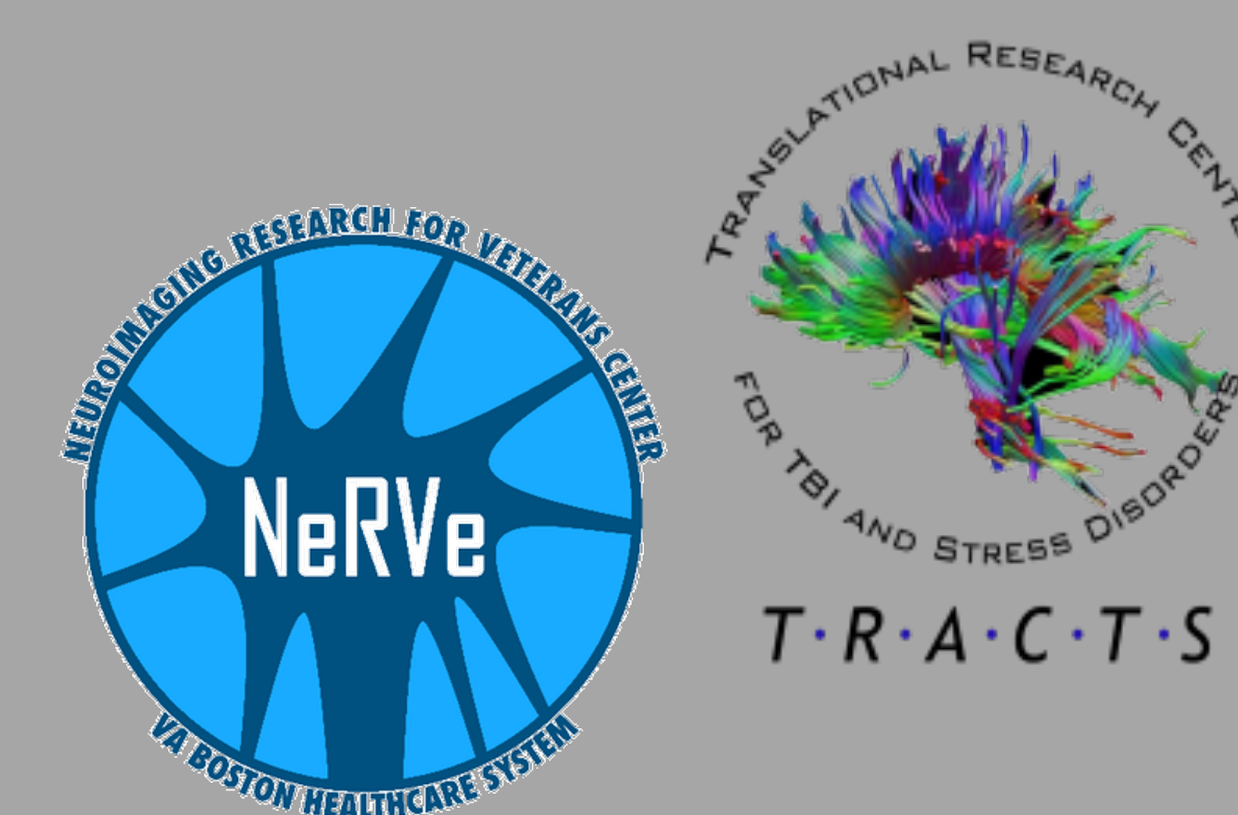


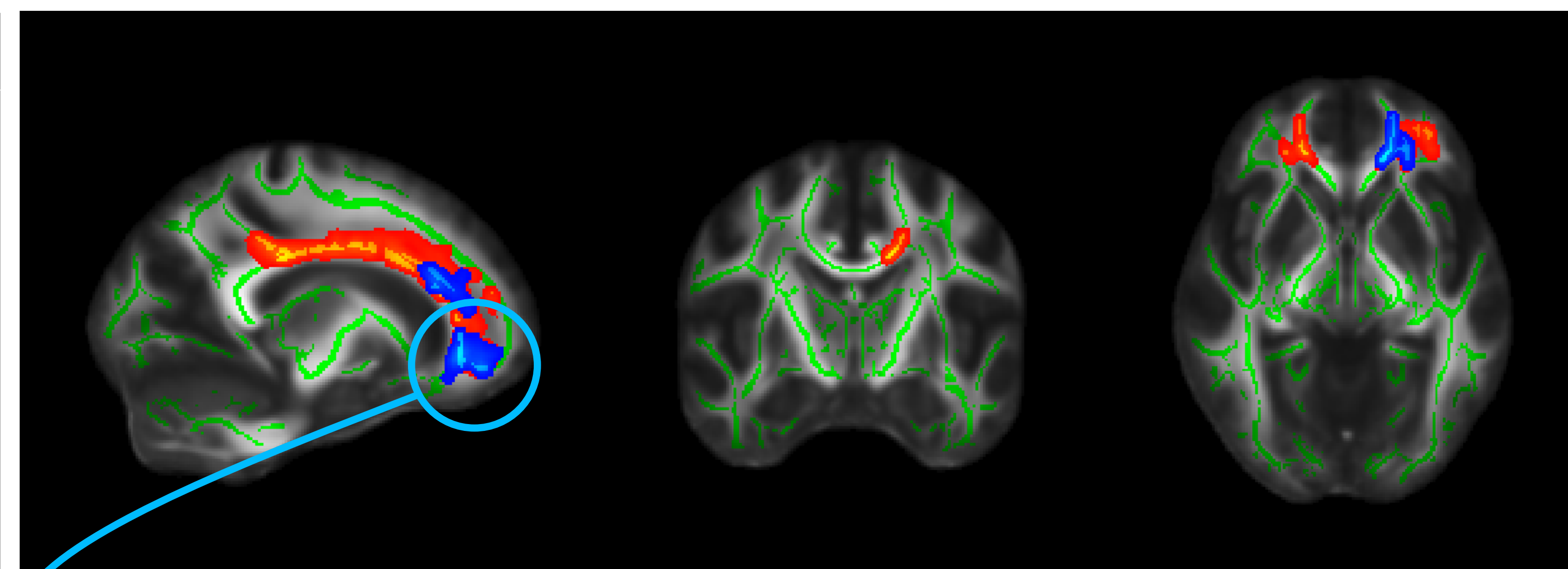
Military Blast Exposure and PTSD are Associated with Aging White Matter Integrity and Functioning

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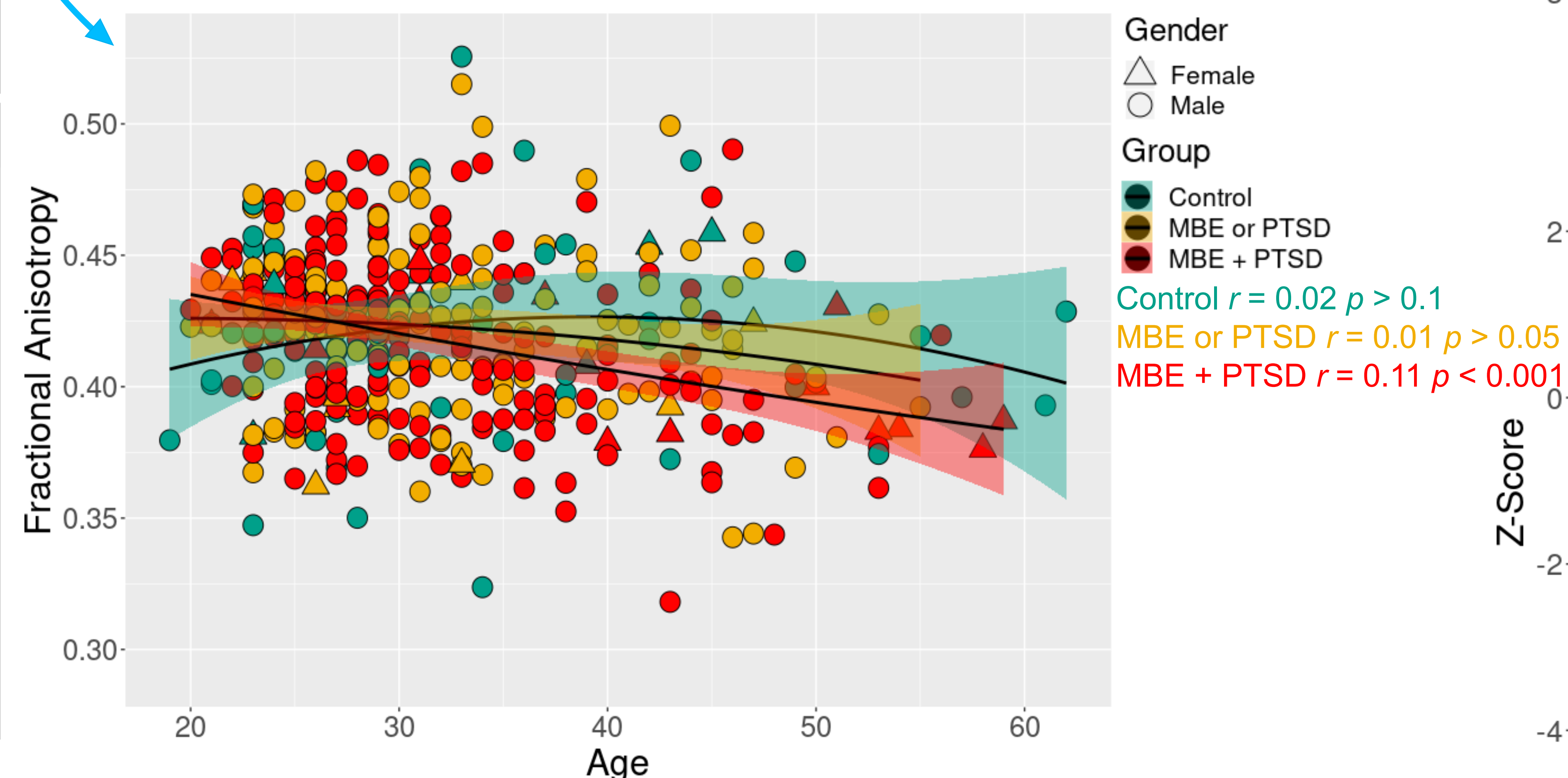


Background

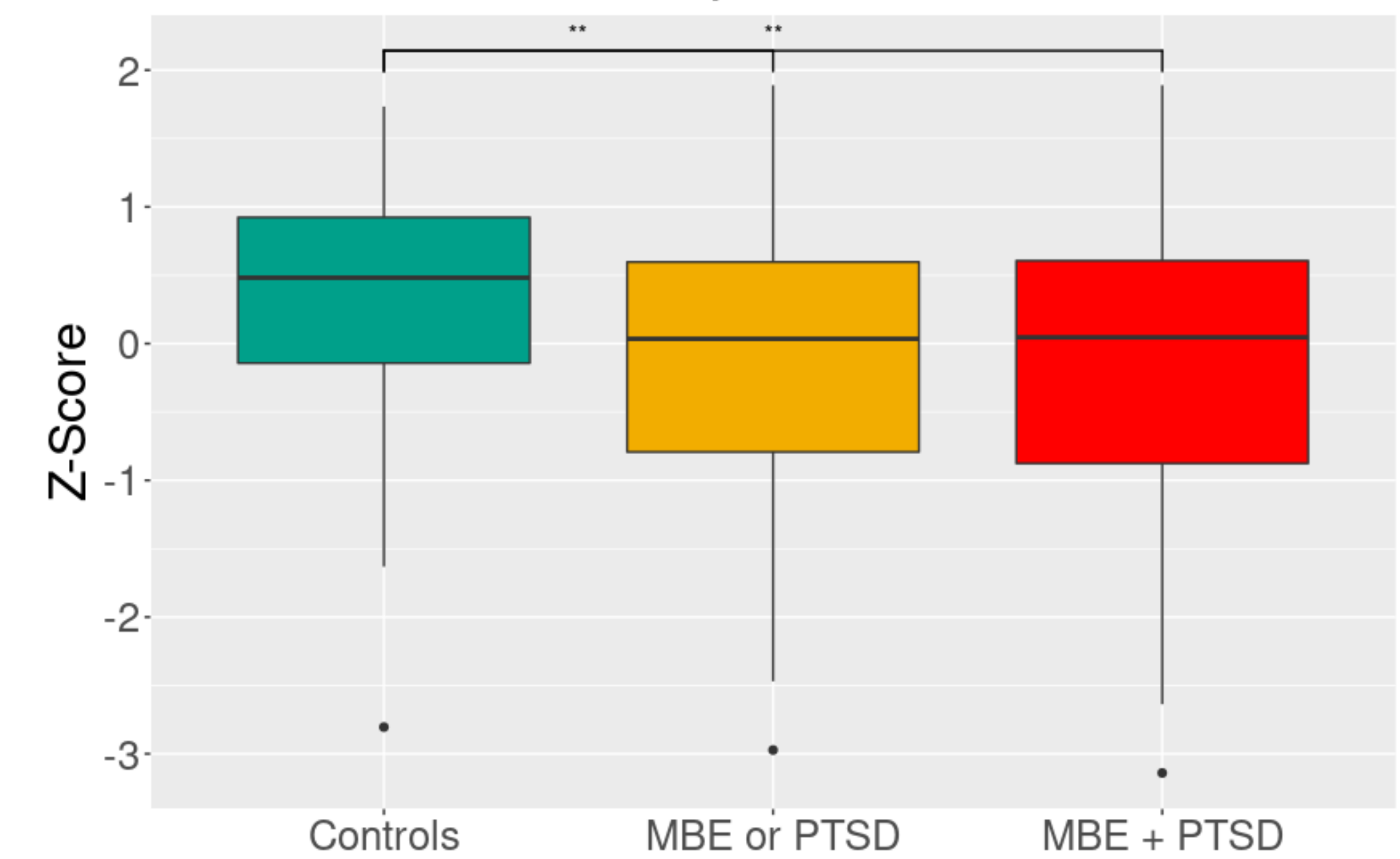
- Military blast exposure (MBE) and posttraumatic stress disorder (PTSD) have been independently associated with alterations in structural integrity, functional connectivity, and neurocognitive function¹⁻⁴
- Group differences in cognitive functioning of Veterans with MBE have been linked to PTSD status¹
- Combined effects of MBE and PTSD on neural integrity and cognition have yet to be explored
- We hypothesized that Veterans with history of both MBE and PTSD would show evidence of accelerated aging at the microstructural level accompanied by cognitive deficits



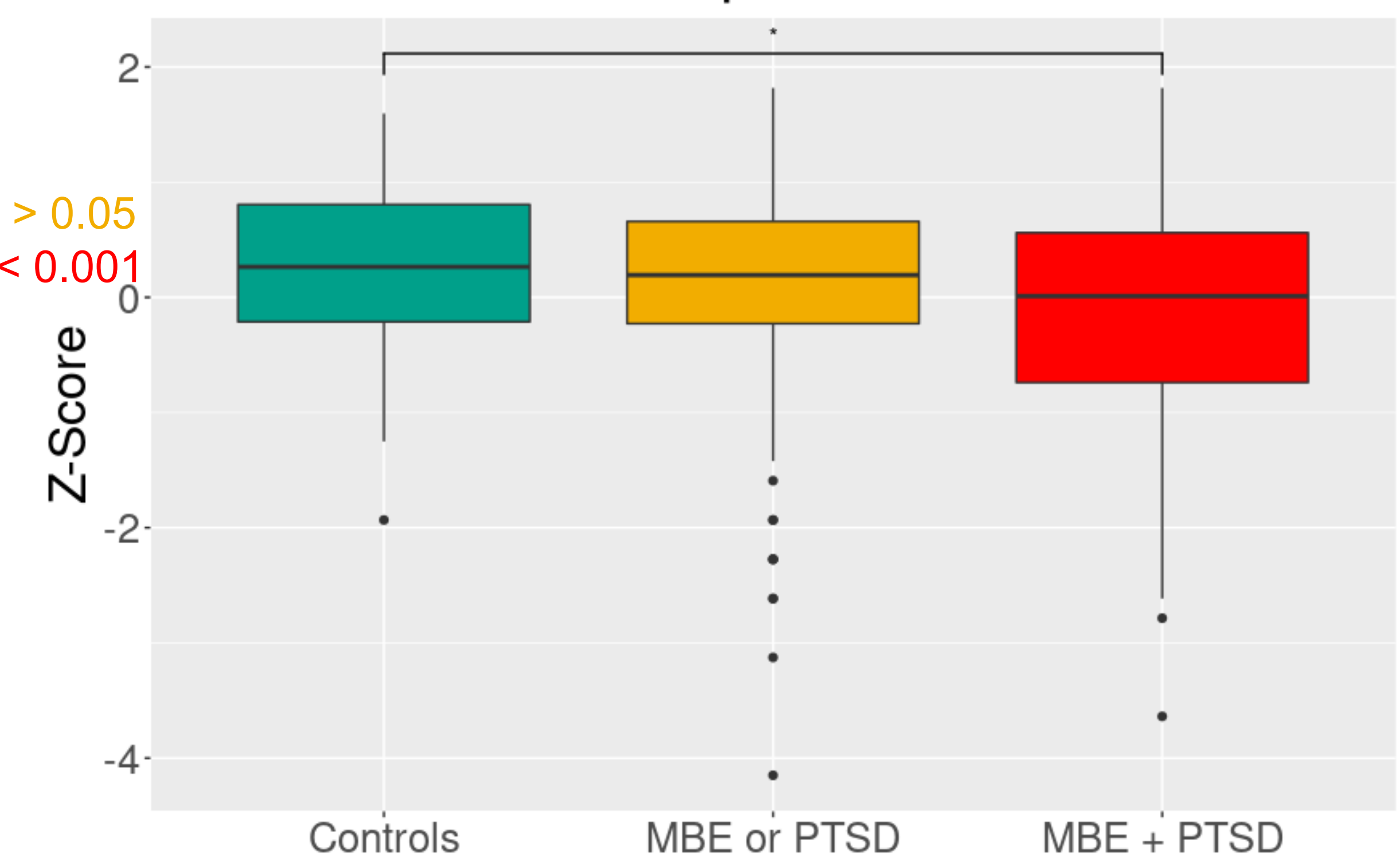
Mean Fractional Anisotropy by Age in the Left Medial Orbitofrontal Cortex



CVLT Composite Z-Scores



BVMT Composite Z-Scores



Methods

- Cross-section of post-9/11 U.S. Veterans ($n = 395$) from the Translational Research Center for TBI and Stress Disorders
- MBE and TBI status were established using the BAT-L, and PTSD with the CAPS-IV
- Memory-targeted cognitive assessments (CVLT, BVMT-R) were standardized and averaged to create a composite
- Diffusion-weighted images 60 directions were acquired using 3T Siemens Magnetom Tim Trio and Prisma^{fit} (Trio-upgrade) and processed using FreeSurfer and FSL software suites

	MBE ⁻ and PTSD ⁻ $n = 51$	MBE ⁺ or PTSD ⁺ $n = 146$	MBE ⁺ and PTSD ⁺ $n = 198$
Age	33.2 ± 10.8	32.2 ± 7.9	32.3 ± 8.2
Gender (M/F)	45/6	135/11	183/15
CAPS-IV current score	15.8 ± 14.8	34.4 ± 24.3	69.1 ± 18.8
Number mild TBI	0.7 ± 0.8	1.2 ± 1.6	1.9 ± 2.5
Years of education	14.3 ± 2.1	14.2 ± 2.1	13.7 ± 1.8
Lifetime drinking history (average)	5.2 ± 3.4	5.4 ± 3.1	6.9 ± 4.2

Results

- Age interaction on diffusion parameters, controlling for scanner, gender, education, and lifetime drinking history:
 - MBE + PTSD group had a stronger association of white matter integrity with age than other groups ($p < 0.01$)
- Distinct regions of lower fractional anisotropy (FA) and higher radial diffusivity (RD) in the MBE + PTSD group
- No significance in matched regression of MBE + PTSD with or without TBI
- MBE + PTSD group performed worse on memory-targeted cognitive assessments ($p < 0.05$)

Conclusions

- MBE + PTSD was associated with accelerated age-associated neurodegeneration of white matter tissue
- MBE + PTSD indirectly influenced memory-targeted cognitive task performance
- MBE individuals showed decreased brain tissue integrity, even in the absence of TBI
- MBE + PTSD may be more vulnerable to effects of neural compromise on cognitive decline
- Future work includes longitudinal assessment of brain tissue integrity and a more nuanced analysis of PTSD and blast exposure profiles

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