

Spontaneous small ratio production in perceptual comparison task

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Abstract

How does the perceptual system compare quantities in the environment? Adult participants ($n=47$) were asked to judge the relative similarity or dissimilarity of two line lengths or brightnesses by making a mouse click along an unmarked horizontal bar. Despite receiving no instruction or feedback regarding how the stimuli should be compared, responding was remarkably consistent across observers and between modalities. A linear model based on the ratio of the smaller to the larger magnitude accounted for 92% and 93% of variance in average responses to line lengths and brightnesses (respectively) across 28 repeated stimulus pairs. A replication using 336 randomly generated pairs showed similar results (with 90% and 91% of variance accounted for). Decades of psychophysical research have delivered mixed results with respect to the relative importance of ratios – as opposed to differences – in perceptual comparison. The current data suggest ‘small ratios’ (Morton et al., 2024) are the predominant comparative function.