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Title of talk:

The New Neuroscience of Two: Understanding Human Social Interactions in the Natural Everyday World

Abstract

Humans, by nature, are profoundly social. However, the brain mechanisms that underlie social behaviors in the "everyday world" are not well-understood nor applied as evidence-based treatments for social and psychiatric disorders. This knowledge gap is now addressed based on principles for measuring brain oxygenation using near infrared spectroscopy, fNIRS. Active neural tissues in the brain recruit highly oxygenated blood that can be detected by optical methods that are sensitive to variations in both oxyHb and deoxyHb concentrations. These measures and taken as proxies of brain function and the locations of "active" regions indicate the neural correlates of the investigated behavior. My goal is to discover the neural mechanisms that underlie interactive social behaviors between humans and to apply them for therapeutic benefits. My laboratory has developed multi-modal two-person neuroimaging technologies based on fNIRS where both neural and behavioral measures are acquired for real-time live face-to-face and dialogue interactions. Converging evidence from these simultaneous measures of neural and behavioral responses including facial classifications, eye-tracking, pupillometry, EEG, and behavioral reports of subjective effects provides a foundation for a theoretical framework of a new "neuroscience of two". This emerging framework is founded on evidence that the interactive brain engages processes not activated during "solo", i.e. non-interactive tasks, and extends the domain of social neuroscience to live interactions with relevance to face processing, conversation and clinical biomarkers. These multimodal hyperscanning techniques are also applied to questions such as "what is the neurobiology of free speech?", and "how do on-line social communications such as Zoom calls differ from live in-person situations?". Conventional as well as emerging machine learning computational tools will also be discussed as tools to inform models of dual-brain social interactions as well as potential experimental pitfalls and quality assurance measures.

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