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THE PHASE TRANSITION IN HUMAN COGNITION

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This article attempts to build a bridge between cognitive psychology and computational neuroscience, perhaps allowing each group to understand the other's theoretical insights and sympathize with the other's methodological challenges. In briefly discussing a collection of conceptual demonstrations, neural network and dynamical system simulations, and human experimental results, we highlight the importance of the concept of phase transition to understand cognitive function. Our goal is to show that viewing cognition as a self-organizing process (involving phase transitions, criticality, and autocatalysis) affords a more natural explanation of these data over traditional approaches inspired by a sequence of linear filters (involving detection, recognition, and then response selection).

Keywords: Cognition; dynamical systems; emergence; phase transition