

Individual differences in arithmetic fluency

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Objectives:

Classical views of dyscalculia consider that a deficit in number representations or in the access to number meaning from symbolic representations may play a causal role in the appearance of deficits in arithmetical fact retrieval. However, recently it has been suggested that hypersensitivity to interference may explain pathological (and normal) differences in arithmetical fluency tasks. In this study we tested the above mentioned hypotheses.

Method:

Seventeen low arithmetic fluency adults and 17 high arithmetic fluency adults were evaluated in a short term memory serial recall test with similar and dissimilar sequences to evaluate sensitivity to (phonological) interference. They also completed a numerical matching task with arrays of dots or with a mixed notation (Arabic numbers and dots). Three ratios and trials with perceptual cues that can be congruent or incongruent with numeracy were employed to explore numerical representations and their access from symbolic representations. Groups did not differ in CI or in general processing speed.

Results:

In the memory task no differences were found in the size of the phonological similarity effect between both groups, suggesting similar sensitivity to interference. High arithmetic fluency participants took advantage of perceptual cues to solve the matching task with dots, however, low arithmetic fluency participants did not benefit from congruent trials.

Conclusions:

The similar pattern in the memory task goes against the hypersensitivity to interference account. The finding of differences in the matching task suggests that deficits in numerical processing may impact on the building of a network of arithmetical facts.