Modeling post-trauma symptoms over time: interaction of sex and traumatic brain injury

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Background and research question

- Female sex is a critical risk factor for worse symptoms in both post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI)
- Do trauma-exposed female individuals with TBI report greater symptom burdens?

Methods

- Participants (N=2,943, 61.8% female) were recruited to the AURORA study from ED waiting rooms following a qualifying traumatic event
- TBI was established using the ACRM criteria (N_{TBI}=842, 56.9% female) and somatic, PTSD, and depression symptoms were assessed through 12 months post-trauma
- Linear mixed effects models were used to examine the main effects of sex, TBI, and time and the interaction effects, adjusted for age, ISS, perceived fatality risk, income, race/ethnicity, and trauma type

Results

- Main effects of TBI, sex, and time were observed for somatic, PTSD, and depression symptoms, such that participants with TBI and female participants exhibited worse symptoms, and all symptoms decreased over time (Fig 1, Table 1)
- The difference between TBI versus no TBI decreased over time for somatic and PTSD symptoms (Fig 1A-B)
- The sex difference in PTSD symptoms decreased over time (Fig 1B)
- The sex difference between TBI versus no TBI decreased over time for depression symptoms (Fig 1C)

Implications

- Following trauma exposure, screening for possible TBI may identify those at risk for worse symptoms

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Figure 1. Trajectories of (A) somatic, (B), PTSD, and (C) depression symptoms over time, by TBI status and sex.
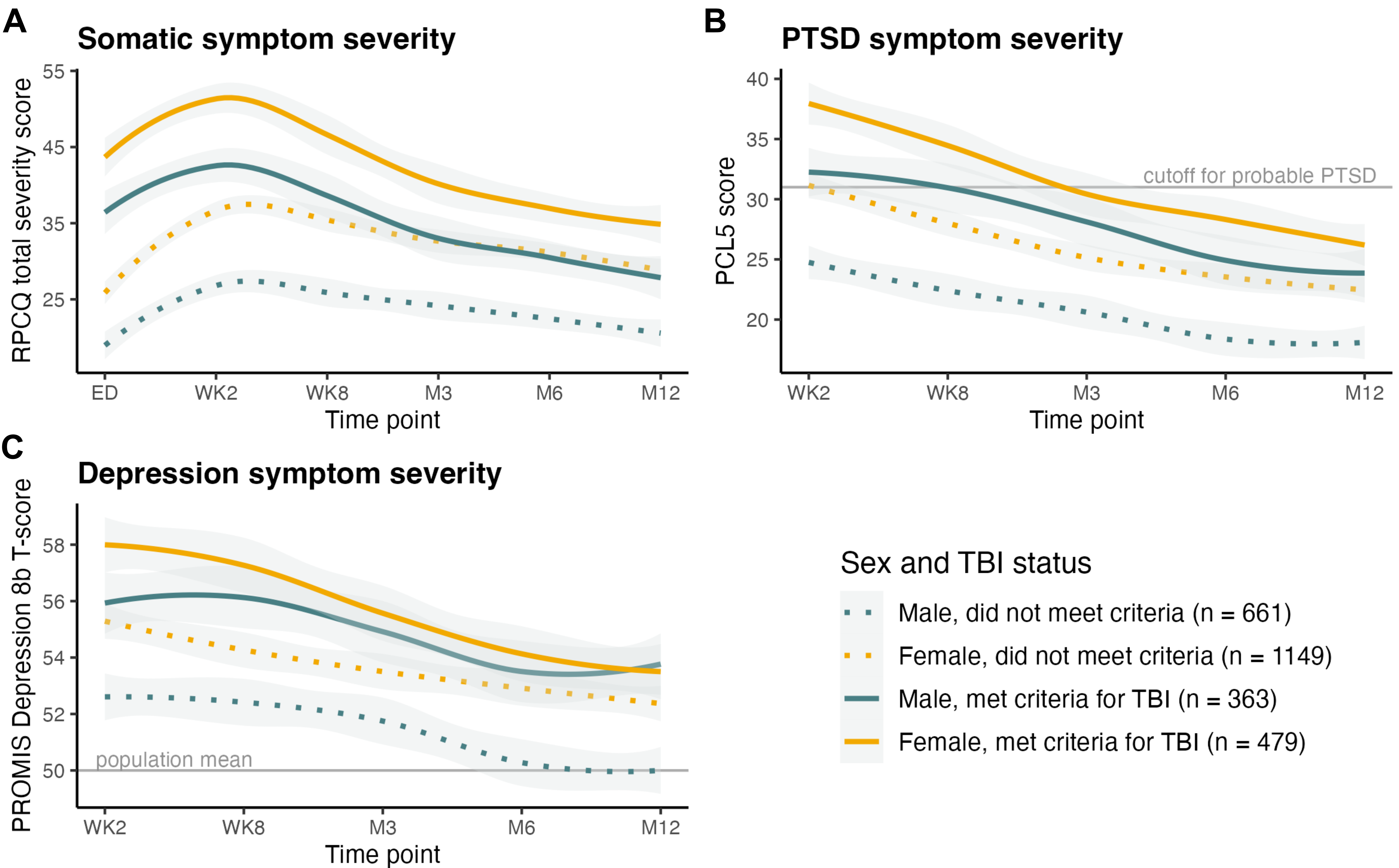

Sex and TBI status
- Male, did not meet criteria (n = 661)
- Female, did not meet criteria (n = 1149)
- Male, met criteria for TBI (n = 363)
- Female, met criteria for TBI (n = 479)

Table 1. Linear mixed model regression results.

	Somatic symptoms	PTSD symptoms	Depression symptoms
Female sex	**8.83 (6.63 – 11.03), p<.001**	**6.49 (4.72 – 8.26), p<.001**	**2.34 (1.35 – 3.33), p<.001**
Met TBI criteria	**13.43 (10.46 – 16.39), p<.001**	**6.97 (4.59 – 9.34), p<.001**	**2.56 (1.23 – 3.90), p<.001**
Time	**-3.68 (-5.61 – -1.76), p<.001**	**-6.06 (-7.42 – -4.70), p<.001**	**-3.03 (-3.85 – -2.22), p<.001**
TBI x time	**-9.69 (-12.91 – -6.48), p<.001**	**-2.35 (-4.62 – -0.08), p=.042**	0.62 (-0.74 – 1.98), p=.368
Sex x time	0.51 (-1.89 – 2.90), p=.679	**-1.97 (-3.66 – -0.28), p=.022**	0.35 (-0.66 – 1.37), p=.493
TBI x sex	-1.78 (-5.56 – 1.99), p=.354	-2.39 (-5.42 – 0.64), p=.123	-0.97 (-2.68 – 0.74), p=.266
TBI x sex x time	-1.73 (-5.88 – 2.42), p=.414	-0.72 (-3.65 – 2.21), p=.629	**-2.27(-4.03 – -0.52), p=.011**