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Objective: A previous review of the syndrome of Agenesis of the Corpus Callosum (ACC) identified three primary deficits: reduced interhemispheric transfer of sensory motor information, slowed cognitive processing, and deficits in complex problem solving (Brown & Paul, 2019). Interaction of these three deficits contributes to a variety of secondary cognitive and psychosocial deficiencies across domains. Recent research has also identified a possible fourth core deficit in ACC: restricted capacity for elaborative thought and creativity (Renteria et al., 2022; Bogen & Bogen 1988). We examined the syndrome of ACC using an exploratory factor analysis of neuropsychological test data (not including data regarding interhemispheric transfer) and hypothesized it would organize into factors of (1) reduced cognitive processing speed, (2) difficulty with complex problem solving, and (3) difficulty with creative tasks.

Participants and Methods: The present study analyzed archival data from individuals with ACC (N=60) acquired from common neuropsychological instruments: D-KEFS, WAIS-III, and WRAT-2. Among the participants, 13 had partial ACC, 1 was unspecified, and the remainder had complete ACC. The participants' ages ranged from 7 to 55 years (M = 21.55, SD = 12.36), with an education level that ranged from 2 to 19 years (M = 11.59, SD = 3.77). All participants had complete data for at least one assessment and all available data was included. Missing values (49.85%) were excluded from analysis. Factor analysis (principal factor solution with promax rotation) was conducted with 33 commonly derived summary (standard) scores. Horn's Parallel Analysis recommended a 4-factor solution, but we elected to generate a 3-factor model that would more closely follow previous literature.

Results: Factor one involved processing speed and was comprised primarily of D-KEFS Color Word Interference Word Reading (1.02) and Color Naming (.78), D-KEFS Trail Making Test Visual Scanning (.86) and Number Sequencing (.74), and WAIS-III Processing Speed Index (.68). The second factor included several problem solving measures [e.g. D-KEFS Sorting Test Free Sorting (.90) and Sort Recognition (.90), and WAIS-III Perceptual Organization Index (.72)], as well as several additional measures including WAIS-III Working Memory

Index (.84), WRAT-2 Arithmetic (.83), and WAIS-III Verbal Comprehension Index (.80). Finally, the third factor involved several measures requiring mental flexibility and cognitive control [e.g. D-KEFS Twenty Questions Test Achievement Score (.70), D-KEFS Design Fluency Switching Condition (.56), and D-KEFS Trail Making Test Number-Letter Switching Condition (.44)], as well as a measure of single word reading [WRAT-2 Reading (.66)].
Conclusions: The findings support inclusion of slowed cognitive processing speed as a core feature of the neurocognitive syndrome in ACC described by Brown and Paul (2019). The second factor is partially consistent with a deficit in complex problem solving, but is not restricted to that cognitive domain. Likewise, the third factor is largely related to mental flexibility and control (one aspect of creativity), but is not restricted to that domain. Future attempts to model the neurocognitive syndrome of ACC may provide greater clarity by including a wider range of cognitive and psychosocial indices and excluding individuals with comorbid neuropathology.

Categories: Behavioral Neurology/Cerebral Lateralization/Callosal Studies

Keyword 1: corpus callosum

Keyword 2: cognitive functioning

Keyword 3: intellectual disability

2 Musical perception skills in Agenesis of the Corpus Callosum

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Objective: Agenesis of the corpus callosum (AgCC) is a disorder in which the connection between the two brain hemispheres is congenitally absent. Previous research has suggested that the auditory system can be affected in individuals with AgCC (Demopoulos et al., 2015). However, the nature of AgCC's effect on musical perception skills is unclear. This study investigated the impact of AgCC on the music perception skills in high-functioning adults using a brief version of the Profile of

Music Perception Skills (PROMS; Zentner, M. & Strauß, H. 2017). It was hypothesized that individuals with AgCC would have diminished music perception abilities when compared to a neurotypical control group.

Participants and Methods: Participants included 10 high-functioning adults with AgCC that had an intelligence quotation within the normal range (FSIQ>80) and 63 neurotypical controls who were recruited via Cloud Research. During the PROMS the participants were asked to listen to two different sound excerpts after which they were asked whether the second sound was the same or different from the first (correct answers= 2 points, uncertain answers= 1 point, and remaining answers not coded). The participants answered questions in four different areas of musical perception: Melody, Tuning, Accent, and Tempo.

Results: Results indicated that there was not a significant difference between the control group and the AgCC participants on music perception skills on the overall PROMS scores $F(1,72)=.365$, $P\text{-value}=.548$. Tested individually, none of the 4 individual domains showed a significant difference: Melody $F(1,72)=2.67$, $P\text{-value}=.107$; Tuning $F(1,72)=.271$, $P\text{-value}=.606$; Accent $F(1,72)=.017$, $P\text{-value}=.897$; or Tempo $F(1,72)=.106$, $P\text{-value}=.746$.

Conclusions: Contrary to the hypothesis of this study, the results showed that the participants with AgCC did not perform significantly differently in the PROMS total score when compared to neurotypical controls, nor were there significant differences in any of the four of the subtests (Melody, Tuning, Accent, and Tempo). Thus these high-functioning individuals with AgCC did not have deficient music perception abilities. These findings demonstrate that although the auditory system may be affected in some individuals with AgCC, we do not see differences in musical perception skills in high-functioning individuals with AgCC.

Categories: Behavioral Neurology/Cerebral Lateralization/Callosal Studies

Keyword 1: corpus callosum

Keyword 2: auditory processing disorder

Keyword 3: congenital disorders

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3 The Aesthetics of Empathy in Agenesis of the Corpus Callosum

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Objective: Previous research suggests that individuals with isolated Agenesis of the Corpus Callosum (AgCC) have cognitive and psychosocial deficiencies that include impaired recognition of the emotions of others (Symington et al., 2010) and a diminished ability to infer and describe the emotions of others (Paul et al., 2021; Turk et al., 2010). In addition, galvanic skin responses effectively discriminated between emotional images despite atypical emotion ratings (Paul et al., 2006), supporting a dissociation between cognitive and affective empathy in AgCC. Likewise, atypical patterns of visual attention to faces corresponded with impaired emotion recognition in AgCC (Bridgman et al., 2014), suggesting that atypical visual attention in AgCC negatively impacts the ability to identify others' emotions. This study used the Multifaceted Empathy Test [MET] (Foell et al., 2018) to examine the impact of visual aesthetics (photo composition) on empathetic feelings (affective empathy) and situational emotion recognition (cognitive empathy) in persons with AgCC. Both cognitive and affective empathy scores are typically higher on MET stimuli composed according to the "Golden Spiral" (Callaway, 2022).

Participants and Methods: Results from 50 control participants recruited from Cloud Research were compared to responses from 19 participants with AgCC and normal-range FSIQ (>80). Data was gathered through an online version of the MET, which uses a series of photographs of individuals displaying an emotion, half of which adhere to the compositional technique known as "The Golden Spiral." To measure cognitive empathy, the participants are asked to pick the correct emotion being displayed with three distractors for each item. To measure affective empathy, they are then asked on a sliding scale, "how much do you empathize with the person shown" (1 = Not at all, 7 = Very much).

Results: Repeated measures mixed ANOVAs revealed no difference between AgCC and