The Relationship Between Motor Skills and Cognitive Abilities in Counting Tasks among Young Children

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Abstract:

Physical play is essential for the growth and development of young children. In recent years, the decline in opportunities for physical play has led to various societal issues, including decreased motor skills, and reduced motivation for learning. Previous studies have shown a positive connection between physical activity and mathematical abilities, such as the positive relationship between finger dexterity and calculation skills. However, it is unknown whether the acquisition of specific motor skills in early childhood contributes to the conceptual development of counting abilities. Therefore, the objective of this study was to investigate and clarify the relationship between motor skills and counting task scores. Ninety-five young children were recruited and assessed on their counting ability and motor skills: standing long jump, ball throw, repetitive horizontal jump, body support duration, catching, and jumping over both feet in a row. After confirming normality using the Shapiro-Wilk test, Spearman's rank correlation coefficient was analyzed for counting ability and motor skills. Subsequently, to control for the effect of age, partial correlation analysis was conducted using the residuals of counting ability and motor skills. The results revealed a positive correlation between counting ability and repetitive horizontal jumps, even after excluding the effect of age ($r = 0.225$, $p = 0.040$). This suggests that the ability to control body while rhythmically jumping and playing may be associated with the skill of rhythmically counting using fingers. Practicing physical play that involves coordinating body movements, such as repetitive horizontal jumping, may help lay a foundation for young children's learning and cognitive development. Therefore, it would be critical to actively incorporate such exercises into young children's activities as a way to ensure a smooth transition to learning in elementary school and to provide key strategies for engaging in motor play that is essential for their growth and development.