adolescents’ problem behaviors.<sup>21</sup> Peer interaction quality, along with self-emotional regulation and adaptive capacity, is a mediating variable in studies that have examined parent-child interactions and parental support affecting adolescents’ academic performance and investigated the process mechanisms by which parents influence their children’s development.<sup>7,22</sup> However, these studies have not expanded on the research on the existence of moderating mechanisms.

In addition, in traditional Chinese values, parents require their children to be excellent through high expectations, especially from the time their children start junior high school. Parents are concerned about their children’s academic

performance and social-emotional and social-behavioral development. Adolescents in junior high school face higher educational expectations from their parents, which is especially reflected in Chinese students. Relevant studies have pointed out that moderate parental expectations of children are a positive force that contributes to the establishment of correct values, whereas high parental expectations can make goals unattainable, leading to parent-child relationship tension, child stress and aversion to schooling, and negative behavioral performance.<sup>23</sup> The magnitude of this educational expectation gap between parents and children within the family can potentially modulate the process of parental participation influence on adolescents' peer interactions and behavioral development. However, studies have focused on the single dimension of family factors or significant others, and have not emphasized the process by which both parental participation and peer interaction together influence adolescent behavioral development, as well as the moderating effect of the gap between parents' and children's educational expectations in this process. Therefore, we aimed to explore the behavioral development of Chinese adolescents, with recognition for the necessity of placing the behavioral development of adolescents in the framework of parental participation and peer interaction. We also accounted for the factors of the parents' and children's educational expectation gap to predict the behavioral development of adolescents in the process of socialization, to help define intervention measures suitable for promoting the behavioral development of Chinese adolescents.

## Literature Review and Hypotheses

### Effects of Parental Participation on Adolescent Behavioral Development

Adolescents are at a stage where behavioral development plasticity is strong. In early adolescence (about 11 to 14 years of age), adolescents focus on seeking opportunities to acquire new skills, make independent decisions, control self-behavioral development, build relationships with peers outside the family, meet challenges, and seize learning opportunities to develop their identity and self-concept. In clinical practice, child-adolescent behavior is measured in terms of comparing the dimensions of anxiety mood, depression, oppositional defiant disorder, conduct disorder, and attention deficit hyperactivity disorder.<sup>24</sup> Children's behavior is affected by parental participation. Particularly, clear family boundaries, good parental interactions, and attentive care of children can correct children's behavior. Moreover, strengthening parenting and good parent-child relationships can reduce the risk of conduct disorder and attention deficit hyperactivity disorder in adolescents, and reduce internalizing and externalizing problems as well as dysfunction.<sup>25</sup>

In psychology, parental relationship quality is correlated with adolescent internalizing or externalizing psychosis (adolescent self-report); for example, perceived parental relationship strain increases adolescents' risk of poor mental health, an effect that lasts into old age. Conversely, more positive parental supervision and more care provided by parents give children a higher sense of well-being. Thus, children have fewer psychological problems, as adolescents, exhibit fewer problematic behaviors and more positive behavioral development.<sup>26</sup> In a meta-analysis based on 448 parental involvement studies, Barger et al (2019)<sup>27</sup> found correlations between parental participation in their child's schooling and their child's long-term academic adjustment (achievement, engagement, and motivation): parental participation is positively associated with adolescents' social competence ( $r = 0.12$ ) and emotional regulation ( $r = 0.17$ ) and negatively associated with juvenile delinquency ( $r = -0.15$ ). A study of 809 Ethiopian high school students also found significant correlations between children having depression, school adjustment problems, and self-esteem problems with perceived parental participation (emotional and behavioral participation).<sup>28</sup> Two types of parental participation (parent-teacher communication and parent-teacher trust) have been associated with increased adolescents' sense of belonging, reduced adolescents' externalizing behaviors and teacher-student conflict, and, academically, positive parent-teacher relationships. According to Li et al (2023),<sup>29</sup> these significantly increase adolescents' reading achievement, classroom engagement, and overall reading achievement, suggesting that parental participation is positively correlated with adolescents' academic achievement and psychological development. Moreover, parental participation both helps adolescents adjust to their school environments and positively predicts adolescents' socio-emotional adaptation. Parental engagement in family learning has also been found to have a positive effect on the expressive language skills of children with developmental problems, with active parental participation having children perform better in expressive language skills compared with their peers in the same conditions.<sup>30</sup>

The family, which is the main place for adolescents to realize socialization and shapes adolescents' good social behavior,<sup>7</sup> is composed of several subsystems. Parental participation is the core element of the family system, and it directly determines the physical and mental development of children. Parental participation is mainly divided into material family resources and non-material support resources. On the one hand, parents are involved in their children's development through investing resources (eg, money for books, clothes, and extracurricular activities) to facilitate their children's healthy development to the maximum degree. Parental participation belongs to the category of parenting behaviors, which reflect parenting perceptions, parenting styles, and emotional expressions toward children. Different parenting behaviors (caring, indifferent, overprotective) influence adolescents' emotional, behavioral, and cognitive development.<sup>31</sup> On the other hand, parental participation involves non-material support, including interrelationships between parents and children (connective social capital), between parents and the community (bridging social capital), and between parents and the school (institutional social capital).<sup>32</sup> Particularly, parental participation is an important category of family social capital, which is measured as "parents discussing with their children what is happening at school", "participation in home-school associations", "supervising children's homework" and "proactive contact with teachers" in the evaluation of the impact on children's behavioral development.<sup>33</sup>

Both family and support resources influence children's cognitive development (eg, science achievement) and behavioral development (eg, dropout behavior), and parents indirectly influence adolescents' academic achievement through the way they are involved in school (emotional, behavioral, and cognitive involvement).<sup>13,34</sup> Parental participation also affects adolescents' emotional functioning and problem behaviors directly or indirectly through behavioral and emotional participation.<sup>35</sup> Knowledgeable, successful families are beneficial to children's cognitive and social development, and a good family atmosphere, parent-child interactions, and parenting behaviors can promote children's physical and mental health and academic achievement.<sup>7,36</sup>

Parental educational participation is a predictor of children's socio-emotional development (self-awareness, self-management, social awareness, relational skills, and responsible decision-making). Thus, parents' school involvement, parent-teacher trust, and home-school communication are positive predictors of a child's socio-emotional development.<sup>37</sup> When parents are active in directing homework and checking homework activities, they are well able to prevent students' behavioral problems. Conversely, noisy family environment and strained parental relationships tend to cause children's emotional dysregulation; one or both parents who do not live with their children tend to bring about companionship absence, both of which inhibit children's development of emotional recognition and rules understanding,<sup>38</sup> these in turn affect adolescents' behavioral development.

### Mediation Effect of Positive or Negative Peer Interaction

Adolescents spend more time with peers than in other social circumstances. Adolescents are influenced by relationships with adults who have more power, higher cognitive ability, and more knowledge experience than them. For example, parents discussing school with their children and monitoring their children's home time, places visited, friendships, and homework completion can increase the children's contact with more learning-active peers and reduce the children's problem behavior.<sup>39</sup> Thus, parental education participation can encourage children to establish good interpersonal relationships. Second, adolescents are influenced by peers who have similar social, physical, and psychological traits. For example, perceived peer norms and parental participation both influence adolescents' attitudes and behaviors toward smoking and drinking, with perceived peer norms being more relevant than perceived parental participation.<sup>40</sup> Researchers have explored adolescents' effortful control, cognitive control, emotion regulation, executive functioning, self-control, and decision making in relation to the type and quality of peer interactions (rejection or acceptance). Results have shown that peer character, peer support, friend quality, and peer rejection in peer groups influence adolescents' self-regulation, sense of loneliness, language expression, and academic competence. Among them, peer rejection or exclusion can reduce adolescents' persistence abilities in the face of difficulties and setbacks, such as attention, independence, initiative, and persistence.<sup>41–43</sup>

Self-regulation development serves as a foundation for adolescents' emotional and behavioral development. Indeed, studies have identified a significant correlation between peer acceptance and adolescents' subsequent self-regulation skills (eg, effortful control and emotion regulation), with positive peer interactions promoting the development of

adolescents' self-regulation skills.<sup>44</sup> Conversely, in adolescents who make more friends with those not accepted by society, the negative peer friendship increases their drinking and smoking,<sup>40</sup> anti-social,<sup>45</sup> and violent behaviors.<sup>21</sup> Negative peer interactions refer to making friends with peer partners who break school rules and regulations, social morals, or even legal system behaviors.<sup>46,47</sup> Problematic and negative behaviors among peers have a peer contagion effect. For example, peer group substance use increases the probability of adolescents' risky or problematic behaviors, all of which indirectly influence adolescents' anti-social behaviors or self-regulatory abilities.<sup>48</sup>

In sum, peer interaction plays three functions in adolescent socialization. First, it provides an important reference for the development of adolescents' social competence and the acquisition of successful social skills. Interaction with peers on an equal footing is useful for learning to acquire interaction skills, avoiding aggressive behavior, and facilitating the establishment of correct values. Second, positive peer interactions directly influence the acquisition of adolescents' sense of security and belonging. Third, positive peer interactions facilitate adolescents' creative self-concept and personality development.

Adolescents' established elder relationships with adults influence their peer interactions. Research has verified that parent-child relationships, behavioral supervision, and emotional participation influence children's peer interactions and peer friendships. Moreover, strict parental supervision avoids peer aggression and problem behaviors in children, while fostering self-regulatory abilities. In particular, children whose fathers are actively participating in parenting have more positive cognitive and emotional outcomes from infancy to adolescence.<sup>49,50</sup> Parental emotional support and behavioral affirmation both differentially affect adolescent peer interaction (rejection or acceptance by peer); indifferent parent-child relationships reduce adolescents' possibility of high-quality peer relationships.<sup>51</sup> Positive parental participation in education or less severe punishment can improve children's social skills and encourage them to build good peer relationships.

However, in adolescents' exposure to negative peers and crime, parents' excessive restrictions on their children's social interaction may hinder the development of autonomy and increase the risk of making bad friends.<sup>52</sup> Related research has also pointed out that strict parental supervision delays the onset of an adolescent's initial sexual behavior, whereas positive parental education reduces an adolescent's exposure to problematic peers. That is, peers indirectly influence adolescents' attitudes toward sex or other behaviors, with peer relationships playing a mediation role.<sup>53</sup>

The relation between parental supervision, peer risk involvement, and adolescent sexual risk behavior has also been explored. With increasing peer risk involvement, adolescents have higher tendencies toward sexual risk behavior, whereas stricter parental supervision reduces adolescent sexual risk behavior. As such, parental supervision mitigates the influence of peers on adolescent risk involvement, and peer interaction plays a mediation role between parental supervision and adolescent sexual risk behavior.<sup>54,55</sup> Peer relationships also influence adolescents' academic and non-academic functioning through school involvement; peer relationships are important variables that indirectly influence academic performance and self-esteem.<sup>56</sup> As such, different types of parental participation patterns (parental supervision, educational style, emotional participation) influence adolescent peer interactions, which in turn influence adolescents' self-regulatory abilities, aggressive behaviors, or sexual risk behaviors. Positive or negative peer interactions may thus transmit the effect of parental participation in influencing adolescent behavioral development.

### Moderating Effect of Educational Expectation Gap

Educational expectation belongs to a social cognitive category that includes both the sender and the desired person. When both are the same, it is called self-educational expectation. When the sender is a parent and the desired person is a child, it is called parental educational expectation.<sup>57,58</sup> Identity Control Theory points out that parental educational expectation is regarded as a reflective evaluation of important others. It is an important type of social environment information input.<sup>59</sup> Meanwhile, self-educational expectation is regarded as an individual's identity standard for the current social role. Inconsistencies between the two can cause the individual to feel stressed or psychologically distressed, leading to an impact on their development. Thus, the educational expectation gap can act as a force that balances the parent-child relationship within the family.

Studies have pointed out that the higher the parents' and teachers' expectations of students, the better their mathematics achievement will be. Parents' educational participation at school, teacher-student relationships, and



home-school communication moderate the relation between parents' educational expectations and children's academic achievement; parents who maintain high academic and life expectations for their children can promote their children's development.<sup>60</sup> A survey of 5369 New Zealand high school students found that students' self-reported educational ambitions, motivation, and relationships with peers and teachers predicted academic achievement, and that low-expectancy parents and teachers predisposed students to poor performance and failure to complete school.<sup>61</sup> Other studies have emphasized that moderate parental expectations are more important. A study examining the relation between academic achievement and the direction of the difference in educational expectations between parents and children in 1092 high school students in Spain found that higher or lower parental educational expectations than self-educational expectations leads to lower reading and math scores, compared with students whose parental educational expectations are in line with their self-educational expectations.<sup>62</sup> Thus, parental educational expectations that are either too low or too high can create an aversion to learning in their children and inhibit goal attainment.<sup>23</sup> Parents' moderate educational expectations for their children will make their children's goals more achievable, compared with the way parents check their children's homework and keep in touch with their teachers.<sup>36</sup> Parents' educational expectations for their children can affect adolescents' academic success to varying degrees and in varying directions, and play a moderating role in adolescents' academic competence. One study reported that parents and peers influence students' financial literacy, which then influences students' saving behavior, with student self-control (self-educational expectations) moderating the relation between financial literacy and saving behavior, taking into account parental effects, peer influence, and self-control.<sup>63</sup> Therefore, the educational expectation gap between parents and children may moderate the process of parental participation influencing adolescent behavioral development.

Parents' educational expectation is not always consistent with their children's educational expectation, and their perceptions of future educational goals are likewise different.<sup>64</sup> High levels of parental expectations urge parents to provide more material base for their children, provide more external support, and invest more time and energy to accompany their children.<sup>65</sup> Parents' attitudes and behaviors can help children understand and recognize themselves, enhance the development of close relationships with their children, and promote the making of positive close friends and quality friendships in children. Meanwhile, low levels of parental expectations may cause children to not take life and learning seriously, resulting in poor academic performance and low self-efficacy.<sup>66</sup> A study using data from the America Longitudinal Survey of Adolescent Health reported that adolescents' friendships with peers with higher educational aspirations does not lead to higher educational aspirations, and that family bonds and parental participation amplify adolescents' educational aspirations, suggesting that differing educational expectations moderate the effects of parental influences on adolescent development.<sup>67</sup> Meanwhile, different parenting styles affect children's abnormal peer interactions, with parental socioeconomic status and effective parenting behaviors moderating the effect of parenting styles on transgressive peer interactions.<sup>68</sup> Indeed, parental expectations and perceived peer emotional support influence adolescents' in-school competence, and peer emotional support positively influences adolescents' academic development, where long-term parental expectations are proven to be an important factor in adolescents' academic attainment and behavioral development.<sup>69,70</sup> The gap between parents' and children's educational expectations also affects the quality, size, and structure of children's peer interactions. Adolescents' regulatory emotional self-efficacy also mediates the link between academic stress and test anxiety, with different parental educational expectations moderating the effect of academic stress on regulatory emotional self-efficacy. The negative effect of academic stress on regulatory emotional self-efficacy tends to be smaller at higher levels of parental expectations.<sup>71</sup> Thus, we speculated that the educational expectation gap between parents and children may moderate the role of parental participation in adolescent behavioral development.

## Present Study and Research Hypotheses

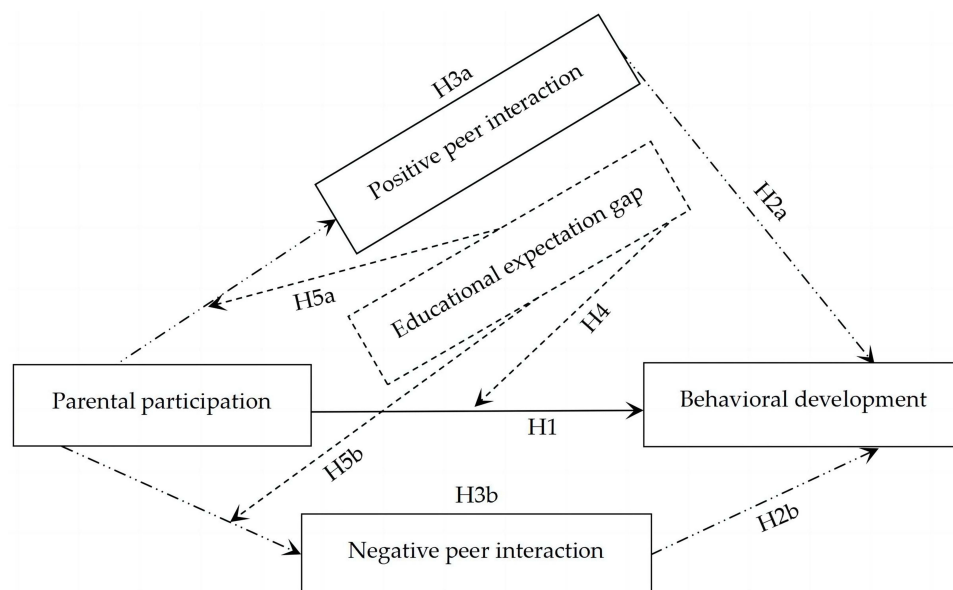
Studies have reported on the relation between family resources (parental participation, parenting styles, parent-child relationships, educational input, and emotional involvement) and adolescents' cognitive abilities, problem behaviors, affective development, academic achievement, expressive language skills, and socio-emotional development.<sup>7,30,31,34,35,37</sup> Research has also been conducted on the effects of positive or negative peer interactions, peer quality, and peer rejection factors on adolescents' problem behaviors, self-regulation skills, sense of loneliness, and

academic persistence.<sup>21,41,43,48,54,55</sup> Many scholars have used parental education expectations as a separate variable to explore the effect of educational expectation on adolescent personality shaping and personality development, parent-child relationship, and academic performance.<sup>23,36,60,65</sup> After reviewing the existing research, we found that parental participation, peer interactions, educational expectation gap, and adolescents' behavioral development have not been researched under the same framework.

Further, based on Attachment Theory,<sup>72</sup> the parent-child emotional connection, as a support resource for children's mental development, is the earliest and most important way for the family to influence children's development. It better supports the relation between parental participation and children's behavioral, emotional, and personality development. Given the increasing influence effects from peer groups in adolescence, the Peer Group Effect Theory<sup>73</sup> emphasizes that peer interaction conveys social norms, values, and even learning skills. Negative or positive peer interaction has a reinforcing or exemplary role, influencing interactants' socialization and cognitive development. Therefore, we adopted the mediating variables of peer interaction. Moreover, according to Identity Control Theory,<sup>59</sup> when there are differences in the identity standards of self and others, individuals feel pressure, which then affects their development. Therefore, we further considered the moderating effect of the educational expectation gap in the mediating mechanisms. By integrating the above three theories, as well as practice combined with theory, we introduced the three core concepts of parental participation, peer interaction, and the educational expectation gap between parents and children in one framework. We aimed to examine the process by which parental participation and peer interaction influence adolescent behavioral development, as well as the role of the parent-child educational expectation gap in this process. Based on available research results, and we referred to relevant studies of moderation and mediation effects,<sup>74</sup> this study proposed the following research hypotheses and a moderated mediation model. Shown in Figure 1.

Hypothesis 1 (H1): High frequent parental participation has a significant positive impact on adolescent behavioral development.

Hypothesis 1a (H1a): The more frequent the parents' behavioral participation, the more positive the adolescent behavioral development.



**Figure 1** A moderated mediation model.

Hypothesis 1b (H1b): The more frequent the parents' emotional participation, the more positive the adolescent behavioral development.

Hypothesis 1c (H1c): The more frequent the parents' educational participation, the more positive the adolescent behavioral development.

Hypothesis 2a (H2a): Positive peer interaction has a significant positive effect on adolescent behavioral development.

Hypothesis 2b (H2b): Negative peer interaction has a significant negative effect on adolescent behavioral development.

Hypothesis 3a (H3a): Positive peer interaction plays a mediation role between parental participation and adolescent behavioral development.

Hypothesis 3b (H3b): Negative peer interaction plays a mediation role between parental participation and adolescent behavioral development.

Hypothesis 4 (H4): Educational expectation gap moderates the effect of parental participation on adolescent behavioral development.

Hypothesis 5a (H5a): Educational expectation gap moderates the effect of parental participation on adolescent positive peer interaction.

Hypothesis 5b (H5b): Educational expectation gap moderates the effect of parental participation on adolescent negative peer interaction.

## Materials and Methods

### Participants

The data for this study were collected from the nationally representative China Education Panel Survey conducted by the China Survey and Data Center of Renmin University of China. The survey was conducted using a stratified multi-stage, probability proportional to size sampling method with a total of 438 seventh- and ninth-grade classes in 112 schools randomly selected from 28 county-level units across the country. The survey obtained informed consent from the participants, their parents, teachers, and school principals. All information filled in the questionnaire by the respondents was also kept strictly confidential following the Statistical Law of the People's Republic of China. We matched student data with parent data in the 2015 baseline survey and identified 10279 seventh-grade students in junior high school. After merging data and removing cases with missing variable values, we obtained a final study sample of 7730 seventh-grade students and parents. The student sample included 3927 males (50.8%) and 3803 females (49.2%).

### Measures

#### Behavioral Development

We referred to the Behavior Inventory used to assess social skills and behavior problems in children and adolescents aged 6 to 17 years<sup>24</sup> and other studies on behavioral development.<sup>75</sup> We defined behavioral development as adolescents' learning persistence, language expression ability, and knowledge absorption ability. This variable was measured by 7 items in the student questionnaire items: (I) I insist on going to school even though I am not feeling well. (II) I insist on trying to do the homework that I do not know. (III) I insist on going to school even though it takes time to complete the homework. (IV) I can express my opinion clearly. (V) I have a fast reaction time. (VI) I can learn quickly. (VII) I am curious about new things. It was also scored in 4 items in the parent questionnaire's evaluation of the child: (I) My child is able to express his or her opinion clearly. (II) My child is quick to respond. (III) My child learns quickly. (IV) My child is curious about new



things. The 11 items in these two dimensions were scored on a three-point Likert scale, with higher total scores indicating more positive adolescent behavioral development. The Cronbach's alpha coefficient was 0.750. The exploratory factor analysis (EFA) yielded the following scores: the first factor = 3.214 and the second factor = 1.991 ( $3.214 / 1.991 = 1.61$ ,  $1.61 < 3$ ). These better covered the multidimensional aspects of adolescent behavioral development. The cumulative variance interpretation rate was 57.4%, the KMO value was 0.774, and Bartlett's test of sphericity was significant ( $P < 0.05$ ), indicating the good reliability and validity of the constructed behavioral development variables.

### Parental Participation

Referring to existing research on parental participation,<sup>33</sup> we measured parental participation in terms of the behavioral, emotional, and educational participation dimensions of parents. Behavioral participation was measured by the frequency of "parents eating dinner with their children, reading books, watching television, participating in sports, visiting museums or zoos or science museums, going out to movies or shows or sporting events. (6 items)" The Cronbach's alpha coefficient was 0.758. Emotional participation was measured by "whether the parent actively discusses with the child what is happening at school, the child's relationship with friends, the child's relationship with teachers, the child's mood, and the child's worries. (5 items)" The Cronbach's alpha coefficient was 0.857. Educational participation was measured by parents' supervision of their children's "homework tests, school performance, and daily school attendance" (3 items). The Cronbach's alpha coefficient was 0.680. Parental participation variable was generated by summing the aforementioned 14 items, with a higher total score representing more frequent parental participation. The Cronbach's alpha coefficient was 0.801. The EFA test indicated that parental participation was multidimensional: The first factor = 4.593 and the second factor = 1.781 ( $4.593 / 1.781 = 2.58$ ,  $2.58 < 3$ ). Meanwhile, the loading coefficient of each factor was between 0.481 and 0.899. The cumulative variance interpretation rate was 65.1%, KMO value was 0.821, and Bartlett's test of sphericity was significant ( $P < 0.05$ ), indicating that the parental participation variable had less information loss and high validity.

### Positive Peer Interaction

Referring to relevant research on positive peer interaction,<sup>76</sup> we measured existence of the "example effect" in peer groups, where excellent peers implicitly influence individuals' behavioral attitudes or values. According to the questions in the questionnaire, we study used 3 items on peers who had "good academic performance, hard work, and want to go to college". These items were scored on a three-point Likert scale. The scores were summed to generate a positive peer interaction variable. A higher total score indicated a more positive peer interaction. The Cronbach's alpha coefficient was 0.773.

### Negative Peer Interaction

We referred to relevant measurement methods of deviant peer affiliation and bad peer relationships.<sup>46,47</sup> From the questionnaire, we used 7 items on peers who had "truancy, violation of school discipline, fighting, smoking or drinking, going to an internet cafe or game hall, premature love, and dropping out of school". These were scored on a three-point Likert scale, the scores were summed to generate a negative peer interaction variable, with higher total scores indicating more negative peer interaction. The Cronbach's alpha coefficient was 0.850.

### Educational Expectation Gap

We referred to an existing measurement of educational expectation.<sup>36,64</sup> According to the questions set in the questionnaire, we measured parental expectations using the parents' questionnaire item "How far do you want your child to read?". Similarly, we measured children's education expectations using the student questionnaire item "How far do you want to read?". The parents' and children's educational expectations were transformed into educational years, and the gap between the former and the latter generated the educational expectation gap variable. If the gap = 0, then the educational expectation gap was "equal". If the gap < 0, then the educational expectation gap was "low". If the gap > 0, then the educational expectation gap was "high". Meanwhile, to better study the influence of parents' educational expectations being higher or lower than their children's on adolescent behavioral development, we used the "equal" level as the comparison reference.

# Data Analysis

We used Stata 17.0 according to the following analysis steps: (I) We subjected all variables to the common method deviation test and Pearson correlation analysis. We conducted independent samples *t*-test for core variables by sex. (II) We created Model 1 and Model 2 for testing the effects of parental participation and its three sub-dimensions (behavioral, emotional, educational participation) on adolescent behavioral development. (III) We created Model 3 for testing the moderating effect of the interaction term between parental participation and the educational expectation gap on behavioral development. (IV) We created Model 4 and Model 5, adding positive and negative peer interactions to predict the effect on adolescent behavioral development. (V) We created Model 6, adding both the parental participation and peer interactions (positive and negative) variables, to further test the mediation role of peer interactions. (VI) We created Model 7 and Model 7<sup>^</sup> for testing the effect of the three sub-dimensions of parental participation on positive or negative peer interaction. (VII) We created Model 8 and Model 8<sup>^</sup> for testing the effect of parental participation on positive and negative peer interaction and examining the mediation role played by positive and negative peer interactions. We used the KHB method to calculate the size of the mediation effect.<sup>77</sup> (VIII) We created Model 9 and Model 9<sup>^</sup> for testing the moderating effect of the educational expectation gap. If the interaction term between the predictor (parental participation) and moderator (educational expectation gap) had a significant effect ( $P < 0.05$ ) on the outcome variable (positive or negative peer interaction), then the moderating variable was confirmed to play a moderating role.

# Results

## Common Method Deviation Test, Descriptive Statistics and Correlation Analysis

We used the extreme difference standardization method. We transformed behavioral participation (BE-P), emotional participation (EM-P), educational participation (ED-P), parental participation (PA-P), positive peer interaction (PO-PI), negative peer interaction (NE-PI), and behavioral development (BE-D) variables to take values from 0 to 100 to ensure that the variables were at the same level, the value of educational expectation gap (ED-EG) variable is “equal = 0, low = 1, high = 2”. Using Harman’s one-factor test, we tested for a common method deviation problem in the variables. The results showed that 10 factors had a characteristic root  $> 1$ . The first factor explained 19% of the variance, lower than the critical value of 40%, indicating that there was no common method deviation problem. Table 1 shows the statistical description and Pearson correlation analysis results of the study variables. All variables were significantly correlated ( $P < 0.05$ ), except for educational participation and adolescent age, which were not correlated.

## Analysis of Independent Samples t-Test

To account for sex differences in the adolescent behavioral development, we divided the research samples into male and female, and used an independent samples *t*-test. As shown in Table 2, we found significant sex differences in Age,

**Table 1** Descriptive Statistics and Correlation Analysis (N = 7730)

Variables	1	2	3	4	5	6	7	8	9
1.Age	1								
2.Behavioral participation (BE-P)	0.195***	1							
3.Emotional participation (EM-P)	0.145***	0.454***	1						
4.Educational participation (ED-P)	0.019	0.202***	0.305***	1					
5.Parental participation (PA-P)	0.158***	0.713***	0.820***	0.683***	1				
6.Education expectation gap (ED-EG)	0.033**	0.053***	0.027*	0.029*	0.048***	1			
7.Positive peer interaction (PO-PI)	0.117***	0.150***	0.194***	0.106***	0.205***	0.093***	1		
8.Negative peer interaction (NE-PI)	-0.132***	-0.092***	-0.106***	-0.049***	-0.111***	-0.053***	-0.174***	1	
9.Behavioral development (BE-D)	0.103***	0.225***	0.241***	0.154***	0.279***	0.092***	0.232***	-0.111***	1
Min	12	0	0	0	0	0	0	0	0
Max	18	100	100	100	100	2	100	100	100
M	13.55	42.7	33.56	28.68	34.98	-	45.07	95.21	29.04
SD	0.71	20.06	25.72	22.94	17.01	-	40.22	12.17	14.21

Notes: \* $P < 0.05$  \*\* $P < 0.01$  \*\*\* $P < 0.001$ .

**Table 2** Independent Samples *t*-Test with Sex Grouping (N = 7730)

Variables	M ± SD		t	95% CI
	Male	Female		
Age	13.61 ± 0.72	13.47 ± 0.69	-8.759***	[-0.172, -0.109]
BE-P	42.71 ± 20.37	42.68 ± 19.75	-0.064	[-0.924, 0.866]
EM-P	34.54 ± 25.31	32.55 ± 26.11	-3.416***	[-3.144, -0.851]
ED-P	28.18 ± 22.77	29.20 ± 23.10	1.946	[-0.008, 2.038]
PA-P	35.15 ± 16.91	34.81 ± 17.11	-0.871	[-1.096, 0.422]
ED-EG	0.91 ± 0.89	0.79 ± 0.85	-5.963***	[-0.157, -0.080]
PO-PI	51.21 ± 40.71	38.73 ± 38.71	-13.801***	[-14.249, -10.705]
NE-PI	93.14 ± 14.15	97.35 ± 9.23	15.459***	[3.680, 4.749]
BE-D	29.17 ± 14.59	28.91 ± 13.81	-0.792	[-0.890, 0.378]

Notes: \*P < 0.05 \*\*P < 0.01 \*\*\*P < 0.001 (two-tailed).

emotional participation (EM-P), educational expectation gap (ED-EG), positive peer interaction (PO-PI), and negative peer interaction (NE-PI) ( $P < 0.001$ ), but not in parental participation (PA-P) and behavioral development (BE-D) (95% confidence interval [-1.096, 0.422] and [-0.890, 0.378]). Therefore, we used sex as a control variable.

## Parental Participation, Peer Interaction and Adolescent Behavioral Development

Table 3 shows the results for analysis that used BE-D as the dependent variable. In Model 1, each additional unit of BE-P, EM-P, and ED-P indicated a corresponding increase in BE-D of 5% to 9% ( $P < 0.001$ ). These results supported H1a, H1b, and H1c. In Model 2, PA-P had a significant positive impact on BE-D ( $P < 0.001$ ). The sum of the effect of PA-P and its three sub-dimension variables (BE-P, EM-P, and ED-P) was also equal, which verified H1. Parents' behavioral participation, emotional participation, and educational participation all play a positive role in influencing adolescents' behavioral development, for instance, parents' participation in various activities with their adolescents (reading books together, joining sports, and visiting museums) not only enhances the parent-child relationship, but also provides a powerful support for adolescents' development of positive behaviors. Parents who are actively participating in the learning process of their adolescents by providing learning resources, monitoring progress and assisting in solving learning difficulties will improve the adolescents' ability to learn on their own and to persevere in their studies. Parental accompaniment and reassurance can alleviate children's anxiety and reduce their risk of developing behavioral problems.

**Table 3** Effects of Parental Participation and Peer Interaction on Adolescent Behavioral Development (N = 7730)

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Sex	-0.01(0.312)	-0.20(0.311)	-0.21(0.311)	-0.88**(0.309)	-0.53(0.314)	-1.09*** (0.312)
Age	1.09*** (0.225)	1.12*** (0.222)	1.12*** (0.222)	0.88*** (0.219)	0.97*** (0.223)	0.79*** (0.220)
BE-P	0.09*** (0.009)					
EM-P	0.08*** (0.007)					
ED-P	0.05*** (0.007)					
PA-P		0.223*** (0.009)	0.24*** (0.013)	0.20*** (0.009)	0.21*** (0.009)	0.19*** (0.009)
ED-EG		-0.72(0.404)	0.65(0.920)	-0.47(0.398)	-0.72(0.403)	-0.49(0.397)
		2.69*** (0.355)	4.27*** (0.822)	2.25*** (0.350)	2.61*** (0.354)	2.206*** (0.350)
PA-P * ED-EG			-0.04(0.024)			
			-0.05** (0.021)			
PO-PI				0.06*** (0.004)		0.06*** (0.004)
NE-PI					-0.09*** (0.013)	-0.06*** (0.013)
Constant	6.15*(2.994)	5.48(2.972)	4.75(2.988)	7.31*(2.929)	15.97*** (3.367)	14.83*** (3.320)
Adjusted R2	0.083	0.090	0.091	0.118	0.095	0.121
F	140.54***	154.59***	111.27***	173.33***	136.71***	152.25***

Notes: \*P < 0.05 \*\*P < 0.01 \*\*\*P < 0.001 (two-tailed).

Parental participation has a deep influence on adolescents' learning persistence, expressive language ability, and knowledge absorption ability.

In Model 3, compared with equal ED-EG, high ED-EG promoted BE-D to a certain extent ( $\beta = 4.27$ ,  $P < 0.001$ ). When we added the interaction term PA-P \* ED-EG, high ED-EG negatively moderated the effect of PA-P on BE-D ( $\beta = -0.05$ ,  $P < 0.01$ ). In other words, parents' educational expectations being higher than their children's will inhibit the positive effect of parental participation on adolescent behavioral development. Thus, H4 was verified. High parental educational expectations may lead to parental over-involvement in the adolescent's educational process, parental over-scheduling the adolescent's study time and activities, interference in the adolescent's hobbies and social activities, and even the triggering of adolescent antipathy and resistance, inhibiting the adolescent's positive behavioral development. Model 4 and Model 5 showed that PO-PI had a significant positive effect on BE-D ( $P < 0.001$ ), whereas NE-PI had a significant negative effect on BE-D ( $P < 0.001$ ), verifying H2a and H2b. Positive peer interactions provide a healthy environment for adolescents to develop, while negative peer interactions may have a negative impact on adolescents' behavioral development, and we should pay attention to adolescents' peer relationships and correctly guide them to establish positive peer interactions in order to promote their comprehensive development. In Model 6, when we added PO-PI and NE-PI at the same time, we found that the effect of PA-P on BE-D decreased from 22.3% (Model 2) to 19%, remaining significant. The mechanisms of PO-PI and NE-PI in the effect of PA-P on BE-D needs to be further explored.

Table 4 shows the results for our analysis using PO-PI and NE-PI as dependent variables. According to Model 7, each additional unit of BE-P, EM-P, and ED-P resulted in a significant increase in PO-PI of 10% to 21% ( $P < 0.001$ ). Similarly, Model 7<sup>^</sup> showed that BE-P, EM-P, and ED-P had a significant negative effect on NE-PI ( $P < 0.05$ ), indicating that parental participation was an important factor in adolescent positive peer interaction. Using Model 8, we found that the effect of PA-P on PO-PI was 45%, that of PO-PI on BE-D was 6%, and that of PA-P on BE-D decreased from 22.3% (Model 2) to 20% (Model 4). The three path coefficients were significant ( $P < 0.001$ ). Using KHB to test the mediating role played by PO-PI between PA-P and BE-D, we found that the mediation effect was 12.3%, which verified H3a. Using Model 8<sup>^</sup>, we confirmed that NE-PI played a 2.5% mediation role between PA-P and BE-D, which verified H3b. Parental participation and peer interactions are both microsystems in the adolescent's life, and they play an irreplaceable role in the adolescent's behavioral development, and the impact of parental participation on adolescent behavioral development is transmitted through peer interactions.

In Model 9, we added the interaction term PA-P \* ED-EG. The results showed that compared with equal ED-EG, high ED-EG would negatively regulate the effect of PA-P on NE-PI ( $\beta = -0.17$ ,  $P < 0.01$ ). That is, parents' educational expectations being higher than children's would inhibit the positive effect of parental participation on adolescent positive peer interaction, which verified H5a. According to Model 9<sup>^</sup>, parents' educational expectations being lower than their

**Table 4** Mediaton Effect of Positive or Negative Peer Interaction in Adolescent (N = 7730)

Variables	Positive Peer Interaction			Negative Peer Interaction		
	Model 7	Model 8	Model 9	Model 7 <sup>^</sup>	Model 8 <sup>^</sup>	Model 9 <sup>^</sup>
Sex	11.60*** (0.887)	11.13*** (0.884)	11.09*** (0.884)	-3.93*** (0.271)	-3.88*** (0.272)	-3.87*** (0.271)
Age	3.99*** (0.640)	3.84*** (0.632)	3.85*** (0.632)	-1.70*** (0.196)	-1.71*** (0.194)	-1.70*** (0.194)
BE-P	0.13*** (0.025)			-0.02** (0.008)		
EM-P	0.21*** (0.020)			-0.03*** (0.006)		
ED-P	0.10*** (0.020)			-0.01* (0.006)		
PA-P		0.45*** (0.026)	0.52*** (0.037)		-0.07*** (0.008)	-0.08*** (0.011)
ED-EG		-4.04*** (1.149)	-0.54 (2.617)		-0.02 (0.353)	-2.31** (0.803)
PA-P * ED-EG		7.21*** (1.009)	13.28*** (2.338)		-1.00** (0.310)	-0.83 (0.718)
			-0.10 (0.068)			0.07** (0.021)
			-0.17** (0.060)			-0.01 (0.018)
Constant	-30.18*** (8.529)	-29.74*** (8.457)	-32.35*** (8.500)	122.61*** (2.607)	123.02*** (2.597)	123.23*** (2.610)
Adjusted R2	0.071	0.081	0.082	0.052	0.053	0.054
F	119.68***	137.06***	99.21***	85.12***	86.94***	63.88***

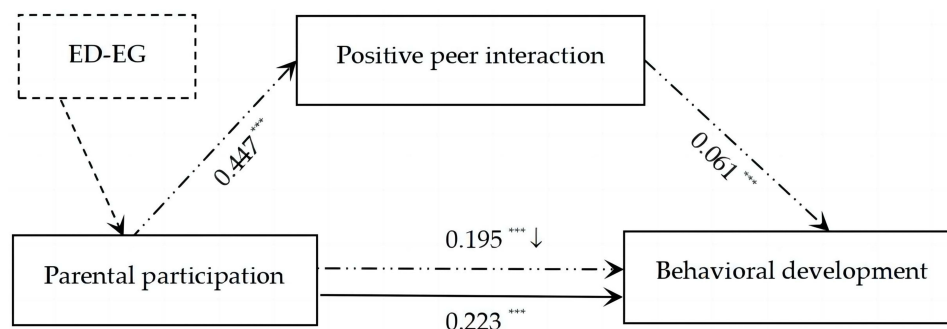
Notes: \* $P < 0.05$  \*\* $P < 0.01$  \*\*\* $P < 0.001$  (two-tailed).

children's would promote negative adolescent peer interaction, which verified H5b. High parental educational expectations may lead to over-intervention and restriction, while low educational expectations may lead to neglect and lack of support; only moderate educational expectations and reasonable parental participation can help adolescents build healthy peer interactions and promote their comprehensive development. Therefore, parents' educational expectations being higher or lower than their children's moderated the effect of parental participation on adolescent behavioral development and positive and negative peer interaction, an equal educational expectation gap would be the most beneficial to adolescents.

## A Moderated Mediation Model

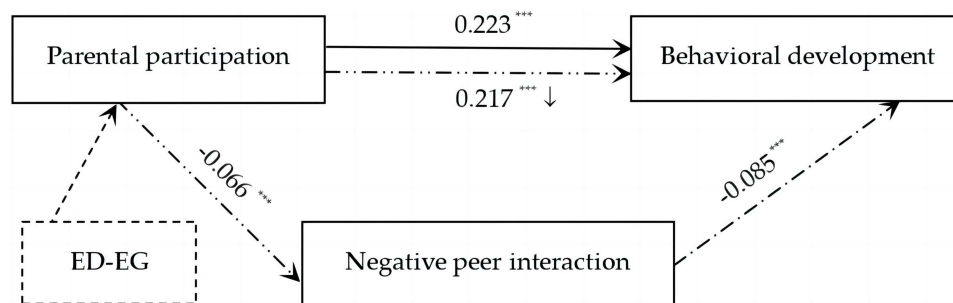
We drew the path diagram of a moderated mediation model, shown in Figure 2. The coefficients of the three paths of parental participation (PA-P)→positive peer interaction (PO-PI), positive peer interaction (PO-PI)→behavioral development (BE-D), and parental participation (PA-P)→behavioral development (BE-D) were 0.447, 0.061, and 0.195, respectively ( $P < 0.001$ ). Through Bootstrap sampling repeated 1000 times,<sup>78</sup> we verified that positive peer interaction played a partial mediation role between parental participation and behavioral development (95% confidence interval [0.023, 0.032]). Positive peer interactions play a partial mediation role between parental participation and adolescent behavioral development, positive parental participation in education or less harsh punishment enhances adolescents' social skills and cooperative abilities, prompting them to build intimate relationships, effective communication, and cooperation with others, which in turn positively contributes to their behavioral development. Therefore, parents and educators should pay attention to the role of peer interaction in the growth process of adolescents, and actively lead and promote positive interaction between adolescents and their peers. Meanwhile, positive parental participation would help parents to better understand the needs and interests of adolescents, so that they can give targeted guidance and support to promote the formation of good behavioral habits and moral characters among adolescents.

Similarly, as shown in Figure 3, we also verified that negative peer interaction played a partial mediation role between parental participation and behavioral development (95% confidence interval [0.003, 0.008]). Parental participation can



**Figure 2** Mediation effect of positive peer interaction.

**Note:** \*\*\* $P < 0.001$ .



**Figure 3** Mediation effect of negative peer interaction.

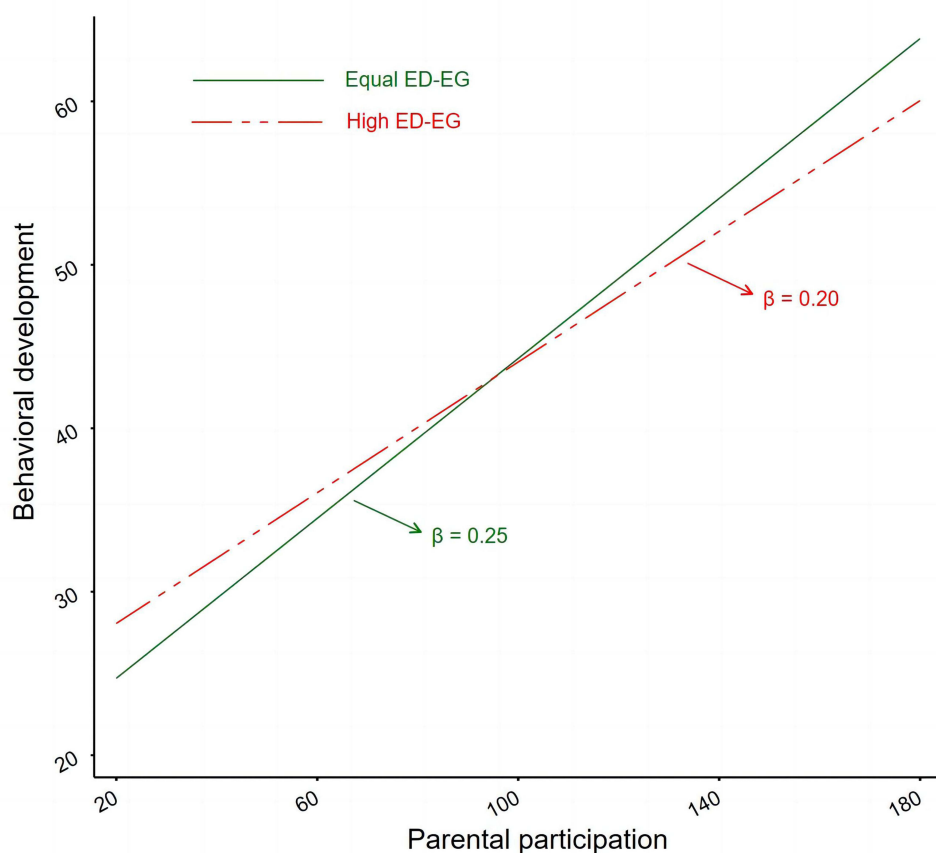
**Note:** \*\*\* $P < 0.001$ .



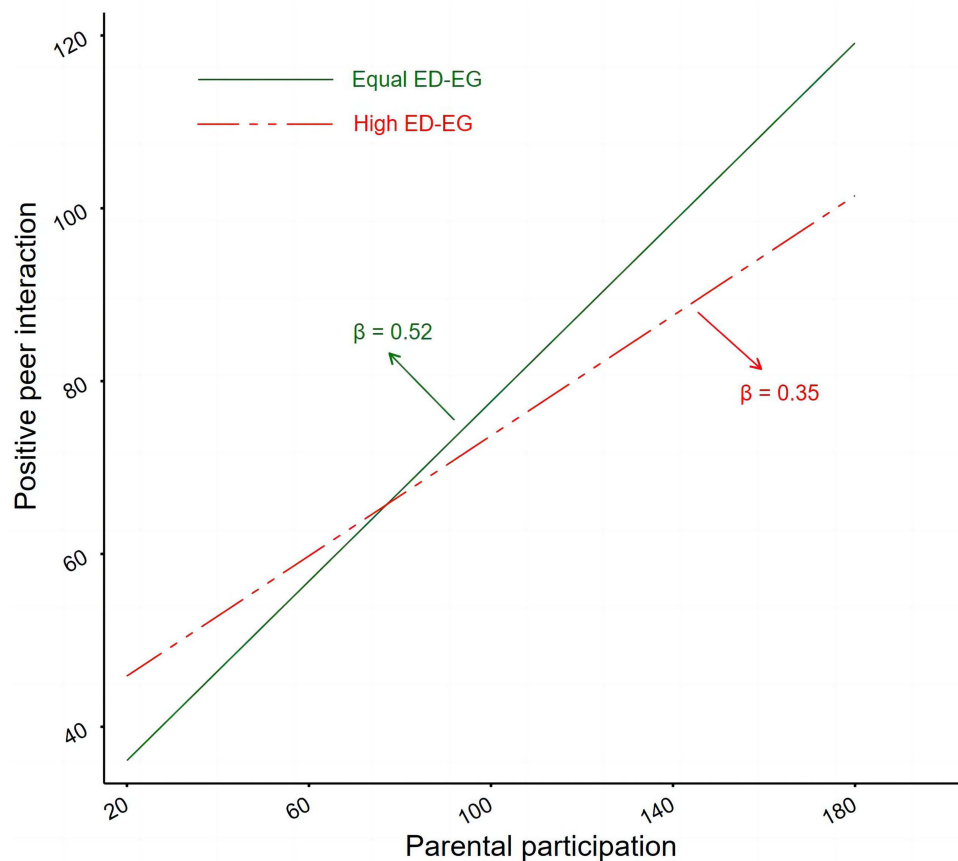
indirectly affect adolescents' behavioral development through negative peer interactions. On the one hand, if parents do not provide enough emotional support, behavioral guidance, and rulesetting for adolescents and are unable to effectively deal with peer conflict and stress, adolescents are easily trapped in negative peer interactions and are thus affected by negative peer interactions. On the other hand, if parent participation is inappropriate, it may lead to the establishment of negative peer interactions among adolescents, for instance, parents are overprotective or restrict their children's social interactions. This may result in the child appearing isolated or out of place among peers and thus being ostracized or bullied by other children.

Using simple slope analysis, we further drew the effect map of educational expectation gap (ED-EG) moderating the effect of parental participation (PA-P) on behavioral development (BE-D), positive peer interaction (PO-PI), and negative peer interaction (NE-PI). As shown in Figures 4 and 5, under equal educational expectation gap (ED-EG), the effects of parental participation (PA-P)  $\rightarrow$  behavioral development (BE-D) and parental participation (PA-P)  $\rightarrow$  positive peer interaction (PO-PI) were ( $\beta_{\text{simple}} = 0.25$ ,  $t = 18.88$ ,  $P < 0.001$ ) and ( $\beta_{\text{simple}} = 0.52$ ,  $t = 13.88$ ,  $P < 0.001$ ), respectively. Conversely, under high educational expectation gap (ED-EG), more frequent parental participation (PA-P) inhibited the positive effect of parental participation on behavioral development (BE-D) ( $\beta_{\text{simple}} = 0.20$ ,  $t = 16.73$ ,  $P < 0.05$ ) and positive peer interaction (PO-PI) ( $\beta_{\text{simple}} = 0.35$ ,  $t = 11.02$ ,  $P < 0.01$ ).

Parental participation in the process of influencing adolescents' behavioral development and peer interactions, in which equal, high, or low parental educational expectations play an important moderating function. Firstly, parents whose educational expectations are consistent with those of their children are more likely to adopt a balanced and supportive attitude towards their adolescents' development, which is neither too strict nor too lenient, and which gives adolescents enough freedom and space to develop their personal social skills and behavioral patterns, this will help adolescents to



**Figure 4** ED-EG moderates the effect of parental participation on behavioral development.

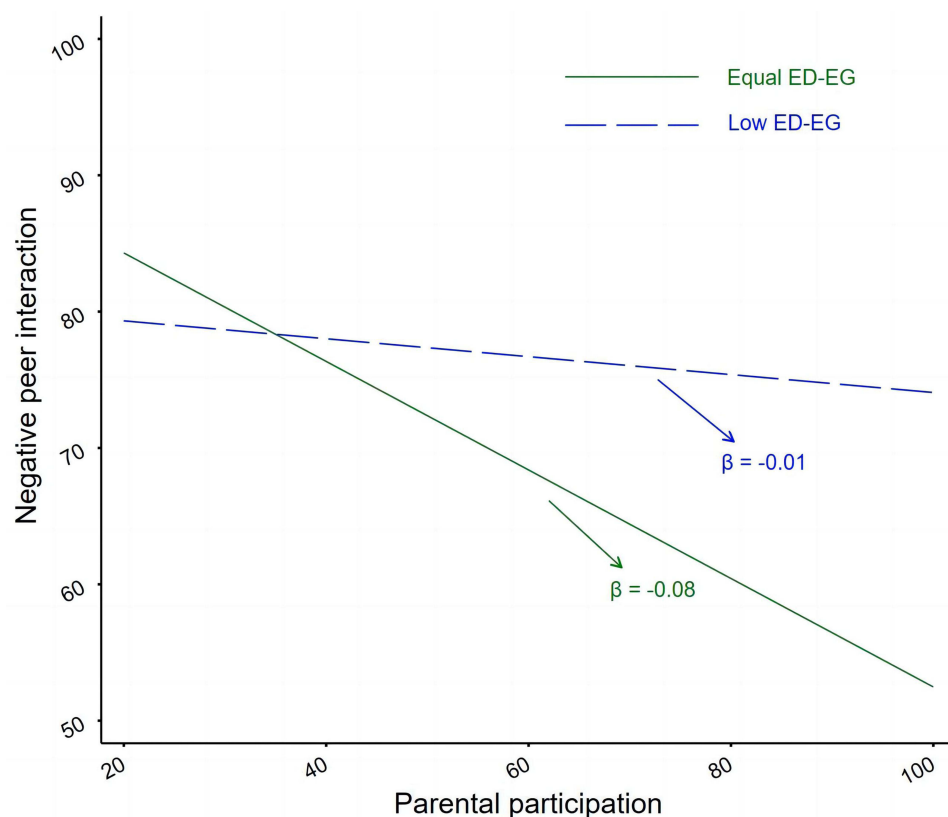


**Figure 5** ED-EG moderates the effect of parental participation on positive peer interaction.

establish positive peer relationships, learn to deal with conflicts and problems in their relationships, and to cultivate healthy behavioral habits.

Secondly, parents with high educational expectations may set strict requirements and expectations for adolescents' peer relationships and behavioral performance. This high expectation may lead to excessive parental intervention in adolescents' social interactions and behavioral choices, limiting adolescents' freedom and space for exploration, which may bring about stress and anxiety, which in turn affects their behavioral development, and also affects them to be excessively tense, anxious, or have low self-esteem in peer interactions, making it difficult for them to establish healthy and positive peer relationships.

Shown in Figure 6, moreover, under equal educational expectation gap (ED-EG), the effect of parental participation (PA-P) → negative peer interaction (NE-PI) was ( $\beta_{\text{simple}} = -0.08$ ,  $t = -7.38$ ,  $P < 0.001$ ). A low educational expectation gap (ED-EG) facilitated negative peer interaction (NE-PI) ( $\beta_{\text{simple}} = -0.01$ ,  $t = -3.98$ ,  $P < 0.001$ ). Finally, parents with low educational expectations may lack adequate supervision and guidance over adolescents' peer relationships and behavioral performance. This low expectation may lead to a permissive or neglectful attitude towards adolescents' social interactions and behavioral choices, and may also cause adolescents to lack the self-confidence and motivation to expand their social circles, which affects their difficulties in forming healthy and positive social skills and behavioral habits. Thus, parents need to reasonably adjust their educational expectations in the process of participating in adolescents' peer relationships and behavioral development. Parental educational expectations that are consistent with their children's educational expectations can help parents better understand and support their children's needs and development, and promote adolescents' formation of positive peer relationships and healthy behavioral habits, while too-high or too-low educational expectations may have a negative impact on adolescents' social ability and behavioral development.



**Figure 6** ED-EG moderates the effect of parental participation on negative peer interaction.

## Discussion

### Theoretical Contributions

Adolescence is the stage of transition from childhood to adulthood, during which individuals experience an expansion in the scope of activities, a reduction in time spent in contact with parents, and an increase in time spent in interaction with peers. Therefore, to better monitor adolescent behavioral development during this period, we explored the internal mechanisms of parental participation, peer interaction, and educational expectation gap affecting adolescent behavioral development. Our work organically integrated Attachment Theory,<sup>72</sup> Peer Group Effect Theory,<sup>73</sup> and Identity Control Theory.<sup>59</sup>

Placing Chinese adolescents' behavioral development in the structural context of elders and peer groups, our introduction of the educational expectation gap between parents and children as a moderator verified the positive effect of parental participation and positive peer interaction on behavioral development, consistent with previous studies.<sup>7,28,31,36,42,43</sup> However, our study was different from previous studies in that our parental participation variable integrated the three dimensions of behavioral, emotional, and educational participation. We showed that each dimension influenced adolescent behavioral development in the same direction, yielding more reliable and comprehensive results. We also confirmed that negative peer interaction negatively affected adolescent behavioral development.<sup>21,40,45</sup> However, our study added both positive and negative peer interaction to the model and verified that the effect of peer interactions on adolescents' behavioral development had a good stability. We also divided parents' educational expectations into three levels: lower, higher, and equal to their children's educational expectations. In comparing the low and high educational expectation gaps with the equal level, we scientifically proved that an equal educational expectation gap was the ideal state. Meanwhile, our study expanded the theoretical perspective of studying adolescent behavioral development and provided a practical reference for interventions for adolescent behavioral development.

## Practical Significance

Our study provided a practical reference for further improving the behavioral development of Chinese adolescents. First, our mediation effect analysis verified the mediating role of positive and negative peer interaction between parental participation and behavioral development. In adolescents, attention must be paid to the influence of parents on children's behavioral development through multiple ways of participation, such as active emotional and behavioral participation, as well as the creation of more opportunities for empathy with children.<sup>34</sup> Parents should also dynamically understand the situation of children making friends and promote the establishment of a good emotional interaction model.<sup>40</sup> In daily life, children should be encouraged to interact with active peers and gain more support from important others, which will help enhance adolescents' perseverance in the face of difficulties and setbacks, improve learning perseverance, and establish proper self-control consciousness.

Second, we tested the moderating effect of the educational expectation gap on the mediation process of parental participation affecting children's behavioral development through peer interaction. The impact of the educational expectation gap on behavioral development was a double-edged sword. High parental expectations lead to the provision of more material basis for their children, but parents with high expectations will negatively affect the behavioral development of adolescents and even cause depression.<sup>79</sup> Meanwhile, low parental expectations may also make children adopt attitudes of not taking life and learning seriously.<sup>65,66</sup> Low parental expectations also lead to adolescents meeting peers with problematic behaviors (truancy, fighting, smoking). Thus, consistent educational expectations between parents and children can not only reduce the possibility of adolescents choosing problematic peers but also directly or indirectly buffer the impact of parental participation on adolescents' peer interaction and behavioral development.

Third, in the case of parents' active participation in children's education, parents' educational expectations being consistent with their children's can promote positive adolescent behavioral development and positive peer interaction.<sup>36,69,70</sup> This is helpful in recognizing that parents' active participation in behavior, emotion, and education. Parents' moderate expectations for their children's future roles or achievements can reduce the pressure caused by too high or too low expectations, as well as play an important role in adolescent positive peer interaction and behavioral development.

## Interventional Implications

Adolescents are in a period when their physical and mental development is not yet mature, and they are easily affected by important others and external environmental factors. Therefore, to better promote the behavioral development of adolescents, we proposed the following. The first recommendation relates to the family environment being the main field for children's socialization and educational vehicle for shaping good behavior. Parental participation in the family helps form a closed "child-family-school" circuit. Parents should pay attention to investing resources in their children's education, providing cognitive stimulation activities, giving attention to their children, and allocating time and energy, for example, communicating about school activities, visiting museums and buying learning materials with their children, and consciously developing their children's cognitive abilities, social skills, and cultural literacy. Meanwhile, creating a good family atmosphere, positive parent-child interaction, and a relaxed parenting style for children would help promote children's social skills, physical and mental health, and self-regulation. From the school's perspective, it can regularly organize social skills training and seminars, invite professionals or teachers to teach students how to communicate effectively and establish friendships, help students set specific and measurable learning goals, and set up corresponding reward mechanisms to motivate students to work hard to achieve their goals, enhance their social abilities, and cultivate their learning persistence.

Second, we recommend the recognition that the more positive the quality of children's peer interactions, the more parents can promote healthy behavioral development. Moreover, parents need to dynamically understand their children's peer choices and of friendships. Excellent peers can transmit or strengthen positive energy signals and help children examine themselves by imitating others and acquiring communication skills and rules. Encourage adolescents to set up study support groups with positive peers to monitor each other's study progress and share study methods and insights. Peers with good academic performance often have good study habits and attitudes, for instance, reviewing regularly, taking the initiative to ask questions, and not being afraid of difficulties, etc. Through socializing with them, adolescents can learn these good study habits and attitudes and gradually apply them to their studying, thereby broadening their horizons and enhancing their social adaptability.

Lastly, in the process of educating children, parents should realize that parental participation and peer interaction are important microsystems of individual life, growth, and development, all of which affect the development of children.<sup>52</sup> From the perspective of parents, parents can encourage adolescents to participate in various kinds of community activities, such as public welfare activities, environmental protection activities, voluntary services and other activities, to provide adolescents with opportunities to interact with their peers, so as to practise their social skills. When parents teach their children to respect others, be friendly to others, and be good at listening and expressing themselves, parents should work with their children to set learning goals, ensure that the goals are specific and measurable, and encourage their children to work hard to achieve the goals, so as to enhance their initiative and perseverance in learning.

Parents may intervene in their children's behavioral development by considering both parental participation in the family environment and peer interaction among significant others. Parents should also recognize the differences in the impact of different educational expectation gaps on behavioral development, correctly grasping the degree of matching between their and their children's educational expectations. Particularly, parents should avoid overly high or low educational expectations that bring about psychological pressure to children and negatively affect behavioral development. Research must be expanded on the differences between parents' and children's educational expectations in the field of individual behavioral development to better promote the behavioral development of adolescents and decision-making arrangements.

## Limitations and Future Research

This study has some limitations that need to be improved in future research. First, based on theories, we explored the mechanism of effects of parental participation on behavioral development using cross-sectional data with a large sample size. Although our research provided empirical support for relevant theories, the use of cross-sectional data limited our findings to correlations. To establish causal relations, future studies should conduct longitudinal research or an experimental research to track and evaluate adolescent behavioral development, which can yield more reliable conclusions. Second, the research data were not designed and investigated specifically to examine adolescent behavioral development. The core variables were mainly obtained through student self-reports and parent reports. Future research should expand data information collection to teachers or peers to ensure the collection of comprehensive information. Finally, cross-national comparative research should be conducted to analyze the similarities and differences in adolescent behavioral development across countries from a multidimensional perspective at the levels of school, family microsystems, and important others (peers). Such a work can propose more applicable intervention measures.

## Conclusion

We used the baseline data of 7730 seventh-grade students and parents from the nationally representative China Education Panel Survey to explore the influence mechanisms of parental participation on adolescent behavioral development. We focused on the mediation role of positive and negative peer interaction, as well as the moderating effect of educational expectation gap between parents and children. The empirical results showed that parental participation (behavioral, emotional, educational) and positive peer interaction had positive impacts on adolescent behavioral development, whereas negative peer interaction had a negative impact. Adolescent positive peer interaction played a mediation role (12.3%) in the process of parental participation affecting behavioral development, whereas negative peer interaction played a smaller mediation role (2.5%). Lastly, the educational expectation gap moderated the mediation process of parental participation in influencing adolescent behavioral development through peer interactions. A high educational expectation gap negatively moderated the effect of parental participation on adolescent behavioral development and positive peer interaction, rendering an inhibitory effect. A low educational expectation gap positively moderated the effect of parental participation on negative peer interaction, engendering a facilitative effect on negative peer interaction. Thus, an equal educational expectation gap between parents and children is a more desirable state. In summary, for developing countries, positive parental participation, peer interactions and matching educational expectations between parents and children are protective factors for adolescent development. These factors work together to enhance adolescents' learning persistence, expressive language ability and knowledge absorption ability, and lay a solid foundation for their future development.



## Data Sharing Statement

The original data for this article can be found online at: <http://ceps.ruc.edu.cn>. The data presented in this study are available in figshare database: doi:10.6084/m9.figshare.23298527.v5. Further inquiries can be directed to the author.

## Ethics Statement

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of the Renmin University of China. All participants were informed about the contents of the survey and obtained their consent, as well as the informed consent of the participants' parents or legal guardians and the class teacher.

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## Disclosure

The author reports no conflicts of interest in this work.

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