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Understanding mathematical development in preschool children: the association between mathematical language and mathematical abilities

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Abstract

This study investigated how the different components of mathematical language, quantitative language (e.g., more) and spatial language (e.g., after) relate to children's performance in different domains of mathematics (numerical competencies, measurement, geometry). Our sample included 75 preschool children (Mage = 4 years 10 months). Children received measures of mathematical language and mathematical ability. We also assessed their general language and spatial skill, and investigated to which extent associations between mathematical language and mathematical abilities remained when these general skills were controlled for. Results indicated that both quantitative and spatial language were correlated with children's numerical competencies, measurement and geometry scores. We further observed that spatial language, but not quantitative language, was a unique predictor of children's mathematical abilities, particularly of their numerical competencies and their geometry performance, suggesting that spatial language is more critical than quantitative language. This relation between spatial language and mathematical ability disappeared when general language and spatial skill, were taken into account. Follow-up analyses further indicated that spatial language partially mediated the association between these general abilities and mathematical abilities. These findings present evidence on the link between distinct types of mathematical language and different mathematical abilities, and they emphasize the role of spatial language in children's mathematical abilities.