

Preliminary Evidence to Support Use of Personal Protective Equipment (PPE) During Administration of the Neuropsychological Assessment Battery (NAB)

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Objective

In June 2020, the American Psychological Association acknowledged that use of personal protective equipment (PPE) was key to psychologists safely resuming in-person services. However, to date, there is no empirical evidence on the impact of PPE in delivering the provision of essential mental health services. [Koterba et al. \(2020\)](#) note impairments in patient responsiveness and neurocognitive skills make it challenging to provide neuropsychological services while adhering to Centers for Disease Control and Prevention (CDC) guidance and institution-specific policies regarding the use of PPE. Of particular concern is the unprecedented use of PPE during psychological assessment, which inherently breaches standardized test administration procedures.

The Neuropsychological Assessment Battery (NAB) is a comprehensive tool assessing neuropsychological abilities in adults ([Stern & White, 2003](#)). According to [Russo \(2018\)](#), 33.1% of direct providers of neuropsychological assessments at the Department of Veterans Affairs reported using the NAB when surveyed. [Robin et al. \(2016\)](#) noted the NAB is ranked among the top 15 tests for usage by clinical neuropsychologists in the United States and Canada. The purpose of this study was to examine the effect of PPE usage during administration of the NAB.

Method

Participants

This study utilized archival data of adult civil litigants referred for a neuropsychological evaluation from a private practice clinic in the western United States. Participants ($n = 101$) who had been administered the NAB using PPE from March 2020 through July 2021 were matched on age, gender, and education with participants who had been administered the NAB without PPE ($n = 101$) prior to March 2020. Final sample and subsample characteristics are shown in **Table 1**.

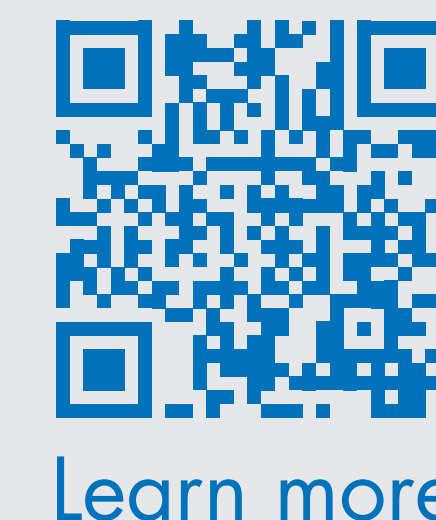
Measures

Neuropsychological Assessment Battery (NAB)

- Attention, Language, Memory, Spatial, Executive Functions, and Total NAB Index scores.

Procedure

For each index score, a paired-samples t test was performed to evaluate statistical differences and an equivalence test was performed to assess statistical equivalence. Equivalence tests were conducted using a two one-sided test (TOST) procedure for dependent samples ([Lakens et al., 2018](#)). The lower and upper equivalence bounds were set to the smallest effect size of interest at a Cohen's d of ± 0.3 . The equivalence tests were performed following [Lakens et al. \(2018\)](#). All standardized administration procedures were followed with the exception of the use of PPE, which included use of a plexiglass shield, surgical masks/face coverings on examinee and examiner, and gloves on the examiner.



Learn more

Procedure (continued)

Table 1. Participant Demographics

	Total (N = 202)	Without PPE (n = 101)	With PPE (n = 101)
Age M (SD)	42.6 (15.8)	42.7 (15.7)	42.5 (15.8)
Gender % (n)			
Female	50 (101)	50.5 (51)	49.5 (50)
Male	50 (101)	49.5 (50)	50.5 (51)
Education % (n)			
Less than high school	4.5 (9)	4.0 (4)	5.0 (5)
High school diploma (or equivalent)	31.2 (63)	30.7 (31)	31.7 (32)
Some college	25.7 (52)	26.7 (27)	24.8 (25)
College degree	38.6 (78)	38.6 (39)	38.6 (39)
Race/ethnicity % (n)			
White	43.1 (87)	32.7 (33)	53.5 (54)
Hispanic	23.8 (48)	17.8 (18)	29.7 (30)
Asian or Pacific Islander	6.4 (13)	5.0 (5)	7.9 (8)
Black	2.5 (5)	2.0 (2)	3.0 (3)
Native American	2.0 (4)	1.0 (1)	3.0 (3)
Other/Not specified	25.2 (51)	42.6 (43)	7.9 (8)
Handedness % (n)			
Right	70.8 (143)	55.4 (56)	86.1 (87)
Left	3.0 (6)	—	5.9 (6)
Ambidextrous/Mixed	3.0 (6)	3.0 (3)	3.0 (3)
Not specified	23.3 (47)	41.6 (42)	5.0 (5)

Results

Paired-samples t tests were conducted to examine differences in index scores between the PPE and non-PPE groups. There were no significant differences in the standardized scores for the Total NAB Index or any of the NAB Index scores. Means and standard deviations for each index score for both PPE and non-PPE groups, as well as results from paired-samples t tests for each index score are listed in **Table 2**.

Nonsignificant effects were further investigated through a series of paired-samples tests of equivalence using R . Based on the equivalence test and the null-hypothesis

Results (continued)

Table 2. Results from Null Hypothesis Significance Tests (NHST) and Two One-Sided T Tests (TOST)

Index score	Non-PPE M (SD)	PPE M (SD)	NHST		TOST	
			t	Sig	t	Sig
Memory	87.0 (16.1)	85.9 (16.4)	0.50	.619	-2.53	.007
Attention	84.6 (16.7)	87.7 (16.5)	-1.46	.148	1.55	.062
Language	92.1 (18.3)	94.1 (21.1)	-0.81	.419	2.23	.014
Spatial	97.0 (15.4)	96.0 (14.5)	0.52	.602	-2.49	.007
Executive Functions	80.9 (29.4)	82.5 (30.9)	-0.56	.574	2.45	.008
Total	89.5 (14.7)	90.6 (16.0)	-0.56	.575	2.48	.008

Note. TOST sig < .05 indicative of statistical equivalence between groups.

test combined, we can conclude the observed effects for the Memory, Language, Spatial, Executive Functions, and Total NAB Index scores were statistically not different from zero and statistically equivalent to zero. This suggests the difference between the Memory, Language, Spatial, Executive Functions, and Total NAB Index scores for PPE and non-PPE groups was so small it is practically equivalent. However, based on the equivalence test and the null-hypothesis test combined, we conclude the observed effect for the Attention Index is inconclusive; that is, it is statistically not different from zero and statistically not equivalent to zero. Closer examination of the scores within the subtests of the Attention Module revealed inconsistent performance across subtests with individuals in the PPE group scoring slightly better on Digit Span Forward ($t[100] = -2.32, p < .05, d = .23$) and Numbers & Letters Part A Errors ($t[100] = -2.78, p < .01, d = .28$). There were no statistically significant differences between the PPE and non-PPE groups for the remaining scores within the subtests of the Attention Module.

Conclusions

- These results provide preliminary psychometric evidence for use of PPE during administration of the NAB. The Memory, Language, Spatial, Executive Functions, and Total NAB Index scores showed no difference for PPE and non-PPE groups and were considered statistically equivalent.
- A limitation of the current study was a small sample size. Investigating equivalence using a smaller effect size of interest would require larger sample sizes to have sufficient statistical power.
- Although there was not a statistically significant difference between the PPE and non-PPE group on the overall Attention Index score, two subtest scores demonstrated statistically significant differences but in an unexpected direction (i.e., PPE group performed better). It is possible this is an artificial finding unique to this small subsample. However, it is hypothesized that examiners may overnunciate on verbal tasks, like Digit Span, to compensate for the perceived obstacle of using PPE, such as face coverings.

References

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