**Title**: Relations of Restricted and Repetitive Behavior to Social Skills in Toddlers with Autism

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**Introduction**: Although restricted and repetitive behaviors (RRB) and social deficits are both diagnostic domains of autism spectrum disorder (ASD), previous research has predominantly focused on social deficits. Much less is known of the developmental trajectories and outcomes related to RRB and even less so, the interplay of RRB and social communication deficits. Given that these features co-emerge over the first several years of life, limited knowledge of their relation in very young children is a critical research gap. Wolff et al. (2014) found that RRB are negatively associated with social skills in early childhood. In the present study, we sought to further elucidate this RRB-social skills relation by examining whether specific forms of RRB are differentially associated with aspects of early social functioning in high-risk 24- ($n$ = 63) and 36-month-olds ($n$ = 35) with ASD.

**Method**: Participants were from the ongoing Autism Center of Excellence (ACE) Network Infant Brain Imaging Study (IBIS). We examined three subtypes of RRB (insistence on sameness [IS], repetitive sensory motor behaviors [RSM], and self-injurious behaviors [SIB]) derived from the six subscales of the Repetitive Behavior Scale-Revised and three aspects of social skills using the socialization subdomains (interpersonal relationships [IPR], play and leisure time [PL], and coping skills [CS]) of the Vineland Adaptive Behavior Scales-II. We used linear regressions, controlling for sex and Mullen ELC scores, to address two research questions: (1) are RRB subtypes differentially associated with overall socialization score among children with ASD at 24 and 36 months? and (2) what are the specific relations between RRB subtypes and subdomains of socialization for children with ASD at 24 and 36 months? For question 1, we hypothesized that higher RRB subtype scores (higher RRB severity) would be associated with lower overall socialization scores at both 24 and 36 months. We further hypothesized that RSM would drive this relation (i.e., explain significant variation in overall socialization scores at both time points). Question 2 was exploratory. Our results are presented with Bonferroni adjusted alpha levels ( = .008 and  = .003, respectively) and without ( = .05).

**Results**: *Research Question 1:* The results reveal that higher RRB severity was associated with lower overall social skills. Unadjusted results reveal that the severity of all three RRB subtypes significantly predicted overall social skills at both 24 and 36 months of age. Adjusted results were similar with the exception that SIB was no longer a significant predictor of overall social skills at 36 months. *Research Question 2:* Unadjusted results reveal that the three RRB subtypes were significant predictors of the three subdomains of socialization, with the exception of SIB and CS at 24 months and SIB and IPR at 36 months. Adjusted results indicate that IS is a significant predictor of all three socialization subdomains only at 24 months and SIB was a significant predictor of only IPR at 24 months. RSM was the only RRB subtype to significantly predict two of three socialization subdomains at both 24 and 36 months. *Post-hoc Analyses:* To ensure that our adoption of a three-factor RRB model did not mask distinct relations between RRB and social skills, we conducted a follow-up series of analyses using all six RRB subscales as predictors. Analyses yielded results consistent with our primary analysis.

**Discussion:** With the exception of small nuances between unadjusted and adjusted results, our study provides evidence that the two core features of ASD, RRB and social communication deficits, develop in inverse relation to one another at ages two and three. Furthermore, this relation appears general— uncharacterized by specific relations between RRB subtypes and aspects of social skills. Post-hoc analyses using a more precise six-subscale RRB breakdown also provide little evidence of specific RRB-social skill relations. Striving to better understand the causal direction and nuances of the RRB-social skills relation may enable more effective and targeted intervention for social deficits by elucidating the role of RRB as well as contribute to our understanding of the emergence of ASD.

**References:** Wolff, J. J., Botteron, K. N., Dager, S. R., Elison, J. T., Estes, A. M., Gu, H., Hazlett, H. C., Pandey, J., Paterson, S. J., Schultz, R. T., Zwaigenbaum, L., Piven, J., &amp; The IBIS Network (2014). Longitudinal patterns of repetitive behavior in toddlers with autism. Journal of Child Psychology and Psychiatry, 55(8), 945–953. https://doi.org/10.1111/jcpp.12207

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