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Dynamic Associations between Physical and Cognitive Development in Twins across Early Childhood

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ABSTRACT:

Owing to high rates of premature birth, twins are often born at low birth weight and display depressed cognitive functioning in infancy and toddlerhood. However, by early childhood, twins typically have "recovered" to the population mean of physical growth (e.g., height and weight) and cognitive ability. Cognitive recovery follows an S-shaped curve characterized by minimal gain across infancy, rapid recovery across toddlerhood, and stabilization around the population mean by early childhood. In contrast, recovery in height and weight begins in early infancy and stabilizes around the population mean by early toddlerhood. Thus, developmentally, twins appear to recovery physically before recovering cognitively. However, temporal associations between physical and cognitive recovery have not been tested in twins. Using longitudinal data from the Louisville Twin Study, we examine temporal associations between physical growth and standardized cognitive ability scores from infancy to middle-childhood using age appropriate measures (Bayley, Stanford-Binet, WPPSI, WISC). Specifically, we examine the dynamic association between physical growth and cognitive ability using a latent change score framework. Models were fit separately for height and weight. Results were consistent across height and weight models and suggest that physical growth anticipates cognitive growth. Findings provide insight into the developmental process by which twins recover physically and cognitively across childhood, and may provide a model for understanding how both twins and singleton children recover from early bio-environmental adversity (e.g., premature birth, anoxia, at low birth weight).

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