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Title

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Journal

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

Authors

Tanida, Yuki

Okamoto, Masahiko

Publication Date

2021

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Peer reviewed

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

Yuki Tanida

Osaka Prefecture University, Sakai, Osaka, Japan

Masahiko Okamoto

Osaka Prefecture University, Sakai, Osaka, Japan

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.