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The effect of kinematics on standard measures used in quantifying decision making using arm movements: a simulation study

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Abstract

Since the landmark paper of Spivey et al. (2005), there has been an explosion in the use of continuous trajectories for studying decision-making. In these studies, the participant makes their decision by reaching to a target. By extracting trajectory-based measures, it is possible to observe how the decision unfolds over time. However, studies have shown that these trajectories may not continuously track the decision-making process, but rather result from several discrete submovements executed intermittently. Due to this, the conclusions of papers using purely kinematic measures may be affected by these motor control properties. This study presents simulations of trajectories using human motor control models and demonstrates the relationship between non-decision-related parameters and outcome measures typically used. We also comment on the implications of these findings for using kinematic measures in decision-making and make recommendations for how the decision variable can be more appropriately sampled.