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## 20 Congenital Left Temporal Lobe Cyst: A Case Study of rs-fMRI and Cognitive Performance

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**Objective:** Behavior is the product of interconnected brain regions that work together as networks. This case study examines whether there are differences between a participant with a large congenital left temporal lobe cyst, which impacted the volume of structures in the region, and control subjects of similar age on cognitive tasks and network connectivity as measured by resting-state functional magnetic resonance imaging (rs-fMRI).

**Participants and Methods:** The case participant (CP; 71 year old female) and controls (CON; n = 25; 48% female) were recruited as part of a larger aging study. CON were chosen from the larger study population by age (+/- 10 years from CP; Range = 68-86 years). Cognitive tasks included: Shopping list memory task, Montreal Cognitive Assessment, WAIS-IV subtests: Digit Span, Digit-Symbol, Symbol Span, and Letter-Number Sequencing. For rs-fMRI, we administered four blood-oxygen level dependent (BOLD) functional connectivity (rs-fMRI) scans at 6 minutes each. Image processing was conducted using the CONN toolbox. Independent sample t-tests evaluated differences between CP and CON. Segregation was evaluated in the Auditory (Au), Cerebellar-basal ganglia (CBBG), Cingulo-Opercular Task Control (COTC), Dorsal Attention (DA), Default Mode (DMN), Fronto-Parietal Task Control (FPTC), Salience (Sa), Sensory Somatomotor Hand (SSH), Sensory Somatomotor Mouth (SSM), Visual (Vi), and Ventral Attention (VA) networks to assess CP's functional segregation by network throughout the brain. Bonferroni correction was applied to account for multiple comparisons in cognitive testing (.05/7 for significance at  $p \leq 0.007$ ) and network segregation (.05/11 for significance at  $p \leq .005$ ). **Results:** Independent samples t-tests did not reveal significant differences across cognitive

tasks ( $t(24) < 1.04$ ,  $p > .05$ ). Network segregation did not reveal significant differences between CP and CON across networks examined ( $t(24) \leq 1.269$ ,  $p > .005$ ). However, DMN and DA segregation trended toward significance ( $t(24) = -2.724$ ,  $p = .006$  and  $t(24) = -2.006$ ,  $p = .028$ ), respectively) with CP demonstrating lower segregation as compared to CON.

**Conclusions:** CP performed similarly on cognitive testing to CON, indicating that the congenital presence of a large temporal lobe cyst did not impact global cognition, list learning and memory, working memory, or processing speed. CP did not demonstrate significantly different segregation across networks of interest after Bonferroni correction. Our cognitive performance results are consistent with a similar case-study examining language, which revealed intact linguistic abilities (Tuckete et al., 2022). The lack of differences in cognitive performance and segregation highlight the capacity for plasticity in the human brain, even in the presence of a large structural abnormality. This also suggests that the processes of aging in this case are not markedly different from controls. In future research we intend to expand on this case study by evaluating right temporal to hippocampal seeds and language network seeds to delve deeper into memory and language functioning.

**Categories:** Cognitive Neuroscience

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**Keyword 2:** temporal lobes

**Keyword 3:** congenital disorders

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## 21 Toxic Wounds are Associated with Cognitive Decrements in Women Veterans of the 1991 Gulf War

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