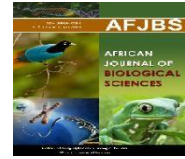


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### GENDER DIFFERENCES IN FUNDAMENTAL MOTOR SKILL DEVELOPMENT: A COMPREHENSIVE ASSESSMENT

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#### Abstract

This study investigates gender differences in fundamental motor skill (FMS) development among 200 children aged 4 to 5 years in Karnataka state, India. A stratified sampling approach ensured a balanced representation of 100 boys and 100 girls from diverse socio-demographic backgrounds. The Test of Gross Motor Development - Second Edition (TGMD-2) assessed locomotor (e.g., running, hopping) and object control skills (e.g., throwing, catching). Statistical analysis, using independent samples t-tests with a significance level of 0.05, revealed distinct outcomes: while no significant difference was found in locomotor skills ( $M_{\text{girls}} = 32.76$ ,  $M_{\text{boys}} = 33.09$ ,  $p = .411$ ), boys demonstrated significantly better object control skills than girls ( $M_{\text{girls}} = 22.28$ ,  $M_{\text{boys}} = 28.21$ ,  $p < .001$ ). These results highlight gender-specific variations in FMS development during early childhood, contributing to our understanding of motor skill acquisition in diverse populations.

**Keywords:** Fundamental Motor Skills, Locomotor Skill, Object Control Skill, Gender.

## Introduction

Fundamental motor skills are foundational movements that form the basis for more complex and specialized skills required in daily activities and sports. These skills are typically categorized into two broad groups: locomotor skills and object control skills. Locomotor skills involve movements that transport an individual from one location to another, such as running, jumping, and hopping (Gallahue et al., 2012). Object control skills involve the handling of objects, such as throwing, catching, and striking (Gallahue et al., 2012). The development of these skills is vital for children's physical, cognitive, and social growth, providing the necessary competence and confidence to engage in various physical activities throughout life (Robinson et al., 2015).

The acquisition and refinement of fundamental motor skills are influenced by a variety of factors including biological, environmental, and sociocultural elements. Among these, gender is a significant determinant, affecting the rate and proficiency of motor skill development (Thomas & French, 1985). Research has consistently shown that boys and girls exhibit differences in motor skill development due to a complex interplay of genetic predispositions and environmental influences (Barnett et al., 2010; Goodway et al., 2019). For instance, boys are often encouraged to participate in activities that promote strength and power, while girls may receive more encouragement in activities that enhance coordination and flexibility (Thomas & French, 1985; Barnett et al., 2010).

Gender differences in motor skill development have been documented in numerous studies. Boys tend to outperform girls in locomotor skills such as running and jumping, and in object control skills like throwing and catching (Malina et al., 2004; Spessato et al., 2013). These differences are evident from a young age and become more pronounced as children grow older (Thomas & French, 1985). The disparities can be attributed to both innate biological differences, such as muscle mass and hormonal influences, and sociocultural factors, including the types of activities that boys and girls are encouraged to participate in by parents, teachers, and peers (Thomas & French, 1985; Spessato et al., 2013).

Understanding motor skill development is not only important for fostering physical activity and health but also for identifying and addressing movement disorders. Movement disorders, which affect an individual's ability to produce and control voluntary movements, can significantly impact a child's daily functioning and quality of life (Zwicker et al., 2012). The prevalence of movement disorders in pediatric populations underscores the need for early identification and intervention (Cairney et al., 2005). Studies have shown that boys are more likely to be diagnosed with movement disorders than girls, which may be due to both biological susceptibilities and differences in how symptoms are recognized and addressed (Cairney et al., 2005; Zwicker et al., 2012).

This comprehensive assessment aims to investigate into the gender differences in fundamental motor skill development, with a focus on both locomotor and object control skills. By exploring these differences, this study seeks to contribute to a deeper understanding of how boys and girls develop essential motor skills and how these differences influence their physical

activity levels, overall health, and development. The findings of this assessment could inform educational and recreational programming, ensuring that both boys and girls receive appropriate opportunities and support to develop their motor skills to their full potential.

### **Theoretical Framework**

The Developmental Systems Theory proposes that FMS development results from intricate interactions between biological predispositions and environmental influences (Thelen & Smith, 1994). Social Learning Theory, articulated by Bandura (1977), suggests that gender differences in FMS proficiency arise from differential societal expectations and opportunities for physical activity among boys and girls. Ecological Systems Theory, as outlined by Bronfenbrenner (1979), underscores the impact of various environmental systems (microsystem, mesosystem, exosystem, macrosystem) on shaping gender-specific behaviors and opportunities for skill development. Moreover, Self-Determination Theory posits that intrinsic motivation, supported through autonomy, competence, and relatedness, plays a crucial role in FMS acquisition, with potential variations influenced by gender-specific encouragement and support within physical activity contexts (Deci & Ryan, 1985). Together, these theoretical perspectives provide a comprehensive framework for understanding how FMS develop in children, influenced by both biological factors and socio-cultural contexts, thereby highlighting the complex interplay between nature and nurture in physical skill acquisition.

### **Methodology**

The study utilizes a stratified sampling approach to select a representative sample of 200 children aged 4 to 5 years from diverse regions and demographics within Karnataka state, India. This includes 100 boys and 100 girls, ensuring balanced representation across different backgrounds. FMS is assessed using the Test of Gross Motor Development - Second Edition (TGMD-2), which evaluates a comprehensive range of locomotor skills such as running, galloping, hopping, sliding, horizontal jumping, and leaping. Additionally, object control skills such as overhand throw, underhand roll, catching, stationary dribbling, kicking, and striking a stationary ball, are also assessed. Each child's performance on these skills is systematically observed and scored based on standardized criteria. This method enables a thorough examination of gender differences in fundamental motor skill development among young children in Karnataka, shedding light on regional variations and contributing to a broader understanding of early childhood motor skill acquisition.

### **TGMD-2 Administration and Scoring**

The Test of Gross Motor Development - Second Edition (TGMD-2) assesses twelve FMS. Each skill is meticulously broken down into three to five specific criteria, such as the windup and follow-through in throwing. Children perform three trials per skill, with the first trial serving as practice and not scored. The subsequent two trials are formal test trials, evaluated for the completion of specified criteria. Scores range from 0 to 1 for each correctly executed criterion, totaling a maximum of 96 points (48 for locomotor skills and 48 for object control skills). For detailed skill-specific criteria, the TGMD-2 manual by Ulrich (2000) provides comprehensive guidelines.

### Statistical Analysis

For this study, an independent samples t-test will be employed to assess gender differences in FMS development among 4 to 5-year-old children. The significance level is set at 0.05.

### Results:

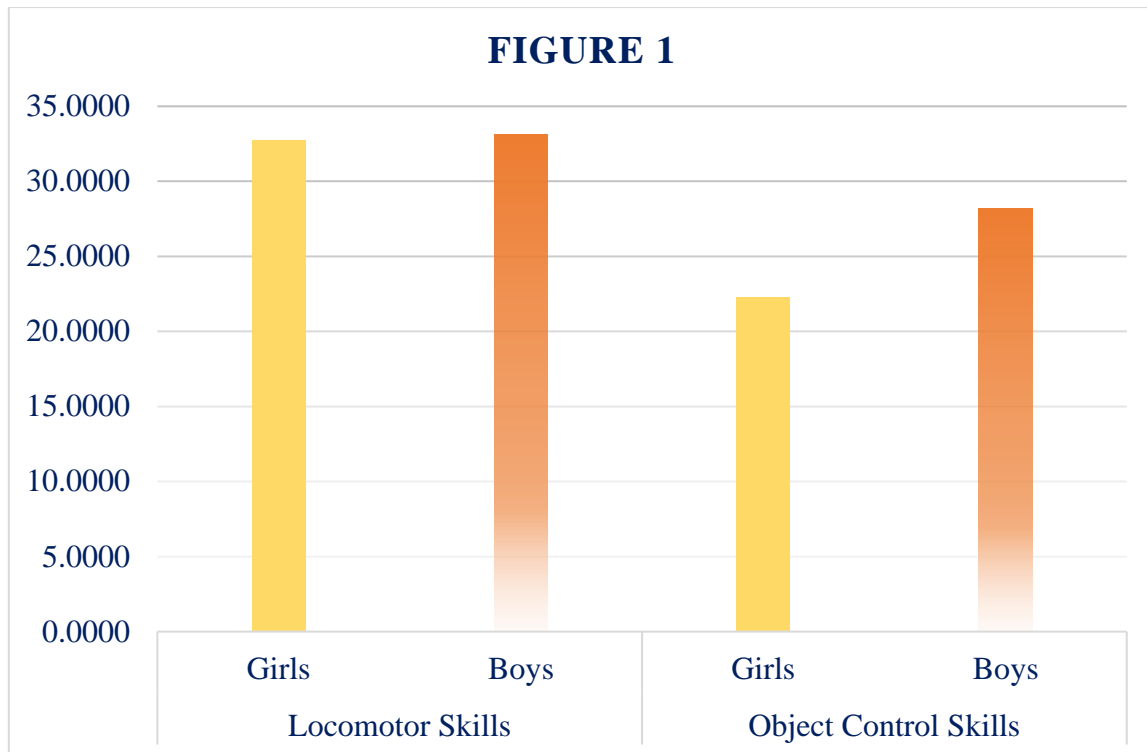
The statistical results are presented in Table 1 and Table 2, with the mean values depicted in Figure 1.

Table 1

Variables	Gender	N	Mean	SD	t	df	Sig. (2-tailed)
Locomotor Skills	Girls	100	32.7600	2.71219	.824	198	.411
	Boys	100	33.0900	2.94767			

Table 2

Variables	Gender	N	Mean	SD	t	df	Sig. (2-tailed)
Object Control Skills	Girls	100	22.2800	2.00545	-25.467	198	.000
	Boys	100	28.2100	1.18317			



The statistical findings from Tables 1 and 2 reveal contrasting outcomes in locomotor and object control skills between boys and girls. In terms of locomotor skills, there was no statistically significant difference observed between genders. Both boys and girls showed similar mean scores, with boys slightly higher but not to a significant degree ( $M_{\text{girls}} = 32.76$ ,  $M_{\text{boys}} = 33.09$ ,  $p = .411$ ). Conversely, object control skills displayed a significant gender difference, where boys exhibited notably superior performance compared to girls ( $M_{\text{girls}} = 22.28$ ,  $M_{\text{boys}} = 28.21$ ,  $p < .001$ ). This disparity was evidenced by a substantial t-value ( $t(198) = -25.467$ ), underscoring a robust statistical significance. These findings suggest that while locomotor skills appear comparable between boys and girls in this study, boys excel significantly in object control skills, highlighting potential gender-specific differences in motor skill development.

### Discussion on Findings

The findings from the study comparing locomotor and object control skills between boys and girls provide valuable insights into gender differences in motor skill development. These results are consistent with existing research while also contributing new perspectives. Previous studies have similarly shown that boys tend to perform better in object control skills compared to girls. For instance, a meta-analysis by Barnett et al. (2009) found that boys generally excel in skills involving object manipulation, such as throwing and catching, which are categorized under object control skills. This advantage has been attributed to biological and social factors, including differences in physical strength, hormonal influences, and gender-specific play patterns that emphasize such skills more in boys from an early age (Lloyd et al., 2013). On the other hand, the lack of significant differences in locomotor skills aligns with some previous research that also reported comparable abilities between genders in activities like running and jumping (Robinson et al., 2015). This consistency suggests that basic

locomotor movements develop similarly in boys and girls, possibly due to shared opportunities for physical activity and motor skill development in childhood. Moreover, these findings underscore the importance of considering gender-specific approaches in physical education and early childhood development programs. For instance, educators and caregivers could tailor activities to enhance object control skills among girls, ensuring equitable opportunities for skill development across genders. Such initiatives could potentially mitigate disparities observed in certain motor skills while promoting overall physical competence and enjoyment of physical activities among children.

### **Conclusion**

The findings of this study provide valuable insights into the differences in motor skill development between boys and girls. Specifically, while no significant disparities were found in locomotor skills, boys demonstrated significantly better object control skills compared to girls. These results align with previous research highlighting gender-specific patterns in motor skill acquisition. Boys' advantage in object control skills may be influenced by biological factors, such as physical strength, as well as social factors like gender-specific play preferences.

### **Future Implications**

Moving forward, several implications emerge from these findings. Educators and caregivers can utilize these insights to tailor physical education and early childhood programs, focusing on designing activities that specifically enhance object control skills in girls. Such targeted interventions could help alleviate observed disparities and foster more equitable motor skill development across genders.

Further research should delve deeper into the multifaceted factors contributing to gender differences in motor skills. Investigating biological, environmental, and sociocultural influences could provide a more nuanced understanding of these disparities and inform future intervention strategies.

In terms of policy and practice, initiatives aimed at promoting physical activity and motor skill development should take into account gender-specific needs. Ensuring inclusive opportunities for skill-building activities can bolster physical competence and confidence in all children, contributing to their overall development.

Addressing disparities in motor skill development early in life may have lasting implications for long-term health outcomes. Enhancing physical literacy across genders can potentially lead to healthier lifestyles and mitigate risks associated with sedentary behaviors later in life.

In conclusion, while this study enriches our understanding of gender differences in motor skills, ongoing efforts are essential to optimize motor skill development for all children. By acknowledging and addressing these differences through targeted interventions and continued research, we can create inclusive environments where every child has the opportunity to thrive physically and developmentally.

## Reference

1. Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice Hall.
2. Barnett, L. M., et al. (2009). Fundamental movement skills and physical activity among children and adolescents: Review and recommendations. *Health Promotion Journal of Australia*, 20(1), 7-15.
3. Barnett, L. M., Van Beurden, E., Morgan, P. J., Brooks, L. O., & Beard, J. R. (2010). Childhood motor skill proficiency as a predictor of adolescent physical activity. *Journal of Adolescent Health*, 46(4), 352-360. <https://doi.org/10.1016/j.jadohealth.2009.11.214>
4. Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, MA: Harvard University Press.
5. Cairney, J., Hay, J. A., Veldhuizen, S., Missiuna, C., Mahlberg, N., & Faught, B. E. (2005). Developmental coordination disorder, gender, and body weight: Examining the impact of participation in active play. *Research in Developmental Disabilities*, 26(5), 459-476. <https://doi.org/10.1016/j.ridd.2004.10.003>
6. Deci, E. L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York, NY: Plenum Press.
7. Gallahue, D. L., Ozmun, J. C., & Goodway, J. D. (2012). *Understanding Motor Development: Infants, Children, Adolescents, Adults*. McGraw-Hill.
8. Goodway, J. D., Robinson, L. E., & Crowe, H. (2019). Gender differences in fundamental motor skill development in disadvantaged preschoolers from two geographical regions. *Research Quarterly for Exercise and Sport*, 90(3), 259-268. <https://doi.org/10.1080/02701367.2019.1625927>
9. Lloyd, M., et al. (2013). The influence of gender and socioeconomic status on the motor proficiency of children in the UK. *Human Movement Science*, 32(6), 1138-1146.
10. Malina, R. M., Bouchard, C., & Bar-Or, O. (2004). *Growth, Maturation, and Physical Activity*. Human Kinetics.
11. Robinson, L. E., et al. (2015). Fundamental movement skills and children with attention-deficit hyperactivity disorder: A meta-analysis. *Journal of Sport and Health Science*, 4(1), 12-20.
12. Robinson, L. E., Stodden, D. F., Barnett, L. M., Lopes, V. P., Logan, S. W., Rodrigues, L. P., & D'Hondt, E. (2015). Motor competence and its effect on positive developmental trajectories of health. *Sports Medicine*, 45(9), 1273-1284. <https://doi.org/10.1007/s40279-015-0351-6>
13. Spessato, B. C., Gabbard, C., Valentini, N. C., & Rudisill, M. (2013). Gender differences in Brazilian children's fundamental movement skill performance. *Early Child Development and Care*, 183(7), 916-923. <https://doi.org/10.1080/03004430.2012.689761>
14. Thelen, E., & Smith, L. B. (1994). *A Dynamic Systems Approach to the Development of Cognition and Action*. Cambridge, MA: MIT Press.
15. Thomas, J. R., & French, K. E. (1985). Gender differences across age in motor performance: A meta-analysis. *Psychological Bulletin*, 98(2), 260-282. <https://doi.org/10.1037/0033-2909.98.2.260>
16. Ulrich, D.A. (2000). *Test of gross motor development-2*. Austin, TX: Pro-Ed.

17. Zwicker, J. G., Missiuna, C., Harris, S. R., & Boyd, L. A. (2012). Developmental coordination disorder: A review and update. *European Journal of Paediatric Neurology*, 16(6), 573-581. <https://doi.org/10.1016/j.ejpn.2012.05.005>