Neurocognitive and Psychological Health Outcomes

Rapid-response Impulsivity Predicts Depression and Posttraumatic Stress Disorder Symptomatology at One Year Follow-Up in Blast-exposed Service Members

A candidate behavioral risk marker for psychiatric decline following blast exposure would be rapid-response impulsivity, as indexed by inhibition of prepotent or already-initiated responses. Researchers at Hunter Holmes McGuire Veterans Affairs (VA) Medical Center (Richmond, Virginia) and Virginia Commonwealth University (Richmond, Virginia), examined if elevated rapid-response impulsivity, as a marker of ventral prefrontal cortex (vPFC) damage, is predictive of future elevated affective symptomatology in blast-exposed Service members (*Bjork et al. 2017*).

Blast-exposed Service members (n = 84, ages 19-39) participated in a longitudinal study, with neurocognitive testing at initial assessment and a one-year follow-up assessment of psychiatric symptomatology by telephone interview. Assessment occurred at VA medical centers and post-deployment assessment centers at military bases.

After controlling for age and affective symptom scores reported at the initial assessment, commission errors on the Continuous Performance Test II (CPT-II) of the initial assessment were predictive of higher symptom scores on the Center for Epidemiologic Studies Depression Scale (CES-D) and Posttraumatic Stress Disorder Checklist Version 5 (PCL-5) at follow-up, but were not predictive of Alcohol Use Disorders Identification Test-C (AUDIT-C) scores (Table 1).

Elevated rapid-response impulsivity, as a behavioral marker of reduced top-down frontocortical control, is a risk factor for elevated mood and posttraumatic stress disorder (PTSD) symptoms over time in blast-exposed individuals. Future longitudinal studies with pre-deployment neurobehavioral testing could enable attribution of this relation to blast-related vPFC damage.

These data suggest that simple neurocognitive markers (e.g., rapid-response impulsivity) may add value to the clinical enterprise by predicting who may be at greater vulnerability for symptom deterioration in depression and PTSD.

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TABLE 1: Subject characteristics. Values are mean ± SD or as otherwise indicated. Abbreviations: ANOVA, analysis of variance; F, female; M, male; WTAR, Wechsler Test of Adult Reading. (Table 1 from Bjork et al. (2017) used with permission from the authors)

Measure	Baseline	1-y Follow-Up	Repeated-Measures ANOVA, $F_{1,83}$	Repeated-Measures ANOVA, *P*
Age, y	26.2±5.5	NA	NA	NA
Sex	80 M, 4 F	NA	NA	NA
No. of blast exposures	1, n=15	NT	NA	NA
	2, n=16	NA	NA	NA
	3, n=17	NA	NA	NA
	≥4, n=36	NA	NA	NA
Interval since most recent blast, mo	11.8±9.3 (median, 8.8)	NA	NA	NA
WTAR, standard	104.0±10.6	NA	NA	NA
CPT-II OE rate, %	1.6±2.9	NT	NA	NA
CPT-II CE rate, %	48.2±21.2	NT	NA	NA
CPT-II perseverative error rate, %	0.3±0.5	NT	NA	NA
AUDIT-C total	4.1±2.6	3.6±2.8	3.863	.053
PCL-5 total	45.3±14.7	43.0±15.9	2.212	.141
CES-D total	15.7±9.4	16.5±12.4	0.544	.463

NOTE. Values are mean ± SD or as otherwise indicated.
Abbreviations: ANOVA, analysis of variance; F, female; M, male; NA, not applicable; NT, not tested.

REFERENCES:

Bjork, J. M., Burroughs, T. K., Franke, L. M., Pickett, T. C., Johns, S. E., Moeller, F. G., and Walker, W. C. 2017. "Rapid-Response Impulsivity Predicts Depression and Posttraumatic Stress Disorder Symptomatology at 1-Year Follow-up in Blast-Exposed Service Members." Arch Phys Med Rehabil 98 (8):1646-1651 e1. doi: 10.1016/j.apmr.2017.03.022.