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Motion Capture of Phase Change Transitions During Insight Problem Solving

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Abstract: Insight problem solving refers to the phenomenon of experiencing a sudden flash of insight when discovering novel problem solving strategies. This sudden transition in thinking suggests a phase change in human cognition as an emergent property of the self-organizing complex system of coupled neural activations. In our study, we developed a method of measuring this phase change within an embodied cognition paradigm. We used 3D motion capture to measure the precise body movements of 21 participants at 120 Hz resolution while they solved 3 different types of insight problems. We analyzed a sliding time series of postural sway and head displacement using recurrence quantification and spectral analyses to determine changes in entropy in the participants' movements. These measures allow us to make inferences about changes in level of self-organization as the participant's neural activation transitions from one state to another.