



## Relationship between parent–child cohesion and adolescent physical activity: A chain mediation model

Dongbin Lai<sup>1</sup>, Menghua Wang<sup>2</sup>, Yuan Zheng<sup>1</sup>, Pengfei Wen<sup>3</sup>, Huan Luo<sup>4</sup>

<sup>1</sup>Graduate School, Guangzhou Sport University, People's Republic of China

<sup>2</sup>College of Physical Education and Health, Zhaoqing University, People's Republic of China

<sup>3</sup>School of Physical Education, Guangzhou Sport University, People's Republic of China

<sup>4</sup>Department of Physical Education, Shenzhen Polytechnic University, People's Republic of China

How to cite: Lai, D., Wang, M., Zheng, Y., Wen, P., & Luo, H. (2024). Relationship between parent–child cohesion and adolescent physical activity: A chain mediation model. *Social Behavior and Personality: An international journal*, 52(12), e13815

In this study we explored the relationship between parent–child cohesion and physical activity among adolescents, as well as examining perceived social support and self-efficacy as mediators of this link. We integrated the Parent–Child Cohesion Scale, the Adolescent Physical Activity Scale, the Perceived Social Support Scale, and the Self-Efficacy Scale, collecting data from 308 adolescents via paper questionnaires. The findings indicated that parent–child cohesion had a direct positive effect on adolescents' physical activity and also indirectly influenced physical activity through the individual and chain mediators of perceived social support and self-efficacy. These results contribute to a deeper theoretical understanding of the mechanisms behind adolescents' physical activity. From a practical perspective, our findings offer new methods and pathways for enhancing physical activity among adolescents.

### Keywords

parent–child cohesion,  
adolescent physical activity,  
perceived social support, self-  
efficacy

### Article Highlights

- Parent–child cohesion was found to be directly and positively associated with adolescents' physical activity.
- Parent–child cohesion had an indirect positive association with adolescents through perceived social support and through self-efficacy.
- Perceived social support and self-efficacy acted as chain mediators of the link between parent–child cohesion and adolescents' physical activity.

Physical activity among adolescents has been declining in many countries since 2016, with up to 81% of adolescents worldwide not meeting the recommended amount of physical activity for health promotion suggested by the World Health Organization (2020) in their global recommendations. Adolescents are increasingly engaging in prolonged sitting and low-intensity physical activity, which has become a concern for public health (Silva et al., 2018).

Numerous studies have found that the family is a key factor affecting the level of physical activity among adolescents (see, e.g., Ornelas et al., 2007). The concept of *parent–child cohesion*, which is integral to family dynamics, encapsulates the deep-seated emotional rapport shared between parents and their children, and it can be manifested in positive interactive behaviors as well as in the psychological intimacy felt by parents and children toward each other (M. Wang

**CORRESPONDENCE** Pengfei Wen, School of Physical Education, Guangzhou Sport University, Guangzhou City, Guangdong Province, People's Republic of China. Email: [275695156@qq.com](mailto:275695156@qq.com), or Huan Luo, Department of Physical Education, Shenzhen Polytechnic University, Shenzhen City, Guangdong Province, People's Republic of China. Email: [409840414@qq.com](mailto:409840414@qq.com) @163.com

& Zhang, 2007). Previous research has primarily focused on factors such as family economics (M. Zhang & Han, 2023), the family environment (Liu et al., 2021), and parental support (Guo et al., 2017). However, the element of parent–child cohesion has not yet been studied, nor has there been an investigation from a psychological perspective into the relationship between parent–child cohesion and adolescents’ physical activity. Hence, in this study we delved into the link between parent–child cohesion and adolescent physical activity, scrutinizing from a psychological standpoint the influence of perceived social support and self-efficacy on the dynamic between parent–child cohesion and adolescent physical activity. Our goal was to understand the mechanisms of action in adolescents’ physical activity in order to further promote their health status.

Researchers have found that factors such as the parent–child relationship (M. Wang & Zhang, 2014), support systems (Pluta et al., 2020), and the overall family health atmosphere (Niermann et al., 2015) play key roles in enhancing adolescents’ physical activity levels. These are specifically manifested in parents serving as role models in physical activity, encouraging and supporting their children, and providing opportunities for physical activity, along with the overall family environment and parents’ attitudes toward health and physical activity (Kamionka et al., 2023; Vega-Díaz et al., 2023). Parent–child cohesion acts as a significant benchmark in the evaluation of the quality of parent–child relationships, typically reflected in mutual understanding, support, emotional expression, and positive interactions between parents and children (M. Wang, 2001). Thus, we proposed the following hypothesis:

**Hypothesis 1:** Parent–child cohesion will positively predict adolescents’ physical activity.

One mediator of interest in this study was *perceived social support*, which denotes the subjective sensation of receiving support and comprehension from others, serving as an essential psychological asset for sustaining one’s mental well-being (Sarason et al., 1991). Individuals with closer relationships with their parents are more likely to perceive social support from others, and a significant positive link has been found between parent–child cohesion and perceived social support (Wei, 2021). Adolescents’ physical activity levels have been found to be positively associated with the social support they receive, with support from parents and friends being particularly significant in promoting higher activity levels (Mendonça et al., 2014). Thus, we proposed the following hypothesis:

**Hypothesis 2:** Perceived social support will act as a mediator of the link between parent–child cohesion and adolescents’ physical activity.

Another key mediating mechanism of interest in this study was *self-efficacy*, which refers to an individual’s belief in their capability to successfully complete a specific task or face challenges (Bandura, 1977). As an important predictor of individual psychological health and behavioral performance, it is particularly crucial for promoting healthy behaviors (Schwarzer, 1992). Research has indicated that parent–child cohesion is significantly and positively associated with self-efficacy (Pan et al., 2021). Furthermore, self-efficacy has been found to be positively correlated with adolescents’ physical activity levels, with adolescents possessing high self-efficacy being more likely to actively engage in physical activity (Dishman et al., 2004). Therefore, self-efficacy may be not only directly associated with adolescents’ physical activity levels but may also serve as an important mediating factor in the impact of parent–child cohesion on adolescents’ physical activity levels. Thus, we proposed the following hypothesis:

**Hypothesis 3:** Self-efficacy will act as a mediator of the link between parent–child cohesion and adolescents’ physical activity.

Individuals with higher levels of perceived social support are more likely to proactively establish positive social relationships and believe that relatives and friends will provide necessary support and assistance when needed. This, in turn, continually enhances their confidence in controlling their surrounding environment, thereby improving their self-efficacy in dealing with difficulties and setbacks (Salovey et al., 2000). According to social cognitive theory, external expectations, support, and guidance can significantly influence an individual’s self-efficacy (Bandura, 1977; Vieno et al., 2007). Perceived social support has been found to be significantly associated with self-efficacy (An et al., 2018), forming a synergistic relationship of mutual connection and influence. Parent–child cohesion has also been found to be significantly and positively associated with both perceived social support and self-efficacy (Pan et al., 2021). Thus, we proposed the following hypothesis:

**Hypothesis 4:** Perceived social support and self-efficacy will act as chain mediators of the relationship between parent–child cohesion and adolescents’ physical activity.

In summary, to examine the mechanism of action between parent–child cohesion and adolescents’ physical activity, we established the chain mediation model shown in Figure 1.

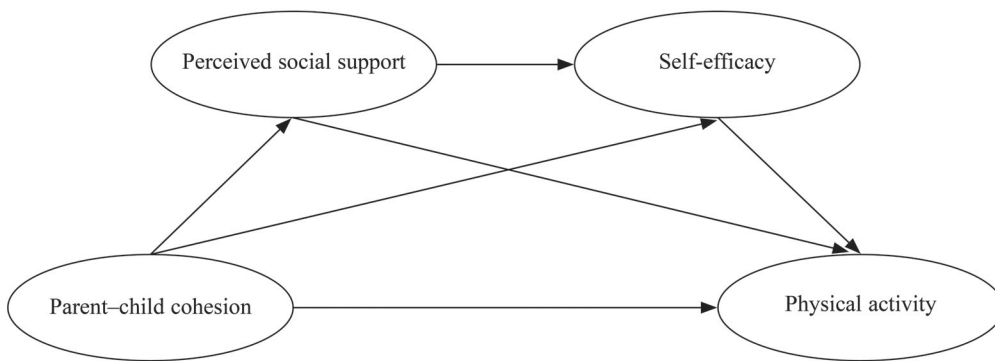


Figure 1. *Conceptual Framework*

## Method

### Participants and Procedure

We conducted surveys in middle schools in Guangdong and Jiangxi Provinces in China. Of 337 questionnaires disseminated, we retained 308 valid responses (91.3%) from 156 (50.65%) boys and 152 (49.35%) girls for data analysis. The mean age was 13.59 years ( $SD = 1.26$ ). There were 104 seventh graders (33.77%), 107 eighth graders (34.74%), and 97 ninth graders (31.49%).

The research design was approved by the Human Research Ethics Committee of Guangzhou Sport University (approval number: 2023LCLL-62). We distributed paper questionnaires through schools, with instructions emphasizing that the survey was anonymous, there were no right or wrong answers, the research was unrelated to academic performance, and the results would be used solely for scientific research. Participants had 10 minutes to complete the survey. All students took part on a voluntary basis and their parents signed informed consent forms. After collecting the questionnaires, invalid samples with missing data and irregular responses were deleted, and the obtained data were rigorously reviewed.

### Measures

#### **Parent–Child Cohesion Scale**

We used the Chinese version of the Parent–Child Cohesion Scale, which was translated and revised by M. Wang and Zhang (2007) from the original by Olson et al. (1979). This scale includes two dimensions, each containing 10 items, which are identical in wording apart from substituting “mother” for “father” (e.g., “I feel very close to my father/mother”). Items 3, 4, 8, and 9 are reverse scored. Responses are made on a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). The total score for parent–child cohesion is calculated as the average of scores from the father and mother subscales, with higher scores indicating better parent–child cohesion. Cronbach’s alpha in this study was .85, indicating the scale was reliable.

#### **Adolescent Physical Activity Scale**

We used the Chinese translation (Li et al., 2018) of the Adolescent Physical Activity Questionnaire (Kowalski et al., 2004) to measure physical activity levels over the past 7 days (e.g., “How many evenings did you engage in physical



activity in the past 7 days?”). The questionnaire contains nine items rated on a 5-point Likert scale, where higher scores indicate higher levels of physical activity. Cronbach’s alpha in this study was .82, indicating the scale was reliable.

### **Perceived Social Support Scale**

The Perceived Social Support Scale was developed by Zimet et al. (1988) and translated and revised by Jiang (1999). This scale consists of 12 items spread over three dimensions: family support (four items, e.g., “My family can give me practical help”), friend support (four items, e.g., “I can discuss my problems with my friends”), and other support (four items, e.g., “There are people in my life, such as leaders, relatives, and colleagues, who care about my feelings”). Items are rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores indicating higher levels of social support received. Cronbach’s alpha in this study was .83, indicating the scale was reliable.

### **Self-Efficacy Scale**

We used the Chinese version (C. K. Wang et al., 2001) of the General Self-Efficacy Scale (Schwarzer et al., 1999) to assess self-efficacy. This scale is unidimensional and consists of 10 items (e.g., “If I try hard enough, I can always solve the problem”). Items are rated on a 4-point Likert scale ranging from 1 (*completely disagree*) to 4 (*completely agree*), with higher scores reflecting greater self-efficacy among participants. Cronbach’s alpha in this study was .73, indicating the scale was reliable.

### **Data Analysis**

We conducted a Pearson correlation analysis using SPSS 26.0 software and employed the PROCESS macro for mediation effect testing. We also conducted a confirmatory factor analysis of the data using Amos 29.0.

## **Results**

### **Test for Common Method Bias**

We applied Harman’s single-factor test to examine common method bias. The results showed that there were 14 factors with eigenvalues greater than 1, and the first factor explained 18.41% of the variance, which is below the critical threshold of 40%. Confirmatory factor analysis was used to extract a common factor from the multiple variables involved in the study and load all items on this factor. The results indicated a poor fit of the single-factor model to the data,  $\chi^2/df = 6.48$ , comparative fit index = .42, Tucker–Lewis index = .40, incremental fit index = .43, root-mean-square error of approximation = .09, standardized root-mean-square residual = .10, suggesting that there no single factor explained a majority of the variance. Therefore, this study did not suffer from serious common method bias.

### **Descriptive Statistics and Correlation Analysis**

As shown in Table 1, the correlation coefficients among parent–child cohesion, perceived social support, self-efficacy, and physical activity were statistically significant. There were significant relationships between parent–child cohesion and perceived social support, self-efficacy, and physical activity, as well as between perceived social support and self-efficacy and physical activity. Finally, there was a significant relationship between self-efficacy and physical activity.

**Table 1. Descriptive Statistics and Correlation Coefficients for Study Variables**

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. Parent–child cohesion	86.45	7.81	—			
2. Perceived social support	68.09	9.66	.45**	—		
3. Self-efficacy	33.32	4.34	.40**	.40**	—	
4. Physical activity	33.34	4.43	.38**	.36**	.31**	—

Note. *N* = 308.

\*\* *p* < .01.

### Mediating Effect of Perceived Social Support and Self-Efficacy

We used Model 6 of the SPSS PROCESS macro to perform a bootstrapping analysis and test the mediation effect. The regression analysis results, as shown in Table 2, indicate that before including the mediating variables, parent–child cohesion significantly and positively predicted physical activity, thus supporting Hypothesis 1. After including the mediating variables, the direct predictive effect of parent–child cohesion on physical activity remained significant, and parent–child cohesion significantly and positively predicted perceived social support and self-efficacy. In addition, perceived social support significantly and positively predicted self-efficacy and physical activity, and self-efficacy significantly and positively predicted physical activity.

**Table 2. Analysis of Regression Relationships Between Variables**

Effect	Item	Coefficient	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
						<i>LL</i>	<i>UL</i>
Direct effects	Parent–child cohesion → Physical activity	0.14	0.03	4.07	< .01	0.07	0.20
	Parent–child cohesion → Perceived social support	0.56	0.06	8.89	< .01	0.44	0.69
	Parent–child cohesion → Self-efficacy	0.15	0.03	4.73	< .01	0.09	0.21
Indirect effects process	Perceived social support → Self-efficacy	0.13	0.03	4.97	< .01	0.08	0.18
	Perceived social support → Physical activity	0.09	0.03	3.24	< .01	0.04	0.14
	Self-efficacy → Physical activity	0.13	0.06	2.26	< .05	0.02	0.25
Total effects	Parent-child cohesion → Physical activity	0.22	0.03	7.23	< .01	0.16	0.28

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Analysis of the mediating effects, as shown in Table 3 and Figure 2, showed that parent–child cohesion directly influenced physical activity. Further, perceived social support and self-efficacy served as chain mediators of the link between parent–child cohesion and adolescents’ physical activity. This total mediating effect comprised indirect effects from three pathways: the pathway from parent–child cohesion to perceived social support to adolescents’ physical activity (22.73%), the pathway from parent–child cohesion to self-efficacy to adolescents’ physical activity (9.10%), and the pathway from parent–child cohesion to perceived social support to self-efficacy to adolescents’ physical activity (4.55%). The 95% confidence intervals for these indirect effects did not include zero, indicating significance; thus, Hypotheses 2, 3, and 4 were all supported.

Table 3. Analysis of Mediating Effects Between Parent–Child Cohesion and Physical Activity

Item	Effect	Boot SE	95% CI		Relative mediating effect %
			LL	UL	
1. Parent–child cohesion → Perceived social support → Physical activity	0.05	0.02	0.02	0.15	22.73
2. Parent–child cohesion → Self-efficacy → Physical activity	0.02	0.01	0.02	0.06	9.10
3. Parent–child cohesion → Perceived social support → Self-efficacy → Physical activity	0.01	0.01	0.01	0.05	4.55
Total mediating effect	0.08	0.02	0.04	0.12	36.36

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

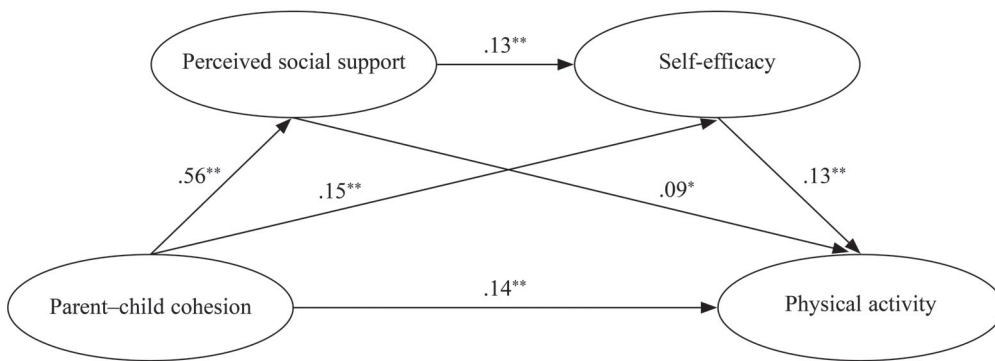


Figure 2. Chain Mediation Model of Parent–Child Cohesion and Physical Activity

Note. \*  $p < .05$ . \*\*  $p < .01$ .

## Discussion

### Parent–Child Cohesion and Adolescents’ Physical Activity

In this study we found a significant direct effect of parent–child cohesion on adolescents’ physical activity, thus supporting Hypothesis 1. Parent–child cohesion provides adolescents with a supportive family environment, making it easier for them to feel their parents’ support and encouragement, and fosters a positive attitude toward physical activity within the family, thus promoting adolescents’ participation in physical activity. Specifically, the impact of parent–child cohesion on adolescents’ physical activity has been found to be closely related to the quality of parent–child interaction and parents’ attitude toward physical activity. For example, when parents frequently encourage their children to participate in sports activities, adolescents’ physical activity levels tend to be higher than when they are not encouraged (Beets et al., 2010). Furthermore, positive physical activity role models in the family environment also motivate adolescents, as parents’ physical activity habits directly influence adolescents’ behavioral choices (Edwardson & Gorely, 2010). Therefore, parent–child cohesion plays an important role in enhancing adolescents’ physical activity.

### Independent Mediating Role of Perceived Social Support

The results of this study indicate that perceived social support served as an independent mediator between parent–child cohesion and adolescents’ physical activity, supporting Hypothesis 2. This is consistent with previous findings that parent–child cohesion positively influences perceived social support (Wei, 2021) and that perceived social support positively affects the level of physical activity (Mendonça et al., 2014). Parent–child cohesion can lead to a stronger



sense of family support, providing adolescents with social and emotional support, which is particularly important when they participate in physical activity (Y. Zhang, 2014). We found that the social support received by adolescents was positively correlated with their physical activity levels, a relationship that has been consistently supported in both cross-sectional and longitudinal studies. Adolescents who receive more social support from parents and friends have higher levels of physical activity (Mendonça et al., 2014). Therefore, adolescents can enhance their physical activity levels by gaining more perceived social support through parent–child cohesion.

### **Independent Mediating Role of Self-Efficacy**

We also found that self-efficacy acted as an independent mediator of the link between parent–child cohesion and physical activity, thus supporting Hypothesis 3. This aligns with previous findings that parent–child cohesion positively affects self-efficacy (Pan et al., 2021), and that self-efficacy positively impacts the level of physical activity (Dishman et al., 2004). As parent–child cohesion increases, so does self-efficacy, leading to greater confidence in managing one’s emotional world and other areas (Huang et al., 2015). Goal-setting theory emphasizes that self-efficacy is a key driving force in achieving goals (Locke & Latham, 2002). When facing difficulties, self-efficacy can stimulate an individual’s motivation level (Annesi & Marenco, 2015), enabling them to persist in achieving their physical activity goals (Sonstroem & Morgan, 1989), thereby enhancing their physical activity levels. Therefore, adolescents can increase their physical activity levels by boosting their self-efficacy through parent–child cohesion.

### **Chain Mediating Effect of Perceived Social Support and Self-Efficacy**

We further discovered that perceived social support and self-efficacy acted as chain mediators of the link between parent–child cohesion and physical activity, thus supporting Hypothesis 4. This result aligns with prior findings indicating that perceived social support can bolster self-efficacy (An et al., 2018). Self-efficacy, as a key psychological variable affecting behavior choices and perseverance, influences the degree to which adolescents persist when facing difficulties or challenges. Adolescents with high self-efficacy are more likely to continue in the face of challenges, thereby increasing the likelihood of completing physical activity tasks (L. Wang & Zhang, 2016). Perceived social support can enhance an individual’s self-efficacy through modeling behavior and shared experiences. Seeing others actively participate in physical activity can motivate individuals to believe in their own abilities (Kim et al., 2015), thereby boosting adolescents’ confidence and motivation in physical activity.

### **Limitations and Future Research Directions**

This study has limitations. Primarily, we adopted a cross-sectional research approach, precluding the ability to establish causality among the variables. Future research could employ longitudinal studies to investigate these causal relationships. Second, there may exist other mediating variables, such as physical self-esteem and exercise motivation, whereas we examined only perceived social support and self-efficacy as mediators. Future research could incorporate other mediators. Additionally, this research relied on self-report measures, which introduces a degree of subjectivity; future studies could combine evaluations from others with self-reports to gather more objective data.

### **Acknowledgments**

This study was funded by the Educational Science Planning Project of Guangdong Province of China (2022GXJK238,2023GXJK354), the Ideological and Political Education Problem in Colleges of Guangdong Province of China in 2021 (2021GXSZ061), and the Zhaoqing College Quality Project and Teaching Reform Programme of Guangdong Province of China (zlgc202002).

Dongbin Lai was responsible for study conception and drafting the manuscript. Pengfei Wen and Huan Luo revised the manuscript. Dongbin Lai, Menghua Wang, and Yuan Zheng collected and analyzed the data.

The authors thank the students who participated in the survey.



## References

- An, Y., Yuan, G., Wu, X., & Wang, W. (2018). The relationships between social support, posttraumatic stress disorder and posttraumatic growth among adolescents after the Wenchuan earthquake: Understanding the role of self-efficacy [In Chinese]. *Psychological Development and Education*, 34(1), 98–104.  
<https://tinyurl.com/3j4sz4mt>
- Annesi, J. J., & Marenco, N. (2015). Improvement in emotional eating associated with an enhanced body image in obese women: Mediation by weight-management treatments' effects on self-efficacy to resist emotional cues to eating. *Journal of Advanced Nursing*, 71(12), 2923–2935.  
<https://doi.org/10.1111/jan.12766>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215.  
<https://doi.org/10.1037/0033-295X.84.2.191>
- Beets, M. W., Cardinal, B. J., & Alderman, B. L. (2010). Parental social support and the physical activity-related behaviors of youth: A review. *Health Education & Behavior*, 37(5), 621–644.  
<https://doi.org/10.1177/1090198110363884>
- Dishman, R. K., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M., & Pate, R. R. (2004). Self-efficacy partially mediates the effect of a school-based physical-activity intervention among adolescent girls. *Preventive Medicine*, 38(5), 628–636.  
<https://doi.org/10.1016/j.ypmed.2003.12.007>
- Edwardson, C. L., & Gorely, T. (2010). Parental influences on different types and intensities of physical activity in youth: A systematic review. *Psychology of Sport and Exercise*, 11(6), 522–535.  
<https://doi.org/10.1016/j.psychsport.2010.05.001>
- Guo, Q., Wang, X., & Jiang, J. (2017). The patterns of physical activity and sedentary behavior in Chinese children and adolescents [In Chinese]. *China Sport Science*, 37(7), 17–29.  
<https://doi.org/10.16469/j.css.201707003-en>
- Huang, S., Cai, F., Liu, P., Zhang, W., & Gong, W. (2015). Parent-child relationship and school adjustment: The mediating of regulatory emotional self-efficacy [In Chinese]. *Chinese Journal of Clinical Psychology*, 23(1), 171–173 + 177.
- Jiang, G. (1999). *Understanding the Social Support Scale* [In Chinese]. China Mental Health Magazine Publishers.
- Kamionka, A., Lipowska, M., Lizińczyk, S., & Lipowski, M. (2023). The impact of parents' physical activity goals and parental attitudes on physical activity during leisure time among children in middle childhood. *Frontiers in Public Health*, 11, Article 1170413.  
<https://doi.org/10.3389/fpubh.2023.1170413>
- Kim, G. S., Lee, C. Y., Kim, I. S., Lee, T. H., Cho, E., Lee, H., ... Kim, S. H. (2015). Dyadic effects of individual and friend on physical activity in college students. *Public Health Nursing*, 32(5), 430–439.  
<https://doi.org/10.1111/phn.12176>
- Kowalski, K. C., Crocker, P. R. E., & Donen, R. M. (2004). *The Physical Activity Questionnaire for Older Children (PAQ-C) and Adolescents (PAQ-A) manual*. College of Kinesiology, University of Saskatchewan.
- Li, X., Li, X., & Wang, Z. (2018). Assessment of physical activity level and the influencing factors among middle school students in the main urban area of Beijing [In Chinese]. *Chinese Journal of School Health*, 39(7), 993–996 + 1000.  
<https://doi.org/10.16835/j.cnki.1000-9817.2018.07.010>

- Liu, J.-M., Hou, X., Guan, J., Li, F., Wang, C., & Wu, M. (2021). Influence of family sports environment on physical activity among urban adolescents in China [In Chinese]. *Chinese Journal of Public Health*, 37(10), 1556–1561.  
<https://doi.org/10.11847/zgggws1132062>
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, 57(9), 705–717.  
<https://doi.org/10.1037/0003-066X.57.9.705>
- Mendonça, G., Cheng, L. A., Mélo, E. N., & de Farias, J. C., Jr. (2014). Physical activity and social support in adolescents: A systematic review. *Health Education Research*, 29(5), 822–839.  
<https://doi.org/10.1093/her/cyu017>
- Niermann, C. Y. N., Kremers, S. P. J., Renner, B., & Woll, A. (2015). Family health climate and adolescents' physical activity and healthy eating: A cross-sectional study with mother-father-adolescent triads. *PLoS One*, 1(11), Article e0143599.  
<https://doi.org/10.1371/journal.pone.0143599>
- Olson, D. H., Sprenkle, D. H., & Russell, C. S. (1979). Circumplex model of marital and family system: I. Cohesion and adaptability dimensions, family types, and clinical applications. *Family Process*, 18(1), 3–28.  
<https://doi.org/10.1111/j.1545-5300.1979.00003.x>
- Ornelas, I. J., Perreira, K. M., & Ayala, G. X. (2007). Parental influences on adolescent physical activity: A longitudinal study. *International Journal of Behavioral Nutrition and Physical Activity*, 4, Article 3.  
<https://doi.org/10.1186/1479-5868-4-3>
- Pan, Y., Liu, J., Wu, L., & Zhao, J. (2021, October 31). *Research on the relationship between parent-child affinity and security of left-behind children: Chain mediating role of perceived social support and self-efficacy* [Paper presentation] [In Chinese]. The 23rd National Conference on Psychology, Hohhot, Inner Mongolia, China.  
<https://doi.org/10.26914/c.cnkihy.2021.041799>
- Pluta, B., Korcz, A., Krzysztozek, J., Bronikowski, M., & Bronikowska, M. (2020). Associations between adolescents' physical activity behavior and their perceptions of parental, peer and teacher support. *Archives of Public Health*, 78, Article 106.  
<https://doi.org/10.1186/s13690-020-00490-3>
- Salovey, P., Rothman, A. J., Detweiler, J. B., & Steward, W. T. (2000). Emotional states and physical health. *American Psychologist*, 55(1), 110–121.  
<https://doi.org/10.1037/0003-066X.55.1.110>
- Sarason, B. R., Pierce, G. R., Shearin, E. N., Sarason, I. G., Waltz, J. A., & Poppe, L. (1991). Perceived social support and working models of self and actual others. *Journal of Personality and Social Psychology*, 6(2), 273–287.  
<https://doi.org/10.1037/0022-3514.60.2.273>
- Schwarzer, R. (1992). Self-efficacy in the adoption and maintenance of health behaviours: Theoretical approaches and a new model. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action* (pp. 217–242). Taylor & Francis.  
<https://doi.org/10.4324/9781315800820>
- Schwarzer, R., Mueller, J., & Greenglass, E. (1999). Assessment of perceived general self-efficacy on the internet: Data collection in cyberspace. *Anxiety, Stress and Coping*, 12(2), 145–161.  
<https://doi.org/10.1080/10615809908248327>
- Silva, D. R., Minderico, C. S., Pinto, F., Collings, P. J., Cyrino, E. S., & Sardinha, L. B. (2018). Impact of a classroom standing desk intervention on daily objectively measured sedentary behavior and physical activity in youth. *Journal of Science and Medicine in Sport*, 21(9), 919–924.  
<https://doi.org/10.1016/j.jsams.2018.01.007>
- Sonstroem, R. J., & Morgan, W. P. (1989). Exercise and self-esteem: Rationale and model. *Medicine and Science in Sports and Exercise*, 21(3), 329–337.  
<https://doi.org/10.1249/00005768-198906000-00018>



- Vega-Díaz, M., González-García, H., & de Labra, C. (2023). Influence of parental involvement and parenting styles in children's active lifestyle: A systematic review. *Peer J*, *11*, Article e16668.  
<https://doi.org/10.7717/peerj.16668>
- Vieno, A., Santinello, M., Pastore, M., & Perkins, D. D. (2007). Social support, sense of community in school, and self-efficacy as resources during early adolescence: An integrative model. *American Journal of Community Psychology*, *39*(1–2), 177–190.  
<https://doi.org/10.1007/s10464-007-9095-2>
- Wang, C. K., Hu, Z. F., & Liu, Y. (2001). Evidence for the reliability and validity of the Chinese version of General Self-Efficacy Scale [In Chinese]. *Chinese Journal of Applied Psychology*, *1*, 37–40.  
<https://doi.org/10.3969/j.issn.1006-6020.2001.01.007>
- Wang, L., & Zhang, Y. (2016). An extended version of the theory of planned behaviour: The role of self-efficacy and past behaviour in predicting the physical activity of Chinese adolescents. *Journal of Sports Sciences*, *34*(7), 587–597.  
<https://doi.org/10.1080/02640414.2015.1064149>
- Wang, M. (2001). *Research on parenting style, adolescent's view of parental authority, expectation of behavioral autonomy, and parent-child relationships* (Master's dissertation) [In Chinese]. Shandong Normal University.
- Wang, M., & Zhang, W. (2007). Research on parent-adolescent conflict and cohesion [In Chinese]. *Journal of Psychological Science*, *30*(5), 1196–1198.  
<https://doi.org/10.16719/j.cnki.1671-6981.2007.05.040>
- Wang, M., & Zhang, W. (2014). Association between COMT gene Rs6267 polymorphism and parent-adolescent cohesion and conflict: Analysis of the moderating effects of gender and parenting behavior [In Chinese]. *Acta Psychologica Sinica*, *46*(7), 931–941.  
<https://doi.org/10.3724/SP.J.1041.2014.00931>
- Wei, X. (2021). Parental cohesion and resilience in adolescents: A multiple mediation model [In Chinese]. *Journal of Gannan Normal University*, *42*(2), 130–135.  
<https://doi.org/10.13698/j.cnki.cn36-1346/c.2021.02.021>
- World Health Organization. (2020). *WHO guidelines on physical activity and sedentary behaviour: At a glance*.  
<https://tinyurl.com/46n8xkxp>
- Zhang, M., & Han, W. (2023). Relationship between family economic capital and children's health: Mediating function of physical activity [In Chinese]. *Shandong Sports Science & Technology*, *45*(4), 19–24.  
<https://doi.org/10.14105/j.cnki.1009-9840.2023.04.002>
- Zhang, Y. (2014). A study on the influence of physical exercise on the interpersonal skills of college students [In Chinese]. *Higher Education Exploration*, *5*, 185–189.  
<https://doi.org/10.3969/j.issn.1673-9760.2014.05.038>
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*(1), 30–41.  
[https://doi.org/10.1207/s15327752jpa5201\\_2](https://doi.org/10.1207/s15327752jpa5201_2)