

# The Effects of Participation in Physical Activity and Exercise on Social and Adaptive Performance among Children with ADHD

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## Abstract

**Background and Purpose:** Despite the significance and crucial role that engaging in sports activities holds in shaping children's social behaviors, limited studies have explored the impact of sports participation on the adjustment and social performance of children diagnosed with ADHD. Therefore, the aim of this study was to explore the effects of participation in physical activity and exercise on social and adaptive performance among children with ADHD.

**Methods:** The current study employed a descriptive-correlational method. A total of 147 children with ADHD (62 girls) between the ages of 7 and 12 were chosen as the study's statistical population using a convenience sampling method. Data was collected using standard questionnaires. T tests and structural equation modeling were used to analyze data.

**Results:** Results revealed that physical activity significantly affected academic performance ( $T= 6.482$ ), relationships with peers ( $T= 5.294$ ), relationships with family ( $T= 4.628$ ) and household tasks/self-care ( $T= 6.417$ ). Results of model fit indicated that the research model has good fit.

**Conclusions:** These findings hold practical implications for professionals and physical education teachers. Hence, it is recommended that practitioners and physical education teachers actively encourage children with ADHD to participate in physical activity and sports to enhance their social and adaptive performance.

**Keywords:** Exercise, sport, social, adaptive, ADHD

## Introduction

Physical education is an integral component of the educational system, fostering and synchronizing the holistic development of individuals through movement and physical activities. It plays a crucial role in nurturing and enhancing human talents (Abdoshahi & Ghorbani 2022; Ohler et al. 2010; Ramachandra et al. 2013; Taghva et al. 2020). Unlike traditional classroom settings and theoretical lessons, certain educational concepts are better imparted through engaging physical activities and games, providing an entertaining learning experience (Afsanepurak et al. 2012; Sadeghipor & Aghdam, 2021a, 2021b; Taso et al. 2014). This subject holds significant importance in the education and instruction of children, as contemporary psychologists recognize movement activities as an effective tool for teaching educational concepts. During physical activities and in sports environments, individuals engage and socialize with other players in an open and unrestricted setting, while being closely observed by many (American Psychological Association, 2014; Sadeghipor et al. 2021; Vasconcelos et al. 2013). This interaction with the surroundings can lead to various changes in the players' personality, emotions, and social behavior. Furthermore, participating in sports can also bring about physical changes that enhance the body's capabilities, consequently influencing an individual's behavior and character (Bandura, 1997; Baniyadi, et al. 2018; Chaharbaghi, et al. 2022; Chris, et al. 2010; Conner & Davidson, 2003; Zaborova et al. 2023). Since the soul and body are inseparable components of a human being, their connection

and harmony give purpose to human existence. Therefore, any alteration in one dimension inevitably impacts the other. As a person's physical strength and power increase, adjustments occur in their individual character and personality structure (Dana et al. 2021, 2023; Sadeghipor et al. 2021). It has been suggested that athletic individuals, particularly those with a healthy and robust physique, possess more appealing qualities compared to weaker individuals. Traits such as chivalry and kindness are often sought after in those who are stronger and healthier.

Scientific studies have provided evidence that individuals with higher levels of physical fitness exhibit commendable qualities such as self-reliance and self-sacrifice. This article focuses on the effects and behavioral changes that occur when individuals engage in physical activities and enhance their physical strength (Davidson, 2003; Ellis et al. 2013; Faircloth, 2017; Seyedi Asl et al. 2016, 2021). However, it is important to note that physical strength alone does not guarantee intellectual, personal, and spiritual growth. Various factors beyond the scope of this discussion influence an individual's spirituality and inner behavior. Therefore, our focus here is to explore the psychological and personality traits that are fortified through participation in wholesome sports environments. The study of physical education includes examining how physical and sports activities contribute to cultural and social growth and development (Ghorbani et al. 2020a, 2020b). The significance of physical education becomes more apparent when considering the positive impact of continuous physical activities on individuals from social and psychological perspectives. Healthy sports environments play a crucial role in fostering the growth and development of the human social dimension, highlighting the social construction aspect of physical education. Sports plays a significant role in shaping the process of socialization (Hazrati et al. 2022; Herrick & Ainsworth, 2003; Seyyedrezaei et al. 2021). This process is crucial for the development of one's personality, as it involves transitioning from group values to individual values. Through sports competitions, individuals learn to align their personal values with those of others, thereby promoting respect for both individual and social rights (Hosseini, et al. 2022; Khosravi, et al. 2023; Shafaei et al. 2024).

The promotion of sports engagement within society and the encouragement of individuals to partake in such activities can potentially yield favorable outcomes for the social aspects of that particular society. Moreover, it has the potential to instigate alterations in an individual's social conduct when interacting with society (Letvak et al. 2012; Masten, 2001; Shafaei et al. 2024). However, it is important to note that the extent of these changes is contingent upon the cultural norms, shared values, and social disposition of the individuals within that society. Some examples of the changes in social behavior that may arise from participating in sports environments are as follows. Nevertheless, despite the significance and crucial role that engaging in sports activities holds in shaping children's social behaviors, limited studies have explored the impact of sports participation on the adjustment and social performance of children diagnosed with ADHD. Therefore, the aim of this study was to explore the effects of participation in physical activity and exercise on social and adaptive performance among children with ADHD.

## Methods

The current study employed a descriptive-correlational method to examine the correlations between engagement in physical activity and exercise, and the social and adaptive performance of children with ADHD. Prior to their involvement, the parents of the children provided written consent. The study protocol adhered to the principles outlined in the Declaration of Helsinki.

The study's statistical population comprised all school children with ADHD who were enrolled in a specialized school for exceptional children with behavioral disorders in Tehran. From this population, a total of 147 children with ADHD (62 girls) between the ages of 7 and 12 were chosen as the study's statistical population using a convenience sampling method.

Participation in physical activity and exercise was assessed utilizing the Physical Activity Questionnaire for Children (PAQ-C), developed by Kowalski et al. (1997) (cited by Mikkelsen et al. 2017). This questionnaire comprises eight questions that were rated by participants on a 5-point Likert scale. The questionnaire's structure validity was verified through confirmatory factor analysis, with a high loading rate exceeding 0.4. Furthermore, the questionnaire's reliability was established with a Cronbach's alpha coefficient of 0.86 (Kowalski et al. 1997). In this study, the reliability of PAQ-C was confirmed with a Cronbach's alpha of 0.92.

To assess the social and adaptive performance of children, the Children and Adolescents Social and Adaptive Functioning Scale (CASAFS) was used (Moradi et al. 2020; Sharma, 2014). This scale, developed by Price et al. in 2002, consists of 24 statements and four subscales: performance, relationships with academic peers, relationships with family, and household tasks/self-care. The responses on this scale are rated on a continuum of four options, ranging from one (never) to four (always). It is important to note that each subscale comprises six statements, resulting in a subscale score between six and 24. The total score of the scale ranges from 24 to 96, with a higher score indicating better social functioning. The validity and reliability of this scale were confirmed in a sample of 1478 Australian children. The internal consistency of the entire scale and its subscales, including academic performance, relationships with peers, relationships with family, and household

tasks/self-care, were also confirmed in a sample of 320 Australian children, with Cronbach's alpha coefficients of 0.81, 0.81, 0.67, 0.74, and 0.69, respectively. Additionally, its retest reliability over a 12-month period was reported as 0.58, 0.63, 0.59, 0.54, and 0.48. In the present study, it was also aimed to investigate the factorial validity of the scale using confirmatory factor analysis based on data from all participants. The results indicated that the four-factor structure of CASAFS demonstrated an acceptable fit with the data ( $\chi^2=5.234$ ,  $df=100$ ,  $P=0.392$ ,  $RMSEA=0.07$ ,  $IFI=0.90$ ,  $CFI=0.90$ ). Furthermore, the internal consistency of the entire scale and its subscales, including academic performance, relationships with peers, relationships with family, and household tasks/self-care, were found to be better when assessed using Cronbach's alpha coefficient (0.80).

Data was analyzed using SPSS software version 26. Mean and standard deviation were used for descriptive statistics. Independent t test was used for considering gender differences. Pearson correlation test and structural equation modeling was used to obtain the effects of the physical activity on social and adaptive performance. P-value was set at  $p<0.05$ .

### Results

Demographic data showed that mean age of the participants was 9.57 years old. Among the research participants, 42% were women while 58% were men. Out of the total of 147 individuals included in the research, 68 children (46%) engaged in physical activity. This data indicates that the majority of the children examined, specifically 54% of them, did not engage in physical activity throughout the week. In addition, the initial findings of this study indicated that children exhibit moderate to low levels of physical activity, and moderate to low levels of adaptive and social performance's components including academic performance, relationships with peers, relationships with family, and household tasks/self-care. Table 1 presents the mean and standard deviation of demographic data and descriptive results across gender, where no significant differences were observed between boys and girls regarding all measurements (all  $P>0.05$ ).

**Table 1.** Demographic Data and Descriptive Results Across Gender

Indicator	Group	No.	mean±SD	P
Age (Year)	boys	85	9.84±1.91	0.70
	girls	62	9.99±1.28	
Height (M)	boys	85	1.35±0.07	0.82
	girls	62	1.32±0.05	
Weight (Kg)	boys	85	35.17±3.47	0.73
	girls	62	30.27±2.64	
Body Mass Index (Kg/M <sup>2</sup> )	boys	85	23.36±1.19	0.59
	girls	62	23.49±1.28	
Academic Performance	boys	85	18.11±2.97	0.47
	girls	62	18.17±3.27	
Relationships with Peers	boys	85	15.28±3.94	0.63
	girls	62	16.84±2.88	
Relationships with Family	boys	85	16.74±3.22	0.50
	girls	62	15.89±2.07	
Household Tasks/Self-Care	boys	85	16.93±3.33	0.41
	girls	62	16.43±2.55	

First of all, the results of Kolmogorov-Smirnov tests showed that all research variables had normal distribution (all  $P>0.05$ ). Then, the correlation test results presented in Table 2 demonstrate the relationship between physical activity and academic performance, relationships with peers, relationships with family, and household tasks/self-care. The results reveal a correlation coefficient between physical activity and academic performance, suggesting that academic performance increases as physical activity levels increase. Furthermore, the correlation coefficient for physical activity level and relationships with peers was direct and significant, suggesting that as physical activity increases, relationships with peers also increases. Also, the correlation between physical activity level and relationships with family was a direct and significant association, indicating that as physical activity increases, relationships with family levels tend to increase. Finally, there was a significant relationship between physical activity and household tasks/self-care. The current study suggests that engaging in exercise and physical activity can enhance one's household tasks/self-care.

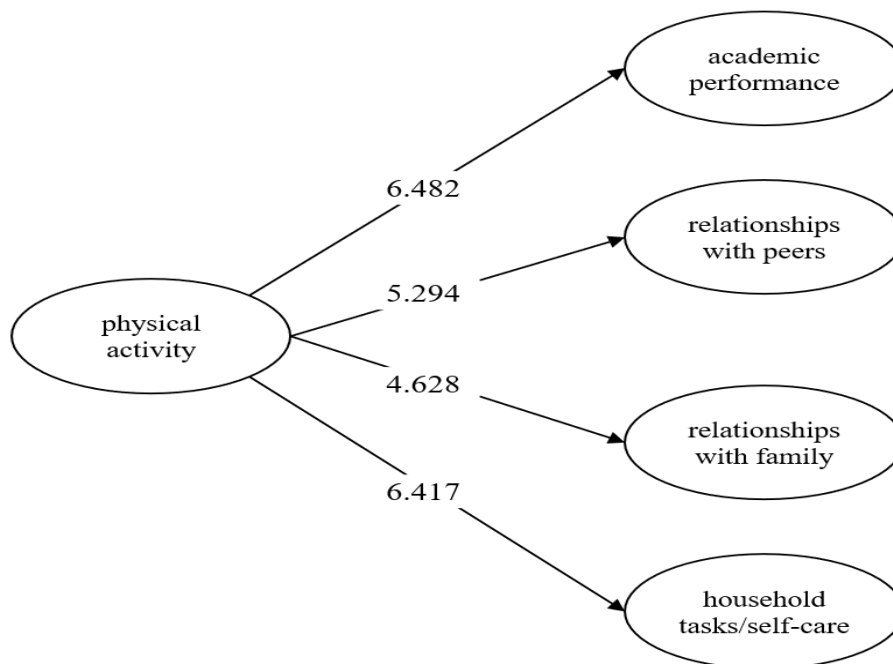
**Table 2.** Descriptive Data and the Results of Bivariate Correlations between Variables

	1	2	3	4	5
1. Physical Activity	-				
2. Academic Performance	r=0.628 P<0.001	-			
3. Relationships with Peers	r=0.517 P<0.001	r=0.409 P<0.001	-		
4. Relationships with Family	r=0.473 P<0.001	r=0.547 P<0.001	r=0.423 P<0.001	-	
5. Household Tasks/Self-Care	r=0.637 P<0.001	r=0.559 P<0.001	r=0.364 P<0.001	r=0.431 P<0.001	-

Table 3 and Figure 1 show the results of structural equation modelling. Results revealed that physical activity significantly affected academic performance (T= 6.482), relationships with peers (T= 5.294), relationships with family (T= 4.628) and household tasks/self-care (T= 6.417). Results of model fit are presented in Table 4 and indicated that the research model has good fit.

**Table 3.** Results of Structural Equation Modelling

Path	$\beta$	T-Value
1 Physical Activity => academic performance	0.639	6.482
2 Physical Activity => relationships with peers	0.530	5.294
3 Physical Activity => relationships with family	0.459	4.628
4 Physical Activity => household tasks/self-care	0.640	6.417



**Figure 1.** Structural Equation Modelling in the form of T-Values

**Table 4.** Results of Model Fit

Index	Optimal Range	Obtained Value	Conclusion
RMSEA	< 0.08	0.07	Good fit
X <sup>2</sup> / df	< 3	2.93	Good fit
RMR	Closer to 0	0.01	Good fit
NFI	> 0.9	0.98	Good fit
CFI	> 0.9	0.97	Good fit

## Discussion

Despite the significance and crucial role that engaging in sports activities holds in shaping children's social behaviors, limited studies have explored the impact of sports participation on the adjustment and social performance of children diagnosed with ADHD. Therefore, the aim of this study was to explore the effects of participation in physical activity and exercise on social and adaptive performance among children with ADHD. The results showed that only 46% of the participants engaged in physical activity. This data indicates that the majority of the children examined, specifically 54% of them, did not engage in physical activity throughout the week. In addition, the initial findings of this study indicated that children exhibit moderate to low levels of physical activity. This finding is in line with those of previous studies (Afsanepurak et al. 2012; Sadeghipor & Aghdam, 2021a, 2021b; Taso et al. 2014; Dana et al. 2021, 2023; Sadeghipor et al. 2021), indicating that children with ADHD have low levels of physical activity. The results clearly indicate that children with ADHD are not in optimal physical condition and require special attention to improve their lifestyle and overall quality of life. Evaluating the health of different societies is an important aspect, as it reveals the societal significance that is intertwined with the variables being researched. Physical activity plays a crucial role in maintaining the vitality and effectiveness of any system, including the health system, and is considered a fundamental requirement for the well-being of children with ADHD (Hazrati et al. 2022; Herrick & Ainsworth, 2003; Seyyedrezaei et al. 2021). Encouraging participation in sports activities not only generates vitality but also aligns their behavior, interests, and needs with valuable and defined objectives. Therefore, meticulous and comprehensive planning is essential to ensure physical activity, and the more detailed and precise the planning, the more sustainable the progress and reinforcement of motivation for sports participation will be (Letvak et al. 2012; Masten, 2001; Shafaei et al. 2024).

In addition, the research findings indicate that Results revealed that physical activity significantly affected academic performance, relationships with peers, relationships with family and household tasks/self-care. This outcome aligns with previous research (Bandura, 1997; Baniyasi, et al. 2018; Chaharbaghi, et al. 2022; Chris, et al. 2010; Conner & Davidson, 2003; Zaborova et al. 2023) and demonstrates the positive impact of sports involvement on social and adaptive performance of children with ADHD. Through involvement in sports, children have the opportunity to interact with individuals outside of their immediate family circle, thus initiating the process of developing social skills. The subsequent sections will delve into various facets of how engaging in sports can impact a child's socialization. The proper and natural maturation of one's psyche serves as a key indicator of their social persona, particularly in the case of children. When physical education is imparted within a framework of ethical values, it steers individuals away from self-absorption, fostering a more genuine spirit that nurtures their innate abilities and facilitates smoother social interactions with peers and adults alike (Sadeghipor & Aghdam, 2021a, 2021b; Taso et al. 2014). Play and sports play a pivotal role in shaping a child's personality, aiding in their overall growth and self-awareness. Engaging in sports activities helps children become more attuned to their physical selves, laying the groundwork for self-concept formation and the subsequent development of their individuality. Engaging in sports activities allows children to showcase their behavior and morals. By immersing themselves in the sports environment, negative behavior and morals are replaced by positive and commendable moral qualities. Sports also highlights the importance of respecting others, fostering proper social relationships between individuals and children. Morality plays a crucial role in both team and individual sports, enabling athletes with good morals to garner admiration in both the sports arena and personal life. Regular exercise not only boosts children's happiness and self-assurance, but also reduces the likelihood of depression in adulthood (Ghorbani et al. 2020a, 2020b). It enhances a child's self-esteem by promoting self-satisfaction. Some children may struggle with shyness and difficulty in socializing with peers. In such cases, parents are encouraged to motivate their children to participate in sports activities to help them regain their vitality. Stress in children arises when they perceive a lack of equilibrium between their abilities and the circumstances they face. This inability to compete with others leads to feelings of stress and anxiety. However, through engaging in sports activities and acquiring new skills, children can effectively manage their stress levels and attain success in sports. This process involves consistent practice, repetition, and the cultivation of self-confidence (Seyyedrezaei et al. 2021). Culture, on the other hand, encompasses the learned behaviors and beliefs of a particular society. Sports, being an integral part of society, contribute to its cultural fabric. By participating in sports and engaging in international competitions, children gain exposure to the cultures of other societies. This exposure significantly impacts their socialization and behavior. Furthermore, involvement in sports broadens the developmental and educational horizons of children, equipping them with a wealth of knowledge and information that sets them apart from their peers (Shafaei et al. 2024).

## Conclusion

The findings from the present study demonstrate that participation in physical activity and exercise leads to a significant enhancement in the social and adaptive abilities of children with ADHD. These improvements

encompass various aspects such as academic performance, relationships with peers and family, as well as household tasks and self-care. Consequently, it can be inferred that physical activity and sports play a crucial role in enhancing the social and adaptive performance of children with ADHD. Therefore, by promoting increased physical activity and sports involvement, we can create a more favorable environment for these children to excel in their social and adaptive skills. These findings hold practical implications for professionals and physical education teachers. Hence, it is recommended that practitioners and physical education teachers actively encourage children with ADHD to participate in physical activity and sports to enhance their social and adaptive performance.

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