

reciprocal social behavior and autistic traits at 24-months of age in children with ACC.

Participants and Methods: Parents of infants who had received a diagnosis of ACC completed the Parent Rating of Communication, Emotion, and Social Skills (PROCESS) for their child at 6, 12, and 24-months of age, and the video-referenced rating of reciprocal social behavior (vrRSB) at 24-months of age. Comparison data were obtained from a convenience community sample in Minnesota.

Aim 1). The distributions of PROCESS total scores at 24-months were compared between the ACC group ($n=43$) and control group ($n=1058$) via a 2-tailed t-test. Likewise, distributions of reciprocal social behavior (RSB) scores at 24 months were compared between ACC ($n=72$) and controls ($n=1438$) via a 2-tailed t-test. **Aim 2).** A partial Pearson Correlation was conducted between ACC participants' 6-month PROCESS scores and 24-month RSB ($n=18$) scores, as well as between their 12-month PROCESS and 24-month vrRSB ($n=37$) scores, controlling for child sex.

Results: Aim 1). At 24 months of age, children with ACC are reported to have significantly higher PROCESS scores ($t = 3.73$, $df = 42.67$, $p < .001$), and RSB ($t = 4.89$, $df = 88.38$, $p < .001$) scores than comparison toddlers, indicating an elevated presentation of behaviors associated with autistic features. Aim 2). No correlation was found between participants' 6-month PROCESS and 24-month RSB scores ($r(16) = .39$, $p = .12$). A relatively strong correlation ($r(35) = .60$, $p < .001$) was found between participants' 12-month PROCESS and 24-month RSB scores.

Conclusions: As early as two years of age, children with ACC display a heightened presentation of autistic features compared to typically developing controls. Additionally, reports of social behaviors related to ASD at 24-months are correlated with reports of autistic features at 12-months of age. This evidence indicates that children with ACC who are at a higher likelihood for being diagnosed with ASD may be identified as early as 12-months old. Formulating and leveraging an early identification methodology is imperative for this population with an already elevated risk for ASD, as providing early interventions leads to improved outcomes later in life.

Categories: Behavioral Neurology/Cerebral Lateralization/Callosal Studies

Keyword 1: corpus callosum

Keyword 2: autism spectrum disorder

Keyword 3: pediatric neuropsychology

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3 Emotional Expression in Infants with Agenesis of the Corpus Callosum: The Role of Callosal Connectivity in Early Temperament

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Objective: Accumulating evidence suggests that corpus callosum development is critically involved in the emergence of behavioral and cognitive skills during the first two years of life and that structural abnormalities of the corpus callosum are associated with a variety of neurodevelopmental disorders. Indeed by adulthood ~30% of individuals with agenesis of the corpus callosum (ACC), a congenital condition resulting in a partial or fully absent corpus callosum, exhibit phenotypic features consistent with autism spectrum disorder (ASD). However, very little is known about developmental similarities and/or differences among infants with ACC and infants who develop ASD. This study describes temperament in infants with ACC during the first year of life in comparison with a neurotypical control group. Additionally, it examines the potential contribution of disrupted callosal connectivity to early expression of temperament in ASD through comparison to children with high familial likelihood of ASD.

Participants and Methods: Longitudinal ratings of positive and negative emotionality were acquired at 6 and 12 months on the Infant Behavior Questionnaire–Revised across four groups of infants: isolated complete and partial ACC ($n=104$), high familial likelihood of ASD

who do and do not have a confirmed ASD diagnosis (HL+ n=81, HL- n=282), and low-likelihood controls (LL- n=152).

Results: Overall, the ACC group demonstrated blunted affect, with significantly lower positive and negative emotionality than LL controls at both timepoints. Specifically, the ACC group exhibited lower activity and approach dimensions of positive emotionality at both timepoints, with lower high-intensity pleasure at 6 months and lower vocal reactivity at 12 months. On negative emotionality subscales, the ACC group exhibited lower distress to limitations and sadness at both timepoints, as well as lower falling reactivity at 6 months.

The ACC and HL groups did not differ significantly on positive emotionality at either timepoint. However, negative emotionality was lower in the ACC group than the HL- group at both timepoints and lower than the HL+ group at 12 months, with lower distress to limitations and sadness ratings than both HL groups at both timepoints.

Conclusions: These findings highlight the importance of interhemispheric connections in facilitating active engagement and pursuit of pleasurable activities during the first year of life, as well as expression of sadness and distress to limitations. Notably, similarities between infants with ACC and infants at elevated familial risk of ASD suggest that disrupted callosal connectivity may specifically contribute to reductions in positive emotionality.

Categories: Behavioral Neurology/Cerebral Lateralization/Callosal Studies

Keyword 1: corpus callosum

Keyword 2: language

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4 Language Development in Infants and Toddlers (12 to 24 months) with Agenesis of the Corpus Callosum

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Objective: It is unclear how agenesis of the corpus callosum (ACC), a congenital brain malformation defined by complete or partial absence of the corpus callosum, impacts language development. fMRI studies of middle childhood suggest that the corpus callosum plays a role in the interhemispheric language network (Bartha-Doering et al., 2020), and that reduced interhemispheric functional connectivity is correlated with worse language abilities in children with ACC (Bartha-Doering et al., 2021). Additionally, accumulating evidence suggests structural abnormalities of the corpus callosum play a role in neurodevelopmental disorders. While children who go on to receive an autism spectrum disorder (ASD) diagnosis may show early signs of altered word and gesture acquisition (Iverson et al., 2018), the same is not known about ACC. This study examined language development during the second year of life in children with ACC in comparison to neurotypical control participants, as well as other children at elevated risk of ASD.

Participants and Methods: The MacArthur-Bates Communicative Development Inventories (MCDI): Words and Gestures scales were administered to parents of 74 children with isolated ACC at 12, 18 and 24 months of age. Children whose first language was not English and children who were bilingual were excluded. Comparison groups consisted of individuals with a low familial likelihood of ASD (LL- n=140) and individuals with high familial likelihood of ASD who do and do not have a confirmed ASD diagnosis (HL+ n=68, HL- n=256).

Results: Compared to LL controls, the ACC group produced fewer words at 18 and 24 months of age, and demonstrated fewer words understood at all three timepoints. Similarly, compared to the HL- group, the ACC group demonstrated fewer words produced and understood at 18 months of age, and fewer words produced at 24 months of age. The ACC and HL+ groups did not differ in words produced or words understood at any timepoint.

Conclusions: Overall, infants with ACC demonstrated delayed vocabulary expansion from 12 to 24 months of age. These findings illustrate the role of callosal connectivity in the