

# Parental Attachment and Adolescent Moral Reaction Modes: The Serial Mediating Model of the Teacher–Student Relationship and Deviant Peer Affiliation

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**Purpose:** Moral decision outcomes and emotional experiences after moral decisions are combined to create four moral reaction modes: happy victimizer (HV), unhappy victimizer (UHV), happy moralist (HM), and unhappy moralist (UHM). This study aimed to explore the relationships between parental attachment (PA) and adolescent moral reaction modes, and further examine the mechanism of the serial mediating effects of the teacher-student relationship (TS) and deviant peer affiliation (DP).

**Sample and Method:** A cross-sectional study was conducted in 2022 among 3053 students (including 1496 females) from four middle schools, four high schools, and three colleges in China using a voluntary and anonymous questionnaire.

**Results:** Our study reveals that PA was positively associated with HM modes and negatively associated with UHM, UHV, and HV modes. Both TS and DP serially or partly mediated the relationship between PA and adolescents' four moral reaction modes.

**Conclusion:** This study uncovered significant social relationship pathways for moral reaction modes. TS and DP are two important mediators between PA and moral reaction modes. Secure parental attachment can develop positive teacher-student and peer relationships. This can then encourage adolescents to behave in more positive HM modes and fewer UHM/HV/UHV modes.

**Keywords:** moral reaction modes, parental attachment, teacher-student relationship, deviant peer affiliation

## Introduction

The world is permeated by moral dilemmas, wherein individuals trade-off between maximizing their own interests and those of others.<sup>1,2</sup> However, individuals may experience positive or negative moral emotions after making decisions to maintain the stability of individual moral decision-making.<sup>2,3</sup> In fact, numerous studies have reported that moral decision-making is associated with moral emotional experiences after making decisions.<sup>2,3</sup> For example, individuals feel unhappy (negative emotion) after they violate a certain social norm. Thus, moral emotions (including moral emotion attributions) play a central role in improving adolescent morality, which is an effective motivator because it encourages individuals to adhere to moral boundaries.<sup>3,4</sup> In addition, the moral self-maintenance theory suggests the integration of moral judgment and emotions elicited after making decisions starts in adolescence; thus, it may become an aspect of self-definition.<sup>4</sup> Recent studies combined the decision outcomes (moral or immoral) with moral emotional experiences (positive or negative) after making moral decisions and formed four moral reaction modes: happy victimizer (HV: positive outcome-oriented emotions for not acting morally), unhappy victimizer (UHV: negative self-evaluative emotions for not acting morally), happy moralists (HM: positive self-evaluative emotions for acting morally), and unhappy moralists (UHM: negative outcome-oriented emotions for acting morally). These reveal the pivotal role of both cognition and emotions in moral decision-making.<sup>2,4</sup>

Previous studies have demonstrated that adolescents develop strong associations between positive emotions and moral behaviors that increase with age, such as more HM modes and fewer UHV modes.<sup>1,3</sup> In addition, in a study on emotional responses to moral dilemma scenarios, scholars found that adults attributed positive emotions to the protagonist who helped others.<sup>4,5</sup> These findings might be explained as an age-related learning effect in terms of moral reaction modes. Individuals engaged in moral behavior, which led to positive emotions.<sup>4</sup> Moreover, numerous studies demonstrated that the frequency order of the four moral reaction modes was the same in both adolescents and adults. Moreover, the frequency order for Chinese individuals in the four moral reaction modes was: HM > UHM > UHV > HV, in which individuals operating in the HM mode occupy the dominant position.<sup>2-4</sup> Adolescents' moral reaction modes have strong plasticity. Despite the significance of morality research, few studies have focused on it. The bioecological model of human development suggests that adolescents are in a dynamic and orderly multi-level system (ie, family, school, community), and the interactions of various levels affect individual moral reaction modes.<sup>5</sup> Adolescent moral reaction modes depend on how various social relationships influence the integration between emotional experiences and moral judgment.<sup>6</sup> These opinions were supported by a previous study that argued that social relationships play a key role in adolescent moral reaction modes.<sup>7</sup> However, there is limited knowledge of how these relationships play out.

Parental attachment is an important social relationship that greatly influences individual moral reaction modes.<sup>7,8</sup> Attachment theory was used as a theoretical framework with which to explain individuals' moral reaction modes.<sup>9</sup> Studies found that the two cores of secure parental attachment (emotional warmth and social control) were both conducive to promoting positive moral judgment and emotional experience. Adolescents with secure attachment transferred their attention to others' needs and had a positive attitude toward them.<sup>10</sup> Conversely, adolescents with insecure attachment lacked sufficient psychological resources and behaved with a more negative understanding of others' intentions and behaviors.<sup>11,12</sup> Numerous studies have supported the positive correlation between parental attachment and moral behaviors.<sup>13,14</sup> Thus, we speculate that the better the parental relationship, the more likely individuals may make altruistic choices during moral decision-making and then experience positive emotions (more HM, fewer UHM/HV/UHV modes). However, there is limited knowledge on the mediating variables between parental attachment and moral reaction modes.

The multiple attachment hypothesis suggests that in addition to parental attachment, individuals also develop attachment relationships with teachers.<sup>8</sup> Teacher-student relationship refers to the social relationship gradually formed by the interaction between teachers and students during the education process.<sup>15</sup> Numerous studies found that the teacher-student relationship had a significant positive predictive effect on prosocial preferences and positive emotional experiences.<sup>16</sup> In addition, development context theory posits that parent-child relationships have a fundamental influence on adolescent teacher-student relationships.<sup>17</sup> Secure parental attachment can lead to a positive teacher-student relationship. For example, adolescents who have closer emotional bonds with their parents tend to perceive good teacher support and experience the resulting positive emotions.<sup>18</sup> Moreover, some studies reported that the teacher-student relationship can mediate the positive relationship between parental attachment and individual prosocial preferences,<sup>19,20</sup> such as prosocial behaviors<sup>21</sup> and well-being.<sup>22</sup> Thus, the findings suggest that the teacher-student relationship may play a crucial role in adolescent moral reaction modes.<sup>23,24</sup> Adolescents with a secure parental attachment may perform better in school, which may be conducive to cultivating more HM and fewer UHM/HV/UHV modes. However, there is limited knowledge of the underlying mediation of teacher-student relationships on the relationship between parental attachment and moral reaction modes.

In addition to the teacher-student relationship, secure parental attachment can also develop positive peer relationships.<sup>28,29</sup> For example, adolescents who have secure parental attachment tend to facilitate supportive interactions among peers.<sup>25</sup> However, deviant peer affiliation is also an important social relationship affecting adolescent moral reaction modes. Deviant peer affiliation refers to socializing with peers who engage in behaviors that violate laws and social norms.<sup>26,27</sup> Social learning theory suggests that adolescents could behave similarly by imitating the negative behaviors of their peers.<sup>28</sup> For example, numerous studies have demonstrated that deviant peer affiliation has a strong effect on adolescents' aggressive<sup>29,30</sup> and immoral behaviors.<sup>28,29</sup> Moreover, different environments have a combined effect on adolescent moral reaction modes. Some studies have reported that deviant peer affiliation mediates the relationship between parental attachment and immoral behaviors.<sup>31,32</sup> Previous studies have focused on the deviant peer affiliation of individual antisocial behaviors;<sup>27</sup> however, there is limited knowledge of how it affects adolescents' moral reaction modes. Insecure

parental attachment may develop negative peer relationships.<sup>28,31</sup> Adolescents may be influenced by bad peers and may spontaneously make more immoral decisions (more HV/UHV, fewer HM/UHM modes).

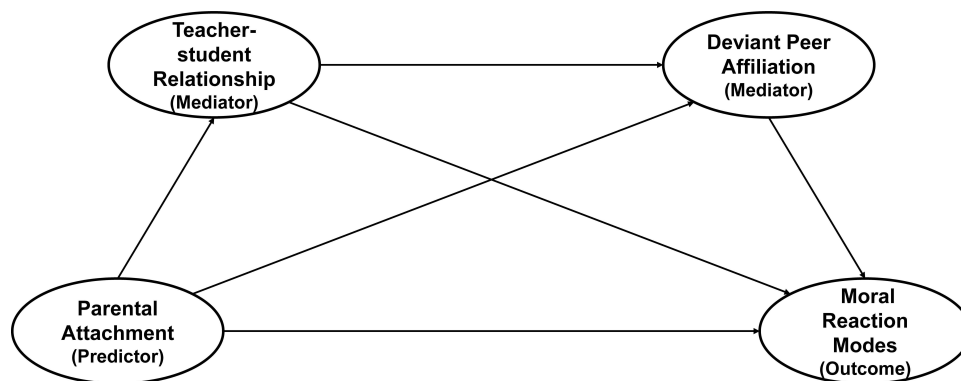
Based on the findings of previous studies, we speculated that teacher–student relationships and deviant peer affiliation may serially mediate the relationship between parental attachment and adolescent moral reaction modes. The individual environment interaction and bioecological models of human development suggest that individual behaviors develop in interactions with different environments.<sup>5,33</sup> The superiority of the family system in terms of social development affects both the school and social systems.<sup>34</sup> For example, a good parental relationship benefits the formation of a harmonious teacher–student relationship<sup>22</sup> and inhibits deviant peer affiliation.<sup>35</sup> These findings suggest that secure parental attachment could improve the teacher–student relationship, which would further promote positive peer relationships. This positive serial effect may promote positive moral reaction modes, such as more HM and fewer UHM/HV/UHV modes.

Therefore, based on the bioecological model of human development, numerous studies have confirmed that adolescents with four moral reaction modes are at the center of the ecosystem.<sup>5,6</sup> Adolescents are surrounded by a multi-layered environmental system. Individual moral reaction modes will be affected by social relationships in three aspects: family, school, and community.<sup>33</sup> This study aimed to expand on previous studies by examining a complex theoretical serial mediating model in which both the teacher–student relationship and deviant peer affiliation were considered mediators. This serial mediation model addresses questions regarding how various social relationships interact to influence adolescents' four moral reaction modes. Thus, the following hypotheses were tested: (1) Parental attachment is significantly positively correlated with HM modes, whereas it is significantly negatively associated with UHM, UHV, and HV modes; (2) Teacher–student relationship plays a partial or complete mediating role between parental attachment and the four moral reaction modes; (3) Deviant peer affiliation also plays a partial or complete mediating role between parental attachment and the four moral reaction modes; and (4) There are significant serial mediation effects of the teacher–student relationship and deviant peer affiliation in the relationship between parental attachment and the four adolescent moral reaction modes (Figure 1).

## Materials and Methods

### Participants

The data for this study were collected as part of the first wave of an ongoing longitudinal study. Using a stratified sampling method, 3053 students from four middle schools (849 students, 27.81% of the participants), four high schools (725 students, 23.75% of the participants), and three colleges (1479 students, 48.44% of the participants) in China were randomly selected. Female students comprised 49% (N = 1496) of the sample. Concerning the educational level of the participants' parents, 50.00% of their fathers and mothers had at least senior high school education.



**Figure 1** The proposed theoretical model predicting moral reaction modes.

## Measures

### Parental Attachment

Attachment to parents was assessed using the parental questionnaire from the Inventory of Parent and Peer Attachment (IPPA).<sup>36,37</sup> The IPPA was used to measure the level of intimacy between parents and children, with higher scores indicating a more secure attachment. The parental questionnaire is a 20-item measure that includes dimensions such as the quality of communication (sample item: “My parents respect my feelings”), the extent of anger (sample item: “I was angry with my parents”), and alienation and/or hopelessness resulting from an unresponsive or inconsistently responsive attachment figure (sample item: “I felt there was no point in telling my parents how I felt”). Parental attachment was scored on a five-point Likert scale (1 = never, 2 = seldom, 3 = sometimes, 4 = often, and 5 = always). The Chinese version of the IPPA has shown satisfactory reliability.<sup>31,38</sup> In this study, the internal consistency for the attachment scale was good ( $\alpha = 0.90$ ).

### Teacher-Student Relationship

The teacher–student relationship was measured using a 23-item teacher–student relationship measure<sup>39</sup> that comprised four dimensions: intimacy (sample item: “My relationship with my teacher is intimate and warm”); conflict (sample item: “The teacher and I always seem to be at war with each other”); support (sample item: “When I encounter difficulties in study, the teacher will explain to me patiently”); and satisfaction (sample item: “At present, my relationship with my teacher is exactly what I hoped”). A five-point Likert scale was used: 1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, and 5 = strongly agree. Higher scores on the dimensions of intimacy, support, and satisfaction indicated a higher level of positive teacher–student relationships, and higher scores on the dimension of conflict indicated a higher level of negative teacher–student relationships. The internal consistency of this measure used in the current study was good ( $\alpha = 0.89$ ).

### Deviant Peer Affiliation

This instrument was developed by Li and Zhu<sup>40</sup> and comprised eight items (eg, “How many of your best friends have been disciplined by the school?”). It was rated using a 5-point scale ranging from “nothing” to “complete.” Higher scores indicate a higher level of deviant peer affiliation ( $\alpha = 0.83$  in the present study).

### Moral Dilemma Scenarios

Participants’ moral reaction modes were measured using 15 moral dilemma scenarios.<sup>4</sup> Each scenario (sample scenario: “When your best friend complains about being bullied, your other three friends get so angry that they want to take your bullied friend to those people and say that if you don’t go, you’re not a friend”) comprised two choices: 1) decision-making, which involved choosing to either engage along with peers in behavior that is not conventionally or morally appropriate (sample option: “You and friends go after those people”) or engage in conventionally or morally appropriate behavior without being influenced by peers (sample option: “You stopped your friends from going after those people”) ( $\alpha = 0.69$  in the present study); and 2) an emotional response, which involved choosing from sad, somewhat sad, somewhat happy, and happy to describe how the participants felt about their decision ( $\alpha = 0.76$  in the present study).

## Procedure

The data used in this study were collected from schools in July, 2022. Participants sat in a classroom at school and completed the paper-and-pencil test within 20 minutes. Students read the questions and wrote down their responses at their own pace within that time. Study participation required informed consent from both parents and students. The participants were presented with written consent forms describing the nature and objective of the study, in compliance with the ethical code of the China Association for Psychology.

## Data Analysis

Following a previous study,<sup>4</sup> we first paired each participant’s responses for the decision outcomes and the emotional experiences elicited after making moral decisions per scenario. Then, we categorized the responses from each scenario into one of four moral reaction modes: non-moral decision-making + somewhat happy and happy (HV), non-moral

decision-making + somewhat sad and sad (UHV), moral decision-making + somewhat happy and happy (HM), and moral decision-making + somewhat sad and sad (UHM). We then assessed each participant's four moral reaction mode frequencies among all the scenarios and obtained the average for each participant. Second, we calculated the means and standard deviations for the main study variables and bivariate correlations between all variables using SPSS 20.0 software (IBM Corp., Armonk, NY, USA).<sup>41</sup> Third, we used Mplus software 8.1<sup>41</sup> to examine the serial mediation effect of the teacher–student relationship and deviant peer affiliation in the relationship between parental attachment and moral reaction modes.

## Results

### Common Method Bias Test

Harman's single-factor test was used to conduct a common method bias test.<sup>42</sup> The results showed that there were 20 factors with precipitation characteristic values greater than one. The largest common factor explained 11.34% of the variation, which was less than 40% of the critical value,<sup>43</sup> indicating that the common method deviation was insignificant.

### Descriptive Statistics and Correlations

The mean (M), standard deviation (SD), and correlation matrix of all the variables are presented in Table 1. As expected, both the teacher–student relationship and HM modes were positively associated with parental attachment; however, they were negatively associated with the other variables. Furthermore, the teacher–student relationship was positively associated with HM modes; however, it was negatively associated with the other variables. Finally, deviant peer affiliation was positively associated with HV and UHV modes; however, it was negatively associated with the HM and UHM modes.

### Testing for Serial Mediation of Teacher–Student Relationship and Deviant Peer Affiliation

Based on the correlation analysis, we further tested multiple serial mediation models for the four moral reaction modes (HV, UHV, HM, and UHM) from the perspectives of parental attachment, teacher–student relationships, and deviant peer affiliation. After controlling for gender and age, structural equation modeling (SEM) was used to investigate the serial mediation models. Social relationships (parental attachment, teacher–student relationship, and deviant peer affiliation) were identified as predictors of the four moral reaction modes using the Mplus software 8.1. The results indicate the measurement models had acceptable fit indices for the observed data (Table 2 and Figure 2).

**Table 1** Means, Standard Deviations, and Intercorrelations Between Variables

Variables	M	SD	1	2	3	4	5
1 age	16.94 <sup>a</sup>	2.77	—				
2 gender	0.49 <sup>a</sup>	0.50	−0.04*	—			
3 PA	3.70 <sup>a</sup>	0.64	−0.04*	0.02	—		
4 TS	3.32 <sup>a</sup>	0.56	−0.14**	−0.03	0.40**	—	
5 DP	1.46 <sup>a</sup>	0.49	0.06**	−0.12**	−0.24**	−0.18**	—
6 HV	0.09 <sup>b</sup>	0.13	0.18**	−0.20**	−0.15**	−0.19**	0.23**
7 UHV	0.14 <sup>b</sup>	0.13	0.22**	0.08**	−0.12**	−0.22**	0.08**
8 HM	0.59 <sup>b</sup>	0.24	−0.16**	0.06**	0.22**	0.27**	−0.15**
9 UHM	0.18 <sup>b</sup>	0.18	−0.07**	0.01	−0.10**	−0.07**	−0.03

**Notes:** M<sup>a</sup>: Mean of three main variables, male = 0, female = 1, M<sup>b</sup>: Frequency of the four moral reaction modes in the total sample. \* $p < 0.05$ , \*\* $p < 0.01$ .

**Abbreviations:** PA, parental attachment; TS, teacher–student relationship; DP, deviant peer affiliation; HM, happy moralist models; UHM, unhappy moralist models; HV, happy victimizer models; UHV, unhappy victimizer models.

**Table 2** Testing the Serial Mediation Effects on Individual Moral Reaction Modes

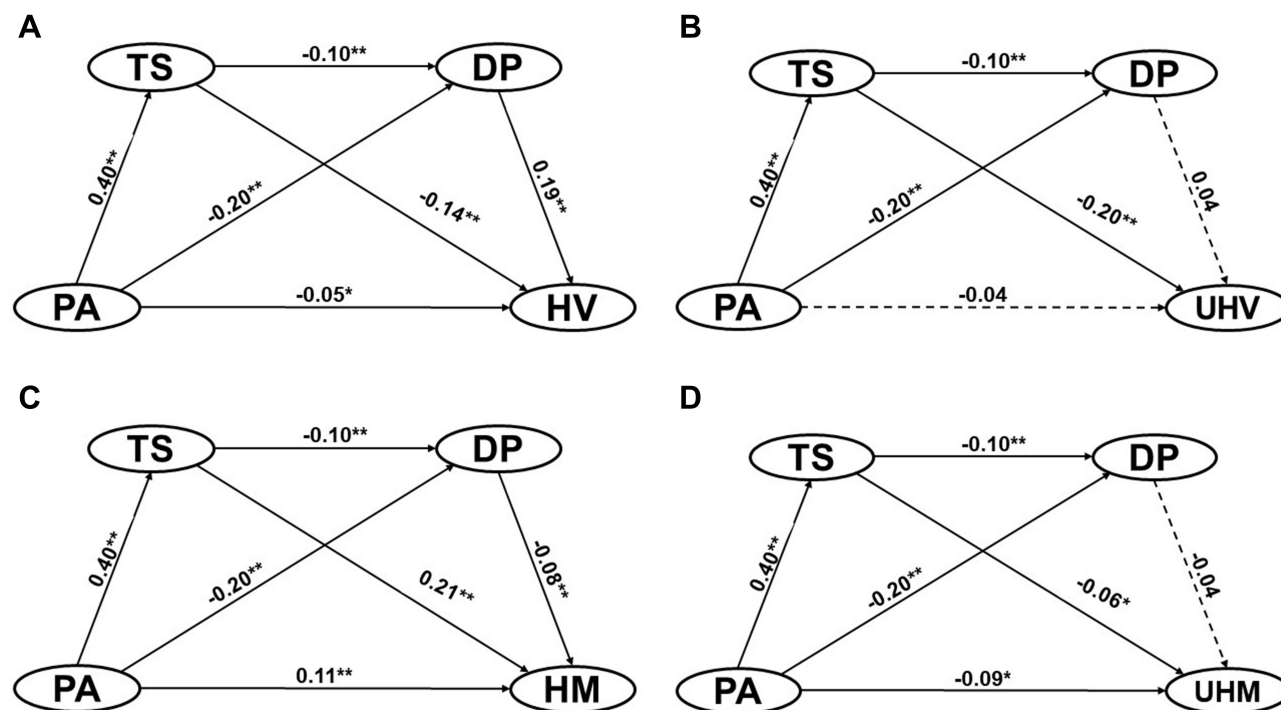
Variables	TS		DP		HV		UHV		HM		UHM	
	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE
PA	0.40**	0.02	-0.20**	0.02	-0.05*	0.02	-0.04	0.02	0.11**	0.02	-0.09*	0.02
TS			-0.10**	0.02	-0.14**	0.02	-0.20**	0.02	0.21**	0.02	-0.06*	0.02
DP					0.19**	0.03	0.04	0.02	-0.08**	0.02	-0.04	0.02
$\chi^2/df$					69.36		70.39		73.00		101.95	
CFI/TLI					0.95/0.88		0.95/0.87		0.95/0.86		0.89/0.73	
RMSEA					0.059		0.059		0.060		0.072	
SRMR					0.025		0.028		0.026		0.035	

**Notes:** The beta values are standardized coefficients. \* $p < 0.05$ , \*\* $p < 0.01$ .

**Abbreviations:** PA, parental attachment; TS, teacher–student relationship; DP, deviant peer affiliation; HV, happy victimizer; UHV, unhappy victimizer; HM, happy moralist; UHM, unhappy moralist.

### HV Modes

The direct effect of parental attachment on HV mode was significant ( $\beta = -0.05$ ,  $p < 0.05$ ). Parental attachment affected HV modes through three indirect paths: PA→TS→HV, PA→DP→HV, and PA→TS→DP→HV. The direct effect of parental attachment on the teacher–student relationship was significant ( $\beta = 0.40$ ,  $p < 0.01$ ). The direct effect of the teacher–student relationship on HV modes was significant ( $\beta = -0.14$ ,  $p = 0.01$ ). The direct effect of parental attachment on deviant peer affiliation was significant ( $\beta = -0.20$ ,  $p < 0.01$ ). The direct effect of deviant peer affiliation on HV mode was significant ( $\beta = 0.19$ ,  $p < 0.01$ ). In addition, the direct effect of the teacher–student relationship on deviant peer affiliation was significant ( $\beta = -0.10$ ,  $p < 0.01$ ). Mediation effects were tested using the bias-corrected percentile bootstrap method (random sampling was repeated 1000 times). The confidence intervals for the teacher-student

**Figure 2** The serial mediation models ((A) HV modes; (B) UHV modes; (C) HM modes; (D) UHM modes).

**Notes:** The number represents the regression coefficient of the two variables connected by the arrow line. \* $p < 0.05$ , \*\* $p < 0.01$ .

**Abbreviations:** PA, parental attachment; TS, teacher–student relationship; DP, deviant peer affiliation; HV, happy victimizer; UHV, unhappy victimizer; HM, happy moralist; UHM, unhappy moralist.



relationship and deviant peer affiliation were  $[-0.08, -0.04]$  and  $[-0.06, -0.03]$ . The mediating effect sizes were  $-0.06$  and  $-0.03$ . Moreover, the serial mediation confidence interval and effect size for the teacher–student relationship and deviant peer affiliation were  $[-0.02, -0.01]$  and  $-0.01$ , respectively (Table 3). Consequently, the teacher–student relationship and deviant peer affiliation partially serially mediated the relationship between parental attachment and HV.

### UHV Modes

The direct effect of parental attachment on UHV modes was not significant ( $\beta = -0.04, p > 0.05$ ). However, parental attachment affected UHV modes through an indirect path: PA→TS→UHV. The direct effect of parental attachment on the teacher–student relationship was significant ( $\beta = 0.40, p < 0.01$ ). The direct effect of the teacher–student relationship on UHV modes was significant ( $\beta = -0.14, p < 0.01$ ). The direct effect of parental attachment on deviant peer affiliation was significant ( $\beta = -0.20, p < 0.01$ ). In addition, the direct effect of the teacher–student relationship on deviant peer affiliation was significant ( $\beta = -0.10, p < 0.01$ ). However, the direct effect of deviant peer affiliation on UHV modes was not significant ( $\beta = 0.04, p > 0.05$ ). Mediation effects were tested using the bias-corrected percentile bootstrap method (random sampling was repeated 1000 times). The mediation confidence interval and effect size of the teacher–student relationship were  $[-0.10, -0.07]$  and  $-0.08$ , respectively (Table 3). Consequently, the teacher–student relationship completely mediated the relationship between parental attachment and UHV modes.

### HM Modes

The direct effect of parental attachment on HM mode was significant ( $\beta = 0.11, p < 0.01$ ). Parental attachment affected HM modes through three indirect paths: PA→TS→HM, PA→DP→HM, and PA→TS→DP→HM. The direct effect of parental attachment on the teacher–student relationship was significant ( $\beta = 0.40, p < 0.01$ ). The direct effect of the teacher–student relationship on HM modes was significant ( $\beta = 0.21, p < 0.01$ ). The direct effect of parental attachment on deviant peer affiliation was significant ( $\beta = -0.20, p < 0.01$ ). The direct effect of deviant peer affiliation on HM modes was significant ( $\beta = -0.08, p < 0.01$ ). In addition, the direct effect of the teacher–student relationship on deviant peer affiliation was significant ( $\beta = -0.10, p < 0.01$ ). Mediation effects were tested using the bias-corrected percentile bootstrap method (random sampling was repeated 1000 times). The confidence intervals for the teacher–student relationship and deviant peer affiliation were  $[0.07, 0.11]$  and  $[0.01, 0.03]$ , respectively. Mediating effect sizes were 0.08 and 0.01. Moreover, the serial mediation confidence interval and effect size of the teacher–student relationship and deviant peer affiliation were  $[0.01, 0.02]$  and 0.01 (Table 3). Consequently, teacher–student relationships and deviant peer affiliation partially serially mediated the relationship between parental attachment and HM reactions.

**Table 3** Mediation and Effect Value

Path	Effect Value	P	Relative Mediation Effect	95% CI	
				Lower Bound	Upper Bound
PA → TS → HV	−0.06	< 0.001	−0.06/−0.11 = 0.54	−0.08	−0.04
PA → DP → HV	−0.03	< 0.001	−0.03/−0.11 = 0.27	−0.06	−0.03
PA → TS → DP → HV	−0.01	0.001	−0.01/−0.11 = 0.09	−0.02	−0.01
HV Total Effect	−0.11	< 0.001			
PA → TS → UHV	−0.08	< 0.001	−0.08/−0.09 = 0.89	−0.10	−0.07
UHV Total Effect	−0.09	< 0.001			
PA → TS → HM	0.08	< 0.001	0.08/0.11 = 0.72	0.07	0.11
PA → DP → HM	0.01	< 0.001	0.01/0.11 = 0.09	0.01	0.03
PA → TS → DP → HM	0.01	0.006	0.01/0.11 = 0.09	0.01	0.02
HM Total Effect	0.11	< 0.001			
PA → TS → UHM	−0.02	0.025	−0.02/−0.03 = 0.66	−0.04	−0.01
UHM Total Effect	−0.03	< 0.001			

**Abbreviations:** PA, parental attachment; TS, teacher–student relationship; DP, deviant peer affiliation; HM, happy moralist; UHM, unhappy moralist; HV, happy victimizer; UHV, unhappy victimizer.

## UHM Modes

The direct effect of parental attachment on UHM modes was significant ( $\beta = -0.09, p < 0.05$ ). Parental attachment affected UHM modes through an indirect path: PA→TS→UHM. The direct effect of parental attachment on the teacher–student relationship was significant ( $\beta = 0.40, p < 0.01$ ). The direct effect of the teacher–student relationship on UHM modes was significant ( $\beta = -0.06, p < 0.05$ ). The direct effect of parental attachment on deviant peer affiliation was significant ( $\beta = -0.20, p < 0.01$ ). Furthermore, the direct effect of the teacher–student relationship on deviant peer affiliation was significant ( $\beta = -0.10, p < 0.01$ ). However, the direct effect of deviant peer affiliation on UHM modes was not significant ( $\beta = -0.04, p > 0.05$ ). Mediation effects were tested using the bias-corrected percentile bootstrap method (random sampling was repeated 1000 times). The mediation confidence interval and effect size of the teacher–student relationship were  $[-0.04, -0.01]$  and  $-0.02$ , respectively (Table 3). Consequently, the teacher–student relationship partially mediated the relationship between parental attachment and UHM reactions.

## Discussion

This study explored the relationship between parental attachment and different modes of moral reaction among Chinese students and included an examination of the serial mediating role of the teacher–student relationship and deviant peer affiliation. The results clarify the internal mechanism of the influence of parental attachment on moral reaction modes, thus enriching the existing research in the field of adolescent moral reaction modes.

## The Relationship Between Parental Attachment and Moral Reaction Modes

The current study found that parental attachment was positively associated with HM and negatively associated with HV/UHV/UHM modes, in line with Hypothesis 1. This supports the view that adolescents who experience more parental care believe that they live in a warm environment and are more able to understand the situations of others and further develop more HM reaction modes.<sup>44</sup> This finding is supported by attachment theory, which argues that emotional warmth can provide youngsters with stronger emotional support.<sup>45</sup> Secure parental attachment meets individual psychological needs and develops good self-awareness in students.<sup>46</sup> This results in them trusting and helping others, and experiencing happiness after making the altruistic decision.<sup>27</sup> For example, those with secure parental attachment were more willing to help others and were more likely to experience happy emotions.<sup>11,45</sup> However, insecure parental attachment leads to externalization problems (such as sexual abuse behavior), and victimizers may experience positive emotions (HV modes).<sup>47</sup> Moreover, youngsters with poor parental relationships externalized a sense of insecurity and believed that helping or victimizing others (UHM, UHV modes) caused a loss of self-interest.<sup>48</sup> Although adolescence is a period of gradually becoming independent and moving toward living apart from parents,<sup>49</sup> the parental role remains important.

## The Mediating Effect of the Teacher-Student Relationship and Deviant Peer Affiliation

First, the results showed that the teacher–student relationship either partly or completely mediated the relationship between parental attachment and all moral reaction modes, which supported Hypothesis 2. This finding is consistent with the social relationship escort model, which reported that warmth and emotional support from parents positively influenced individual teacher–student relationships.<sup>50</sup> Adolescents with secure parental attachment may perform better in school and receive more emotional and social support from teachers, which is conducive to cultivating HM modes. However, numerous studies have suggested that students with negative parental and teacher–student relationships have poor social abilities and exhibit antisocial behaviors.<sup>51</sup> When parental relationships cannot meet students' inner psychological demands, they perceive the external environment as unsafe, which results in negative teacher–student relationships and negative evaluations of events, leading to more HV, UHM, and UHV modes in social interaction. We speculate that these students may gain a sense of security when confronted with these modes of moral reaction. Teachers play an increasingly significant role in the moral development of students.<sup>8,24</sup> Therefore, parental attachment can predict moral reaction modes through the teacher–student relationship. Secure parental attachment plays a stronger protective role in improving teacher–student relationships and promoting positive moral reaction modes.



Second, this study found that deviant peer affiliation partly mediated the relationship between parental attachment and HV/HM modes. Hypothesis 3 was partly supported, which is consistent with previous studies.<sup>28,46</sup> According to the findings of the social relationship escort model, insecure parental attachment can result in negative peer relationships.<sup>50</sup> Under the guidance of the social learning theory,<sup>28</sup> adolescents will be influenced by bad peers, spontaneously make immoral decisions, and experience positive emotions after making such decisions. Adolescents showed consistent HV modes with bad peers to obtain peer recognition, which effectively compensated for the lack of psychological security caused by insecure parental attachment.<sup>29,30,52</sup> However, adolescents with secure parental attachment, who did not lack psychological security, had fewer deviant peer affiliations. Thus, such adolescents behave more morally and experience more positive emotions (HM mode). Therefore, the intervention of individual negative moral reaction modes (HV/UHV/UHM modes) should not only stem from the single factors of family and peers but should be regarded as a whole, and importance should be attached to the connections among them. Good and secure parental relationships can effectively protect children from deviant peer relationships and develop positive HM modes.

Third, the results showed that teacher–student relationships and deviant peer affiliation serially mediated parental attachment and HV/HM modes. This was partially in line with Hypothesis 4, which was supported by both the multiple-attachment hypothesis and developmental systems theory.<sup>5,53</sup> A negative family atmosphere may prompt youngsters to develop negative teacher–student relationships,<sup>35</sup> hinder them from regulating their peer affiliation with correct norms, and further promote increased HV mode behaviors. However, secure parental attachment can develop a positive teacher–student relationship.<sup>31</sup> In addition, a positive teacher–student relationship includes a variety of internal emotions, attitudes, and ideas (such as warm support, rational guidance, praise, and encouragement),<sup>19,24</sup> which protects against the formation of deviant peer relationships.<sup>28,30</sup> Secure and supportive parental and teacher–student relationships contributed to students’ positive orientation.<sup>51</sup> Individuals were more likely to experience adequate love and attention and adopted more HM modes in their behavior. In addition, this study found that correlations between deviant peer affiliation and UHM/UHV modes were weak, and deviant peer affiliation did not predict adolescent UHM/UHV modes. However, parental attachment and teacher–student relationships were highly correlated with and predictive of adolescent UHM/UHV modes. We speculated that parental attachment and teacher–student relationships have special predictive effects on these two moral reaction modes of adolescents, which are not affected by deviant peer affiliation. On the one hand, adolescents with negative parental or teacher–student relationships had a disadvantage in emotional perception recognition and emotional empathy.<sup>24,46</sup> They were in a period of conflict between identity and identity disorder and may have faced more psychological confusion;<sup>8</sup> therefore, they may have made more moral decisions based on their parents’ authority.<sup>51</sup> However, they did not experience adequate love and attention; thus, they experienced negative emotions after making moral decisions (UHM modes).<sup>27,45,50</sup> However, secure and supportive parental and teacher–student relationships contribute to adolescents’ positive orientation.<sup>47</sup> They meet the inner psychological demands of students.<sup>24</sup> Adolescents expected to be praised by elders (parents or teachers) rather than criticized after making immoral decisions (UHV modes), thus experiencing negative emotions.<sup>15,22</sup> Therefore, positive parental and teacher–student relationships may reduce individual deviant peer affiliation. Adolescents experiencing this warm relationship can further master positive emotional expression rules and develop positive HM modes in a constructive social atmosphere.

## Limitations and Future Research Directions

Although this study provides several important insights, it has some limitations. First, although the cross-sectional mediation model provides useful information about variable relationships, a complete autoregressive cross-lagged design would be beneficial to verify the relationship between parental attachment and moral reaction modes. Second, our data collection method relied on individual self-reports. Although youngsters are more sensitive to their social relationships and moral reactions, and perceived social relationships have a significant impact on their development, reliance on multiple informants (self-reports, parent reports, peer reports, and teacher reports) will afford more rigorous tests of the study hypotheses. Third, parental attachment can be divided into paternal and maternal attachments, which may have different effects. Future studies should investigate their influence on young adults’ modes of moral reaction.

## Conclusion

The present study suggests parental attachment is positively associated with HM and negatively associated with HV/UHV/UHM modes in Chinese students. This confirms the value of parental attachment in adolescent moral reaction modes. Moreover, both teacher–student and peer relationships played important mediating roles in the relationship between parental attachment and the four moral reaction modes. Secure parental attachment can develop both positive teacher–student and peer relationships, which can further prompt adolescents to behave in more positive HM modes and fewer UHM/HV/UHV modes. These findings emphasize how integrated and harmonious social relationships can play a key role in improving adolescents' morality.

## Data Sharing Statement

The data supporting the findings of this study are openly available at <https://doi.org/10.3886/E169921V1>, reference number E169921V1.

## Ethics Approval and Informed Consent

1. As our study was non-interventional (ie, a survey), the ethical committee of Hunan University of Science and Technology granted us exemption from ethical approval.
2. Before the survey was conducted, participants were apprised about the aim of the research. They were asked whether they were willing to participate in this research and whether they were willing to let their data be published. In addition, they were informed that they could quit the research at any time, and that the data would be kept anonymous. All identifiable information was also eliminated.
3. The research reported in this manuscript strictly respects the Declaration of Helsinki Ethical Principles.

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## Disclosure

The authors report that there are no competing interests to declare.

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