**Supplementary Materials**

Byrd, AL, Tung, I, Manuck, SD, Vine, V, Horner, M, Hipwell, AE, & Stepp SD. An interaction between early threat exposure and the oxytocin receptor in females: Disorder-specific versus general risk for psychopathology and social-emotional mediators.

**Table S1**. *OXTR* Allele and Genotype Frequencies

**Table S2**. Multiple-group (GG versus AA/AG) general-specific (bi-factor) model testing *OXTR* (rs2254298) genotype differences in the association between early threat exposure and disorder-specific versus general factors of psychopathology in early adulthood.

**Table S3**. Multiple-group (GG versus AA/AG) general-specific (bi-factor) mediation models testing *OXTR* (rs2254298) genotype differences in the association between early threat exposure and psychopathology in early adulthood via social-emotional deficits in adolescence.

**Table S4**. Means and correlations for all study variables by race.

**Table S5**. Factor loadings in multiple group (GG versus AA/AG) general-specific (bi-factor) models.

**Table S6**. Multiple-group (GG versus AA/AG) general-specific (bi-factor) mediation models by race testing *OXTR* (rs53576) genotype differences in the association between early threat exposure and psychopathology in early adulthood via social-emotional deficits in adolescence.

**Table S1**. *OXTR* Allele and Genotype Frequencies

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Total Sample**  | **Caucasian**  | **African American** |
|  | **rs53576** | **rs2254298** | **rs53576** | **rs2254298** | **rs53576** | **rs2254298** |
| **Allele Frequency** | n | % |  n | % |  n | % |  n | % |  n | % |  n | % |
| A | 1053 | 26% | 680 | 17% | 475 | 30% | 196 | 12% | 576 | 24% | 484 | 20% |
| G | 2961 | 74% | 3366 | 83% | 1113 | 70% | 1414 | 88% | 1844 | 76% | 1946 | 80% |
| **Genotype Frequency** |  |  |  |  |  |  |  |  |  |  |  |  |
| AA | 128 | 6% | 55 | 3% | 61 | 8% | 11 | 1% | 67 | 5% | 44 | 4% |
| AG | 797 | 40% | 570 | 28% | 353 | 44% | 174 | 22% | 442 | 37% | 396 | 32% |
| GG | 1082 | 54% | 1398 | 69% | 380 | 48% | 620 | 77% | 701 | 58% | 775 | 64% |
| **Dichotomized Genotypes** |  |  |  |  |  |  |  |  |  |  |  |  |
| AA/AG | 925 | 46% | 625 | 31% | 414 | 52% | 185 | 23% | 509 | 42% | 440 | 36% |
| GG | 1082 | 54% | 1398 | 69% | 380 | 48% | 620 | 77% | 701 | 58% | 775 | 64% |

**Table S2**. Multiple-group (GG versus AA/AG) general-specific (bi-factor) model testing *OXTR* (rs2254298) genotype differences in the association between early threat exposure and disorder-specific versus general factors of psychopathology in early adulthood.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **GG** | **AA/AG** | **Wald Difference Test** |
|  | β | SE | *p* | β | SE | *p* | Wald | df | *p* |
| Threat Exposure → General Factor | 0.078 | 0.058 | 0.180 | 0.038 | 0.151 | 0.803 | 0.080 | 1 | 0.777 |
| Threat Exposure → DEP  | 0.094 | 0.221 | 0.670 | 0.298 | 0.386 | 0.440 | 0.264 | 1 | 0.608 |
| Threat Exposure → ANX  | 0.029 | 0.125 | 0.815 | 0.171 | 0.361 | 0.637 | 0.199 | 1 | 0.655 |
| Threat Exposure → BPD  | **0.234** | **0.108** | **0.031** | 0.280 | 0.308 | 0.362 | 0.022 | 1 | 0.883 |
| Threat Exposure → ASPD  | *0.119*  | *0.060* | *0.049* | 0.112 | 0.162 | 0.491 | 0.017 | 1 | 0.898 |

Note. Standardized (β) coefficients were estimated separately for each *OXTR* (rs2254298) group. Overall model fit was good (χ2 (470) = 1020.757, *p* < .05; RMSEA = .03; CFI = .97).ANX=anxiety symptom severity; ASPD=antisocial personality disorder symptom severity; BPD=borderline personality disorder symptom severity; DEP=depression symptom severity; *OXTR*=oxytocin receptor. Significant associations are bolded and represent effects after accounting for race, receipt of public assistance, cohort, and number of years with available threat exposure data.

**Table S3**. Multiple-group (GG versus AA/AG) general-specific (bi-factor) mediation models testing *OXTR* (rs2254298) genotype differences in the association between early threat exposure and psychopathology in early adulthood via social-emotional deficits in adolescence.

|  |  |  |  |
| --- | --- | --- | --- |
|   | **GG** | **AA/AG** | **Wald Difference Test** |
|   | b | SE | *p* | b | SE | *p* | Wald | df | *p* |
| **Direct Path** |  |  |  |  |  |  |  |  |  |
|  Threat Exposure ® General Factor | -0.304 | 0.251 | 0.226 | -0.445 | 0.255 | 0.075 | 0.353 | 1 | 0.553 |
|   |  |  |  |  |  |  |  |  |  |
| **Indirect Paths via Emotion Dysregulation** |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Emotion Dysregulation | **0.110** | **0.031** | **0.000** | **0.211** | **0.032** | **0.000** | **5.150** | **1** | **0.023** |
|  Emotion Dysregulation ® General Factor | **0.537** | **0.054** | **0.000** | **0.500** | **0.072** | **0.000** | 1.097 | 1 | 0.295 |
|  Indirect Effect via Emotion Dysregulation | **0.059** | **0.018** | **0.001** | **0.106** | **0.023** | **0.000** | **5.896** | **1** | **0.015** |
| **Indirect Paths via Callousness** |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Callousness | **0.220** | **0.028** | **0.000** | **0.197** | **0.031** | **0.000** | 0.072 | 1 | 0.788 |
|  Callousness ® General Factor | **-0.123** | **0.034** | **0.000** | **-0.141** | **0.037** | **0.000** | 0.441 | 1 | 0.507 |
|  Indirect Effect via Callousness | **-0.028** | **0.008** | **0.001** | **-0.028** | **0.009** | **0.001** | 0.188 | 1 | 0.664 |
| **Indirect Paths via Quality of Attachment** |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Quality of Attachment | **-0.105** | **0.031** | **0.001** | **-0.090** | **0.034** | **0.008** | 0.082 | 1 | 0.774 |
|  Quality of Attachment ® General Factor | **-0.143** | **0.033** | **0.000** | **-0.150** | **0.036** | **0.000** | 0.425 | 1 | 0.515 |
|  Indirect Effect via Quality of Attachment |  **0.015** | **0.006** | **0.008** | **0.013** | **0.006** | **0.027** | 0.010 | 1 | 0.919 |

Note. Standardized (β) coefficients were estimated separately for each *OXTR* (rs2254298) group. Overall model fit was good (χ2 (470) = 1470.851, *p* < .05; RMSEA = .04; CFI = .95).

All effects are after accounting for the effects of early threat exposure on all specific factors as well as the effect of race, receipt of public assistance, cohort, and number of years with available threat exposure data.

**Table S4**. Means and correlations for all study variables by race.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   |   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|  | Mean/% (SD) | 53%\* | 42%\* | 0.93\* (1.10) | 6.78\* (3.53) | 3.76\* (1.60) | 2.74 (0.35) | 6.31 (3.83) | 6.65\* (3.90) | 2.67\* (2.23) | 1.54 (1.74) |
| 1. Public Assistance | 19%\* |   | -.01 |  **.10\*\*** |  .05 |  **.16\*\*** |  -.02 | -.02 |  -.03 |  .02 |  -.03 |
| 2. *OXTR* (rs53576)  | 52%\* | **-.07\*** |  |  .01 | -.06 |  .01 |  .01 |  .01 |  -.01 |  .03 |  **.06\*** |
| 3. Threat Exposure (ages 5-12) | 0.53\* (0.91) |  **.21\*\*** | -.04 |  |  **.12\*\*** |  **.19\*\*** |  **-.07\*** |  **.08\*\*** | .05 |  **.10\*\*** |  **.07\*** |
| 4. Emotion Dysregulation (ages 14-17) | 5.51\* (3.61) |  **.08\*** | -.06 |  **.26\*\*** |  |  **.22\*\*** |  **-.27\*\*** |  **.40\*\*** |  **.40\*\*** |  **.49\*\*** |  **.48\*\*** |
| 5. Callousness (ages 13-17) | 2.67\* (1.56) |  **.25\*\*** | -.03 |  **.32\*\*** |  **.29\*\*** |  |  **-.19\*\*** | -.04 |  **-.07\*** |  **.06\*** |  **.09\*\*** |
| 6. Quality of Attachment (ages 13-17) | 2.72 (0.97) | **-.15\*\*** |  .01 | **-.17\*\*** | **-.35\*\*** | **-.32\*\*** |  | **-.20\*\*** |  **-.20\*\*** |  **-.21\*\*** |  **-.25\*\*** |
| 7. DEP symptom severity (ages 18-22) | 6.51 (4.12) |  .**08\*** |  .02 |  **.12\*\*** |  **.49\*\*** |  **.09\*** |  **-.29\*\*** |  |  **.82\*\*** |  **.70\*\*** |  **.49\*\*** |
| 8. ANX symptom severity (ages 18-22) | 7.20\* (3.83) |  .04 |  .01 |  **.11\*\*** |  **.50\*\*** |  **.08\*** |  **-.24\*\*** |  **.85\*\*** |  |  **.67\*\*** |  **.48\*\*** |
| 9. BPD symptom severity (ages 18-22) | 2.36\* (2.20) |  **.09\*** |  .01 |  **.20\*\*** |  **.54\*\*** |  **.15\*\*** |  **-.24\*\*** |  **.74\*\*** |  **.69\*\*** |  |  **.65\*\*** |
| 10. ASPD symptom severity (ages 18-22) | 1.63 (1.95) | .01 | -.04 |  **.14\*\*** |  **.52\*\*** |  **.15\*\*** |  **-.28\*\*** |  **.53\*\*** |  **.44\*\*** |  **.64\*\*** |  |

Note. Means and correlations below the diagonal are specific to Caucasian girls and means and correlations above the diagonal are specific to African American girls. ANX=anxiety; ASPD=antisocial personality disorder; BPD=borderline personality disorder; DEP=depression. *OXTR*=oxytocin receptor. Those means with a “\*” signify means that vary significantly (*p* < .05) by race.

Significant correlations are bolded. \**p* < .05. *\*\*p* < .01.

**Table S5**. Factor loadings in multiple group (GG versus AA/AG) general-specific (bi-factor) models.



Note. Standardized (β) coefficients were estimated separately for each *OXTR* (rs53576) group within 1) total sample; 2) Caucasian sample; and 3) African American sample. Overall model fit was good for each model: 1) χ2 (290) = 398.66, *p*<.05; RMSEA = .04; CFI = .98; 2) χ2 (290) = 628.70, *p*<.05; RMSEA = .06; CFI = .94; and 3) χ2 (290) = 495.65, *p*<.05; RMSEA = .03; CFI = .98.

Significant correlations are bolded. †*p*<.10, \**p* < .05, *\*\*p* < .01.

**Table S6**. Multiple-group (GG versus AA/AG) general-specific (bi-factor) mediation models by race testing *OXTR* (rs53576) genotype differences in the association between early threat exposure and psychopathology in early adulthood via social-emotional deficits in adolescence.

|  |  |  |  |
| --- | --- | --- | --- |
|   | **GG** | **AA/AG** | **Wald Difference Test** |
|   | b | SE | *p* | b | SE | *p* | Wald | df | *p* |
| **Caucasians** |  |  |  |  |  |  |  |  |  |
| **Direct Path** |  |  |  |  |  |  |  |  |  |
|  Threat Exposure ® General Factor | -0.026 | 0.083 | 0.751 | *0.130* | *0.076* | *0.086* | 2.350 | 1 | 0.125 |
|   |  |  |  |  |  |  |  |  |  |
| **Indirect Paths via Emotion Dysregulation** |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Emotion Dysregulation | **0.208** | **0.051** | **0.000** | **0.251** | **0.046** | **0.000** | 0.565 | 1 | 0.452 |
|  Emotion Dysregulation ® General Factor | **0.603** | **0.045** | **0.000** | **0.562** | **0.045** | **0.000** | 0.433 | 1 | 0.510 |
|  Indirect Effect via Emotion Dysregulation |  **0.125** | **0.033** | **0.000** | **0.141** | **0.028** | **0.000** | 0.887 | 1 | 0.346 |
| **Indirect Path via Callousness** |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Callousness |  **0.264** | **0.047** | **0.000** |  **0.281** | **0.045** | **0.000** | 0.230 | 1 | 0.632 |
|  Callousness ® General Factor | -0.041 | 0.056 | 0.462 | **-0.112** | **0.050** | **0.024** | 1.194 | 1 | 0.275 |
|  Indirect Effect via Callousness |  -0.011 | 0.015 | 0.466 | -0.032 | 0.015 | 0.466 | 1.343 | 1 | 0.245 |
|  **Indirect Path via Quality of Attachment** |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Quality of Attachment | **-0.181** | **0.051** | **0.000** | **-0.103** | **0.049** | **0.034** | 0.911 | 1 | 0.340 |
|  Quality of Attachment ® General Factor | **-0.162** | **0.056** | **0.004** | **-0.134** | **0.049** | **0.006** | 0.018 | 1 | 0.893 |
|  Indirect Effect via Quality of Attachment |  **0.029** | **0.013** | **0.026** | *0.014* | *0.008* | *0.095* | 0.579  | 1 | 0.447 |
|   |  |  |  |  |  |  |  |  |   |
| **African Americans** |  |  |  |  |  |  |  |  |  |
| **Direct Path** |  |  |  |  |  |  |  |  |  |
|  Threat Exposure ® General Factor | -0.271 | 0.288 | 0.346 | -0.345 | 0.334 | 0.302 | 0.135 | 1 | 0.713 |
|   |  |  |  |  |  |  |  |  |  |
| **Indirect Path via Emotion Dysregulation** |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Emotion Dysregulation | *0.067* | *0.038* | *0.083* | **0.172** | **0.044** | **0.000** | *2.993* | *1* | *0.084* |
|  Emotion Dysregulation ® General Factor | **0.504** | **0.052** | **0.000** | **0.483** | **0.068** | **0.000** | 0.154 | 1 | 0.695 |
|  Indirect Effect via Emotion Dysregulation |  *0.034* | *0.020* | *0.091* |  **0.083** | **0.025** |  **0.001** | *3.021* | *1* | *0.082* |
|  **Indirect Path via Callousnes**s |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Callousness |  **0.205** | **0.037** | **0.000** | **0.157** | **0.043** | **0.000** | 0.526 | 1 | 0.468 |
|  Callousness ® General Factor | **-0.162** | **0.04** | **0.000** | **-0.157** | **0.046** | **0.001** | 0.000 | 1 | 0.997 |
|  Indirect Effect via Callousness |  **-0.033** | **0.010** | **0.001** | **-0.025** | **0.010** | **0.013** | 0.234 | 1 | 0.629 |
| **Indirect Path via Quality of Attachmen**t |  |  |  |  |  |  |  |  |   |
|  Threat Exposure ® Quality of Attachment | *-0.066* | *0.038* | *0.083* | -0.071 | 0.045 | 0.116 | 0.001 | 1 | 0.974 |
|  Quality of Attachment ® General Factor | **-0.130** | **0.039** | **0.001** | **-0.175** | **0.048** | **0.000** | 1.017 | 1 | 0.313 |
|  Indirect Effect via Quality of Attachment |  0.009 | 0.006 | 0.125 |  0.012 | 0.009 |  0.151  | 0.179 | 1 | 0.675 |

Note. Significant associations (*p* < .05) are bolded. Trend level associations (*p* < .10) are italicized.