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Objective: Neuropsychological assessment of preschool children is essential for early detection of delays and referral for intervention prior to school entry. This is especially relevant in low- and middle-income countries (LMICs), which are disproportionately impacted by micronutrient deficiencies and teratogenic exposures. There are limited options for assessment of preschool learning and memory, developed and validated in resource-limited regions. The Grenada Learning and Memory Scale (GLAMS) was created for use in the Caribbean using an indigenous "ground-up" approach, with feedback from regional stakeholders at various stages of development. The GLAMS contains two subtests – a verbal list-learning task, which imagines a trip to the shop to buy culturally familiar items, and a face-name associative learning task using locally-drawn faces of Caribbean children. There are two versions: a 4-item version for 3-year-olds and a 6-item version for 4 and 5-year-olds. Here we present descriptive data and psychometric features for the GLAMS from an initial preschool sample.

Participants and Methods: Participants were recruited from a social-emotional intervention study (SGU IRB#14099) in Grenada between 2019-2021. Children were between 36 and 72 months of age, primarily English-speaking, and had no known history of neurodevelopmental disorders. Trained Early Childhood Assessors administered the GLAMS and NEPSY-II in public preschools and homes across Grenada. Exploratory descriptive statistics characterized participant sociodemographics and test score distributions. Spearman correlations, Mann-Whitney U, and Kruskal-Wallis tests examined the impact of sociodemographics on test scores. Internal reliability was assessed with coefficient alpha. NEPSY-II subtests were used to assess convergent validity, with the prediction that the highest correlations would be observed for NEPSY-II Sentence Repetition. Test engagement (as reflected by "zero-learning", "some learning", and "positive learning curves") was assessed across each age bracket (in 6-month increments). We assessed and summarized barriers to engagement qualitatively.

Results: The sample consisted of 304 children (152 males,152 females). Participants were predominantly Afro-Caribbean and Indo-Caribbean. Parent education and household income (Mdn=$370-740 USD per month) were consistent with the general population. GLAMS internal consistency was reliable (α=0.713). There were age effects on list-learning (rs=0.51; p<0.001), list recall (rs=0.51; p<0.001), face-name learning (rs=0.30;p<0.001), and face-name recall (rs=0.25; p<0.001). There were gender effects on list-learning (p=0.02) and list recall (p=0.01) but not face-name learning or recall. All GLAMS subtests were correlated with NEPSY Sentence Repetition (rs=0.22-0.34; p<0.001). There was sufficient sampling of males and females across all 6 age brackets. As age increased, a higher proportion of children showed a positive learning curve (and fewer "zero-scores") on verbal learning ($X2$ =30.88, p<0.001) and face-name learning ($X2$=22.19, p=0.014), demonstrating increased task engagement as children mature. There were various qualitative observations of why children showed "zero-scores", ranging from environmental distractions to anxiety and inattention.

Conclusions: As far as we know, the GLAMS is the first preschool measure of learning and memory developed indigenously from within the Caribbean. It shows reliable internal consistency, expected age and gender effects and convergent validity. These initial results are encouraging and support continued efforts to establish test-retest and inter-rater reliability. Plans include validation in clinical samples, scale-up to other Caribbean countries, and eventual adaptation across global LMICs.

Categories:
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2 Effects of Early Exposure to More Than One Language in the Home on Language Skills and Brain Functional Network Organization in Young Children with Autism Spectrum Disorder

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Objective: Concerns that exposure to more than one language in the home might negatively impact language development in young children with autism spectrum disorder (ASD) are common among caregivers. Although research directly examining the impact of a multilingual home environment in ASD is scarce, emerging evidence shows that language outcomes might be equivalent or better in children with ASD exposed to more than one language (Romero & Uddin, 2021). However, no evidence to date exists on whether exposure to more than one language affects early brain functional development in children with ASD. The current study aims to examine the (1) cross-sectional and (2) longitudinal associations between home language environment (exposure to one v. multiple languages at home, H_{1L} vs. $H_{>1L}$) and receptive and expressive language skills in young children with and without ASD, and (3) to investigate links between home language environment and brain functional network organization.

Participants and Methods: Participants included young children with ASD (n=67, mean age: 35±13 months, $H_{>1L}$ n=43) and typically developing (TD) children (n=39, mean age: 32±16 months, $H_{>1L}$ n=17) enrolled in a longitudinal study of early brain markers of autism. A subset of children with ASD for whom longitudinal behavioral data from two study visits were available (n=21, $H_{>1L}$ n=11) were used for exploratory analysis. Receptive language (RL) and expressive language (EL) skills were assessed by the Mullen Scales of Early Learning at each study visit. Data from 42 children with ASD ($H_{>1L}$ n=27) and 38 TD children ($H_{>1L}$ n= 15) for whom functional MRI data were acquired during natural sleep were included in functional connectivity (FC) analysis. ANCOVAs were employed to examine the effect of diagnosis, home language environment (H_{1L} vs. $H_{>1L}$) and its interaction on RL and EL skills while controlling for socioeconomic variables (i.e., maternal education level, income-to-needs ratio) and gestational age at birth. Linear mixed models were applied to explore the longitudinal effect of home language environment on RL and EL skills across two study visits in the ASD group. Lastly, FC analysis was conducted to compare functional connectivity across 7 canonical brain networks in children with and without ASD who were raised in H_{1L} and $H_{>1L}$.

Results: We found significant diagnosis by home language environment interaction effect on EL skills, with children with ASD and H_{1L} exhibiting the lowest EL skills. Longitudinal analysis identified a significant home language environment by study visit interaction effect on EL skills in children with ASD. Specifically, children with ASD and H_{1L} showed lower EL skills at study visit 1 but equivalent EL skills at study visit 2 compared to children with ASD and $H_{>1L}$. FC analysis revealed that children with ASD and $H_{>1L}$ displayed more typical brain network organization (similar to TD children) compared to those with H_{1L}, specifically for FC between language, frontoparietal, and default mode networks.

Conclusions: These results suggest that early exposure to more than one language in the home may be linked with better expressive language skills in young children with ASD. Results of functional connectivity analysis also suggest that exposure to more than one language may be associated with more neurotypical functional network organization, particularly involving language and high-order networks.

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3 Development of a Computerized Neurocognitive Battery for Children and Adolescents Affected by Human Immunodeficiency Virus in Botswana

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