General Magnitude Representation and Mathematics: How Number and Area Acuity Relate to Math Ability

Justin Bonny
Emory University

Stella Lourenco
Emory University

Abstract: Recent research points to a relation between non-verbal number estimation and knowledge of formally taught mathematical principles and operations, with more accurate estimation (i.e., number acuity) predicting better performance on standardized math tests (Halberda et al., 2008). Here we asked whether math ability relates to acuity for magnitude more generally, as might be predicted by a system of generalized magnitude representation (Walsh, 2003). Thirty-five undergraduates were given two standardized math tests (Woodcock-Johnson and KeyMath) and two non-verbal estimation tasks (which measured acuity for number and cumulative area). Analyses revealed both general associations between magnitude acuity and math ability (ranging from $r = .368$ to .488, $ps < .05$), as well as more specific associations between each type of acuity (number vs. area) and math ($r = .383$ - .511, $ps < .05$). These results suggest both common and more distinct connections between magnitude estimation and math.