

# Neuropsychological Correlates of Challenging Behavior in Moderate to Severe ABI

Sarah West, PhD, ABPP; Caitlin Ogram Buckley, PhD ; Claire McGrath, PhD, ABPP



## INTRODUCTION

- Cognitive and behavioral changes following moderate to severe acquired brain injury (ABI) are important predictors of functional recovery, independence, and quality of life.
- A standardized measure of ABI challenging behaviors, the Overt Behavior Scale (OBS), identifies behavioral domains that negatively affect daily functioning. The OBS is sensitive to behavioral interventions, suggesting it is an important contributor to post-injury assessment.
- The neuropsychological underpinnings of the OBS are unknown; it was hypothesized that OBS ratings would be negatively related to cognitive domains associated with behavior management.
- The current study provides information about these relationships.

## METHODS

- Archival OBS and NPE data from 81 adults with moderate to severe ABI residing in a community brain injury program [68% male, 86% white]

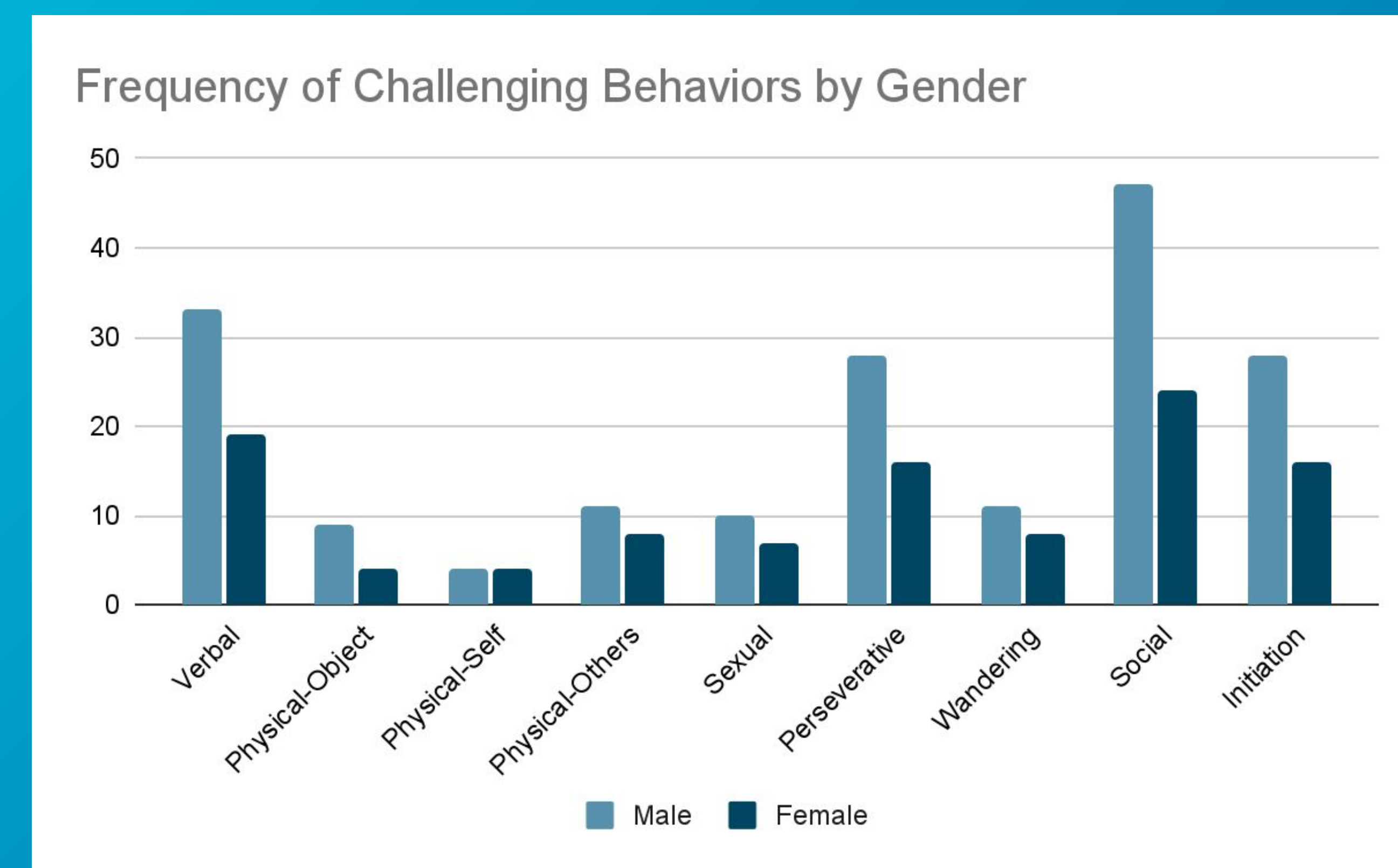
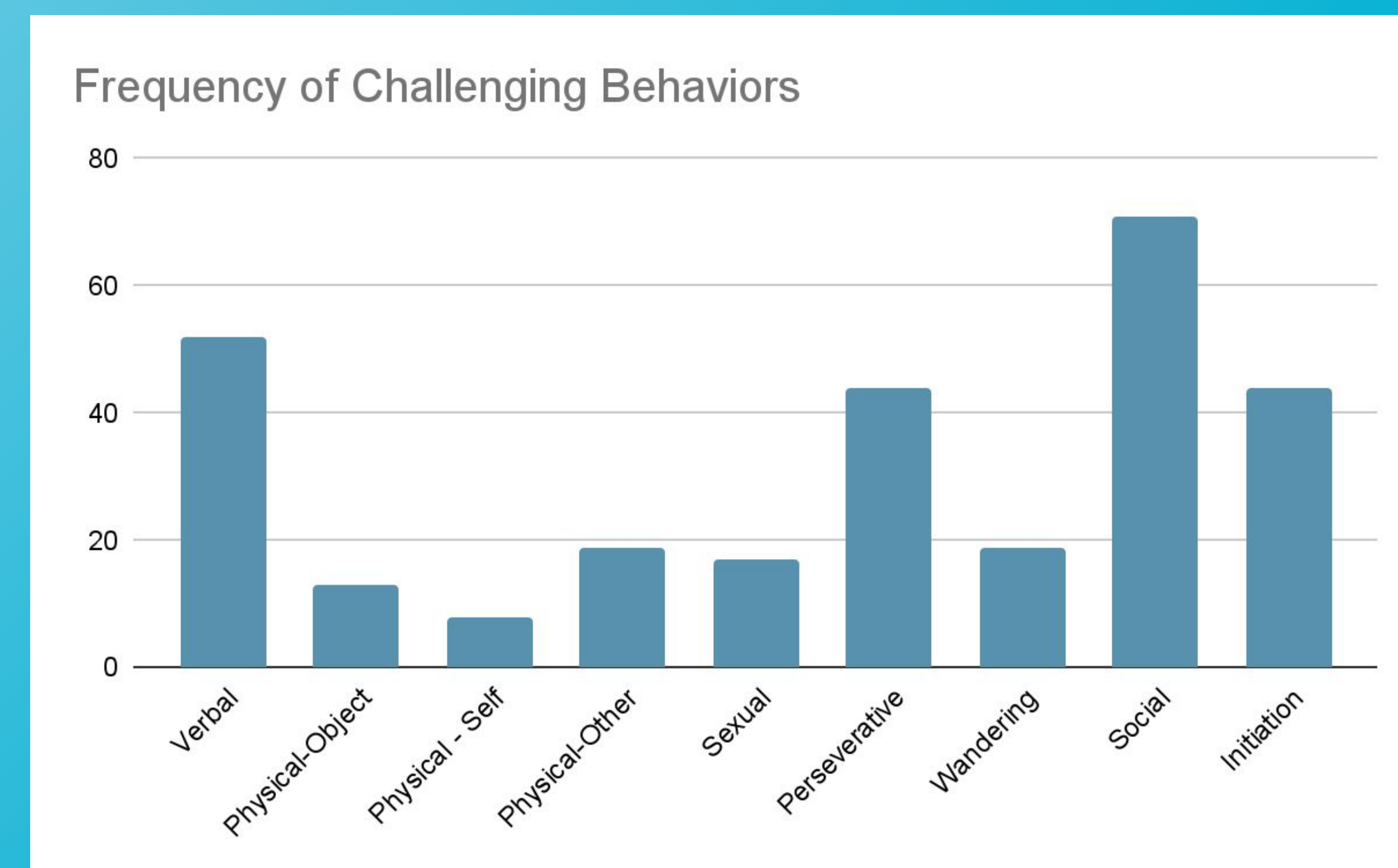
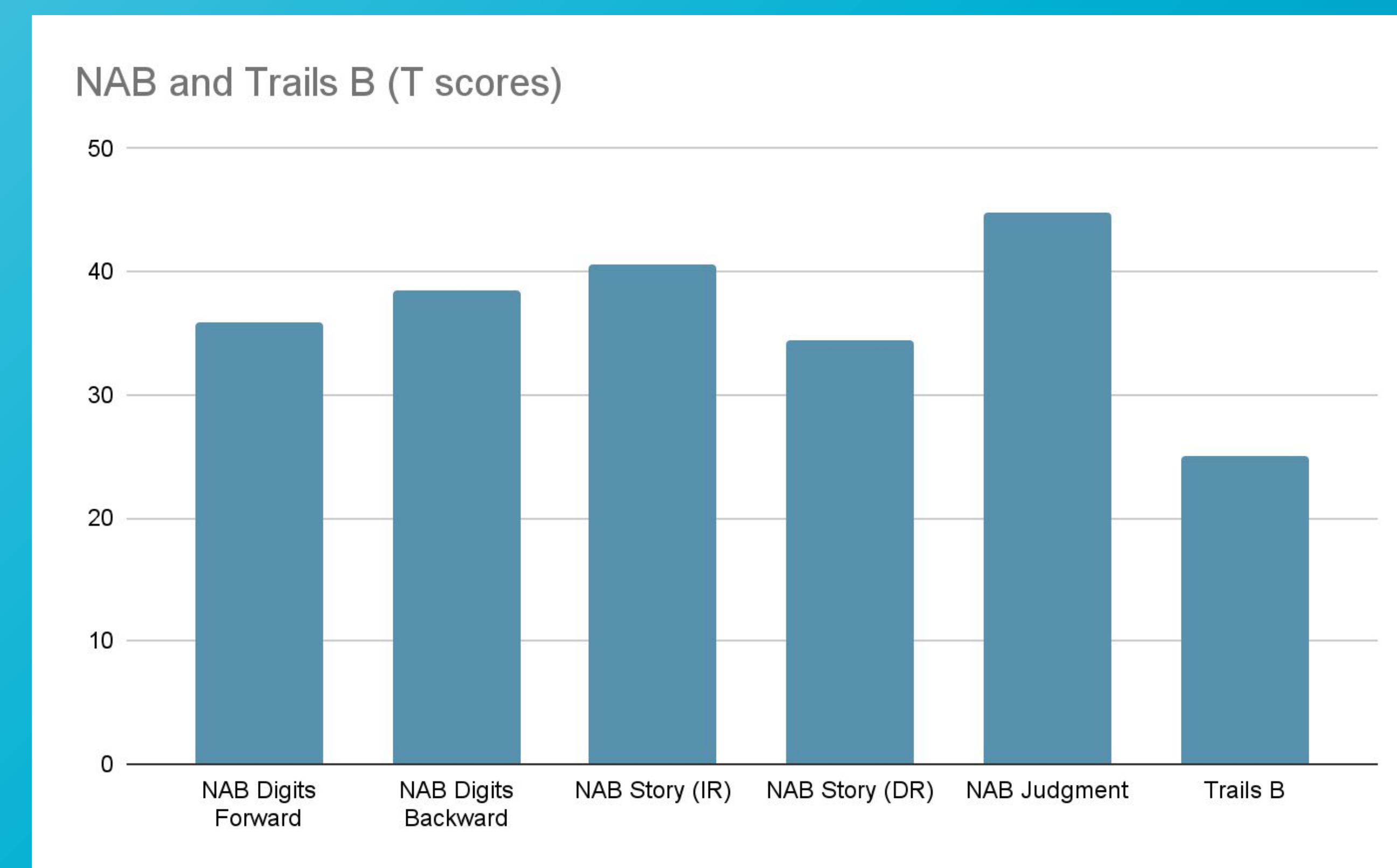
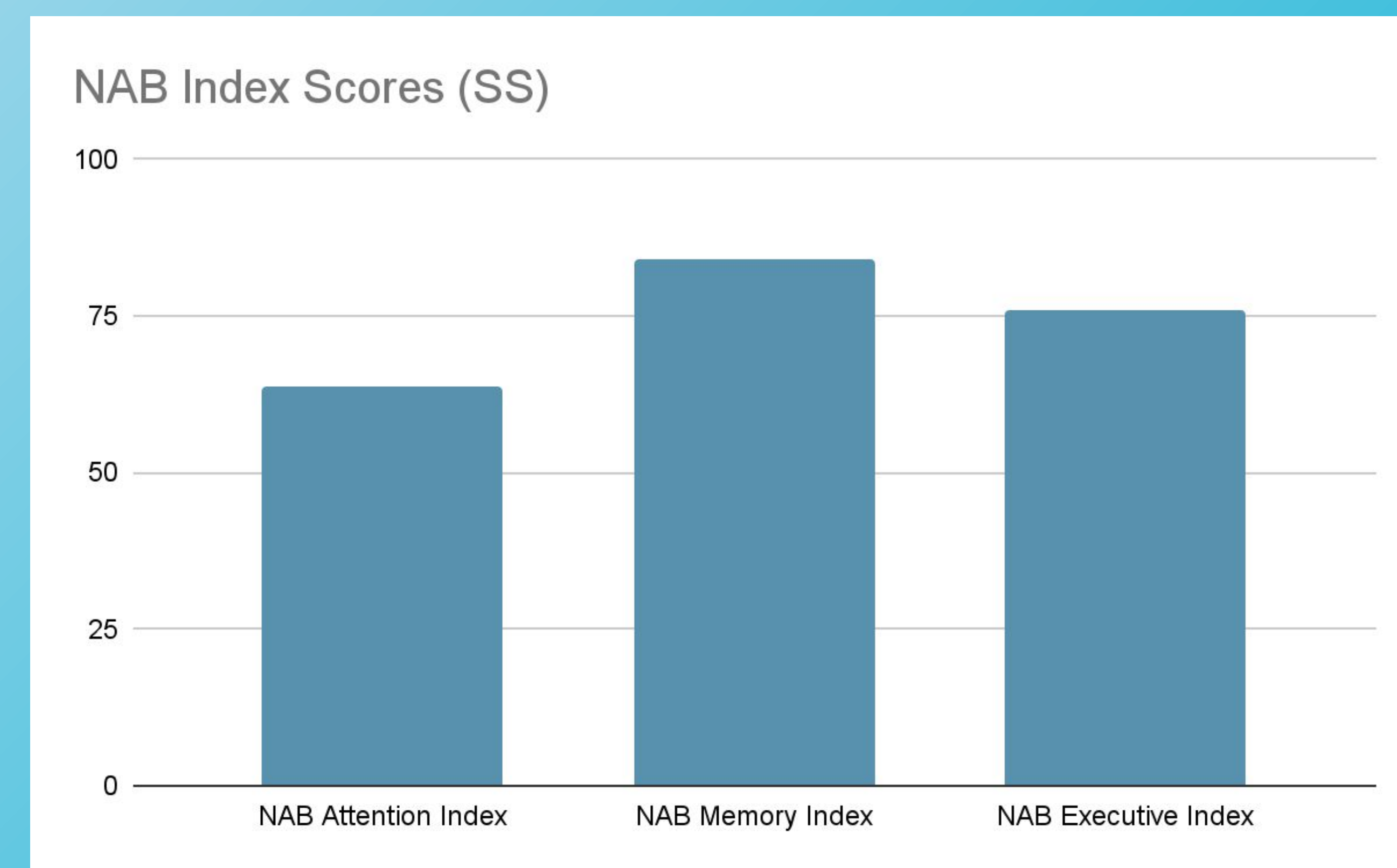
Sample Demographics		
	Mean (SD)	Range
Age (years)	51.85 (10.46)	27 - 71
Education (years)	12.64 (2.15)	6 - 20
Age at injury (years)	24.99 (14.62)	<1 - 59
Years post injury	26.34 (13.35)	2 - 58
Time between NPE and OBS (years)	1.95 (1.79)	2 days - 6 years

- OBS-calculated severity of behaviors based on clinical consensus, frequency, and impact.

OBS Score and Descriptor		Mean (SD)	Range
Cluster Score	# of domains	4.85 (1.86)	1 - 9
Challenging Behavior Domains	# of domains with challenging behaviors	3.59 (2.13)	0 - 9
Total Severity	# of behaviors	8.25 (4.42)	1 - 21
Clinical Weighted Severity	severity of behaviors	16.94 (9.59)	1 - 43

- Neuropsychological measures:

Cognitive Domain & Neuropsychological Measure		Mean (SD)	Range
Attention/Working Memory	NAB Attention Index	63.77 (14.41)	45 - 108
	NAB Digits Forward	35.86 (10.71)	19 - 66
	NAB Digits Backward	38.52 (10.61)	19 - 67
Memory	NAB Memory Index	84.18 (14.32)	55 - 116
	NAB Immediate Story Learning	40.59 (11.40)	19 - 59
	NAB Delayed Story Learning	34.39 (11.68)	19 - 59
Executive Functioning	NAB Executive Index	75.77 (19.12)	9 - 114
	NAB Judgment	44.79 (12.48)	19 - 72
	Trail Making Test-B	24.98 (14.32)	1 - 62



Correlation table for OBS and neuropsychological measures

	NAB Attention Index	NAB Digits Forward	NAB Digits Backward	NAB Memory Index	NAB Story Learning Immediate	NAB Story Learning Delayed	NAB Executive Index	NAB Judgment	Trails B
Cluster Score	<b>-0.041</b>	<b>-0.001</b>	<b>0.142</b>	<b>-0.105</b>	<b>-0.052</b>	<b>-0.182</b>	<b>-0.041</b>	<b>0.083</b>	<b>0.034</b>
Challenging Behavior Domains	<b>-0.055</b>	<b>0.006</b>	<b>0.195</b>	<b>-0.157</b>	<b>-0.120</b>	<b>-0.285*</b>	<b>-0.048</b>	<b>-0.114</b>	<b>0.051</b>
Total Severity	<b>-0.051</b>	<b>-0.019</b>	<b>0.082</b>	<b>-0.122</b>	<b>-0.075</b>	<b>-0.214</b>	<b>-0.113</b>	<b>0.021</b>	<b>0.048</b>
Clinical Weighted Severity	<b>-0.104</b>	<b>-0.036</b>	<b>0.061</b>	<b>-0.125</b>	<b>-0.094</b>	<b>-0.233</b>	<b>-0.120</b>	<b>-0.029</b>	<b>0.031</b>

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## RESULTS

- A proposed negative relationship between cognitive domains associated with behavior management (attention/working memory, memory, executive functioning) and standardized assessment of challenging behaviors identified only 1 significant finding out of 36 correlations (# domains with challenging behavior and delayed story recall,  $r = -.285$ ,  $p = .027$ ).
- Measures of attention/working memory, immediate recall, and executive functioning were not correlated with OBS scores.

## DISCUSSION

- These results raise the possibility that the OBS captures unique aspects of behavioral change that are not measured by traditional neuropsychological tests.
- Given that frontal lobe dysfunction is common following moderate to severe ABI, including measures such as the OBS to quantify behavioral change may be an important supplement to traditional neuropsychologists tests. The combination of findings may provide the most robust picture of functioning and offer the most comprehensive treatment recommendations.
- Results also suggest that neuropsychological testing following moderate to severe ABI may not capture all changes affecting recovery and functioning.
- Future analyses include examination of neuropsychological data and specific behavioral domains, relationship of challenging behavior to physical limitations, and possible moderation of time since injury on relationships of interest.

## REFERENCES

Kelly, G., & Simpson, G. (2011). Remediating serious inappropriate sexual behavior in a male with severe acquired brain injury. *Sex Disability*. DOI 10.1007/s11195-011-9213-9

Kelly, G., Todd, J., Simpson, G., et al. (2006). The overt behaviour scale (OBS): A tool for measuring challenging behaviors following ABI in community settings. *Brain Injury*, 20(3), 307-319.

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<b>Cluster Score</b>	-0.041	-0.001	0.142	-0.105	-0.052	-0.182	-0.041	0.083	0.034
<b>Challenging Behavior Domains</b>	-0.055	0.006	0.195	-0.157	-0.120	<b>-0.285*</b>	-0.048	-0.114	0.051
<b>Total Severity</b>	-0.051	-0.019	0.082	-0.122	-0.075	-0.214	-0.113	0.021	0.048
<b>Clinical Weighted Severity</b>	-0.104	-0.036	0.061	-0.125	-0.094	-0.233	-0.120	-0.029	0.031

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## Performance on neuropsychological tests and observations of challenging behaviors may be independent measures of brain injury symptomatology



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