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Temporal Structure in Reaction Time Data is sensitive to exercised control

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Abstract

Hierarchical control theories of perception-action conceptualize action as control of input, occurring simultaneously at multiple levels. These levels differ in terms spatio-temporal proximity of the perception controlled. However, it is not clear how this interaction between different levels in a control hierarchy can be measured from the behavior of the organism. We propose that Long Range Temporal Correlations (LRTC) in RT data can be used as a measure of coupling between different control levels within such complex system. Participants perform the task of controlling a hierarchical stimulus either at global level or at local level in a noisy presentation, while the level of control and noise are manipulated. The results suggest that LRTC in control task is higher for global level of control compared to local level of control in the no noise condition. We discuss implications of the results for understanding of perception-action interactions as a complex dynamic system.