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Identifying the Bounds of Peripersonal Space with Phase Transition Methods

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Abstract

The shape of the transition in multisensory integration between the (defensive) peripersonal space (DPPS) and the extrapersonal space (EPS) has recently been debated. Contributing to this discussion, we approached the DPPS-EPS transition from a dynamic systems perspective. Specifically, the dynamic complexity of visuotactile reaction times to moving stimuli was employed to evaluate the presence of phase transitions. Reverting well-established findings on the DPPS-EPS transition, we hypothesized that a phase transition would be identified for looming stimuli, but not for receding stimuli, and that the phase transition for looming threatening stimuli would be located further away from the body than for looming non-threatening stimuli. Contrary to these hypotheses, we found that phase transitions for receding stimuli were more prominent and located further away from the body than phase transitions for looming stimuli. Nonetheless, we consider the identification of phase transitions to be a promising approach for future studies of multisensory integration.