**Title**: Conceptualizing the Substrates and Sequelae of Decreased Sound Tolerance as a Developmental Cascade

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**Introduction**: A growing body of research has shown that decreased sound tolerance (DST) is highly prevalent and impacts the mental health of affected individuals. Recent work in our lab has shown this is especially true for individuals on the autism spectrum. The extant literature has been limited, however, by a focus on DST relatively late in life. Consequently, at present we know little about when and how DST emerges and produces cascading effects on mental health. In this preliminary study, our team has prospectively followed infants at high likelihood for autism, and thus hypothetically for DST, based on their status as younger siblings of autistic children (HL infants) and infants at lower likelihood for these conditions (LL infants) to determine whether (a) early alterations in resting brain states and sensory hyperresponsiveness predict future DST, (b) DST predicts anxiety and broader internalizing and externalizing symptoms in childhood, and (c) the aforementioned associations vary by familial likelihood for autism or later autism status.

**Method**: In a pilot, we drew on data from our ongoing R01 with temporal precedence for all constructs of interest in n=41 infants (matched on chronological age and biological sex) including: (a) indices of oscillatory power as measured via resting state electroencephalography at 12-18 months of age; (b) an aggregate of caregiver-reported sensory hyperresponsiveness validated in prior work by our team at 21-27 months of age; (c) a proxy for DST that was generated using items we found to load onto an auditory hyperreactivity factor in a recent integrative data analysis and that has excellent internal consistency in the present sample (sqrt transformed to correct for skew; Cronbach’s α = .91) at 3 years of age, and (d) a measure of anxiety at 5-8 years of age.

**Results**: Findings suggest that HL infants, particularly those who receive a diagnosis of autism (HL-Autism), do display greater features of DST in early childhood, with a large effect in pilot data (η2 = .16). Further, (a) indices of oscillatory power implicated in DST in adults and shown to covary with familial likelihood for autism, including increased alpha and beta power and decreased gamma power, predict sensory hyperresponsiveness; (b) sensory hyperresponsiveness predicts future DST symptoms; and (c) DST symptoms predict subsequent anxiety. These relations are all moderate to large in our pilot sample and do not vary by group (.39-.65).

**Discussion:** These findings provide preliminary support for the theory that DST may arise early in life from altered resting brain states and generalized hyperresponsiveness and cascade onto mental health in infants at elevated familial likelihood for autism.

**References:**

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