

(specifically estimated household income) significantly predicts phonemic fluency performance among patients with PBT, and it was hypothesized that higher SES would be associated with better phonemic fluency outcomes.

Participants and Methods: 136 participants with PBT ages 7-20 (\bar{x} =14.15 years, SD =3.87), were administered phonemic fluency trials (either from the *NEPSY - Second Edition* or *Delis-Kaplan Executive Function System*, with no significant differences in performance between measures). The sample was 58.8% male and half Latino (50.0%), followed by Caucasian (30.1%), Asian American (7.4%), Black (6.6%), and Other (5.9%) ethnicity. All patients identified English as their primary and preferred language regardless of predominant household language, reducing the potential confounding impact of language. Given documented associations between PBT and lower intelligence following diagnosis and treatment, estimated intellectual functioning was included in the first block of hierarchical regression to isolate and further elucidate the potential contributing influence of SES on phonemic fluency. Median household income for specific neighborhoods was used as a proxy for SES, while *Wechsler Matrix Reasoning (MR)* was used as an estimate of general intellectual functioning given the high correlation between MR and full scale IQ.

Results: Consistent with prior literature, phonemic fluency was lower than normative age expectations [$t(135)=-3.653$, $p=.0002$], though still within the average range clinically (\bar{x} =8.93). As hypothesized, SES was positively correlated with phonemic fluency [$r(136)=.219$, $p=.005$]. Furthermore, SES significantly predicted phonemic fluency performance above and beyond estimated intelligence, accounting for a significant increase in variance ($p=.020$). Post-hoc analyses also revealed poorer phonemic fluency among participants with infratentorial brain tumors as compared to supratentorial brain tumors after controlling for SES, $t(108)=-1.748$, $p=.042$.

Conclusions: Consistent with the known impact of SES on neuropsychological late effects among patients with pediatric cancer, phonemic fluency was positively correlated with SES among participants with PBT above and beyond estimated intelligence, suggesting the distinct role of SES on rapid verbal retrieval within this population. This has important implications for identifying patients at higher risk, helping to

ensure timely provision of services and supports. Poorer phonemic fluency was also noted among patients with infratentorial (vs. supratentorial) brain tumors after controlling for SES, which may influence studies combining tumor location as the vast majority of PBTs are infratentorial. This supports prior literature demonstrating the need for increased cerebellar activation during phonemic (vs. semantic) retrieval. Additional research is needed to further explore these findings.

Categories: Cancer

Keyword 1: pediatric neuropsychology

Keyword 2: brain tumor

Keyword 3: executive functions

Correspondence: Kelsey A. Hawthorne, Cancer and Blood Disease Institute, Children's Hospital Los Angeles, kahawthorne@chla.usc.edu

15 Practical Adaptive Skills in Pediatric Brain Tumor Survivors

Lily Nolan^{1,2}, Rachel Peterson¹

¹Kennedy Krieger Institute, Baltimore, Maryland, USA. ²Johns Hopkins University, Baltimore, Maryland, USA

Objective: Adaptive functioning, most notably practical skills, are impacted in pediatric brain tumor survivors. This study aimed to examine the individual components of practical adaptive functions that are most impacted in pediatric brain tumor survivors, and to identify specific medical and socio-demographic factors that contribute to weaknesses in this domain.

Participants and Methods: The sample consisted of 117 pediatric brain tumor patients seen for a clinical neuropsychological evaluation. Inclusion criteria included participants <18 years at time of brain tumor diagnosis, and whose parents were administered the Adaptive Behavior Assessment System, Second (ABAS-II) or Third Edition (ABAS-3) as a measure of adaptive functioning. Medical and socio-demographic variables were gathered from the patient's medical record. Medical variables examined were age at diagnosis, age at evaluation, time since diagnosis, tumor location (supratentorial or infratentorial), and history of treatment and associated complications as measured by the

Neurologic Predictor Scale (NPS). Socio-demographic factors examined included sex, race, insurance type, parental education, and Area Deprivation Index (ADI) as a measure of neighborhood deprivation/access to community resources. One sample t-tests compared the brain tumor sample to population normative means. Correlations examined associations between practical skills and medical and socio-demographic variables. To determine predictors of practical skills, significant correlations were entered into separate linear regressions for each of the four practical subscales (Community Use, Home Living, Health & Safety, Self-Care).

Results: Participants were diagnosed around 7 years and were approximately 5 years from diagnosis at the time of neuropsychological evaluation. Practical skills were clinically and statistically significantly below the normative mean (Standard Score=85.5, $p<.001$). Additionally, all practical subscales were statistically significantly below the normative mean ($p<.001$), with both Community Use (Scale Score=7.6, $p<.001$) and Home Living (Scaled Score=6.9, $p<.001$) being clinically significant. Community Use was positively correlated with age at diagnosis ($r=.27$, $p=.004$) and negatively correlated with Neurologic Predictor Scale ($r=-.33$, $p<.001$), time since diagnosis ($r=-.24$, $p=.01$), and ADI ($r=-.23$, $p=.02$). Health and Safety was positively correlated with age at diagnosis ($r=.21$, $p=.024$). Self-Care was positively correlated with age at diagnosis ($r=.202$, $p=.029$) and parental education ($r=.203$, $p=.037$); Home Living was not correlated with any of the variables examined. Predictors of Community Use included NPS score ($p=.002$); ADI approached significance ($p=.07$). Age at diagnosis predicted Health & Safety practical skills ($p=.024$), and parental education predicted Self-Care skills ($p=.004$).

Conclusions: Pediatric brain tumor survivors demonstrate clinically significant weakness in practical skills. While specific medical and socio-demographic factors contribute to lower practical adaptive functioning (e.g., younger age at diagnosis, higher NPS score suggestive of greater treatment burden, longer time since diagnosis, lower ADI score suggestive of greater neighborhood deprivation, and lower parental education), medical and socio-demographic factors do not equally impact practical adaptive functions, but rather individual factors predict specific practical skills. While there is appreciation for the contribution of medical factors in pediatric oncology, few studies have

examined socio-demographic factors in this population. This study highlights the importance of considering the role of family and environmental factors on neuropsychological functioning in pediatric oncology in addition to medical factors.

Categories: Cancer

Keyword 1: adaptive functioning

Keyword 2: brain tumor

Keyword 3: pediatric neuropsychology

Correspondence: Lily Nolan, Kennedy Krieger Institute and Johns Hopkins University, lnolan7@jhu.edu

16 Superior Verbal Learning and Memory in Pediatric Brain Tumor Survivors Treated with Proton Versus Photon Radiotherapy

Lisa E. Mash^{1,2}, Lisa S. Kahalley^{1,2,3}, M. Fatih Okcu⁴, David R. Grosshans⁵, Arnold C. Paulino⁵, Heather Stancel^{1,2}, Luz A. De Leon^{1,2}, Elisabeth A. Wilde⁶, Nilesch Desai⁷, Zili D. Chu⁷, William E. Whitehead⁸, Murali Chintagumpala⁴, Kimberly P. Raghubar^{1,2}

¹Department of Pediatrics, Division of Psychology, Baylor College of Medicine, Houston, TX, USA. ²Psychology Service, Texas Children's Hospital, Houston, TX, USA. ³Texas Children's Hospital Cancer and Hematology Centers, Texas Children's Hospital, Houston, TX, USA. ⁴Department of Pediatrics, Division of Hematology Oncology, Baylor College of Medicine, Houston, TX, USA. ⁵Division of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA. ⁶Department of Neurology, University of Utah School of Medicine, Salt Lake City, Utah, USA. ⁷Department of Pediatrics, Division of Neuroradiology, Baylor College of Medicine, Houston, TX, USA. ⁸Department of Pediatrics, Division of Neurosurgery, Baylor College of Medicine, Houston, TX, USA

Objective: Radiotherapy for pediatric brain tumor has been associated with late cognitive effects. Compared to conventional photon radiotherapy (XRT), proton radiotherapy (PRT) delivers less radiation to healthy brain tissue. PRT has been associated with improved long-