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Magnitude Comparisons of Improper Fractions

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Abstract

Previous studies examining the mental representations of fractions have focused on fractions with magnitudes less than one (e.g., $2/3$). In the current study, we examine the mental representations of fractions with magnitudes greater than one, specifically those of improper fractions. Participants were asked to make magnitude comparisons of these improper fractions to a reference that was in an improper fraction, a mixed fraction, or a decimal format. Results show that magnitudes of improper fractions were more accurately accessed when they were compared to mixed fractions and decimals. This suggests that the reinterpretation of these improper fractions benefited magnitude processing. Distance effects on error rate and response time were observed for all three reference formats and more consistently took the form of a Welford function, which predicts worse performance above rather than below the reference. Possible explanations of these results are discussed.