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Correlation between different types and intensities of physical activity and children's sports performance

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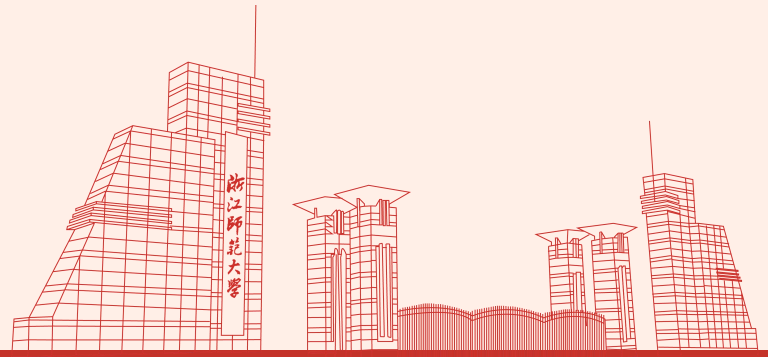
Catalogue



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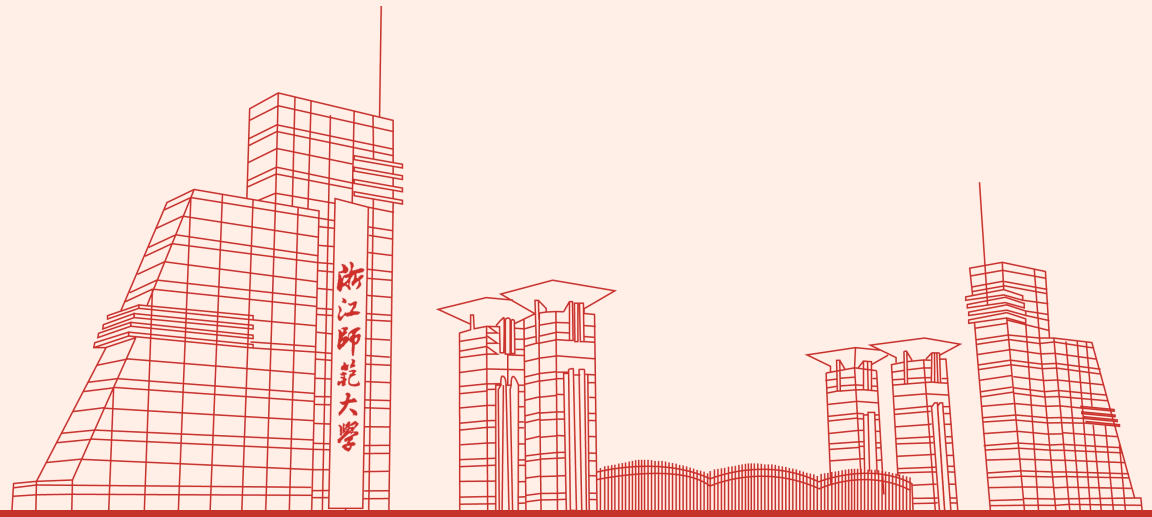
Abstract



Abstract

- This study used the literature method to systematically review correlation studies on the sports performance of school-aged children aged 7–12 years. Twenty related studies were summarized and sorted out. Results showed that most of the studies used the motion sensor method to measure the intensity of physical activity, and few used the observation and survey methods.
- Most studies measured sports performance on the basis of changes in various physical fitness indicators to reflect differences in sports performance.
- Moderate and high-intensity comprehensive sports are more helpful to improve the sports performance of school-aged children;

Abstract

At present, the differences in the improvement effects of various physical activities on children's sports performance need to be further compared. The research results can provide scientific theoretical guidance for the selection of children's physical activities and sports methods and the development of comprehensive courses such as school sports activities, as well as help children's sports performance improvement and effective development of physical and mental health.

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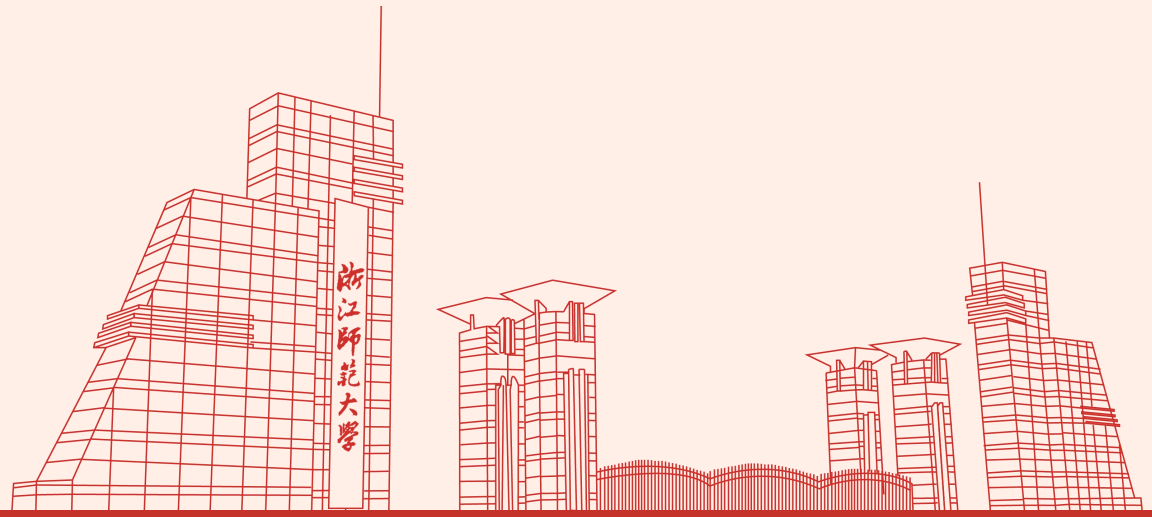
Introduction



Introduction

- What is physical activity and sports performance?
- Sports performance in childhood can intuitively reflect their athletic talent, which is very important for the development of children's physical fitness and athletic ability in the future.
- In recent years, it has been confirmed by many studies that appropriate physical activity in childhood helps to improve sports performance. Sex research is not perfect. On this basis, the present study adopted the 41 literature data method to systematically summarize and organize the types, intensity,and influencing factors of physical activity and sports performance in school-aged 2 children and their measurement methods. Moreover, the correlation between physical 3 activity and sports performance was analyzed. The results of this study can be used to 4 provide a basis for further research in related fields.

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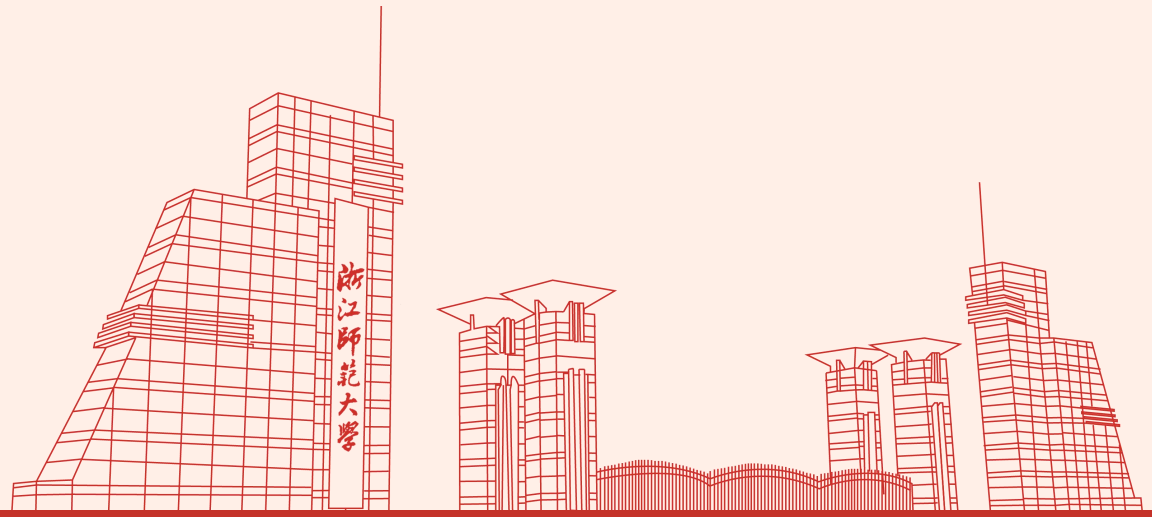
03 Physical activity



type

Classification criteria	Type	Activities
People's daily life style and behavior habits	Occupation	Physical activity (labor) involved in an 8-hour working day
	traffic	Physical activity involved in everyday modes of transportation, such as walking, cycling, riding, driving, etc.
	Leisure	Recreational activities other than basic activities, such as physical exercise, dancing, playing with children, going up and down stairs, walking, etc.; physical activities that involve little body movement in leisure time, such as watching TV, playing computer, chatting, playing cards, etc.
	Housework	Housework, such as grocery shopping, cooking (cooking), laundry, moving/lifting light objects, mopping the floor, cleaning glass, weaving, etc.
Characteristics of energy metabolism during activity	Aerobic metabolism	It mainly includes physical activities (such as agricultural production labor, housework, long-distance running, walking, cycling, swimming, etc.
	Anaerobic metabolism	Anaerobic Metabolism Physical activity that causes short, powerful muscle contractions (such as carrying heavy objects, running fast, throwing, long jump, etc.).
Activity form	single class	Activity form Single category Extension, flexion and rotation activities of the body or limbs (such as squatting, bending, turning, etc.)
	Impedance	Repetitive movements that work against resistance through muscles (e.g., weightlifting, bouncing machine exercises, push-ups, pull-ups, etc.)
	Combination class	Combination activities to improve the balance and coordination of the human body (such as gymnastics, boxing, dance, etc.)

Strength

Classification criteria	grade	METs value/PAL value/RPE range	Activity example/speaking test
metabolic equivalent	Low	<3．0	Metabolic equivalents Low <3.0 General activities of daily living, such as shopping, cooking, laundry, etc.
	middle	3．0～6．0	Such as dancing, riding, mowing, yoga, golf, walking, Tai Chi, table tennis, tennis doubles, biking (<10 mph), carrying heavy objects (<20 kg), etc.
	high	>6．0	Such as walking, skipping, running, fast cycling, football, heavy physical labor (such as logging, construction), playing basketball, tennis, swimming, backpacking, carrying heavy objects (>20 kg), etc.
daily physical activity level	Low	1．40～1．69	Daily physical activity level Low 1.40-1.69 Office work, repairing electrical clocks, sales clerks, hotel waiters, chemical experiment operation, giving lectures, etc.
	middle	1．70～1．99	Students' daily activities, motor vehicle driving, electrician installation, lathe operation, metal cutting, etc.
	high	2．00～2．40	High 2.00～2.40 Non-mechanized agricultural labor, steelmaking, dancing, sports, loading and unloading, mining, etc.
Subjective exercise intensity scale	Low	<12	can talk/sing
	middle	12～14	can talk but not sing
	high	≥15	difficulty speaking

Measurement method

Measurement methods		Advantages and disadvantages
Calorie Expenditure Measurement	direct method	The accuracy is high, but the equipment and technical requirements are high, and the test cost is also high. Only in the laboratory, suitable for subject research
	indirect method	The accuracy is high, but the equipment is expensive and requires a breathing mask, which will cause mild discomfort to the test subject. Often used to determine the validity of other measures of physical activity or small sample studies.
	Double standard water method	The sample collection and measurement process is simple, safe, without toxic side effects, and has a wide range of applications, but the cost is high, and it can only test TEE for a period of time, and cannot accurately reflect the ratio of AEE, DEE and BMR. Often used to assess the validity of other measures of physical activity.
heart rate monitoring		It is simple and easy to operate, but unstable, with large individual differences, and is easily affected by many factors, such as body composition, training level, smoking, caffeine, nervousness, etc. It is suitable for epidemiological investigations with large samples.
motion sensor method	Pedometer	It is small in size, cheap in price, easy to wear, does not affect the activities of the survey object, and has accurate measurement results. However, it does not provide information on activity intensity, duration of activity, and activity pattern, making it difficult to sense movements that do not involve significant body movement, muscle isometric contractions, or upper extremity activity. Suitable for small population studies.
	Accelerometer	Accelerometers are small, light, and easy to use, and can provide information on physical activity intensity and activity patterns. They can store data for days, weeks, or even months. It can explain changes in TEE well, but it cannot easily detect TEE. Physical activities that do not involve significant body movement, such as cycling, upper extremity exercise, etc, also cannot be used to measure energy expenditure in swimming, diving, etc.
Observation		Various parameters of the physical activity of the observed object and the surrounding environment during the activity can be completely recorded, and the obtained data is objective and reliable, but it requires a well-trained observer, and the cost is high. It is suitable for small sample surveys, especially preschool children with poor recall of details.
Survey		The cost is low, the operation is simple, and information such as activity type, frequency, time, intensity, etc. can be provided. However, the results are greatly influenced by subjective factors and are prone to bias, especially for people with limited cognitive ability, recall ability, and comprehension ability. Suitable for large-scale epidemiological investigations.

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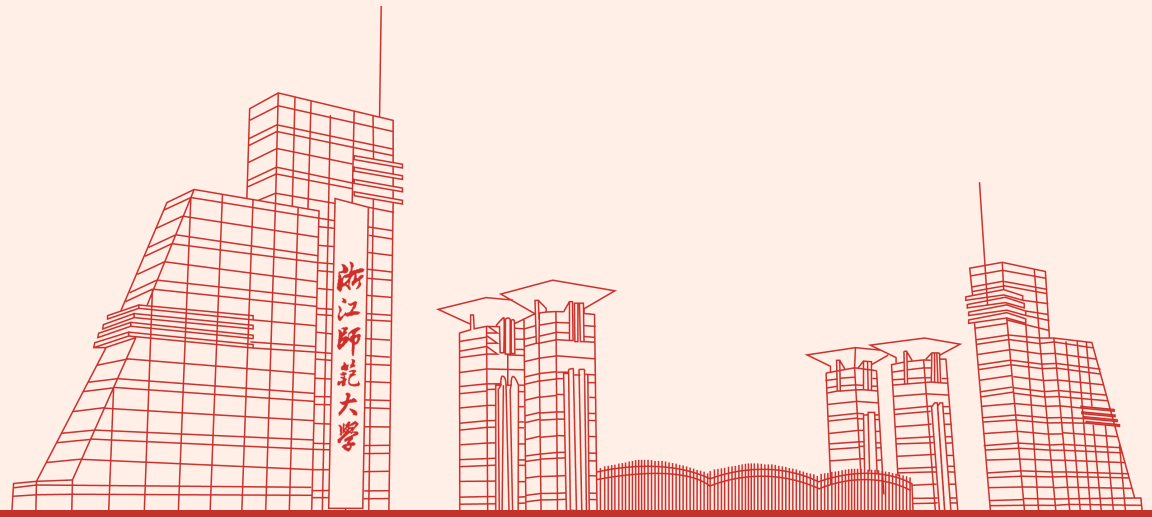
sports performance



- Sports performance in childhood can intuitively reflect their athletic talent, which is very important for the development of children's physical fitness and athletic ability in the future.And there are certain differences between men and women.

- More and more studies have shown that children's coordination ability is the key to determine their sports performance.

- After a large number of literature searches, it is found that the current reports on the measurement methods of sports performance are not sufficient.

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Empirical research on physical activity and sports performance

- In recent years, it has been gradually confirmed that appropriate physical activity at school age contributes to the improvement of athletic performance. However, reports on the different effects of different types and intensities of physical activity on children's athletic performance are not well established. Guo Jiajun et al. (2022) conducted an in-depth study on the relationship between basic motor skills, physical activity and body perception ability of children aged 8-9, and found that basic motor skills can significantly predict physical activity and body perception ability .

- Hou Tongtong (2021) found that there is a positive correlation between motor coordination ability and physical activity, and high-intensity physical activity and moderate-intensity physical activity can promote motor coordination ability. There is a positive correlation between sports coordination ability and interest in sports learning, and the degree of sports participation, active interest in sports learning and the degree of autonomous learning can promote sports coordination ability .

- Peng Yong et al. (2021) found that the INT plan may be more in line with the structural characteristics of the actual training content of sports training, avoid single development, and can comprehensively develop the different sports qualities required by athletes.Integral 33 neuromuscular training enhances health- and skill-related fitness in children during 34 physical education.
- Damiano Formenti, (2021) studied open and closed skills and found that the open skills movement group showed higher inhibitory control and motor performance (reaction time, speed, agility and strength) . Teachers' perceptions of children's motor learning ability can predict children's basic motor skills , Sebastiaan Platvoet, (2020) found that we found an association between children's motor learning ability and the level of basic motor skills and their changes; this The phenomenon is particularly pronounced in children with lower levels of motor learning, with lower 43 proficiency and lower progress on lateral tests.

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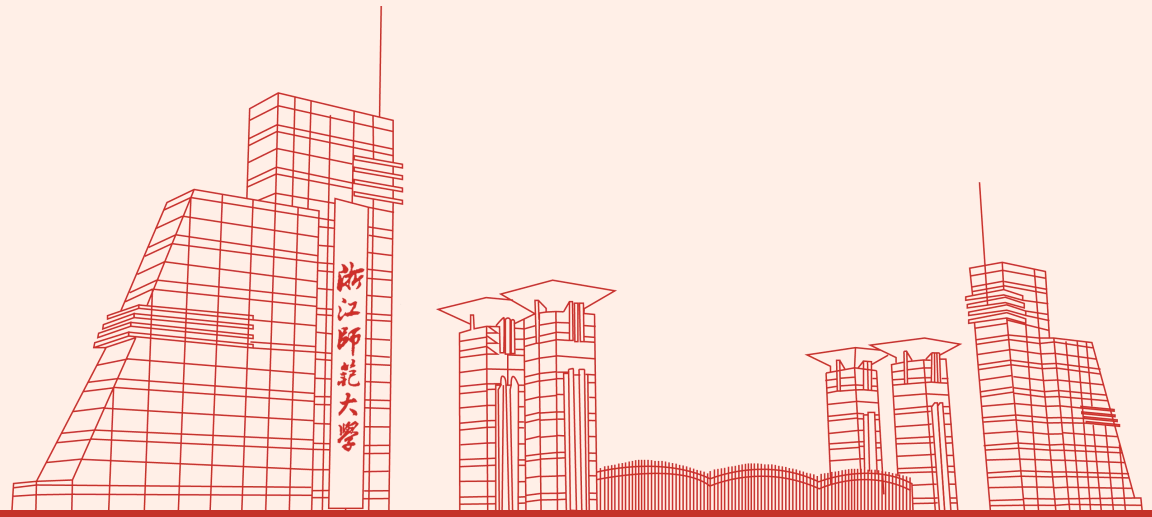
Conclusion



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- Regular or open-ended, comprehensive, and interesting sports for school-age children will be more conducive to the improvement of sports performance and even improve sports ability.
- Medium and high-intensity activities during physical activity in leisure time can more promote motor coordination ability, which can further improve children's sports performance.
- In the selection of physical education courses for school-age children and after-school time activity courses, it can be biased to choose sports games as the main line to drive students' interest in sports learning, and then comprehensively develop students' physical qualities and continuously improve sports performance. It is recommended that each course activity The time should not exceed 60 minutes and not less than 30 minutes.

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Thank you!

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