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Journal
Proceedings of the Annual Meeting of the Cognitive Science Society, 43(43)

ISSN
1069-7977

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Publication Date
2021

Peer reviewed

Complexity of processing to activate magnitude representation for common fractions and precision of their magnitude representations in fraction magnitude comparison

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Abstract

This study investigated processing/strategy complexity to activate magnitude representation for common fractions (1/4, 1/3, 1/2, 2/3, and 3/4), and the precision of their magnitude representations on the mental number line. We compared the magnitude comparison performance for pairs involving any one of common fractions and pairs of two uncommon fractions. We hypothesized the mean reaction time to be shorter for pairs involving a common fraction with a simple processing/strategy to activate the magnitude representation, and the magnitude distance effect to be smaller for pairs involving common fractions with precise magnitude representation. Bayesian mixed-effect regression analysis found a shorter mean reaction time for pairs involving common fractions except 1/4. Comparisons involving common fractions did not show a smaller magnitude distance effect. Thus, processing to activate magnitude representation is simpler for common (except 1/4) than for uncommon fractions, although common fractions do not have more precise magnitude representation than uncommon fractions.