Sex-specific Association Between High Traumatic Stress Exposure and Social Cognitive Functioning in Youth

Supplemental Information

Supplemental Analyses

Angry and Sad Bias on the Emotion Identification Test

Supplemental analyses were conducted to examine whether the increased identification of angry expressions seen in males with traumatic stress exposure was due to an overall response bias for angry. A score representing the percent total incorrect angry responses was calculated. As was done in the main analyses, linear and non-linear age effects and socioeconomic status (SES) were regressed out of the angry response bias score. A two-by-two ANOVA, with Group (High exposure, No exposure) and Sex (Male, Female) as between subjects' factors, revealed no significant effect of Group, Sex, or Group-by-Sex. All F's$(1,5982)<1$ and p's$>.40$. Thus, the increased identification of angry expressions seen in males exposed to stress does not appear to be due to a bias to respond with identification of angry emotion.

Matched Group Analyses

The main text presents analyses, controlling for age and SES by regressing out these variables from the main outcome variables. Here, we present parallel analyses to those presented in the main text using non stress exposed controls that are matched on age, SES, as well as sex and race to the 830 participants in the high stress exposure group.

Age Differentiation Test

For overall accuracy, the two-by-two ANOVA revealed a main effect of Sex, $F(1,1621)=9.88$, $p=.002$, Cohen's $d=0.16$. The main effect of Group was not significant, $F(1,1621)<1$. The Sex-by-Group interaction was not significant, $F(1,1621)=3.45$, $p=.06$.

Emotion Identification Test

For overall accuracy, the two-by-two ANOVA revealed a main effect of Group, $F(1,1644)=4.59$, $p=.03$, Cohen's $d=0.10$. Neither the main effect of Sex, $F(1,1644)=2.26$, $p=.13$, or the Sex-by-Group interaction, $F(1,1644)=1.87$, $p=.17$, were significant. In the main text, results showed a significant Sex-by-Group interaction, which was driven by males in the high traumatic stress exposure group outperforming males in the no traumatic stress exposure group. Using the matched stress groups, these post-hoc analyses were also significant: males in the high stress group outperformed males in the control group on identifying angry facial expressions, $t(780.84)= -3.51$, $p<.001$, Cohen's $d=0.25$, and sad facial expressions at trend level significance, $t(771.52)= -2.23$, $p=.03$, Cohen's $d=0.16$.   The male groups did not differ in their ability to identify happy, fear or neutral, all p's $>.42$. There were no group differences detected in the females, p's$>.40$.

Emotion Differentiation Test

For overall accuracy, the two-by-two ANOVA revealed a main effect of Group, $F(1,1635)=3.82$, $p=.05$, Cohen's $d=0.10$, and Sex, $F(1,1635)=9.08$, $p=.003$, Cohen's $d=0.15$. The Sex-by-Group interaction was at trend level significance, $F(1,1635)=3.39$, $p=.07$. In the main text, results showed a significant Sex-by-Group interaction, which was driven by females in the high traumatic stress exposure group performing less accurately than females in the no traumatic stress exposure group in differentiating the intensity of happy emotions and a trend level difference in differentiating angry emotion intensity. Using the matched stress groups, the post-hoc analyses revealed that for

females, groups significantly differed on happy, $t(837)= 2.59$, $p=.01$, Cohen's $d=0.18$, and angry, $t(837)=2.90$, $p=.004$, Cohen's $d=0.20$, expressions. The female groups did not differ on differentiating between intensities of fear, $t(837)=1.78$, $p=.08$, Cohen's $d=0.12$, and sad expressions, $t(837)= 1.72$, $p=.09$, Cohen's $d=0.12$. There were no group differences detected in the males, $p's>.35$.

Table S1. Demographics of trauma exposed participants grouped by lifetime PTSD diagnosis.

	No PTSD N=440	PTSD N=390	Test	t/X^2	P-value
Age, years (SD)	16.4 (3)	16.9 (3.1)	T-Test	2.2	.029
Sex Male, N (%)	276 (62.7%)	140 (35.9%)	Chi-square	59.53	<.001
SES z-score (SD)	-.46 (1)	-.61 (1)	T-Test	2.1	.037
Caucasian, N (%)	159 (36.1%)	118 (30.3%)	Chi-square	3.22	.073

Table S2. Demographics of male study participants grouped by conduct diagnosis.

	No conduct N=2763	Conduct N=197	Test	t/X^2	P-value
Age, years (SD)	13.4 (2.9)	15.1 (3.7)	T-Test	6.4	<.001
SES z-score (SD)	.136 (.94)	-.593 (1.03)	T-Test	10.5	<.001
Caucasian, N (%)	1725 (62.4%)	58 (29.4%)	Chi-square	84	<.001

Table S3. Demographics of study female participants grouped by depression diagnosis.

	No depression N=2691	Depression N=383	Test	t/X^2	P-value
Age, years (SD)	13.8 (2.9)	16.4 (3.7)	T-Test	13	<.001
SES z-score (SD)	.055 (.99)	.003 (1.02)	T-Test	0.09	0.035
Caucasian, N (%)	1516 (56.3%)	221 (57.7%)	Chi-square	2.55	0.614

Table S4. Accuracy in emotion related social cognition tasks grouped by sex and PTSD diagnosis in youth exposed to traumatic stress.

	Males		Females	
	No PTSD (N=275)	PTSD (N=138)	No PTSD (N=164)	PTSD (N=249)
Emotion Identification Overall Accuracy, Mean (SD)	.0652 (.95)	.0529 (.90)	-.005 (1.10)	.0125 (1.00)
Emotion Differentiation Overall Accuracy, Mean (SD)	-.0130 (1.09)	-0.005 (1.08)	-.038 (1.13)	-.013 (.98)

Table S5. Social cognition differences in youth exposed to traumatic stress with and without PTSD.

Emotion Identification Test

Overall Accuracy						
	F	*df*	*p*			
PTSD	1.45	1,822	.23			
Sex	0.09	1,822	.76			
PTSD x Sex	1.85	1,822	.18			

Post-Hoc Tests		Males			Females	
	t	*df*	*p*	*T*	*df*	*P*
Happy: PTSD	1.27	175.55	.21	-0.69	411	.49
Sad: PTSD	-0.26	411	.79	-1.53	411	.13
Angry: PTSD	-0.21	411	.83	-1.38	411	.17
Fear: PTSD	-0.71	411	.48	-1.58	304.93	.12
Neutral: PTSD	0.44	411	.66	-0.06	411	.96

Emotion Differentiation Test

Overall Accuracy						
	F	*df*	*P*			
PTSD	0.79	1,815	.38			
Sex	0.23	1,815	.63			
PTSD x Sex	0.46	1,815	.48			

Post-Hoc Tests		Males			Females	
	t	*df*	*p*	*T*	*df*	*P*
Happy: PTSD	0.67	407	.50	-0.26	408	.80
Sad: PTSD	-1.17	407	.24	-0.81	408	.42
Angry: PTSD	-1.25	407	.21	0.23	408	.80
Fear: PTSD	-1.17	407	.24	-0.08	408	.94