

**Conclusions:** To the best of our knowledge, this is the first report documenting detailed neuropsychological data on this rare disease. The case study documents widespread cognitive deficits with greater difficulty with visually based abilities than verbal abilities. Specifically, patients with ECD may present with cognitive difficulties in visual learning and memory, processing speed, visuospatial processing, select areas of executive/frontal systems, letter and semantic verbal fluency, and fine motor dexterity.

**Categories:** Cancer

**Keyword 1:** cancer

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## 11 Social Determinants of Health in Pediatric Brain Tumor Survivors: Associations between Neighborhood Opportunity and Neurocognitive and Psychological Outcomes

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**Objective:** A growing body of research demonstrates that social determinants of health (SDOH) are important predictors of neurocognitive and psychological outcomes in survivors of pediatric brain tumor (PBT). Existing research has focused primarily on individual level SDOH (e.g., family income, education, insurance status). Thus, more information is needed to understand community level factors which may contribute to health inequities in PBT survivors. This study aimed to examine the effects of specific aspects of neighborhood opportunity on cognitive and emotional/behavioral outcomes among PBT survivors.

**Participants and Methods:** The sample included clinically-referred PBT survivors who completed a neuropsychological evaluation (N=199, Mage=11.63, SD= 4.63, 56.8% male, 71.8% White). Data included an age-appropriate Wechsler Scale and parent-report questionnaires (Behavior Rating Inventory of

Executive Function, Child Behavior Checklist). Nationally-normed Child Opportunity Index (COI) scores were extracted for each participant from electronic medical records based on home address using Census tract geocoding. The COI measures neighborhood-level quality of environmental and social conditions that contribute to positive health. It includes three component scores assessing distinct aspects of opportunity, which include educational opportunity (e.g., educational quality, resources, and outcomes), health/environmental opportunity (e.g., access to healthy food, healthcare, and greenspace) and social/economic opportunity (e.g., income, employment, poverty). Stepwise linear regression models were examined to identify significant predictors of cognitive/psychological outcomes associated with PBT; the three COI indices were entered as predictors and retained in the model if they significantly contribute to variance in the outcome.

**Results:** Lower educational opportunity was associated with lower processing speed performance (Wechsler Processing Speed Index:  $t = 2.47$ ,  $p = 0.02$ ) and increased parent-reported executive functioning problems (BRIEF GEC:  $t = -2.25$ ,  $p = 0.03$ ; BRIEF Working Memory:  $t = -2.45$ ,  $p = 0.02$ ) and externalizing problems (CBCL Externalizing:  $t = -2.19$ ,  $p = 0.03$ ). Lower social/economic opportunity was associated with lower working memory performance (Wechsler Working Memory Index:  $t = 2.63$ ,  $p < 0.01$ ) and increased parent-reported internalizing problems (CBCL Internalizing:  $t = -2.38$ ,  $p = 0.02$ ).

Health/environmental opportunity did not emerge as a primary predictor of any of the examined cognitive/psychological outcomes. Exploratory analyses examining the impact of age on associations between COI and cognitive/psychological outcomes found a significant moderation effect of age on the relationship between educational opportunity and processing speed ( $t = 2.35$ ,  $p = 0.02$ ) such that this association was stronger at older ages. There were no other moderation effects by age.

**Conclusions:** Consistent with a growing body of literature demonstrating the impact of social and environmental contexts to health outcomes, these results show inequities in neurocognitive and psychosocial outcomes in PBT survivors related to neighborhood-level SDOH. Examination of specific neighborhood factors highlight educational and social/economic factors as particularly important contributors to

neurocognitive/psychological risk for survivors. The identification of these specific and potentially modifiable risk factors is crucial to inform individual-level problem-prevention following oncological treatment, as well as community-level policy and advocacy efforts.

**Categories:** Cancer

**Keyword 1:** brain tumor

**Keyword 2:** pediatric neuropsychology

**Keyword 3:** neuro-oncology

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## 12 Differential Processing Efficiency Skills in Survivors of Pediatric Primary CNS Cancer and Cancers of non-CNS Origin

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**Objective:** Pediatric cancer and cancer-related treatments may disrupt brain development and place survivors at risk for long term problems with cognitive functions. Processing efficiency has been operationalized as a nuanced cognitive skill that reflects both processing speed (PS) and working memory (WM) abilities and is sensitive to neurobiological disruption. Pediatric cancer survivors are at risk for processing efficiency deficits; however, a thorough characterization of processing efficiency skills across pediatric primary central nervous system (CNS) tumor and non-CNS cancer survivors has not yet been reported.

**Participants and Methods:** Participants were selected from a mixed retrospective clinical database of pediatric cancer survivors (Total  $n=160$ ; primary CNS tumor  $n=33$ ; Non-CNS  $n=127$ ). Univariate analyses were conducted to examine differences in processing efficiency mean scores (t-tests) and percent impairment (scores  $>1$  SD below mean; chi-squared tests) between the total sample and normative sample, and across groups (CNS vs. Non-CNS). Multiple linear regressions were utilized to evaluate the relationships between additional risk factors, including biological sex, age at diagnosis, time

since treatment, and socioeconomic status, and processing efficiency outcomes.

**Results:** The total sample obtained lower scores on WM ( $M=90.83$ ,  $SD=13.35$ ) and PS ( $M=88.86$ ,  $SD=14.38$ ) measures than normative samples ( $M=100$ ,  $SD=15$ ),  $p < 0.001$ . Greater percentage of pediatric cancer survivors demonstrated impairment across all processing efficiency measures (24.8-38.1%) than normative samples (15.9%),  $p < 0.001$ . Regarding group differences, the CNS group obtained lower mean WM ( $M=84.85$ ,  $SD=11.77$ ) and PS ( $M=80$ ,  $SD=14.18$ ) scores than the Non-CNS group (WM  $M=92.39$ ,  $SD=13.32$ ; PS  $M=91.16$ ,  $SD=13.56$ ),  $p < 0.001$ . Rates of impairment between groups only differed for PS scores, with 63.6% of the CNS group and 31.5% of the non-CNS group demonstrating impairment,  $p < 0.001$ . Primary CNS tumor cancer type and male biological sex emerged as the only significant risk factors that predicted processing efficiency skills, with male sex predicting lower scores on PS ( $B=8.91$ ,  $p<.001$ ) and semantic fluency ( $B=7.59$ ,  $p=.007$ ).

**Conclusions:** These findings indicate that both pediatric primary CNS tumor and non-CNS cancer survivors exhibit substantial weaknesses in processing efficiency skills after treatment. While both groups demonstrated deficits compared to normative samples, the CNS group was more susceptible to PS impairments than non-CNS group. A basic initial study of the relationships between risk factors and processing efficiency skills revealed that primary CNS cancer was a predictor of lower performance on working memory and processing speed measures, while male biological sex was a significant risk factor for worse performance on processing speed and semantic fluency measures. Continued focus on the construct of processing efficiency in pediatric cancer survivors is warranted. Applying a standardized approach to assessing and communicating this nuanced cognitive skill could contribute to advancing both clinical practice and outcomes research of pediatric cancer survivors.

**Categories:** Cancer

**Keyword 1:** cancer

**Keyword 2:** pediatric neuropsychology

**Keyword 3:** executive functions

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