**Title**: Exploring developmental ability and dysregulation in toddlerhood as predictors of SIB severity in early childhood in autistic youth

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**Introduction:** Self-injurious behaviors (SIB) are prevalent, and a represent one of the most serious health issues affecting autistic individuals in development. Up to 50% of autistic individuals engage in SIB at some point in their lives1. Evidence demonstrates links between SIBs and limited expressive language, lower cognitive abilities, higher rates of anxiety, elevated autism severity scores, and increased aggression2–5. Longitudinal work has supported the notion that developmental ability in toddlerhood is predictive of SIB 2 years later in youth with an older sibling with autism3. Dysregulation of emotional and physiological responses have also been widely implicated in the onset and persistence of SIB in neurotypical individuals6 and may be an important component to better understand severity of SIB in autistic children in early development. The present study sought to establish an alternative method to score SIB *severity* as a measure of the overall impactof SIBs on autistic individuals and their families. Furthermore, the present study shall 1) examine the contribution of dysregulation among autistic children between 2-4 years of age on SIB severity; and 2) Identify early (i.e. Time 1) predictors of SIB severity 2 years later in early childhood,

**Method:** In this study, we analyzed SIBs among 320 (n = 213/107 (m/f); mage = 3.1 years, sd = 6.1 months) autistic children in toddlerhood (Time 1) and followed up 113 (n=85/28 (m/f) mage = 5.5 years, sd = 10 months) participants 2 years later (Time 2). Diagnoses were confirmed at study entry using the Autism Diagnostic Observation Schedule 2nd Edition (ADOS-2) and Autism Diagnostic Interview – Revised (ADI-R) administered by licensed clinical psychologists. At Time 1, developmental level was assessed using the Mullen Scales of Early Learning (MSEL) and dysregulation was assessed by averaging scores from Child Behavior Checklist (CBCL) subscales of attention, anxious/depressed, and aggressive behavior7. At both time points, SIB was assessed using the Repetitive Behaviors Scale-Revised (RBS-R) in which parents rate the severity of 8 SIBs on a 0-3 point likert scale, with 3 indicating the behavior is a severe problem. At each time point, we subdivided the cohort into four severity groupings (none, mild, moderate, severe) of SIB based on their highest rating for any SIB.

**Results:** At Time 1, subgrouping by severity level of SIB resulted in 27% of participants in the none group (n = 87, 56 male/31 female), 35% in the mild group (n = 111, 71 male/40 female), 25% in the moderate group (n = 80, 54 male/26 female), and 13% in the severe group (n= 42, 32 male/10 female).An ANCOVA controlling for DQ revealed that the dysregulation profile score differed between SIB groups. Higher levels of dysregulation were observed in the groups with more severe SIBs F(3,296)= 19.660, p<0.001). DQ was not a significant predictor of severity groupings at Time 1 (*F*(1,296) = 2.965, *p* = 0.09). Tukey HSD post-hoc analyses indicated significant differences in dysregulation between the severe endorsement group (M=66.36) and each of the other groups: no endorsement (m=56.81; *p* < 0.001); mild (m=59.42; p < 0.001), and moderate (m=62.21; p=0.01). In addition, the moderate group had significantly higher dysregulation scores compared to the no endorsement group (p < 0.001), and relatively higher dysregulation compared to the mild group (p=0.042). At Time 2, we subgrouped participants (n=113) based on severity level of SIB, combining moderate and severe groups due to smaller numbers of participants in these groups. There were 37 participants (33%) in the none group, 40 participants (35%) in the mild group, and 36 participants (32%) in the moderate/severe group . Multinomial regression will be utilized to identify the extent to which early Time 1 DQ and dysregulation may predict SIB severity at time 2.

**Discussion:** The present study offers an innovative approach to measure the severity of SIB which may better characterize overall impairment/impact of SIB compared to other scoring methods. We found that dysregulation was associated with increasing SIB levels above and beyond developmental ability in 2-4 year-old autistic children. Data analyses are ongoing to explore time 1 predictive factors of SIB at time 2 such as developmental ability and dysregulation.

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