

The influence of attachment on bullying behavior on campus: The moderating effect of physical exercise

Wang Jingnan^{1,a,*}, Ou Min^{1,b}, Huang Zhongjie^{2,c}, Tian Yanyan^{1,d},
Wang Haiqing^{1,e}

¹College of Psychology, Northwest Normal University, Lanzhou, China

²Lanzhou No.82 Middle School, Lanzhou, China

^a1473874940@qq.com, ^b2445936657@qq.com, ^c375953806@qq.com, ^d409547854@qq.com,

^e1871229497@qq.com

*Corresponding author

Abstract: This study explores the impact of attachment on campus bullying behaviour and the moderating effect of physical exercise. A questionnaire survey was conducted among students in a middle school in Lanzhou, using a self-designed general demographic questionnaire, a Physical Activity Rating Scale, a questionnaire on middle school students' campus bullying behaviour, and an Experiences in Close Relationships Scale. A total of 354 questionnaires were collected, and after examining the completion time and eliminating invalid questionnaires (4 in total), 350 valid questionnaires were obtained, with an effective rate of 98.87%. After organizing the data, SPSS was used for analysis. The results showed significant correlations between attachment anxiety, attachment avoidance, physical exercise, and campus bullying behaviour ($p < 0.01$). Attachment anxiety and attachment avoidance positively predicted campus bullying behaviour ($\beta = 0.411$, $t = 8.420$, $p < 0.001$; $\beta = 0.226$, $t = 4.326$, $p < 0.001$). Physical exercise moderated the effects of attachment anxiety and attachment avoidance on campus bullying behaviour ($\beta = -0.193$, $t = -4.321$, $p < 0.001$; $\beta = -0.146$, $t = -3.082$, $p < 0.01$). Higher levels of attachment avoidance and anxiety are associated with higher occurrences of campus bullying behavior, but physical exercise can mitigate the effects of attachment anxiety and avoidance on such behavior. These findings suggest that parents and schools should prioritize physical exercise and provide more opportunities for adolescents to engage in sports activities. This not only helps adolescents alleviate stress and improve their awareness of rules but also promotes their physical and mental health development, as well as contributes to the establishment of a positive campus culture.

Keywords: Attachment; Campus Bullying Behaviour; Aggressive Behaviour; Physical Exercise; Adolescents

1. Introduction

The "Opinions on Deepening the Integration of Physical Education and Education to Promote the Healthy Development of Adolescents" states that promoting the coordinated development of physical exercise and cultural learning among adolescents is beneficial for their physical and mental health, as well as their holistic personality development as socialist builders and successors. With guidance from national policies and the dissemination of related media, people have gained a deeper understanding of the importance of sports activities.

The period of adolescence is a critical stage for physical and mental development among junior high school students. During this phase, individuals experience rapid cognitive growth, significant emotional fluctuations, and face challenges related to self-esteem and resilience. It is an important period for building adolescents' autonomous emotional management. Engaging in sports activities can facilitate positive emotional exchanges among individuals, which has a positive impact on promoting adolescent psychological well-being ^[1]. Additionally, sports have been found to have significant effects on mood improvement and enhancing executive functioning ^[2].

Attachment is an essential aspect of individual adaptation and survival. It assists individuals in better adapting to life throughout their entire lifespan. Secure attachment influences the level of closeness between individuals and their parents, striking a balance between a sense of security and independence to better adapt to society. On the other hand, individuals with insecure attachment have lower tolerance for negative emotions ^[3] and are more prone to experiencing extreme emotions while having poor

emotional management skills^[4]. Building upon these considerations, this study focuses on the adolescent population to examine the influence of attachment on bullying behavior during adolescence and the moderating role of physical exercise.

2. Literature review

Attachment refers to a special emotional bond that exists between an infant and their primary caregiver (usually the mother or father). It typically begins to form in infancy and continues to develop, with lifelong implications for the individual^[5] (Bowlby, 1969). Individual attachment styles can be classified using two methods: typologies and dimensions. This study adopts Brennan et al.'s dimensional approach, which defines attachment styles along the continuum of attachment avoidance and attachment anxiety^[6]. Attachment avoidance pertains to an individual's level of comfort and reliance on intimate relationships, while attachment anxiety pertains to an individual's level of concern about being abandoned or rejected.

Aggressive behavior refers to intentional actions aimed at causing harm, discomfort, and pain to others^[7] (Li Wenge, 2004). Campus bullying behavior represents a specific context for aggressive behavior. The "Notice on Carrying out Special Governance of Campus bullying behavior" issued by the Office of the State Council Education Supervision Committee clearly defines campus bullying behavior as "intentional or malicious acts of bullying, insults, and injuries inflicted on students through physical, verbal, or online means that have adverse effects on students' physical and mental health."

There is a certain link between parent-child attachment and problematic behaviors such as aggression, bullying, and criminal activities. Negative parent-child attachment predicts problem behavior and aggression, with individuals reporting higher levels of aggression in insecurely attached individuals^[8]. Research has shown that physical exercise can help adolescents alleviate negative emotions, cultivate positive behavioral habits, improve aggressive personality traits, aggressive cognition, and aggressive emotions, thereby reducing the occurrence of campus bullying behavior^[9]. Building upon this foundation, this study proposes the following hypotheses:

H1: Attachment directly predicts campus bullying behavior.

H2: Physical exercise moderates the relationship between attachment and campus bullying behavior.

3. Methods

3.1. Subjects

The participants of this study were selected from a middle school in Lanzhou City, Gansu Province. The voluntary and anonymous nature of the survey was explained to the participants beforehand, using standardized instructions. The online survey questionnaires were distributed at the class level. A total of 354 questionnaires were collected, and after excluding invalid responses, 350 valid questionnaires remained, resulting in a valid response rate of 98.87%. Among the participants, there were 181 males (51.71%) and 169 females (48.29%). In terms of student background, 273 students (78.00%) came from urban areas, while 77 students (22.00%) came from rural areas. Additionally, there were 175 only children (50%) and 175 non-only children (50%). The paper size must be set to A4 (210x297 mm). The margins must be set as the following:

3.2. Research Instruments

3.2.1. General Demographic Questionnaire

The general demographic questionnaire used in this study was a self-developed population survey questionnaire that collected basic information such as age, gender, and place of origin.

3.2.2. Physical Activity Rating Scale

To measure physical exercise, this study employed the Physical Activity Rating Scale revised by Liang Deqing^[10]. This scale is widely used to assess physical exercise or activity. It assesses participants' exercise intensity, duration, and frequency on three dimensions, each divided into five levels. Exercise intensity and frequency are rated on a scale from 1 to 5, while exercise duration is rated on a scale from 1 to 5, with varying values from 0 to 4. The physical activity level is calculated as the product of exercise

intensity, duration, and frequency (physical activity level = exercise intensity \times exercise duration \times exercise frequency). The evaluation criteria for physical activity level are as follows: scores ≤ 19 indicate low physical activity level, scores between 20 and 42 indicate moderate physical activity level, and scores ≥ 43 indicate high physical activity level. The Physical Activity Level Scale used in this study has demonstrated good reliability and validity.

3.2.3. Experiences in Close Relationships Scale

The Experiences in Close Relationships Scale, developed by Brennan et al. and translated by Li Tonggui and Kato Kazuo [11], was used in this study to measure intimate relationships. Originally used to measure adult attachment styles, this scale has also been used to measure attachment styles in adolescents. The questionnaire consists of two subscales: Attachment Anxiety and Attachment Avoidance, each consisting of 28 items, for a total of 36 items. The odd-numbered items assess the Avoidance-Closeness dimension, representing attachment avoidance, while the even-numbered items assess the Anxiety-Security dimension, representing attachment anxiety. Participants were asked to rate each item on a 7-point scale, ranging from 1 (completely disagree) to 7 (completely agree), based on their own experiences in intimate relationships. The internal consistency coefficient (α) for this study was calculated at 0.908, indicating good reliability.

3.2.4. Questionnaire on Campus Bullying Behaviour among Middle School Students

The Questionnaire on School Bullying Behavior among Middle School Students, developed by Qin Liyan [12] from Guizhou Normal University, was used in this study to measure school bullying behavior among junior high school students. The questionnaire consists of 21 items, organized into five dimensions: verbal bullying, relational bullying, physical bullying, transferred aggression, and cyberbullying. The response options are as follows: verbal bullying (1, 2, 3, 4, 5); relational bullying (6, 7, 8, 15); physical bullying (9, 10, 11, 12, 20); cyberbullying (13, 18, 19, 21); and transferred aggression (14, 16, 17). All items are scored positively, with higher scores indicating more severe instances of school bullying behavior. The Cronbach's α coefficient for this questionnaire in this study was calculated at 0.937, indicating good reliability.

3.3. Data Statistics

Data analysis for this study was conducted using SPSS version 26.0 and included descriptive statistics, independent samples t-tests, correlation analysis, and hierarchical regression analysis.

4. Results

Table 1: Statistics of basic demography variables and comparison of differences between main variables ($N=350$)

		<i>N</i>	Attachment Avoidance <i>M</i> \pm <i>SD</i>	Attachment Anxiety <i>M</i> \pm <i>SD</i>	Physical Exercise <i>M</i> \pm <i>SD</i>	Campus Bullying Behavior <i>M</i> \pm <i>SD</i>
gender	Man	181	3.483 \pm 0.830	2.779 \pm 1.024	22.193 \pm 18.795	28.668 \pm 1.729
	Woman	169	3.519 \pm 0.900	2.818 \pm 1.071	21.982 \pm 16.767	27.367 \pm 8.291
	<i>t</i>		-0.389	-0.344	0.111	1.275
Place of origin	City	273	3.523 \pm 0.807	2.786 \pm 1.005	21.425 \pm 16.949	28.154 \pm 9.910
	Countryside	77	3.421 \pm 1.043	2.869 \pm 1.185	24.455 \pm 20.561	27.636 \pm 8.649
	<i>t</i>		0.910	-0.391	-1.319	0.416
Family formation	Only-child	175	3.480 \pm 0.871	2.645 \pm 0.950	23.103 \pm 17.854	27.674 \pm 9.682
	Non-only child	175	3.521 \pm 0.858	2.951 \pm 1.116	21.080 \pm 17.778	28.406 \pm 9.606
	<i>t</i>		-0.450	-2.766**	1.062	-0.709

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; "p" is the probability, reflecting the probability of an event.

Table 1 reveals that there were no significant differences ($ps > 0.05$) in attachment avoidance, physical exercise, and campus bullying behavior based on gender, place of origin, and family structure. However, a significant difference ($p < 0.01$) was found in attachment anxiety based on whether the participants were only children or not. Non-only children scored significantly higher in attachment avoidance compared to only children.

Table 2: Correlation analysis of main variables (N=350)

	<i>M±SD</i>	1	2	3	4
1. Attachment Avoidance	3.500±0.863	1			
2. Attachment Anxiety	2.797±1.045	0.683***	1		
3. Physical Exercise	22.091±17.20	-0.163**	-0.240***	1	
4. Campus Bullying Behavior	28.040±9.637	0.226***	0.411***	-0.423***	1

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; “p” is the probability, reflecting the probability of an event.

From Table 2, it can be observed that there were significant negative correlations ($p < 0.01$, $p < 0.001$) between attachment avoidance and attachment anxiety with physical exercise. Additionally, there were significant positive correlations ($p < 0.01$, $p < 0.001$) between both attachment avoidance and attachment anxiety with campus bullying behavior. These findings suggest that higher levels of attachment anxiety and attachment avoidance are associated with a greater likelihood of engaging in campus bullying behavior. Furthermore, there was a significant negative correlation between physical exercise and campus bullying behavior, indicating that individuals who engage in more physical exercise are less likely to exhibit campus bullying behavior. Lastly, physical exercise demonstrated significant negative correlations with both attachment avoidance and attachment anxiety, suggesting that individuals who engage in less physical exercise are more likely to experience attachment avoidance and attachment anxiety.

Table 3: The moderating effect of physical exercise on attachment anxiety and campus bullying behavior(N=350)

Models and Variables	Campus Bullying Behavior					
	Model 1		Model 2		Model 3	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
1. Attachment Avoidance	0.226	4.326***	0.161	6.322**	0.171	3.558***
2. Physical Exercise			-0.397	-8.177***	-0.391	-8.157***
3. Attachment Avoidance×Physical Exercise					-0.146	-3.082**
	0.048		0.200		0.219	
	0.051		0.204		0.226	
<i>F</i>	18.715***		44.565***		33.603***	

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; “p” is the probability, reflecting the probability of an event.

The results of the moderation analysis, as shown in Table 3, indicate that Model 1, which includes attachment avoidance as the independent variable, demonstrates that attachment avoidance is a significant predictor of campus bullying behavior ($\beta = 0.226$, $t = 4.326$, $p < 0.001$). In Model 2, when physical exercise is introduced as a moderator on top of Model 1, it reveals that physical exercise plays a significant moderating role in the relationship between attachment avoidance and campus bullying behavior ($\beta = -0.146$, $t = -3.082$, $p < 0.01$). Specifically, physical exercise can weaken the impact of attachment avoidance on campus bullying behavior. These findings support the second hypothesis.

Table 4: The moderating effect of physical exercise on attachment anxiety and campus bullying behavior(N=350)

Models and Variables	Campus Bullying Behavior					
	Model 1		Model 2		Model 3	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
1. Attachment Anxiety	0.411	8.420***	0.329	7.016***	0.308	6.700***
2. Physical Exercise			-0.344	-7.345***	-0.335	-7.324***
3. Attachment Anxiety×Physical Exercise					-0.193	-4.321***
	0.167		0.277		0.312	
	0.169		0.281		0.318	
<i>F</i>	70.904***		67.820***		53.739***	

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; “p” is the probability, reflecting the probability of an event.

The results of the moderation analysis, as shown in Table 4, indicate that Model 1, which includes attachment anxiety as the independent variable, demonstrates that attachment anxiety is a significant predictor of campus bullying behavior ($\beta = 0.411$, $t = 8.420$, $p < 0.001$). In Model 2, when physical

exercise is introduced as a moderator on top of Model 1, it reveals that physical exercise plays a significant moderating role in the relationship between attachment anxiety and campus bullying behavior ($\beta = -0.193$, $t = -4.321$, $p < 0.001$). Specifically, physical exercise can weaken the impact of attachment anxiety on campus bullying behavior. These findings support the second hypothesis.

5. Discussion

The present study examined the influence of attachment on campus bullying behavior. The results showed a significant positive correlation between attachment anxiety and attachment avoidance with campus bullying behavior among middle school students. Furthermore, attachment anxiety and attachment avoidance were found to directly predict campus bullying behavior, indicating that higher levels of attachment avoidance and attachment anxiety increase the likelihood of engaging in bullying behavior during adolescence, which is consistent with previous research and supports the first hypothesis.

The positive role of physical exercise was also confirmed in this study. Physical exercise was found to effectively moderate the impact of attachment avoidance and attachment anxiety on campus bullying behavior, reducing its occurrence. This finding supports the second hypothesis.

During adolescence, individuals often experience negative emotions such as jealousy and anger, which may manifest as aggressive behavior. Given that schools are the primary setting for adolescents' lives, campus bullying becomes a prominent form of expression for these emotions^[13]. Physical exercise provides a safe outlet for adolescents to release dissatisfaction, alleviate stress, improve interpersonal relationships, and integrate better into social groups. Consequently, it reduces impulsive negative behaviors^[14].

Physical exercise has always been a crucial component of comprehensive education. Engaging in physical exercise not only allows adolescents to learn various sports skills and improve physical fitness but also enhances their moral qualities and social abilities, contributing to the development of a healthy personality that better adapts to society. It is also an effective means of preventing juvenile delinquency^[15]. Recognizing the importance of physical exercise as a key method to address adolescent behavioral issues enables parents and teachers to provide faster and more effective assistance to adolescents during this challenging period.

This study established a mechanism for examining the influence of attachment on campus bullying behavior by considering physical exercise as a moderating variable. The findings suggest that physical exercise serves as a protective factor against campus bullying behavior. Increasing physical exercise can effectively reduce the occurrence of campus bullying and weaken the impact of attachment avoidance and attachment anxiety on such behavior. Therefore, it can be inferred that this intervention strategy may reduce negative emotions and psychological issues associated with campus bullying. Consequently, parents and teachers can guide adolescents to participate in sports activities, increase opportunities for physical exercise, and cultivate a positive attitude towards exercise to reduce the likelihood of campus bullying, thereby protecting the mental and physical well-being of adolescents and fostering a positive school environment.

Based on the above discussion, the following educational recommendations are proposed:

(1) The importance of physical exercise should be advocated through social media and society at large. The sports competition system should be improved. Schools should promote students' participation in various forms of physical exercise by integrating physical and intellectual development. Parents should support their children's involvement in sports activities and competitions, even joining them themselves to enhance their secure attachment levels.

(2) According to the theory of psychosocial development stages, individuals aged 12-18 are going through adolescence characterized by rebellion and facing challenges related to identity formation and role confusion. During this stage, they experience emotional instability, an increased sense of independence, conflicts, and disciplinary difficulties. Therefore, parents should create opportunities for adolescents to engage in physical exercise, develop multiple sports skills, and establish healthy exercise habits, which will benefit their future learning and life.

(3) Research suggests that intimate friends and peers serve as protective factors between attachment and aggressive behavior^[8]. Therefore, when implementing physical exercise interventions, it may be effective to design programs that operate in class units or groupings based on peers.

6. Conclusion

Attachment can directly predict adolescent campus bullying behavior, with higher levels of attachment anxiety and attachment avoidance predicting more bullying behavior. In this study, the surveyed adolescents engaged in moderate levels of physical exercise. Physical exercise was found to have a moderating effect on the relationship between attachment and adolescent campus bullying behavior. It can weaken the impact of attachment avoidance and attachment anxiety on such behavior.

7. Shortcomings and Prospects

This study used the quantity of physical exercise as an indicator for adolescents, but it did not explore the role of different types of physical exercise in the influence of attachment on campus bullying behavior. Future research could investigate which types of physical exercise are more suitable as interventions for addressing campus bullying behavior and explore other intervention variables that may affect such behavior.

References

- [1] Xin Chao. (2022). *The Influence of Orienteering Teaching on Emotion Management Ability in Middle School*. (Master's thesis). Jinan University, Jinan.
- [2] Li Jing, Shen Qiqi & Yin Hengchan. (2018). *The impact of exercise on emotion regulation and its relationship with executive function*. Beijing Sports University. Summary of the 11th National Conference on Sports Psychology (Post Conference Edition) (pp. 107).
- [3] Bateman, Anthony, Fonagy, & Peter. (2016). *Mentalization Based Treatment for Personality Disorders: A Practical Guide*.
- [4] Fonagy, P. (1996). *Patterns of attachment, interpersonal relationships and health*. D Blane.
- [5] Bowlby, J. (1969). *Attachment and loss: Attachment (vol. 1)*. London: Random House.
- [6] Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). *Self-report measurement of adult attachment: An integrative overview*. *Attachment theory and close relationships*, 46, 76.
- [7] Li Wenge. (2008). *Experimental study on emotional status of working students' aggressive behavior*. *Issues on Juvenile Crimes and Delinquency*, 33-37.
- [8] Bilge Kaplan & Eda Seyda Aksel. (2013). *The Investigation Of Relationship Between Attachment And Aggressive Behavior Of Adolescents*. *Nesne Psikoloji Dergisi*, (1).
- [9] Zhang Xiaoxiao. (2022). *Effects of exercise on susceptibility to negative emotions in left-behind children aged 9-12*. (Master's thesis), Anqing Normal University, Anqing.
- [10] Liang Deqing. (1994). *College students' stress levels and their relationship to physical exercise*. *Chinese Mental Health Journal*. (01).
- [11] Li Tonggui & Kato Kazuo. (2006). *Measuring Adult Attachment: Chinese Adaptation of the ECR Scale*. *Acta Psychologica Sinica*, 38(3), 399-406.
- [12] Qin Liyan. (2019). *Research on compiling and influencing factors of campus bullying behavior questionnaire for middle school students*. (Master's thesis). Guizhou Normal University, Guangzhou.
- [13] Zhang Xiaoqiang. (2020). *The Impact of Sports Activities on the Aggressiveness of Junior Middle School Students: The Coordination Effect of Coping Style and Psychological Resilience*. (Master's thesis). Wuhan University of Technology, Wuhan.
- [14] Xu Xiang. (2018). *New measures to prevent juvenile crime: Based on sports safety valve performance*. *Journal of Shandong Sport University*, (05), 49-54.
- [15] Ren Jiaojiao, Lv Wei, & Zhang Rujia. (2014). *New Perspective on Prevention of Juvenile Delinquency as Seen from Sports*. *Journal of Wuhan Sports University*, (11), 45-49.