**Supplemental Material**

**Parental overprotection moderates the association between recent stressor exposure and anxiety during the transition to university**

Here, we present sensitivity analyses showing that the effect in the main text of higher parental overprotection and more transition to university stress predicting greater symptoms is specific to anxiety symptoms. Below, we include regression models with the General Depression subscale from the IDAS-II. We also present models that substitute transition to university stress with lifetime stressor exposure, as well as counts of specific stressor characteristics calculated from the STRAIN. The STRAIN algorithm calculates counts for each stressor characteristic by summing the stressors reported within each domain: Physical Danger (e.g., violence or life-threatening injuries); Entrapment (e.g., chronic, inescapable stressors); Humiliation (e.g., public embarrassment or rejection); Interpersonal Loss (e.g., bereavement); and Role Change or Reversal (e.g., significant shifts in life status or responsibilities).

Pearson correlations (Table S1) of all variables are included below.

Table S1. Pearson *r* correlations for variables in the main analysis: parental care, parental overprotection, transition to college stressor count, and anxiety symptoms, and additional variables of depression symptoms, lifetime stressor exposure, and lifetime counts of specific stressor characteristics (e.g., physical danger, entrapment, humiliation, interpersonal loss, role change or reversal).

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | *M* (*SD*) | Range |
| 1. Parental Care | -- |  |  |  |  |  |  |  |  |  | 25.99 (6.75) | 1, 36 |
| 2. Parental Overprotection | -.48\*\* | -- |  |  |  |  |  |  |  |  | 11.89 (6.10) | 0.5, 29.5 |
| 3. Transition to College Stressor Count | -.12 | .09 | -- |  |  |  |  |  |  |  | 3.69 (2.21) | 0, 12 |
| 4. Lifetime Stressor Count | -.35\*\* | .14\* | .38\*\* | -- |  |  |  |  |  |  | 11.54 (7.24) | 0, 46 |
| 5. Lifetime Physical Danger Count | -.14\* | .06 | .23\*\* | .73\*\* | -- |  |  |  |  |  | 1.73 (7.24) | 0, 19 |
| 6. Lifetime Entrapment Count | -.32\*\* | .20\*\* | .32\*\* | .54\*\* | .28\*\* | -- |  |  |  |  | 0.84 (0.82) | 0, 4 |
| 7. Lifetime Humiliation Count | -.47\*\* | .22\*\* | .25\*\* | .68\*\* | .37\*\* | .40\*\* | -- |  |  |  | 1.59 (1.84) | 0, 8 |
| 8. Lifetime Interpersonal Loss Count | -.22\*\* | .06 | .23\*\* | .62\*\* | .30\*\* | .21\*\* | .28\*\* | -- |  |  | 2.94 (2.04) | 0, 11 |
| 9. Lifetime Role Change Count | -.12 | .02 | .32\*\* | .75\*\* | .41\*\* | .35\*\* | .33\*\* | .35\*\* | -- |  | 3.23 (2.52) | 0, 12 |
| 10. Symptoms of Anxiety | -.14\* | .18\*\* | .30\*\* | .27\*\* | .22\*\* | .10 | .20\*\* | .10 | .25\*\* | -- | 76.87 (20.90) | 44, 143 |
| 11. Symptoms of Depression | -.13 | .05 | .26\*\* | .21\*\* | .15\*\* | .06 | .19\*\* | .16\* | .09 | .36\*\* | 44.32 (11.26) | 20, 80 |

*Note.* \* *p* < .05; \*\* *p* < .01.

As we collected symptom data with the IDAS-II, we also have participant symptoms of depression measured by the General Depression subscale. Depression and anxiety symptoms were moderately positively correlated, *r*(238) = .36, *p* < .001 (see Table S1). A linear regression was run where parental overprotection, care, and their interactions with stressor exposure were entered as predictor variables, and depression symptoms as the outcome variable (see Table S2). By examining results across separate models with depression and anxiety outcome variables, we show that interactive effects of overprotection and transition to university stressors are related to greater anxiety symptoms, but were not significantly related to depression symptoms.

Table S2. Effects of Parenting, Stressor Count, and their Interaction on Depression Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Parental Care | -0.27 | 0.24 | -0.16 | -1.15 | .252 |
| Parental Overprotection | -0.31 | 0.26 | -0.17 | -1.20 | .233 |
| Stressor Count | -0.09 | 1.83 | -0.02 | -0.05 | .960 |
| Parental Care × Stressor Count | 0.02 | 0.05 | 0.13 | 0.44 | .664 |
| Parental Overprotection × Stressor Count | 0.07 | 0.06 | 0.23 | 1.15 | .253 |

*Note.* In this model, 8.4% of the variance was explained, Adjusted R2 = .06, *F*(5, 234) = 4.30, *p* < .001.

In a similar vein, we explored if these associations were influenced by trauma-related anxiety symptoms, as Traumatic Intrusion and Traumatic Avoidance subscales from the IDAS-II were included in our anxiety composite. The correlation between the new composite scale excluding trauma and our original composite from the main text was strong and significant, *r* = .96. We ran the same regression model with the new composite scale excluding trauma (Table S3).

Table S3. Effects of Parenting, Stressor Count, and their Interaction on Anxiety Symptoms from IDAS-II without Trauma scales

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Paternal Care | -0.24 | 0.35 | -0.10 | -0.70 | .485 |
| Paternal Overprotection | -0.47 | 0.38 | -0.17 | -1.24 | .216 |
| Stressor Count | -1.83 | 2.68 | -0.24 | -0.69 | .494 |
| Care × Stressor Count | 0.06 | 0.08 | 0.21 | 0.73 | .468 |
| Overprotection × Stressor Count | 0.22 | 0.08 | 0.50 | 2.59 | .010 \* |

*Note.* \* *p* < .05; \*\* *p* < .01. In this model, 13.35% of the variance was explained, Adjusted R2 = .11, *F*(5, 234) = 7.21, *p* < .001. The composite measure includes scales of Panic, Social Anxiety, Claustrophobia, Checking, Cleaning, and Ordering from the IDAS-II.

These results suggest that anxiety symptoms across different domains, excluding trauma, are still associated with stressor exposure and parental overprotection.

Additionally, we explored if these effects are specifically driven by recent university transition stressors, or if the cumulative burden of stressor exposure across the lifespan also played a role. In an exploratory fashion, we also examined *characteristics* of lifetime stressors along with lifetime stressor count. Lifetime stressor count from the STRAIN and transition to college (TTC) stressor count from the TTC module, reported in the main analyses, were moderately positively correlated, *r*(238) = .38, *p* < .001 (see Table S1). Individual stressor characteristics were also all significant correlated with lifetime and TTC stressor count, *r* = .21 to .75, *p* < .001 (see Table S1).

We aimed to clarify the temporal relevance of stressor exposure to enhance our understanding of the unique impact of transitional stressor exposure versus lifetime stressor exposure accumulation on anxiety symptoms. A linear regression was run wherein parental overprotection, care, and their interactions with *lifetime* stressor exposure were entered as predictor variables, and anxiety symptoms as the outcome variable (see Table S4). These results suggest that parental overprotection exacerbates the effects of acute, transitional stressors, in relation to greater anxiety, whereas overprotection did not significantly interact with lifetime stressor exposure in a separate model.

To examine if specific stressor characteristics might be most strongly associated with anxiety, or most likely to interact with parenting behaviors, we substituted TTC stressor count with counts of lifetime stressors with different characteristics (see Tables S4.1 to S4.5).

Table S4. Effects of Parenting, Overall Lifetime Stressor Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Parental Care | -0.50 | 0.45 | -0.16 | -1.12 | .266 |
| Parental Overprotection | -0.13 | 0.50 | -0.04 | -0.26 | .794 |
| Lifetime Stressor Count | -1.01 | 1.05 | -0.35 | -0.97 | .336 |
| Parental Care × Lifetime Stressor Count | 0.05 | 0.03 | 0.37 | 1.49 | .137 |
| Parental Overprotection × Lifetime Stressor Count | 0.05 | 0.03 | 0.35 | 1.55 | .121 |

*Note.* In this model, 10.6% of the variance was explained, Adjusted R2 = .09, *F*(5, 234) = 5.55, *p* < .001.

Table S4.1. Effects of Parenting, Lifetime Physical Danger Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Parental Care | -0.09 | 0.29 | -0.03 | -0.30 | .765 |
| Parental Overprotection | 0.14 | 0.31 | 0.04 | 0.46 | .645 |
| Physical Danger Count | -0.62 | 3.52 | -0.07 | -0.18 | .860 |
| Parental Care × Physical Danger Count | -0.01 | 0.11 | -0.02 | -0.07 | .945 |
| Parental Overprotection × Physical Danger Count | 0.19 | 0.11 | 0.35 | 1.79 | .075 |

*Note.* In this model, 9.75% of the variance was explained, Adjusted R2 = .08, *F*(5, 234) = 5.06, *p* < .001.

Table S4.2. Effects of Parenting, Lifetime Entrapment Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Parental Care | -0.78 | 0.35 | -0.25 | -2.24 | .026 \* |
| Parental Overprotection | 0.13 | 0.39 | 0.04 | 0.33 | .744 |
| Entrapment Count | -19.34 | 9.72 | -0.75 | -1.99 | .048 \* |
| Parental Care × Entrapment Count | 0.65 | 0.27 | 0.62 | 2.36 | .019 \* |
| Parental Overprotection × Entrapment Count | 0.37 | 0.30 | 0.26 | 1.24 | .218 |

*Note.* In this model, 6.19% of the variance was explained, Adjusted R2 = .04, *F*(5, 234) = 3.09, *p* = .010.

Table S4.3. Effects of Parenting, Lifetime Humiliation Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Parental Care | -0.32 | 0.34 | -0.10 | -0.93 | .354 |
| Parental Overprotection | 0.38 | 0.36 | 0.11 | 1.04 | .300 |
| Humiliation Count | -2.67 | 3.59 | -0.24 | -0.74 | .458 |
| Parental Care × Humiliation Count | 0.17 | 0.11 | 0.33 | 1.52 | .129 |
| Parental Overprotection × Humiliation Count | 0.06 | 0.12 | 0.09 | 0.49 | .625 |

*Note.* In this model, 6.96% of the variance was explained, Adjusted R2 = .05, *F*(5, 234) = 3.50, *p* = .005.

Table S4.4. Effects of Parenting, Lifetime Interpersonal Loss Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Parental Care | -0.31 | 0.42 | -0.10 | -0.73 | .465 |
| Parental Overprotection | 0.11 | 0.43 | 0.03 | 0.25 | .805 |
| Interpersonal Loss Count | -2.05 | 3.73 | -0.20 | -0.55 | .584 |
| Parental Care × Interpersonal Loss Count | 0.05 | 0.11 | 0.12 | 0.44 | .657 |
| Parental Overprotection × Interpersonal Loss Count | 0.14 | 0.12 | 0.23 | 1.18 | .241 |

*Note.* In this model, 4.9% of the variance was explained, Adjusted R2 = .03, *F*(5, 234) = 2.41, *p* = .037.

Table S4.5. Effects of Parenting, Lifetime Role Change/Reversal Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Parental Care | -0.41 | 0.39 | -0.13 | -1.04 | .299 |
| Parental Overprotection | 0.43 | 0.42 | 0.12 | 1.02 | .310 |
| Role Change/Reversal Count | -0.83 | 3.43 | -0.10 | -0.24 | .810 |
| Parental Care × Role Change/Reversal Count | 0.09 | 0.10 | 0.29 | 0.93 | .353 |
| Parental Overprotection × Role Change/Reversal Count | 0.04 | 0.10 | 0.08 | 0.39 | .695 |

*Note.* In this model, 9.67% of the variance was explained, Adjusted R2 = .08, *F*(5, 234) = 5.01, *p* < .001.

These results suggest that the interaction terms of counts of stressors with different characteristics and parental overprotection, while non-significant, are still in the same direction as that of the main analyses. Interestingly, the model using count of entrapment stressors (e.g., stressors like chronic health conditions or financial instability) showed significant conditional effects of parental care and stressor count, and a significant interaction effect between these variables, where *greater* parental care and more entrapment stressors were associated with greater anxiety symptoms. Although this finding is outside the primary scope of the current study examining TTC stressors, it points at a potentially important association of how parental care, while typically characterized as a buffer, might instead exacerbate certain types of stressors to increase anxiety.

We were also interested in whether the effects as presented in the main text were driven by maternal or paternal parenting. We ran two regression models separately with maternal and paternal models (Tables S5 and S6).

Table S5. Effects of Maternal Parenting, Stressor Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Maternal Care | -0.13 | 0.38 | -0.04 | -0.34 | .734 |
| Maternal Overprotection | -0.16 | 0.34 | -0.06 | -0.46 | .649 |
| Stressor Count | -0.08 | 2.71 | -0.01 | -0.03 | .976 |
| Care × Stressor Count | 0.02 | 0.08 | 0.06 | 0.26 | .796 |
| Overprotection × Stressor Count | 0.17 | 0.08 | 0.39 | 2.29 | .023 \* |

*Note.* \* *p* < .05; \*\* *p* < .01. In this model, 14.9% of the variance was explained, Adjusted R2 = .13, *F*(5, 234) = 8.16, *p* < .001.

Table S6. Effects of Paternal Parenting, Stressor Count, and their Interaction on Anxiety Symptoms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Coefficients** | *B* | *SE* | *β* | *t* | *p* |
| Paternal Care | -0.53 | 0.32 | -0.22 | -1.65 | .100 |
| Paternal Overprotection | -0.46 | 0.42 | -0.16 | -1.11 | .268 |
| Stressor Count | -1.60 | 2.45 | -0.17 | -0.65 | .515 |
| Care × Stressor Count | 0.11 | 0.07 | 0.34 | 1.46 | .145 |
| Overprotection × Stressor Count | 0.17 | 0.10 | 0.32 | 1.77 | .077 |

*Note.* In this model, 12.1% of the variance was explained, Adjusted R2 = .10, *F*(5, 227) = 6.24, *p* < .001.

In sum, the effects are in the same direction and of a similar magnitude for both maternal and paternal overprotection.