Math Processing Interferes with Directing Attention into the Right Visual Field

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The brain mechanisms underlying math processing have been the subject of much recent investigation. Clinical, human imaging, and transcranial magnetic stimulation experiments have identified a network of cortical sites – most notably in the parietal and prefrontal areas – which contribute to this processing. These areas have also been implicated in a number of other processes such as attention and working memory that are not specific to math per se. The extent to which these processes can be dissociated from those involved with performing math and whether there are hemispheric differences in this dissociation were examined in a series of four experiments. For this purpose, a dual-task methodology was employed in which a serial addition task was paired with a peripheral target detection task. Detection times were found to be significantly greater for targets appearing in the right as opposed to left visual field when math was also performed (experiment 1). Control experiments demonstrated that the asymmetric interference was not due to the language (experiment 2) or working memory (experiment 3) components of the math task. Finally, adding a go-nogo contingency to the target detection task showed that the longer detection times for targets appearing in the right visual field were due to delays in disengaging attention from the central fixation point (experiment 4) during the reaction time period. Taken together, these results imply that for simple addition there is a substantial degree of overlap with processing required to direct attention into the right hemifield.