

Supplemental Tables

Table S1. Pearson's correlation coefficient matrix for the 7 cognitive domain outcomes

	Episodic Memory	Attention	Processing Speed	Working Memory	Executive Function	Verbal Fluency	Fine Motor & Dexterity
Episodic Memory	-	0.29	0.44	0.43	0.45	0.29	0.26
Attention		-	0.49	0.31	0.4	0.29	0.36
Processing Speed			-	0.37	0.44	0.38	0.43
Working Memory				-	0.44	0.42	0.25
Executive Function					-	0.27	0.3
Verbal Fluency						-	0.19
Fine Motor & Dexterity							-

Note: P-values are always significant because of the large sample size of our study

Table S2. Variance Inflation factor (VIF) for Primary Analysis

	Episodic Memory	Attention	Processing Speed	Working Memory	Executive Function	Verbal Fluency	Fine Motor & Dexterity
mTBI Group (0, 1-2, 3+)	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Age	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Gender	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Race/Ethnicity	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Married	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Education	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BMI	1.1	1.1	1.1	1.1	1.1	1.1	1.1
AD(H)D	1	1	1	1	1	1	1
Service Branch	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Current Military	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Deployed duration (years)	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Combat Intensity (DRRI-2-C)	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Depression (PHQ-9)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Pain Interference (TBI-QOL)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Premorbid IQ est (NIHTB-CB pic vocab)	1.2	1.2	1.2	1.2	1.2	1.2	1.2
PTSD (PCL-5)	2	2	2	2	2	2	2
Hazardous Alcohol use (AUDIT-C)	1	1	1	1	1	1	1
Sleep Problems (PSQI)	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Sleep Apnea High Risk (STOP-BANG)	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Controlled Blast Exposures	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Somatosensory Symptoms (NSI)	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Vestibular Symptoms (NSI)	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Note: Table values are generalized VIF, $GVIF^{1/(2*Df)}$. If this value <2.4, there is no evidence of multicollinearity. The threshold is equivalent to conventional VIF<5.

Abbreviations: ADHD = Attention Deficit Hyperactivity Disorder; AUDIT-C= Alcohol Use Disorders Test Consumption; DAST-10= Drug Abuse Screening Test- 10;

DRRI-2= Deployment Risk and Resiliency Inventory, Version 2; NIH TB-CB = NIH Toolbox Cognition battery; NSI= Neurobehavioral Symptom Inventory;

PCL-5= PTSD Checklist for the Diagnostic and Statistical Manual, 5th edition; PSQI= Pittsburgh Sleep Quality Index; PHQ-9=Patient Health Questionnaire-9;

TBI QoL= Traumatic Brain Injury Quality of Life;

Table S3A. Sensitivity Analysis with # lifetime mTBIs of any etiology as a continuous variable

variable	Episodic Memory			Attention			Processing Speed			Working Memory		
	Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value	
		Raw	Adjust		Raw	Adjust		Raw	Adjust		Raw	Adjust
Number of mTBI	0.01 (-0.01, 0.03)	0.44	1	0.00 (-0.03, 0.03)	0.85	1	-0.01 (-0.03, 0.01)	0.34	1	0.01 (-0.01, 0.03)	0.53	1
Age	-0.03 (-0.03,-0.02)	<0.001	0.01	-0.03 (-0.03,-0.02)	<0.001	0.01	-0.03 (-0.04,-0.03)	<0.001	0.01	-0.02 (-0.03,-0.02)	<0.001	0.01
Gender: Male	-0.29 (-0.43,-0.15)	<0.001	0.01	-0.10 (-0.29, 0.10)	0.34	0.69	-0.36 (-0.50,-0.22)	<0.001	0.01	0.10 (-0.03, 0.23)	0.15	0.6
Race/Ethnicity: Non-Hispanic White/Asian	0.07 (-0.03, 0.16)	0.16	0.52	0.17 (0.04, 0.30)	0.012	0.06	0.07 (-0.02, 0.17)	0.13	0.52	0.13 (0.04, 0.21)	0.006	0.04
Married: Married/couple	0.08 (-0.02, 0.18)	0.13	0.78	0.01 (-0.13, 0.15)	0.86	1	0.09 (-0.02, 0.19)	0.10	0.7	0.05 (-0.05, 0.14)	0.32	1
Never married	0.03 (-0.10, 0.16)	0.60	1	-0.04 (-0.22, 0.15)	0.69	1	-0.04 (-0.17, 0.09)	0.56	1	0.03 (-0.10, 0.15)	0.69	1
Education: Some College	-0.04 (-0.17, 0.08)	0.48	0.64	0.12 (-0.06, 0.30)	0.18	0.64	0.10 (-0.02, 0.23)	0.11	0.55	0.24 (0.12, 0.36)	<0.001	0.01
College Graduate	-0.03 (-0.16, 0.10)	0.67	0.67	0.11 (-0.08, 0.29)	0.26	0.52	0.21 (0.08, 0.34)	0.002	0.01	0.21 (0.08, 0.34)	0.001	0.01
BMI	0.00 (-0.01, 0.01)	0.44	1	0.00 (-0.01, 0.01)	0.72	1	0.00 (-0.01, 0.01)	0.43	1	0.00 (-0.01, 0.01)	0.96	1
ADHD?: Yes	-0.17 (-0.32,-0.01)	0.035	0.25	0.06 (-0.16, 0.28)	0.59	1	-0.05 (-0.20, 0.10)	0.53	1	-0.05 (-0.20, 0.10)	0.52	1
Service Branch: Army	-0.02 (-0.13, 0.09)	0.73	1	-0.10 (-0.26, 0.05)	0.18	1	-0.03 (-0.14, 0.08)	0.61	1	-0.06 (-0.17, 0.04)	0.23	1
Marine Corps	-0.02 (-0.16, 0.13)	0.82	1	0.10 (-0.10, 0.31)	0.33	1	0.02 (-0.13, 0.16)	0.82	1	0.00 (-0.14, 0.14)	0.96	1
Current Military: Yes	0.10 (-0.01, 0.21)	0.07	0.42	0.10 (-0.05, 0.26)	0.19	0.95	0.03 (-0.08, 0.14)	0.62	1	0.13 (0.02, 0.23)	0.017	0.12
Deployed Time (yr)	-0.01 (-0.05, 0.04)	0.75	1	-0.01 (-0.07, 0.05)	0.69	1	0.04 (-0.01, 0.08)	0.09	0.63	0.02 (-0.02, 0.06)	0.44	1
Combat Intensity (10 × DRRI-2-C)	0.00 (-0.04, 0.03)	0.81	1	0.04 (-0.01, 0.09)	0.09	0.63	0.01 (-0.02, 0.05)	0.46	1	-0.02 (-0.05, 0.01)	0.24	1
Depression (PHQ9)	0.00 (-0.01, 0.01)	0.96	1	-0.01 (-0.03, 0.01)	0.39	1	0.00 (-0.01, 0.01)	0.94	1	0.00 (-0.01, 0.01)	0.85	1
Pain (TBIQOL)	0.00 (0.00, 0.01)	0.29	1	0.00 (-0.01, 0.01)	0.52	1	0.00 (0.00, 0.01)	0.25	1	0.00 (-0.01, 0.00)	0.36	1
Premorbid IQ est (NIHTB-CB pic vocab)	0.02 (0.02, 0.03)	<0.001	0.01	0.01 (0.00, 0.02)	0.003	0.01	0.01 (0.01, 0.02)	<0.001	0.01	0.03 (0.02, 0.03)	<0.001	0.01
PTSD (PCL5)	0.00 (-0.01, 0.00)	0.037	0.22	0.00 (-0.01, 0.00)	0.10	0.4	0.00 (-0.01, 0.00)	0.21	0.63	0.00 (-0.01, 0.00)	0.044	0.22
ETOH (AUDIT-C): Yes, non-hazardous	-0.03 (-0.12, 0.06)	0.58	1	-0.02 (-0.14, 0.11)	0.80	1	-0.03 (-0.12, 0.06)	0.51	1	0.03 (-0.05, 0.12)	0.47	1
Not user	-0.10 (-0.22, 0.02)	0.10	0.6	-0.01 (-0.18, 0.16)	0.94	1	-0.11 (-0.24, 0.01)	0.06	0.42	0.03 (-0.08, 0.15)	0.59	1
Sleep Problems (PSQI)	0.00 (-0.01, 0.02)	0.45	1	0.01 (-0.01, 0.02)	0.55	1	-0.01 (-0.02, 0.01)	0.40	1	0.01 (0.00, 0.02)	0.024	0.17
Sleep Apnea High Risk (STOP-BANG)	-0.08 (-0.19, 0.02)	0.12	0.84	0.06 (-0.09, 0.21)	0.42	1	-0.06 (-0.17, 0.04)	0.25	1	-0.04 (-0.14, 0.06)	0.42	1
Controlled Blast Exposure: Low (1-9)	-0.01 (-0.16, 0.13)	0.89	1	0.08 (-0.13, 0.28)	0.47	1	0.00 (-0.14, 0.15)	0.97	1	-0.03 (-0.17, 0.10)	0.63	1
Medium (10-89)	-0.03 (-0.17, 0.11)	0.66	1	-0.04 (-0.24, 0.16)	0.72	1	-0.03 (-0.17, 0.11)	0.66	1	-0.02 (-0.16, 0.12)	0.77	1
Heavy (>89)	-0.04 (-0.18, 0.10)	0.58	1	-0.03 (-0.24, 0.17)	0.75	1	0.02 (-0.12, 0.17)	0.75	1	-0.08 (-0.22, 0.05)	0.23	1
Somatosensory Symptoms (NSI)	0.00 (-0.01, 0.01)	>0.99	1	0.00 (-0.02, 0.02)	0.97	1	0.00 (-0.02, 0.01)	0.55	1	-0.01 (-0.02, 0.01)	0.34	1
Vestibular Symptoms (NSI)	-0.01 (-0.04, 0.01)	0.31	1	-0.01 (-0.05, 0.03)	0.64	1	-0.02 (-0.05, 0.01)	0.11	0.66	-0.01 (-0.04, 0.02)	0.52	1

Notes: Bolded covariates are significant after P < 0.05 corrected for multiple comparisons.

Number of observations used to fit model, in order, are: 1129,1127,1129,1129

Table S3B. Sensitivity Analysis with # lifetime mTBIs of any etiology as a continuous variable (continued)

variable	Executive Function			Verbal Fluency			Fine Motor & Dexterity		
	Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value	
		Raw	Adjust		Raw	Adjust		Raw	Adjust
Number of mTBI	0.00 (-0.02, 0.02)	0.95	1	0.01 (-0.01, 0.04)	0.26	1	0.00 (-0.02, 0.03)	0.79	1
Age	-0.02 (-0.02,-0.01)	<0.001	0.01	-0.01 (-0.02,-0.01)	<0.001	0.01	-0.03 (-0.04,-0.02)	<0.001	0.01
Gender: Male	-0.06 (-0.17, 0.04)	0.23	0.69	0.05 (-0.11, 0.21)	0.56	0.69	-0.27 (-0.44,-0.10)	0.002	0.01
Race/Ethnicity: Non-Hispanic White/Asian	0.15 (0.07, 0.22)	<0.001	0.01	0.00 (-0.11, 0.11)	0.99	0.99	0.05 (-0.07, 0.16)	0.41	0.82
Married: Married/couple	0.01 (-0.06, 0.09)	0.76	1	-0.05 (-0.17, 0.07)	0.40	1	-0.04 (-0.17, 0.08)	0.48	1
Never married	-0.05 (-0.15, 0.05)	0.36	1	0.01 (-0.14, 0.17)	0.88	1	-0.19 (-0.35,-0.03)	0.023	0.16
Education: Some College	0.07 (-0.03, 0.17)	0.16	0.64	0.08 (-0.07, 0.23)	0.27	0.64	0.21 (0.06, 0.37)	0.007	0.04
College Graduate	0.10 (0.00, 0.20)	0.06	0.18	0.22 (0.07, 0.38)	0.005	0.02	0.37 (0.21, 0.54)	<0.001	0.01
BMI	0.00 (-0.01, 0.00)	0.24	1	0.01 (0.00, 0.02)	0.06	0.36	-0.01 (-0.03, 0.00)	0.007	0.05
ADHD: Yes	-0.10 (-0.22, 0.01)	0.09	0.54	-0.03 (-0.22, 0.15)	0.71	1	0.15 (-0.04, 0.34)	0.12	0.6
Service Branch: Army	-0.04 (-0.12, 0.04)	0.32	1	-0.09 (-0.22, 0.04)	0.18	1	-0.02 (-0.15, 0.11)	0.76	1
Marine Corps	-0.05 (-0.16, 0.06)	0.34	1	-0.09 (-0.27, 0.08)	0.29	1	-0.03 (-0.21, 0.15)	0.78	1
Current Military: Yes	0.01 (-0.07, 0.09)	0.85	1	0.07 (-0.06, 0.20)	0.31	1	0.00 (-0.14, 0.13)	0.96	1
Deployed Time (yr)	0.00 (-0.03, 0.03)	0.91	1	0.01 (-0.04, 0.06)	0.59	1	-0.01 (-0.06, 0.04)	0.74	1
Combat Intensity (10 × DRR1-2-C)	0.01 (-0.01, 0.04)	0.27	1	0.02 (-0.02, 0.06)	0.43	1	-0.02 (-0.07, 0.02)	0.29	1
Depression (PHQ9)	-0.01 (-0.02, 0.00)	0.16	1	0.00 (-0.02, 0.01)	0.91	1	0.00 (-0.02, 0.01)	0.72	1
Pain (TBIQOL)	0.00 (0.00, 0.01)	0.74	1	0.00 (-0.01, 0.01)	0.73	1	0.00 (0.00, 0.01)	0.23	1
Premorbid IQ est (NIHTB-CB pic vocab)	0.02 (0.01, 0.02)	<0.001	0.01	0.03 (0.03, 0.04)	<0.001	0.01	0.01 (0.01, 0.02)	<0.001	0.01
PTSD (PCL5)	0.00 (-0.01, 0.00)	0.27	0.63	0.00 (-0.01, 0.00)	0.21	0.63	-0.01 (-0.01, 0.00)	0.027	0.19
ETOH: Yes, non-hazardous	-0.05 (-0.11, 0.02)	0.20	1	-0.01 (-0.12, 0.10)	0.89	1	0.01 (-0.10, 0.12)	0.85	1
Not user	-0.07 (-0.16, 0.02)	0.12	0.6	-0.03 (-0.17, 0.11)	0.67	1	-0.04 (-0.19, 0.11)	0.61	1
Sleep Problems (PSQI)	0.00 (-0.01, 0.01)	0.76	1	0.00 (-0.02, 0.01)	0.82	1	0.00 (-0.02, 0.01)	0.96	1
Sleep Apnea High Risk (STOP-BANG)	0.04 (-0.04, 0.12)	0.31	1	-0.03 (-0.16, 0.09)	0.59	1	-0.03 (-0.16, 0.10)	0.62	1
Controlled Blast Exposure: Low (1-9)	0.00 (-0.11, 0.11)	>0.99	1	-0.11 (-0.29, 0.06)	0.20	1	-0.07 (-0.25, 0.11)	0.44	1
Medium (10-89)	0.00 (-0.11, 0.10)	0.94	1	-0.28 (-0.45,-0.11)	0.001	0.01	0.03 (-0.14, 0.21)	0.70	1
Heavy (>89)	-0.02 (-0.13, 0.09)	0.78	1	-0.18 (-0.35,-0.01)	0.042	0.29	-0.12 (-0.29, 0.06)	0.20	1
Somatosens Sympt (NSI)	-0.01 (-0.02, 0.00)	0.06	0.42	0.00 (-0.02, 0.02)	0.83	1	0.00 (-0.02, 0.01)	0.64	1
Vestib Sympt (NSI)	0.00 (-0.02, 0.02)	0.85	1	-0.02 (-0.06, 0.01)	0.18	0.9	-0.05 (-0.09,-0.02)	0.003	0.02

Notes: Bolded covariates are significant after P < 0.05 corrected for multiple comparisons.

Number of observations used to fit model, in order, are: 1129,1127,1129,1129

Table S4A. Sensitivity Analysis with # blast-related mTBIs as a continuous variable

variable	Episodic Memory			Attention			Processing Speed			Working Memory		
	Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value	
		Raw	Adjust		Raw	Adjust		Raw	Adjust		Raw	Adjust
Number of Blast-related mTBIs	-0.01 (-0.07, 0.04)	0.63	1	-0.01 (-0.09, 0.06)	0.76	1	-0.04 (-0.09, 0.02)	0.18	1	-0.03 (-0.08, 0.02)	0.20	1
Age	-0.03 (-0.03,-0.02)	<0.001	0.01	-0.03 (-0.04,-0.02)	<0.001	0.01	-0.03 (-0.04,-0.03)	<0.001	0.01	-0.02 (-0.03,-0.02)	<0.001	0.01
Gender: Male	-0.29 (-0.42,-0.15)	<0.001	0.01	-0.09 (-0.29, 0.10)	0.34	0.69	-0.36 (-0.50,-0.22)	<0.001	0.01	0.11 (-0.02, 0.24)	0.11	0.44
Race/Ethnicity: Non-Hispanic White/Asian	0.07 (-0.02, 0.16)	0.15	0.52	0.17 (0.04, 0.30)	0.012	0.06	0.07 (-0.02, 0.17)	0.13	0.52	0.13 (0.04, 0.22)	0.005	0.03
Married: Married/couple	0.08 (-0.02, 0.18)	0.13	0.78	0.01 (-0.13, 0.16)	0.85	1	0.09 (-0.01, 0.19)	0.09	0.63	0.05 (-0.04, 0.15)	0.29	1
Never married	0.04 (-0.09, 0.17)	0.58	1	-0.04 (-0.22, 0.15)	0.69	1	-0.04 (-0.17, 0.09)	0.56	1	0.03 (-0.10, 0.15)	0.66	1
Education: Some College	-0.04 (-0.16, 0.09)	0.55	0.64	0.12 (-0.06, 0.30)	0.18	0.64	0.11 (-0.02, 0.23)	0.10	0.5	0.25 (0.13, 0.37)	<0.001	0.01
College Graduate	-0.02 (-0.15, 0.11)	0.74	0.74	0.11 (-0.08, 0.29)	0.25	0.5	0.21 (0.08, 0.34)	0.002	0.01	0.22 (0.09, 0.34)	<0.001	0.01
BMI	0.00 (-0.01, 0.01)	0.49	1	0.00 (-0.01, 0.01)	0.70	1	0.00 (-0.01, 0.00)	0.37	1	0.00 (-0.01, 0.01)	0.91	1
ADD: Yes	-0.16 (-0.32,-0.01)	0.038	0.27	0.06 (-0.16, 0.28)	0.59	1	-0.05 (-0.21, 0.10)	0.50	1	-0.05 (-0.19, 0.10)	0.55	1
Service Branch: Army	-0.02 (-0.13, 0.09)	0.69	1	-0.10 (-0.26, 0.05)	0.18	1	-0.03 (-0.14, 0.08)	0.60	1	-0.07 (-0.17, 0.04)	0.20	1
Marine Corps	-0.02 (-0.17, 0.13)	0.78	1	0.10 (-0.11, 0.31)	0.34	1	0.01 (-0.13, 0.16)	0.88	1	0.00 (-0.14, 0.14)	0.96	1
Current Military: Yes	0.10 (0.00, 0.21)	0.06	0.36	0.10 (-0.05, 0.25)	0.19	0.95	0.02 (-0.08, 0.13)	0.67	1	0.13 (0.03, 0.24)	0.012	0.08
Deployed Time (yr)	-0.01 (-0.05, 0.04)	0.80	1	-0.01 (-0.07, 0.05)	0.69	1	0.04 (0.00, 0.08)	0.08	0.56	0.02 (-0.02, 0.06)	0.38	1
Combat Intensity (10 × DRRI-2-C)	0.00 (-0.04, 0.04)	0.92	1	0.04 (-0.01, 0.10)	0.10	0.6	0.02 (-0.02, 0.06)	0.28	1	-0.01 (-0.04, 0.03)	0.63	1
Depression (PHQ9)	0.00 (-0.01, 0.01)	0.93	1	-0.01 (-0.03, 0.01)	0.39	1	0.00 (-0.01, 0.01)	0.93	1	0.00 (-0.01, 0.01)	0.89	1
Pain (TBIQOL)	0.00 (0.00, 0.01)	0.28	1	0.00 (-0.01, 0.01)	0.50	1	0.00 (0.00, 0.01)	0.30	1	0.00 (-0.01, 0.00)	0.35	1
Premorbid IQ est (NIHTB-CB pic vocab)	0.02 (0.02, 0.03)	<0.001	0.01	0.01 (0.00, 0.02)	0.003	0.01	0.01 (0.01, 0.02)	<0.001	0.01	0.03 (0.02, 0.03)	<0.001	0.01
PTSD (PCL5)	0.00 (-0.01, 0.00)	0.033	0.2	0.00 (-0.01, 0.00)	0.11	0.44	0.00 (-0.01, 0.00)	0.22	0.54	0.00 (-0.01, 0.00)	0.039	0.2
ETOH: Yes, non-hazardous	-0.03 (-0.12, 0.06)	0.56	1	-0.02 (-0.14, 0.11)	0.81	1	-0.03 (-0.12, 0.06)	0.55	1	0.03 (-0.05, 0.12)	0.47	1
Not user	-0.10 (-0.22, 0.02)	0.09	0.56	-0.01 (-0.17, 0.16)	0.95	1	-0.11 (-0.23, 0.01)	0.08	0.56	0.03 (-0.08, 0.15)	0.60	1
Sleep Problems (PSQI)	0.01 (-0.01, 0.02)	0.41	1	0.01 (-0.01, 0.02)	0.55	1	-0.01 (-0.02, 0.01)	0.39	1	0.01 (0.00, 0.03)	0.019	0.13
Sleep Apnea High Risk (STOP-BANG)	-0.08 (-0.19, 0.02)	0.13	0.91	0.06 (-0.09, 0.21)	0.41	1	-0.06 (-0.17, 0.05)	0.26	1	-0.04 (-0.14, 0.06)	0.46	1
Controlled Blast Exposure: Low (1-9)	-0.01 (-0.16, 0.13)	0.87	1	0.07 (-0.13, 0.28)	0.47	1	0.00 (-0.14, 0.15)	>0.99	1	-0.04 (-0.18, 0.10)	0.60	1
Medium (10-89)	-0.03 (-0.17, 0.11)	0.65	1	-0.04 (-0.24, 0.16)	0.72	1	-0.03 (-0.18, 0.11)	0.64	1	-0.02 (-0.16, 0.11)	0.75	1
Heavy (>89)	-0.04 (-0.19, 0.10)	0.56	1	-0.03 (-0.24, 0.17)	0.75	1	0.02 (-0.12, 0.17)	0.75	1	-0.09 (-0.22, 0.05)	0.22	1
Somatosens Sympt (NSI)	0.00 (-0.01, 0.02)	0.91	1	0.00 (-0.02, 0.02)	0.98	1	0.00 (-0.02, 0.01)	0.58	1	-0.01 (-0.02, 0.01)	0.45	1
Vestib Sympt (NSI)	-0.01 (-0.04, 0.02)	0.37	1	-0.01 (-0.05, 0.03)	0.64	1	-0.02 (-0.05, 0.01)	0.11	0.66	-0.01 (-0.03, 0.02)	0.64	1

Notes: Bolded covariates are significant after P < 0.05 corrected for multiple comparisons.

Number of observations used to fit model, in order, are: 1129,1127,1129,1129

Table S4B. Sensitivity Analysis with # blast-related mTBIs as a continuous variable (continued)

variable	Executive Function			Verbal Fluency			Fine Motor & Dexterity		
	Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value	
		Raw	Adjust		Raw	Adjust		Raw	Adjust
Number of Blast-related mTBI	0.00 (-0.04, 0.04)	0.96	1	-0.07 (-0.13,-0.01)	0.028	0.2	-0.03 (-0.09, 0.04)	0.44	1
Age	-0.02 (-0.02,-0.01)	<0.001	0.01	-0.01 (-0.02,-0.01)	<0.001	0.01	-0.03 (-0.04,-0.02)	<0.001	0.01
Gender: Male	-0.06 (-0.17, 0.04)	0.23	0.69	0.07 (-0.09, 0.24)	0.39	0.69	-0.26 (-0.43,-0.09)	0.003	0.01
Race/Ethnicity: Non-Hispanic White/Asian	0.15 (0.07, 0.22)	<0.001	0.01	0.01 (-0.11, 0.12)	0.92	0.92	0.05 (-0.06, 0.17)	0.39	0.78
Married: Married/couple	0.01 (-0.06, 0.09)	0.76	1	-0.05 (-0.17, 0.07)	0.45	1	-0.04 (-0.17, 0.08)	0.50	1
Never married	-0.05 (-0.15, 0.05)	0.36	1	0.02 (-0.14, 0.17)	0.82	1	-0.19 (-0.35,-0.02)	0.024	0.17
Education: Some College	0.07 (-0.03, 0.17)	0.16	0.64	0.10 (-0.05, 0.25)	0.17	0.64	0.22 (0.07, 0.38)	0.005	0.03
College Graduate	0.10 (0.00, 0.20)	0.06	0.18	0.24 (0.09, 0.40)	0.002	0.01	0.38 (0.22, 0.54)	<0.001	0.01
BMI	0.00 (-0.01, 0.00)	0.24	1	0.01 (0.00, 0.02)	0.11	0.66	-0.02 (-0.03, 0.00)	0.006	0.04
ADD: Yes	-0.10 (-0.22, 0.01)	0.09	0.54	-0.03 (-0.21, 0.15)	0.76	1	0.15 (-0.04, 0.34)	0.11	0.55
Service Branch: Army	-0.04 (-0.12, 0.04)	0.32	1	-0.10 (-0.22, 0.03)	0.15	1	-0.02 (-0.16, 0.11)	0.73	1
Marine Corps	-0.05 (-0.17, 0.06)	0.34	1	-0.11 (-0.28, 0.06)	0.21	1	-0.03 (-0.21, 0.15)	0.73	1
Current Military: Yes	0.01 (-0.07, 0.09)	0.84	1	0.08 (-0.05, 0.21)	0.22	0.95	0.00 (-0.13, 0.13)	>0.99	1
Deployed Time (yr)	0.00 (-0.03, 0.03)	0.91	1	0.02 (-0.03, 0.07)	0.47	1	-0.01 (-0.06, 0.04)	0.78	1
Combat Intensity (10 × DRR1-2-C)	0.02 (-0.01, 0.04)	0.29	1	0.04 (0.00, 0.08)	0.07	0.49	-0.01 (-0.06, 0.03)	0.53	1
Depression (PHQ9)	-0.01 (-0.02, 0.00)	0.16	1	0.00 (-0.02, 0.01)	0.84	1	0.00 (-0.02, 0.01)	0.70	1
Pain (TBIQOL)	0.00 (0.00, 0.01)	0.74	1	0.00 (-0.01, 0.01)	0.71	1	0.00 (0.00, 0.01)	0.24	1
Premorbid IQ est (NIHTB-CB pic vocab)	0.02 (0.01, 0.02)	<0.001	0.01	0.03 (0.03, 0.04)	<0.001	0.01	0.01 (0.01, 0.02)	<0.001	0.01
PTSD (PCL5)	0.00 (-0.01, 0.00)	0.27	0.54	0.00 (-0.01, 0.00)	0.18	0.54	-0.01 (-0.01, 0.00)	0.025	0.18
ETOH: Yes, non-hazardous	-0.05 (-0.11, 0.02)	0.20	1	-0.01 (-0.12, 0.10)	0.88	1	0.01 (-0.10, 0.12)	0.85	1
Not user	-0.07 (-0.16, 0.02)	0.12	0.6	-0.03 (-0.18, 0.11)	0.65	1	-0.04 (-0.19, 0.11)	0.61	1
Sleep Problems (PSQI)	0.00 (-0.01, 0.01)	0.76	1	0.00 (-0.01, 0.01)	0.95	1	0.00 (-0.01, 0.01)	>0.99	1
Sleep Apnea High Risk (STOP-BANG)	0.04 (-0.04, 0.12)	0.31	1	-0.03 (-0.15, 0.10)	0.69	1	-0.03 (-0.16, 0.10)	0.65	1
Controlled Blast Exposure: Low (1-9)	0.00 (-0.11, 0.11)	>0.99	1	-0.12 (-0.29, 0.05)	0.17	1	-0.07 (-0.25, 0.11)	0.42	1
Medium (10-89)	0.00 (-0.11, 0.10)	0.93	1	-0.29 (-0.45,-0.12)	<0.001	0.01	0.03 (-0.14, 0.21)	0.71	1
Heavy (>89)	-0.02 (-0.13, 0.09)	0.78	1	-0.18 (-0.36,-0.01)	0.035	0.25	-0.12 (-0.30, 0.06)	0.20	1
Somatosens Sympt (NSI)	-0.01 (-0.02, 0.00)	0.06	0.42	0.00 (-0.01, 0.02)	0.60	1	0.00 (-0.02, 0.01)	0.71	1
Vestib Sympt (NSI)	0.00 (-0.04, 0.04)	0.96	1	-0.07 (-0.13,-0.01)	0.028	0.2	-0.03 (-0.09, 0.04)	0.44	1

Notes: Bolded covariates are significant after P < 0.05 corrected for multiple comparisons.
 Number of observations used to fit model, in order, are: 1129,1127,1129,1129

Table S5. Variance Inflation factor (VIF) for Number of Blast-related mTBIs:

	Episodic Memory	Attention	Processing Speed	Working Memory	Executive Function	Verbal Fluency	Fine Motor & Dexterity
Number of Blast mTBIs	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Age	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Gender	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Race/Ethnicity	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Married	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Education	1.1	1.1	1.1	1.1	1.1	1.1	1.1
BMI	1.1	1.1	1.1	1.1	1.1	1.1	1.1
ADD	1	1	1	1	1	1	1
Service Branch	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Current Military	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Deployed duration (years)	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Combat Intensity (DRRI-2-C)	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Depression (PHQ9)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Pain Interference (TBIQOL)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Premorbid IQ est (NIHTB-CB pic vocab)	1.2	1.2	1.2	1.2	1.2	1.2	1.2
PTSD (PCL5)	2	2	2	2	2	2	2
ETOH use (AUDIT-C)	1	1	1	1	1	1	1
Sleep Problems (PSQI)	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Sleep Apnea High Risk (STOP-BANG)	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Controlled Blast Exposures	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Somatosensory Symptoms (NSI)	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Vestibular Symptoms (NSI)	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Note: Table values are generalized VIF, $GVIF^{1/(2 \cdot Df)}$. If this value < 2.4 , there is no evidence of multicollinearity. The threshold is equivalent to conventional $VIF < 5$.

Table S6A. Sensitivity Analysis with TBI negative controls removed and # years since mTBI added as covariates

variable	Episodic Memory			Attention			Processing Speed			Working Memory		
	Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value	
		Raw	Adjust		Raw	Adjust		Raw	Adjust		Raw	Adjust
Groups: 3+ mTBIs	-0.09 (-0.21, 0.03)	0.15	0.75	0.15 (-0.02, 0.32)	0.08	0.48	-0.04 (-0.16, 0.08)	0.53	1	-0.05 (-0.16, 0.07)	0.41	1
Age	-0.03 (-0.04,-0.02)	<0.001	0.01	-0.03 (-0.04,-0.02)	<0.001	0.01	-0.03 (-0.04,-0.03)	<0.001	0.01	-0.03 (-0.03,-0.02)	<0.001	0.01
Gender: Male	-0.18 (-0.34,-0.02)	0.030	0.15	0.02 (-0.21, 0.25)	0.84	1	-0.35 (-0.51,-0.19)	<0.001	0.01	0.08 (-0.07, 0.24)	0.30	1
Race/Ethnicity: Non-Hispanic White/Asian	0.06 (-0.05, 0.16)	0.28	0.76	0.20 (0.05, 0.35)	0.008	0.05	0.07 (-0.03, 0.17)	0.19	0.76	0.09 (-0.01, 0.19)	0.07	0.35
Married: Married/couple	0.08 (-0.04, 0.19)	0.18	1	-0.02 (-0.18, 0.14)	0.83	1	0.08 (-0.03, 0.19)	0.17	1	0.05 (-0.06, 0.16)	0.34	1
Never married	0.07 (-0.08, 0.22)	0.34	1	-0.02 (-0.23, 0.18)	0.82	1	-0.04 (-0.19, 0.11)	0.58	1	0.01 (-0.13, 0.15)	0.92	1
Education: Some College	0.00 (-0.14, 0.14)	0.99	1	0.14 (-0.06, 0.34)	0.17	0.68	0.10 (-0.05, 0.24)	0.18	0.68	0.22 (0.08, 0.36)	0.002	0.01
College Graduate	-0.01 (-0.16, 0.14)	0.86	0.86	0.19 (-0.02, 0.40)	0.08	0.32	0.22 (0.07, 0.37)	0.004	0.02	0.22 (0.08, 0.36)	0.003	0.02
BMI	0.01 (0.00, 0.02)	0.29	1	0.00 (-0.01, 0.01)	0.91	1	0.00 (-0.01, 0.01)	0.84	1	0.00 (-0.01, 0.01)	0.45	1
ADD: Yes	-0.18 (-0.34,-0.01)	0.039	0.27	0.05 (-0.19, 0.28)	0.70	1	-0.08 (-0.25, 0.08)	0.33	1	-0.06 (-0.22, 0.10)	0.46	1
Service Branch: Army	-0.06 (-0.18, 0.07)	0.37	1	-0.04 (-0.22, 0.13)	0.63	1	0.00 (-0.13, 0.12)	0.96	1	-0.09 (-0.21, 0.03)	0.13	0.91
Marine Corps	-0.04 (-0.21, 0.12)	0.61	1	0.16 (-0.07, 0.39)	0.18	1	0.06 (-0.10, 0.22)	0.46	1	-0.05 (-0.21, 0.10)	0.50	1
Current Military: Yes	0.07 (-0.04, 0.19)	0.22	1	0.09 (-0.07, 0.26)	0.28	1	0.00 (-0.11, 0.12)	0.94	1	0.08 (-0.04, 0.19)	0.19	1
Deployed Time (yr)	0.00 (-0.04, 0.05)	0.88	1	-0.02 (-0.08, 0.05)	0.60	1	0.05 (0.01, 0.10)	0.026	0.18	0.01 (-0.03, 0.06)	0.55	1
Combat Intensity (10 × DRRI-2-C)	-0.01 (-0.05, 0.02)	0.45	1	0.04 (-0.01, 0.09)	0.14	0.98	0.00 (-0.04, 0.04)	0.96	1	-0.01 (-0.05, 0.03)	0.57	1
Depression (PHQ9)	0.00 (-0.01, 0.01)	0.87	1	-0.02 (-0.03, 0.00)	0.12	0.84	0.00 (-0.02, 0.01)	0.81	1	0.01 (-0.01, 0.02)	0.42	1
Pain (TBIQOL)	0.00 (0.00, 0.01)	0.23	1	0.00 (-0.01, 0.01)	0.69	1	0.00 (0.00, 0.01)	0.23	1	0.00 (-0.01, 0.00)	0.32	1
Premorbid IQ est (NIHTB-CB pic vocab)	0.03 (0.02, 0.03)	<0.001	0.01	0.01 (0.00, 0.02)	0.012	0.02	0.01 (0.01, 0.02)	<0.001	0.01	0.03 (0.02, 0.04)	<0.001	0.01
PTSD (PCL5)	0.00 (-0.01, 0.00)	0.10	0.6	0.00 (-0.01, 0.00)	0.40	1	0.00 (-0.01, 0.00)	0.51	1	0.00 (-0.01, 0.00)	0.054	0.38
ETOH: Yes, non-hazardous	-0.05 (-0.15, 0.06)	0.38	1	-0.02 (-0.16, 0.12)	0.80	1	-0.04 (-0.14, 0.06)	0.42	1	0.01 (-0.09, 0.11)	0.85	1
Not user	-0.13 (-0.27, 0.00)	0.06	0.36	-0.05 (-0.24, 0.14)	0.58	1	-0.14 (-0.27, 0.00)	0.048	0.34	-0.01 (-0.14, 0.12)	0.83	1
Sleep Problems (PSQI)	0.01 (0.00, 0.02)	0.16	0.96	0.01 (-0.01, 0.03)	0.32	1	0.00 (-0.02, 0.01)	0.60	1	0.01 (0.00, 0.02)	0.08	0.56
Sleep Apnea High Risk (STOP-BANG)	-0.06 (-0.18, 0.06)	0.34	1	0.12 (-0.04, 0.29)	0.15	1	-0.08 (-0.20, 0.04)	0.18	1	-0.03 (-0.14, 0.09)	0.66	1
Controlled Blast Exposure: Low (1-9)	0.05 (-0.07, 0.16)	0.43	1	0.09 (-0.07, 0.26)	0.28	1	-0.03 (-0.14, 0.09)	0.67	1	0.07 (-0.05, 0.18)	0.26	1
Medium (10-89)	0.00 (-0.13, 0.13)	0.95	1	-0.02 (-0.20, 0.16)	0.80	1	-0.05 (-0.18, 0.08)	0.43	1	0.04 (-0.08, 0.17)	0.48	1
Heavy (>89)	0.04 (-0.12, 0.20)	0.66	1	0.02 (-0.21, 0.25)	0.86	1	-0.04 (-0.20, 0.12)	0.61	1	0.09 (-0.06, 0.25)	0.23	1
Somsens Sympt (NSI)	0.00 (-0.02, 0.01)	0.89	1	0.00 (-0.02, 0.02)	0.91	1	-0.01 (-0.02, 0.01)	0.49	1	-0.01 (-0.03, 0.00)	0.18	1
Vestib Sympt (NSI)	-0.01 (-0.04, 0.02)	0.70	1	-0.02 (-0.06, 0.03)	0.48	1	-0.02 (-0.05, 0.01)	0.23	1	-0.01 (-0.04, 0.02)	0.67	1
First TBI (yrs. since)	0.01 (0.00, 0.01)	0.021	0.15	0.00 (-0.01, 0.01)	0.84	1	0.00 (0.00, 0.01)	0.55	1	0.01 (0.00, 0.01)	0.06	0.36
Last TBI (yrs. since)	-0.01 (-0.02, 0.00)	0.009	0.06	0.01 (0.00, 0.02)	0.23	1	0.00 (-0.01, 0.01)	0.71	1	0.00 (-0.01, 0.00)	0.33	1

Notes: Bolded covariates are significant after P < 0.05 corrected for multiple comparisons.

Number of observations used to fit model, in order, are: 1129,1127,1129,1129

Table S6B. Sensitivity Analysis with TBI negative controls removed and # years since mTBI added as covariates (continued)

variable	Executive Function			Verbal Fluency			Fine Motor & Dexterity		
	Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value		Coefficient (95% CI)	p-value	
		Raw	Adjust		Raw	Adjust		Raw	Adjust
Groups: 3+ mTBIs	0.03 (-0.06, 0.13)	0.49	1	0.18 (0.03, 0.32)	0.015	0.1	0.04 (-0.10, 0.19)	0.56	1
Age	-0.02 (-0.03,-0.01)	<0.001	0.01	-0.02 (-0.02,-0.01)	<0.001	0.01	-0.04 (-0.05,-0.03)	<0.001	0.01
Gender: Male	-0.04 (-0.17, 0.09)	0.54	1	-0.02 (-0.22, 0.17)	0.83	1	-0.31 (-0.51,-0.10)	0.004	0.02
Race/Ethnicity: Non-Hispanic White/Asian	0.14 (0.06, 0.23)	<0.001	0.01	0.02 (-0.11, 0.14)	0.77	0.77	0.08 (-0.05, 0.21)	0.22	0.76
Married: Married/couple	-0.01 (-0.10, 0.08)	0.85	1	-0.08 (-0.22, 0.05)	0.22	1	-0.05 (-0.19, 0.10)	0.54	1
Never married	-0.07 (-0.18, 0.05)	0.26	1	-0.02 (-0.19, 0.16)	0.87	1	-0.18 (-0.37, 0.01)	0.06	0.42
Education: Some College	0.10 (-0.02, 0.21)	0.10	0.5	0.04 (-0.13, 0.21)	0.67	1	0.17 (-0.01, 0.36)	0.06	0.36
College Graduate	0.10 (-0.02, 0.21)	0.11	0.32	0.16 (-0.02, 0.33)	0.08	0.32	0.34 (0.15, 0.53)	<0.001	0.01
BMI	0.00 (-0.01, 0.00)	0.26	1	0.00 (-0.01, 0.01)	0.59	1	-0.01 (-0.03, 0.00)	0.028	0.2
ADD: Yes	-0.12 (-0.25, 0.01)	0.08	0.48	-0.11 (-0.31, 0.09)	0.27	1	0.15 (-0.06, 0.36)	0.17	0.85
Service Branch: Army	-0.03 (-0.13, 0.07)	0.53	1	-0.06 (-0.21, 0.09)	0.45	1	-0.03 (-0.18, 0.13)	0.74	1
Marine Corps	-0.03 (-0.16, 0.10)	0.69	1	-0.06 (-0.26, 0.13)	0.53	1	-0.03 (-0.24, 0.17)	0.74	1
Current Military: Yes	0.01 (-0.08, 0.11)	0.80	1	0.03 (-0.11, 0.17)	0.67	1	0.04 (-0.11, 0.19)	0.59	1
Deployed Time (yr)	0.00 (-0.04, 0.03)	0.82	1	0.03 (-0.03, 0.08)	0.32	1	0.01 (-0.05, 0.07)	0.73	1
Combat Intensity (10 × DRR1-2-C)	0.02 (-0.01, 0.05)	0.15	0.98	0.00 (-0.04, 0.05)	0.94	1	-0.01 (-0.06, 0.04)	0.61	1
Depression (PHQ9)	-0.01 (-0.02, 0.00)	0.19	1	0.00 (-0.02, 0.02)	0.92	1	-0.01 (-0.03, 0.01)	0.35	1
Pain (TBIQOL)	0.00 (0.00, 0.01)	0.57	1	0.00 (-0.01, 0.01)	0.65	1	0.00 (0.00, 0.01)	0.32	1
Premorbid IQ est (NIHTB-CB pic vocab)	0.02 (0.01, 0.02)	<0.001	0.01	0.03 (0.03, 0.04)	<0.001	0.01	0.01 (0.00, 0.02)	0.018	0.02
PTSD (PCL5)	0.00 (-0.01, 0.00)	0.37	1	0.00 (-0.01, 0.00)	0.40	1	0.00 (-0.01, 0.00)	0.14	0.7
ETOH: Yes, non-hazardous	-0.06 (-0.14, 0.02)	0.15	1	-0.03 (-0.15, 0.09)	0.66	1	0.04 (-0.09, 0.17)	0.55	1
Not user	-0.09 (-0.20, 0.02)	0.10	0.5	-0.02 (-0.18, 0.14)	0.81	1	0.00 (-0.17, 0.17)	0.99	1
Sleep Problems (PSQI)	0.00 (-0.01, 0.01)	0.86	1	-0.01 (-0.02, 0.01)	0.48	1	0.00 (-0.02, 0.02)	0.94	1
Sleep Apnea High Risk (STOP-BANG)	0.07 (-0.03, 0.16)	0.17	1	0.04 (-0.10, 0.18)	0.57	1	0.01 (-0.14, 0.16)	0.90	1
Controlled Blast Exposure: Low (1-9)	0.01 (-0.08, 0.10)	0.85	1	0.10 (-0.04, 0.24)	0.15	1	0.05 (-0.10, 0.19)	0.55	1
Medium (10-89)	-0.01 (-0.11, 0.09)	0.86	1	-0.10 (-0.26, 0.05)	0.19	1	0.12 (-0.05, 0.28)	0.16	1
Heavy (>89)	0.01 (-0.12, 0.13)	0.92	1	0.15 (-0.04, 0.35)	0.11	0.77	0.02 (-0.18, 0.22)	0.86	1
Somsens Sympt (NSI)	-0.01 (-0.02, 0.00)	0.11	0.77	-0.01 (-0.03, 0.01)	0.32	1	-0.01 (-0.03, 0.01)	0.56	1
Vestib Sympt (NSI)	-0.01 (-0.03, 0.02)	0.63	1	-0.01 (-0.05, 0.02)	0.43	1	-0.04 (-0.08,-0.01)	0.023	0.16
First TBI (yrs. since)	0.00 (0.00, 0.01)	0.41	1	0.00 (-0.01, 0.01)	0.55	1	0.00 (-0.01, 0.01)	0.75	1
Last TBI (yrs. since)	0.00 (0.00, 0.01)	0.68	1	0.01 (0.00, 0.01)	0.19	1	0.00 (0.00, 0.01)	0.35	1

Notes: Bolded covariates are significant after P < 0.05 corrected for multiple comparisons.

Number of observations used to fit model, in order, are: 1129,1127,1129,1129