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Bimanual Interference Experimental Paradigm

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Protocol Information

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Authors: Rini Varghese, Jasmine Ma, James Gordon, Robert L Sainburg, Carolee J Winstein

Summary: Successful bimanual coordination is accomplished by overcoming a variety of cognitive, perceptual and neuromotor constraints, e.g. higher-order representation of task goals, visual perceptual demands, attention demands, task demands (i.e., speed, accuracy) and sensorimotor integration. Sensorimotor interference in planning, executing and correcting bilateral movements especially arise when the hands are required to accomplish two independent or disparate goals. In this study, we describe the experimental paradigm to study sensorimotor interference during performance of a planar reaching task, in which the experimental condition consists of the two hands moving to two visually cued targets at separate distances (spatially asymmetric). Whereas the control conditions consisted of same-size movements performed unimanually with each limb and bimanually to symmetric targets. The paradigm is a modification of a previously conceptualized model task paradigm (e.g. 1-5) to study interference in discrete bilateral movements, wherein the two limbs are tasked with accomplishing asymmetric movement goals. However, our study paradigm involved important modifications to task design such as absence of online visual feedback (so as to test fairly rapid preprogrammed movements) and task instructions which emphasized speed and accuracy but not interlimb synchrony. The study aims: 1) to characterize sensorimotor interference in discrete bilateral reaching movements in young adults, and subsequently, 2) to determine the influence of the side of stroke on such sensorimotor interference. The experimental paradigm was conducted using the KineReach kinematic data collection system and accompanying software (Sainburg, Pennsylvania State University). MATLAB code to generate session and target files for this experiment are included in this protocol. Details of data processing and analysis will be published in the primary papers and code will be made available thereafter. References: 1. Kelso (1979) 2. Marteniuk (1984) 3. Swinnen (1991) 4. Diedrichsen (2006) 5. Blich (2011)

Affiliations: University of Southern California, University of Southern California, University of Southern California, Pennsylvania State University, University of Southern California

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