Request #: 621 - KHS - Publication/Article

prefrontal roles in stopping a balance recovery step

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Background

Using fNIRS to investigate the role of PFC in stopping a balance step

Sample

Brain signals during a balance task. 21 young adults. Data collection complete.

Hypothesis

The ability to quickly step is an important strategy to avoid a fall. However, real-world settings often constrain a stepping path. Such constraints necessitate response inhibition to prevent an inappropriate step and select a new course of action to ultimately recover balance. The present study investigated neural mechanisms that underlie this ability to stop a highly automatic balance recovery step. In the field of cognitive neuroscience, response inhibition has typically been researched using focal hand reaction tasks performed by seated participants. This approach combined with neuroimaging has revealed a neural stopping network, which includes the right Inferior Frontal Gyrus (rIFG) as a key node in this network. It's unclear if the same brain-based stopping networks suppress a prepotent balance reaction since compensatory balance reactions are subcortically triggered, multi-segmental responses that are much faster than voluntary reactions. To test this, we used functional near-infrared spectroscopy (fNIRS) to measure brain activity in 21 young adults (ages 18-30) as they performed a balance recovery task that demanded rapid step suppression following postural perturbation. We hypothesized that the rIFG would show heightened activity when suppressing an automatic balance recovery step.

Progress

Data collection is complete and all fNIRS (brain imaging) data has been processed.

Request

I have looked into various studies that have used fNIRS to evaluate brain signals and the types of stats have varied. I have a specific approach that I have zeroed in on now using a potential 2x2 ANOVA, but I need to confirm that this is appropriate for this study.

Timeline

Aiming to submit manuscript late November.