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The ghosts of number forms (2): between-individual variation of mental number lines in non-synaesthetes

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Abstract: Some individuals automatically and involuntarily “see” mental images of numbers in spatial arrays when they think of numbers (number forms). Makioka (2009) proposed a theoretical framework called self-organizing learning account of number forms (SOLA), which argues that number forms are generated by self-organizing learning between numerical and spatial representation. This framework explains three important properties of number forms: (a) within-individual consistency, (b) between-individual variation, and (c) mixture of regularity and randomness. This study aims to examine whether SOLA can explain the interaction between numerical and spatial representations in non-synaesthetes. Participants viewed pairs of numerals and reported vocally which numeral was larger. The two numerals were presented in various spatial configurations, and mean reaction times (RTs) were calculated for each configuration of each individual. We have found significant interactions between numeral pairs and spatial configuration in some participants, which suggests that they have irregular mental number lines.