A Magnetoencephalography investigation of the role of stuttering anticipation on the preparation and execution of speech in adults who stutter

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ABSTRACT

Developmental stuttering is characterized by atypical movement kinematics and functional brain activity. However, coordination of the speech neural network prior to the initiation of individual speech utterances has not been explored. The primary objective of the present study was to characterize motor and sensory recruitment in preparation for and execution of speech in adults who stutter, using magnetoencephalography, a high temporal resolution brain imaging technique. The second objective was to investigate the effect of stuttering anticipation on speech-motor recruitment. Participants were cued to overtly repeat visually presented sentences, while their brain activity was recorded. Neural oscillatory activity was analyzed relative to both stimulus presentation and speech onset. Results did not reveal differences between high and low anticipation. However, results indicated that adults who stutter demonstrate stronger bilateral recruitment of the mouth motor cortex compared to controls in both preparation and execution of speech. Adults who stutter also recruit the right mouth motor cortex before the left, while controls show a preference for the left mouth motor cortex. The study was therefore the first to find differences in motor recruitment during preparation for speech onset in AWS. This is proposed to reflect facilitative mechanisms adopted to assist a limited motor speech network.