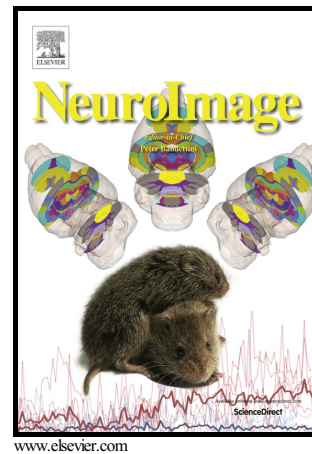


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Functional Anatomy of Arithmetic and Word Reading and its Relationship to Age

Tanya M. Evans,^a D. Lynn Flowers,^{a,b} Megan M. Luetje,^a Eileen Napoliello^a and Guinevere F. Eden^a

a Center for the Study of Learning, Department of Pediatrics, Georgetown University Medical Center, Suite 150 Building D, 4000 Reservoir Road NW, Washington, DC 20057 USA

b Wake Forest University Baptist Medical Center, Medical Center Boulevard, Winston-Salem, NC

Correspondence to:

Guinevere Eden, D.Phil.,

Center for the Study of Learning,

Georgetown University Medical Center,

BOX 571406,

Suite 150, Building D,

4000 Reservoir Road, NW,

Washington, DC 20057, USA

E-mail: edeng@georgetown.edu

ABSTRACT

Arithmetic and written language are uniquely human skills acquired during early schooling and used daily. While prior studies have independently characterized the neural bases for arithmetic and reading, here we examine both skills in a single study to capture their shared and unique cognitive mechanisms, as well as the role of age/experience in modulating their neural representations. We used functional MRI in 7- to 29-year-olds who performed single-digit subtraction, single-digit addition, and single-word reading. Using a factorial design, we examined the main effects of Task (subtraction, addition, reading) and Age (as a continuous variable), and their interactions. A main effect of Task revealed preferential activation for subtraction in bilateral intraparietal sulci and supramarginal gyri, right insula, inferior frontal gyrus, and cingulate. The right middle temporal gyrus and left superior temporal gyrus were preferentially active for both addition and reading, and left fusiform gyrus was preferentially active for reading. A main effect of Age revealed increased activity in older participants in right angular gyrus, superior temporal sulcus, and putamen, and less activity in left supplementary motor area, suggesting a left frontal to right temporo-parietal shift of activity with increasing

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