

Testing the 'excessive neural variability' hypothesis of autism spectrum disorder

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09.06.2021

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Previous research has demonstrated that children and adults with autism exhibit excessive cortical response variability across trials when examined with either electroencephalogram (EEG) or functional magnetic resonance imaging (fMRI) recordings. A universal characteristic of cortical neural activity is that trial-by-trial variability is reduced (i.e., “quenched”) by stimulus presentation. For example, EEG variability across trials is reduced by ~30% after presentation of visual stimuli. Previous studies have not examined whether neural variability quenching may differ in autism. Our findings demonstrate a trend for larger neural variability across trials in adults with ASD along with similar magnitudes of variability quenching across groups. Nevertheless, individual magnitudes of variability quenching were associated with perceptual-performance and with the severity of ASD symptoms as estimated by the Autism Quotient. Intact variability quenching suggests that basic cortical mechanisms that act to suppress neural variability following stimulus presentation are acting in a similar manner in adults with ASD as in controls.