

Regular Article

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

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Abstract

The first year of university is a developmentally significant transition that involves substantial stressor exposure and, for some, heightened anxiety. Parenting may influence the association between stressor exposure and anxiety symptoms, with some research showing that parental care and overprotection throughout childhood and adolescence are associated with the experience of anxiety. However, how these factors interact and relate to anxiety symptoms in early adulthood is not clear. To address this issue, we examined interactions between parenting characteristics (care and overprotection) and stressors experienced during the transition to university, and how they relate to anxiety symptoms in 240 first-year undergraduates ($M_{age} = 18.2$, $SD = 1.18$, 75% female, 51.7% White). Results revealed a significant interaction between parental overprotection and stressor exposure, such that higher parental overprotection and higher levels of recent stressor exposure were associated with more anxiety symptoms ($\beta = 0.52$, $p = .008$). These findings demonstrate continued evidence for associations between experiences of parenting and psychopathology in emerging adulthood and suggest that overprotective parenting behaviors may exacerbate effects of stress exposure.

Keywords: Anxiety; life stress; parental care; parental overprotection; transition to university

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Introduction

The first year of university is a developmentally significant transition that involves new relationships, routines, and increased independence (Barton & Kirtley, 2012; Joo et al., 2008). Changes during this period can constitute significant stressors (Abouserie, 1994; Bouteyre et al., 2007; Lu, 1994), which are risk factors for increased anxiety (Andrews & Wilding, 2004). Indeed, on average, first-year students tend to report greater anxiety than more senior students (Bassols et al., 2014; Moutinho et al., 2017). However, not all first-year students experience heightened symptoms of anxiety, despite exposure to stressors (Andrews & Wilding, 2004; Cheung et al., 2020; Crocker et al., 2010). Thus, there is a need to examine factors that may explain why some individuals are more likely to experience anxiety following stressor exposure than others. One potential factor is experiences of parenting, as prior research has suggested that positive early received parenting can buffer against the negative effects of later stressor exposure on health (Kenny & Donaldson, 1991; Nijhof & Engels, 2007; Pinquart & Kauser, 2018; Wintre & Yaffe, 2000).

Parenting practices have a lasting impact on emotional, cognitive, and social development (Clayborne et al., 2021; Gee, 2016; Hoskins, 2014) and can alter the trajectories of internalizing

symptoms (Hammen et al., 2004; Yap et al., 2014, 2016). Parental care and control, two distinct dimensions of parenting, appear to be particularly important in determining physical and psychological outcomes (Kazarian et al., 1987; Mackinnon et al., 1989; Parker et al., 1979; Parker, 1990; Power, 2013). Parental care refers to providing warmth and affection and being responsive to a child to ensure their survival and health (Balshine, 2012; LeVine, 1988; Power, 2013). A high level of parental care has been associated with reduced anxiety in youth (Butterfield et al., 2021; McLeod et al., 2007; Quach et al., 2015; Warren & Simmens, 2005), and even in young adults (Clayborne et al., 2021; Giakoumaki et al., 2013; Smout et al., 2020). Parental control, in contrast, refers to behavioral control, such as establishing rules to modulate a child's behavior, and/or psychological control which refers to guiding a child's thoughts and emotions (Ballash et al., 2006; Barber, 1996; Grolnick & Pomerantz, 2009). Unlike care, both over- and under-control have been associated with adverse outcomes (Borelli et al., 2014, 2019; González-Cámara et al., 2019; Harris-McKoy, 2016). Appropriate levels of control change across development, such that fewer restrictions are typically expected across time (Ballash et al., 2006). Excessive levels of parental control, or overprotection, can include practices like guilt, coercion, and micromanagement, and these parental behaviors have been associated with more anxiety symptoms across the lifespan (Beesdo et al., 2010; Drake & Ginsburg, 2012; Lieb et al., 2000; Mathijs et al., 2023; Rork & Morris, 2009; Vigdal & Brønnick, 2022).

In addition to direct associations with anxiety, some research suggests that care and overprotection can buffer against or

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exacerbate the effects of stress exposure, respectively, to decrease or increase anxiety in children and adolescents (Evans et al., 2007; Grant et al., 2006). Indeed, some evidence suggests that from infancy to adolescence, the physical presence of a caring parent results in decreased stress reactivity, as measured by cortisol levels or neural activity, after laboratory-induced stressors (2015b; Brown et al., 2020; Conner et al., 2012; Doom et al., 2015; Hostinar et al., 2015a; Parenteau et al., 2020). The physical presence of a parent is also not always necessary, as people who report having a *relationship* with a caring and responsive parent have been shown to be less reactive to laboratory stressors (Engel & Gunnar, 2020; Gunnar, 2017; Hackman et al., 2013; Wade et al., 2020).

Similar buffering effects of parental care against real-world stressors have also been found among children and adolescents, such that individuals show reduced neurological and physiological stress reactivity (Cohodes et al., 2021a; Engel & Gunnar, 2020; Hibel et al., 2011; Kahhalé et al., 2023) and decreased anxiety symptoms following stressors (Affrunti et al., 2014; Boullion et al., 2023; Cohodes et al., 2021b; Costa et al., 2009; Sharma et al., 2019) if they have experienced higher levels of parental care. Taken together, this literature suggests that, from childhood to adolescence, caring parenting buffers against the adverse effects of varied forms of stress exposure – from laboratory (Engel & Gunnar, 2020; Gunnar, 2017; Hackman et al., 2013; Wade et al., 2020) to the real-world (Cohodes et al., 2021a; Engel & Gunnar, 2020; Hibel et al., 2011; Kahhalé et al., 2023).

In contrast, greater parental overprotection has been associated with more anxiety symptoms and increased physiological reactivity during and after lab stressors (Borelli et al., 2016, 2018, 2019; Thirlwall & Creswell, 2010; de Wilde & Rapee, 2008), as well as a stronger cortisol response and more anxiety symptoms in children and adolescents in response to real-world stressors (Affrunti et al., 2014; Costa et al., 2009; Fox et al., 2022; Leung, 2021; Taylor et al., 2013). Although research into the modulating effects of parental control on stress reactivity is more limited, existing findings suggest that, across childhood and adolescence, parental overcontrol also moderates reactivity to both laboratory and real-world stressors.

In adulthood, however, evidence for persistent stress-buffering or stress-exacerbating effects of parenting received is more mixed. Beginning in adolescence, parental stress-buffering effects appear to decrease (Burton et al., 2004; Hostinar et al., 2015b; Jeong et al., 2021), potentially due to decreased dependence on the parents (Doom et al., 2015, 2017; Gee et al., 2014; van Rooij et al., 2017). Although some studies have found support for the buffering effects of experiences of parenting in adulthood, across both laboratory (Coan et al., 2013; Goger et al., 2020) and real-world stressors (Brody et al., 2017; Farrell et al., 2017; Hiester et al., 2009; Jeong et al., 2021; Larose & Boivin, 1998; Lucas-Thompson, 2014; Spokas & Heimberg, 2009; Sun et al., 2000), other researchers have not found these associations (Cummings-Robeaue et al., 2009; Engert et al., 2010; Farber et al., 2019; Mattanah et al., 2011; Van Bronkhorst et al., 2024), suggesting the need for further study.

An additional limitation of the stress-buffering literature in adult samples is the way in which life stress is measured or manipulated. Studies have often relied on well-controlled but artificial laboratory-based stressors (Coan et al., 2013; Eisenberger et al., 2007; Goger et al., 2020), the results of which may not generalize to real-world experiences of stressor exposure. Those studies that have examined real-world stressors (e.g., transition to university; low-income status) have often not explicitly measured

the number and severity of different experiences associated with these exposures (Brody et al., 2017; Cummings-Robeaue et al., 2009; Larose & Boivin, 1998; Spokas & Heimberg, 2009; Sun et al., 2000). Other studies have relied on measures of perceived stress rather than measures of actual stressor exposure (Hiester et al., 2009; Mattanah et al., 2011; Rodriguez et al., 2019).

Although subjective experience of stress is an important consideration, it is closely associated with and may be confounded with symptoms (Shields et al., 2023). Subjective reports of stress, especially captured retrospectively, are influenced by current mood and recollections that can bias reporting (Monroe, 2008; Slavich, 2016). This complicates interpretations of the association between perceived stress and symptomology (Epel et al., 2018; Espejo et al., 2011). Indeed, measures that separate whether a stressor occurred and how an individual experienced the stressor might be more suitable for examining how the adverse effects of stressor exposure may be buffered by parenting. Finally, studies of stress-buffering or exacerbation effects in adults often collapse across diverse sources of social support, including parents, but also support from partners, peers, and even children (Cummings-Robeaue et al., 2009; Eisenberger et al., 2007; Rodriguez et al., 2019; Wolfe et al., 2023), making it difficult to identify specific effects of parenting. Therefore, the extent to which experiences of good parental practices may continue to buffer the effects of stressor exposure into early adulthood is unclear.

In sum, although evidence suggests that parental care and overprotection may play a role in stress responsivity in childhood and adolescence, whether these associations persist into young adulthood requires further study, particularly during key transitional periods in adulthood which are associated with increases in anxiety (Kahn et al., 2017). We addressed this gap here by investigating interactions between parental behaviors and recent life stressor exposure as they relate to symptoms of anxiety at entry to university. Based on the literature summarized above, we hypothesized that higher levels of stressor exposure would be associated with more anxiety symptoms during the transition to college, but that this association would be moderated by parenting experiences. Specifically, we hypothesized that parental overprotection would exacerbate the negative effects of recent stressor exposure on anxiety levels during the transition to college and that parental care would buffer against these negative effects.

Method

Participants

Participants were 240 undergraduate students ($M_{age} = 18.2$, $SD = 1.18$) who were recruited in the first two months of the fall semester of their first year of undergraduate studies, from 2016 to 2019. In the sample, 75.0% were female, 24.2% were male, and 0.8% preferred not to answer or selected other. Regarding race and ethnicity, 51.7% self-identified their background as White, 32.9% as Asian or Asian Canadian, 2.9% as of Middle Eastern or North African descent, 1.2% as Black, 10.0% indicated they were of another non-specified or multiple racial/ethnic groups, and 1.3% preferred not to answer. Out of the 174 individuals who reported their family income, the median was in the CAD \$150,000 to CAD \$199,000 range (of a full sample range from less than CAD \$10,000 to greater than CAD \$250,000).

These participants completed a battery of electroencephalographic (EEG) tasks as a part of a larger longitudinal study. Results from these EEG tasks and different subsamples have been reported elsewhere (e.g., Banica et al., 2020, 2021; Dell'Acqua et al., 2024;

Ethridge & Weinberg, 2018; Freeman, Carpentier, et al., 2023; Freeman, Panier, et al., 2023; Panier et al., 2024; Pegg et al., 2019; Renault et al., 2023; Sandre et al., 2019; Weinberg et al., 2021). All participants provided informed, written consent, and received their choice of course credit or monetary compensation of CAD \$25 for their time. All procedures were pre-approved by the McGill University Research Ethics Board. The deidentified data, syntax, and task code for the analyses reported here can be found here: <https://osf.io/4tgau>.

Measures

Stressor exposure

Participants completed the Stress and Adversity Inventory for Adults (Adult STRAIN; Slavich & Shields, 2018) to assess lifetime stressor exposure, and the additional Transition to College (TTC) module to assess the recent stressors related to the transition to university. The STRAIN has been shown to predict anxiety (and other psychopathology) symptoms (Banica et al., 2020; Parra et al., 2023), has strong test-retest reliability, and is not strongly influenced by social desirability or personality characteristics (Slavich & Shields, 2018; Sturmbauer et al., 2019). Further, stressor exposure summary scores on this measure have been shown to predict mental health complaints in university students (Toussaint et al., 2016). In the TTC module, participants responded to 14 core questions regarding different domains of stressors, such as life-threatening situations, personal loss, and housing stressors that they could have encountered at the start of university up to the date of the interview. If they endorsed having been exposed to that stressor, the STRAIN system used branching logic to ask follow-up questions regarding the severity, frequency, timing, and duration of the stressor. For this analysis, we focused on stressor count from the TTC module, calculated as the sum of all recent stressor frequencies participants faced. By using the cumulative count of stressors during the transition to university, we differentiated the frequency of stressors from participants' subjective responses to those stressors, which could be more strongly confounded with anxiety symptoms, our main outcome of interest.

Anxiety symptoms

Participants completed the Inventory of Depression and Anxiety Symptoms (IDAS-II; Watson et al., 2012) through a Qualtrics survey. The IDAS-II is a 99 item self-report measure of 18 symptom dimensions of depression and anxiety. Item scores range from 1 to 5, with higher scores indicating more symptoms over the past two weeks. The IDAS-II scales have shown good convergent and discriminant validity with other self-report measures in a university student population (Watson et al., 2008).

In the present study, we used a composite measure of 42 items from the eight anxiety subscales of the IDAS-II (e.g., Banica et al., 2020). This composite score represents the total sum of panic (8 items; range: 8–40), social anxiety (6 items; range: 5–30), claustrophobia (5 items; range: 5–25), traumatic intrusions (4 items; range: 4–20), traumatic avoidance (4 items; range: 4–20), checking (3 items; range: 3–15), ordering (5 items; range: 5–25), and cleaning (7 items; range: 7–35) subscales (range for the composite scale: 42–210; $\alpha = 0.94$). The IDAS-II was administered during the participants' first two months of school. From this questionnaire, 0.17% of the data was missing. To determine whether our data were missing completely at random (MCAR), we conducted Little's MCAR Test on all self-reported items. This is a maximum likelihood chi-square statistic that tests whether

significant differences exist between the means of different missing-value patterns. Little's MCAR Test was not statistically significant ($\chi^2(2449) = 2524.85, p = .091$), indicating that we failed to reject the null hypothesis and that our data meet the assumption of MCAR. All missing values were imputed with the overall mean value of the question item (Çokluk & Kayri, 2011; Kalton & Kasprzyk, 1986).

Parenting behaviors

To measure parenting behaviors, participants completed the Parental Bonding Instrument (PBI; Parker et al., 1979). The PBI consists of 25 self-reported items designed to retrospectively measure maternal and paternal parenting behavior in an individual's first 16 years of life. The PBI captures two dimensions of parenting – care and overprotection (Mackinnon et al., 1989; Parker et al., 1979). Each item was rated on a 4-point Likert scale from 0 (very unlike) to 3 (very like), with higher scores indicating more care (i.e., more parental warmth) or overprotection (i.e., more controlling and authoritarian behaviors). Prior research has shown that the PBI possesses high internal consistency and test-retest reliability (Wilhelm et al., 2005) and, importantly, is not influenced by the current mood state of the respondent (Gotlib et al., 1988; Parker, 1981). All 240 participants completed the PBI about maternal behaviors, but seven participants did not provide sufficient ratings for paternal behaviors (i.e., missing data on more than 20% of items). In total, 0.40% of the PBI data were missing and imputed with the overall mean value of the question item. Maternal and paternal care was summed across all care items and then averaged into a single parental care score for each participant, and the same was done for overprotection. For the seven participants who did not have any paternal care and overprotection ratings, scores were based only on their maternal ratings. The final care subscale consisted of 12 items ($\alpha = 0.93$), and the overprotection subscale consisted of 13 items ($\alpha = 0.88$).

Data analysis

All statistical analyses were conducted in RStudio (R version 4.3.3). Pearson's correlations were conducted to examine bivariate associations between parenting, stressor count, and anxiety symptoms. Next, a linear regression was run where parental overprotection, care, and their interactions with stressor exposure were entered as predictor variables, and anxiety symptoms as the outcome variable. By including both parenting variables in the same model, along with the interaction terms, we aimed to determine the unique contributions of each parenting dimension in moderating the relationship between stressor exposure and anxiety. Sensitivity analyses conducted in G*Power indicated that our sample of 240 participants provided sufficient power (80%) to detect small-to-medium effect sizes ($f^2 > .05$, or β values of 0.20 to 0.25) in the regression model. Additional regression analyses incorporating the General Depression subscale from the IDAS-II and lifetime stressor count from the STRAIN were conducted as part of sensitivity analyses. Details and results of these sensitivity analyses can be found in the supplement (Tables S1 to S6).

Results

Pearson correlations (Table 1) showed that parental care and overprotection were correlated with anxiety symptoms, such that less care and higher overprotection were associated with more anxiety symptoms. Participants who reported experiencing more

Table 1. Pearson *r* correlations for parental care and overprotection, transition to college stressor count, and anxiety symptoms

	1.	2.	3.	<i>M</i> (<i>SD</i>)	Range
1. Parental Care	–			25.99 (6.75)	1, 36
2. Parental Overprotection	–.48**	–		11.89 (6.10)	0.5, 29.5
3. Stressor Count	–.12	.09	–	3.69 (2.21)	0, 12
4. Symptoms of Anxiety	–.14*	.18**	.30**	76.87 (20.90)	44, 143

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

Table 2. Effects of parenting, stressor count, and their interaction on anxiety symptoms

Coefficients	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>
Parental Care	–0.55	0.43	–0.18	–1.29	.198
Parental Overprotection	–0.63	0.47	–0.18	–1.35	.178
Stressor Count	–3.44	3.29	–0.36	–1.05	.297
Parental Care × Stressor Count	0.11	0.10	0.33	1.13	.259
Parental Overprotection × Stressor Count	0.28	0.10	0.52	2.75	.008 **

Note. **p* < .05; ***p* < .01. In this model, 14.5% of the variance in anxiety symptoms was explained by the predictors, Adjusted R^2 = .13, *F* (5, 234) = 7.94, *p* < .001.

stressors during the transition to university also reported more anxiety symptoms.

The results of the regression model (presented in Table 2) revealed a significant interaction (Figure 1A) between overprotection and stressor exposure, such that a higher stressor count was associated with more anxiety symptoms, but this effect was strongest for those reporting higher levels of parental overprotection. For those reporting lower levels of overprotection, this association was less strong. Johnson-Neyman analyses (Figure 1B) showed that this interaction was significant when overprotection values were outside the interval [–23.34, 7.19] (Figure 1b). While the Johnson-Neyman interval includes negative values, it does not correspond to real data points in our sample (range [0.5, 29.5]). The significant association between stressor exposure and symptoms of anxiety only applies to individuals in our sample with moderate-to-high levels of overprotection. Simple slopes analyses showed that the slope of stressor count on anxiety was significant and positive at mean (11.89) and high (+1 SD) overprotection (17.99), but not at low (–1 SD) levels of overprotection (5.79). Care did not significantly moderate the association with stressor exposure.

Discussion

The present study investigated the buffering and exacerbating effects of parental care and overprotection on life stressors experienced during the university transition. Because not all students will develop anxiety during this transition (Andrews & Wilding, 2004; Cheung et al., 2020; Crocker et al., 2010), it is important to identify those individuals who will be most susceptible to stress exposure. A better understanding of the associations between parenting and stress susceptibility can potentially contribute to targeted interventions in earlier stages of development (Brody et al., 2017; Jeong et al., 2021). Consistent with our hypothesis, parental overprotection interacted with recent stressor exposure, such that individuals with higher levels of

overprotection and more frequent stressor exposure also reported more anxiety symptoms during the transition to college. These results are consistent with prior research in adults demonstrating that greater parental overprotection and stressors are cross-sectionally associated with greater anxiety symptoms (Eberly Lewis et al., 2024; Goger et al., 2020; Ono et al., 2017).

Contrary to our hypotheses and some prior research (Engert et al., 2010; Sameshima et al., 2020), we did not find that higher levels of parental care buffered against transition to university stressors to predict fewer anxiety symptoms. Although unexpected, these results are consistent with studies showing parental overprotection or overinvolvement explaining more variance in childhood anxiety compared to care or other parental variables (McLeod et al., 2007; Rork & Morris, 2009), suggesting that the negative effects of overprotection may outweigh the potential positive effects of care even in young adults.

Furthermore, although the present research documents an interaction between proximal stress exposure and parenting experiences (albeit measured retrospectively) as they relate to anxiety in emerging adulthood, additional research is needed to identify the mechanisms underlying this effect. One potential mechanism of the enduring effect of parenting is attachment styles (Yirmiya et al., 2020). Overprotective parenting tends to lead to insecure attachment (Bowlby, 1977; Köruk et al., 2016; Otani et al., 2013), which research suggests remains stable throughout adulthood (Chris Fraley, 2002; Waters et al., 2000). This can color adult social interactions and contribute to increased anxiety during the transition to university (Parade et al., 2010; Yu et al., 2020) where many new social connections are made. Another proposed mechanism of overprotective parenting is poorer learned emotion regulation and coping skills (Nijhof & Engels, 2007; Wolfradt et al., 2003), which can last into adulthood (Bahtiyar & Gençöz, 2023; Manzeske & Stright, 2009; Spada et al., 2012; Yao et al., 2022), resulting in greater distress in response to stressors (McLafferty et al., 2019; Segrin et al., 2013). Future studies might examine these constructs as potential mechanisms of the observed effects to better understand the ways in which parenting might relate to individual differences in stress susceptibility across development.

Limitations

This study has several limitations. First, we did not collect information about parental anxiety. Given that overprotective parenting can be associated with parents' own anxiety (Clarke et al., 2013; Ginsburg et al., 2005; Jones et al., 2021), and that anxiety disorders and symptoms are subject to substantial genetic contributions (Barrett et al., 1996; Hettema et al., 2001; Meier & Deckert, 2019), it could be the case that observed effects of parenting simply reflect a greater genetic vulnerability to anxiety. However, we would note that there is previous evidence for

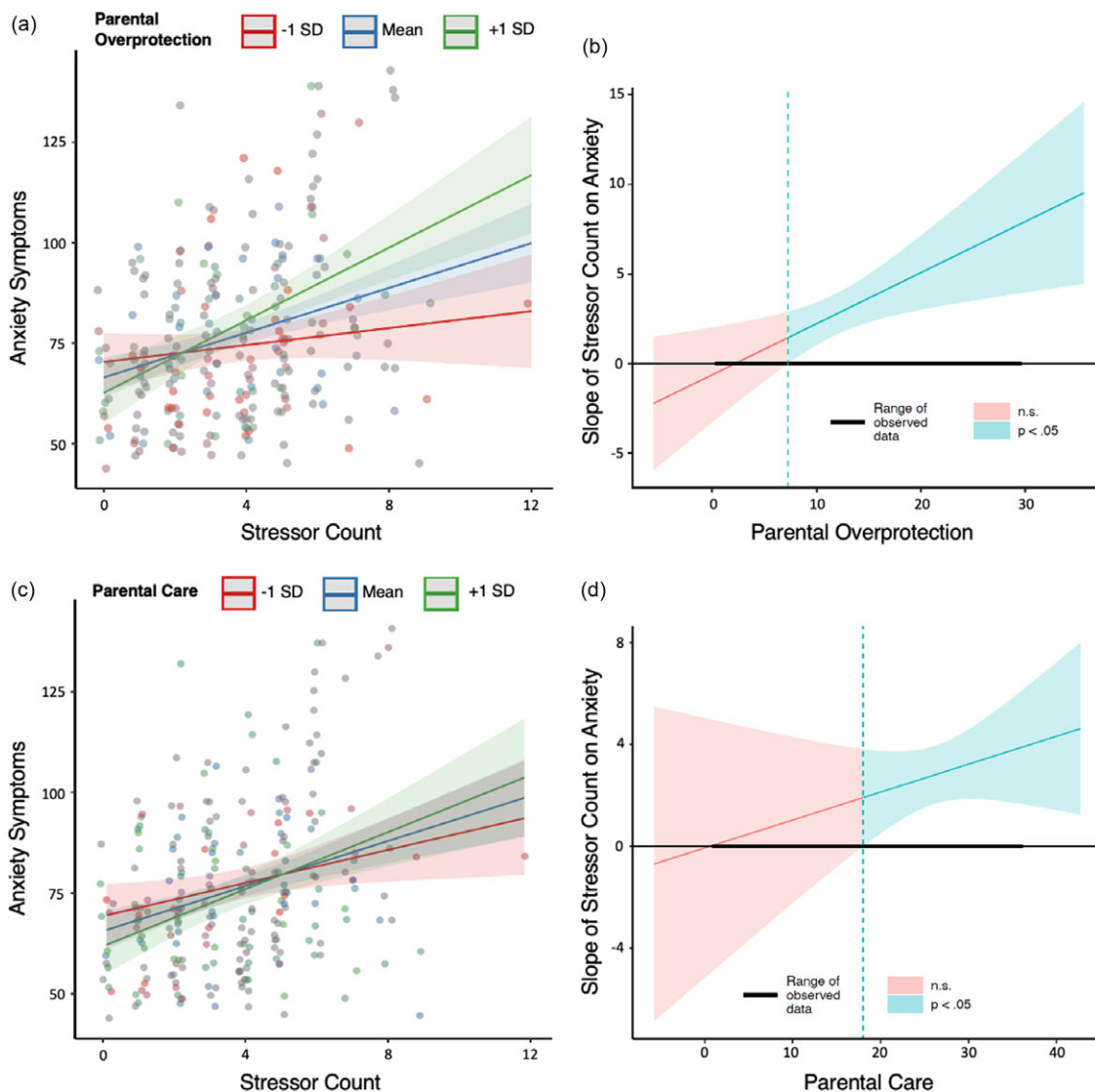


Figure 1. (a) Partial plots for stressor count and parental overprotection, divided into ± 1 standard deviation from the mean, predicting anxiety symptoms from the IDAS-II. Larger values represent more overprotective behaviors. Scatter points are jittered for visualization. (b) Johnson-Neyman intervals showing the values of parental overprotection that yielded a significant interaction with stressor count to predict anxiety. (c) Partial plots for stressor count and parental care, divided into ± 1 standard deviation from the mean, predicting anxiety symptoms from the IDAS-II. Note that this interaction is non-significant. (d) Johnson-Neyman intervals showing the values of parental care that yielded a significant interaction with stressor count to predict anxiety.

independent effects of parenting, such that, even controlling for parental anxiety, overprotective parenting or behavior is still associated with offspring anxiety symptoms (Edwards et al., 2010; Hudson & Rapee, 2001; Moore et al., 2004). It will be critical for future studies to also consider the potential role of parental anxiety in influencing the associations observed here. Additionally, anxiety during early life stages and parenting styles also have a bi-directional association, such that parents tend to be more overcontrolling with anxious children (Drake & Ginsburg, 2012; Gouze et al., 2016; Hale et al., 2013), which may result in more anxiety in adulthood. Dynamic and longitudinal study designs that can more convincingly isolate genetic and environmental sources of influence will be useful in understanding the mechanisms of this effect. Second, we do not have reports of participants' anxiety symptoms before the transition to university. Anxiety symptoms prior to university can set the stage for enduring symptoms later in life and are often a better predictor of future anxiety than parenting or stress exposure (Hovenkamp-Hermelink et al., 2021). Future

research should consider examining if parenting styles can predict longitudinal changes in symptoms before and after stressors.

Third, the use of a retrospective self-report measure of received parenting that assesses a wide age range (0 to 16) does not account for changes in parenting over the course of development. For instance, some levels of parental control can be appropriate at younger developmental stages but are interpreted as overprotection at later developmental stages (Ballash et al., 2006). It might be difficult for participants to adequately average parenting styles across years of development. That said, despite the inherent limitations of retrospective reports, the PBI has shown considerable reliability and stability over time (Murphy et al., 2010; Wilhelm et al., 2005; Wilhelm & Parker, 1990). In addition to the PBI, future studies should also consider incorporating parent-rated scales of parenting, objective measures of parenting behaviors (e.g., observational methods), as well as whether the parenting behaviors were developmentally appropriate. The cross-sectional nature of the analyses also means that we are unable to determine whether

the documented interaction between experiences of parental overprotection and stressor exposure plays a causal role in predicting changes in anxiety symptoms and reverse causality is also possible. Longitudinal research would be better positioned to address this limitation and should collect intensive longitudinal data, when possible (Moriarty & Slavich, 2023).

Finally, our analyses focused on stressor count as a measure of stressor exposure frequency, without considering the context, severity, duration, or characteristics of each stressor exposure. We did not have any *a priori* reasons to examine different types of stressors during this transition period, but acknowledge that not all types of stressors or their durations exert equivalent effects on internalizing symptoms (Epel et al., 2018; McLoughlin et al., 2021). Future research should thus examine different stressor characteristics, such as social versus non-social stressors, in a larger sample with sufficient power.

Conclusion

In conclusion, the present findings indicate that higher levels of parental overprotective behaviors and more stressor exposure during the transition to university, combined, are associated with more anxiety symptoms during this developmentally important period. These results thereby advance our understanding of the enduring associations between parenting behaviors and vulnerability to subsequent stressors and associated psychological outcomes into early adulthood. These findings not only support the identification of those individuals who may be most vulnerable to experiencing anxiety during major life transitions, but also point toward meaningful directions for future research into underlying mechanisms. Namely, longitudinal studies further exploring these processes could support the optimal promotion of impactful, positive change in the parent-offspring relationship with an eye toward improved individual outcomes over development.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S095457942510028X>.

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Data availability. Deidentified data, syntax, and task code can be found here: <https://osf.io/4tgau>.

Competing of interests. The authors declare no conflicts of interest with respect to this work.

References

- Abouerie, R. (1994). Sources and levels of stress in relation to locus of control and self esteem in university students. *Educational Psychology*, 14(3), 323–330. <https://doi.org/10.1080/0144341940140306>
- Affrunti, N. W., Geronimi, E. M. C., & Woodruff-Borden, J. (2014). Temperament, peer victimization, and nurturing parenting in child anxiety: A moderated mediation model. *Child Psychiatry & Human Development*, 45(4), 483–492. <https://doi.org/10.1007/s10578-013-0418-2>

- Andrews, B., & Wilding, J. M. (2004). The relation of depression and anxiety to life-stress and achievement in students. *British Journal of Psychology*, 95(4), 509–521. <https://doi.org/10.1348/0007126042369802>
- Bahtiyar, B., & Gençöz, T. (2023). The association between perceived parenting and adulthood anxiety: The mediator roles of emotion regulation, shame and anger. *Current Psychology*, 42(12), 9953–9962. <https://doi.org/10.1007/s12144-021-02279-1>
- Ballash, N., Leyfer, O., Buckley, A. F., & Woodruff-Borden, J. (2006). Parental control in the etiology of anxiety. *Clinical Child and Family Psychology Review*, 9(2), 113–133. <https://doi.org/10.1007/s10567-006-0007-z>
- Balshine, S. (2012). Patterns of parental care in vertebrates. In N. J. Royle, P. T. Smiseth, & M. Kölliker (Eds.), *The evolution of parental care* (pp. 62–75). Oxford University Press.
- Banica, I., Sandre, A., Shields, G. S., Slavich, G. M., & Weinberg, A. (2020). The error-related negativity (ERN) moderates the association between interpersonal stress and anxiety symptoms six months later. *International Journal of Psychophysiology : Official Journal of the International Organization of Psychophysiology*, 153, 27–36. <https://doi.org/10.1016/j.ijpsycho.2020.03.006>
- Banica, I., Sandre, A., Shields, G. S., Slavich, G. M., & Weinberg, A. (2021). Associations between lifetime stress exposure and the error-related negativity (ERN) differ based on stressor characteristics and exposure timing in young adults. *Cognitive, Affective & Behavioral Neuroscience*, 22(4), 672–689. <https://doi.org/10.3758/s13415-021-00883-z>
- Barber, B. K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development*, 67(6), 3296–3319.
- Barrett, P. M., Rapee, R. M., Dadds, M. M., & Ryan, S. M. (1996). Family enhancement of cognitive style in anxious and aggressive children. *Journal of Abnormal Child Psychology*, 24(2), 187–203. <https://doi.org/10.1007/BF01441484>
- Barton, A. L., & Kirtley, M. S. (2012). Gender differences in the relationships among parenting styles and college student mental health. *Journal of American College Health*, 60(1), 21–26. <https://doi.org/10.1080/07448481.2011.555933>
- Bassols, A. M., Okabayashi, L. S., Silva, A. B. da, Carneiro, B. B., Feijó, F., Guimarães, G. C., Cortes, G. N., Rohde, L. A., & Eizirik, C. L. (2014). First- and last-year medical students: Is there a difference in the prevalence and intensity of anxiety and depressive symptoms? *Revista Brasileira De Psiquiatria (Sao Paulo, Brazil)*, 36(3), 233–240. <https://doi.org/10.1590/1516-4446-2013-1183>
- Beesdo, K., Pine, D. S., Lieb, R., & Wittchen, H.-U. (2010). Incidence and risk patterns of anxiety and depressive disorders and categorization of generalized anxiety disorder. *Archives of General Psychiatry*, 67(1), 47–57. <https://doi.org/10.1001/archgenpsychiatry.2009.177>
- Borelli, J. L., Burkhart, M. L., Rasmussen, H. F., Smiley, P. A., & Hellemann, G. (2018). Children's and mothers' cardiovascular reactivity to a standardized laboratory stressor: Unique relations with maternal anxiety and overcontrol. *Emotion*, 18(3), 369–385. <https://doi.org/10.1037/emo0000320>
- Borelli, J. L., Margolin, G., & Rasmussen, H. F. (2014). Parental overcontrol as a mechanism explaining the longitudinal association between parent and child anxiety. *Journal of Child and Family Studies*, 24(6), 1559–1574. <https://doi.org/10.1007/s10826-014-9960-1>
- Borelli, J. L., Shai, D., Smiley, P. A., Boparai, S., Goldstein, A., Rasmussen, H. F., & Granger, D. A. (2019). Mother-child adrenocortical synchrony: Roles of maternal overcontrol and child developmental phase. *Developmental Psychobiology*, 61(8), 1120–1134. <https://doi.org/10.1002/dev.21845>
- Borelli, J. L., Smiley, P. A., Rasmussen, H. F., & Gómez, A. (2016). Is it about me, you, or us? Stress reactivity correlates of discrepancies in we-talk among parents and preadolescent children. *Journal of Youth and Adolescence*, 45(10), 1996–2010. <https://doi.org/10.1007/s10964-016-0459-5>
- Boullion, A., Linde-Krieger, L. B., Doan, S. N., & Yates, T. M. (2023). Parental warmth, adolescent emotion regulation, and adolescents' mental health during the COVID-19 pandemic. *Frontiers in Psychology*, 14, 1216502. <https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1216502>
- Bouteyre, E., Maurel, M., & Bernaud, J.-L. (2007). Daily hassles and depressive symptoms among first year psychology students in France: The role of coping and social support. *Stress and Health*, 23(2), 93–99. <https://doi.org/10.1002/smi.1125>

- Bowlby, J. (1977). The making and breaking of affectional bonds: I. Aetiology and psychopathology in the light of attachment theory. *British Journal of Psychiatry*, 130(3), 201–210. <https://doi.org/10.1192/bjp.130.3.201>
- Brody, G. H., Gray, J. C., Yu, T., Barton, A. W., Beach, S. R. H., Galván, A., MacKillop, J., Windle, M., Chen, E., Miller, G. E., & Sweet, L. H. (2017). Protective prevention effects on the association of poverty with brain development. *JAMA Pediatrics*, 171(1), 46–52. <https://doi.org/10.1001/jamapediatrics.2016.2988>
- Brown, S. M., Schlueter, L. J., Hurwich-Reiss, E., Dmitrieva, J., Miles, E., & Watamura, S. E. (2020). Parental buffering in the context of poverty: Positive parenting behaviors differentiate young children's stress reactivity profiles. *Development and Psychopathology*, 32(5), 1778–1787. <https://doi.org/10.1017/S0954579420001224>
- Burton, E., Stice, E., & Seeley, J. R. (2004). A prospective test of the stress-buffering model of depression in adolescent girls: No support once again. *Journal of Consulting and Clinical Psychology*, 72(4), 689–697. <https://doi.org/10.1037/0022-006X.72.4.689>
- Butterfield, R. D., Silk, J. S., Lee, K. H., Siegle, G. S., Dahl, R. E., Forbes, E. E., Ryan, N. D., Hooley, J. M., & Ladouceur, C. D. (2021). Parents still matter! parental warmth predicts adolescent brain function and anxiety and depressive symptoms 2 years later. *Development and Psychopathology*, 33(1), 226–239. <https://doi.org/10.1017/S0954579419001718>
- Cheung, D. K., Tam, D. K. Y., Tsang, M. H., Zhang, D. L. W., & Lit, D. S. W. (2020). Depression, anxiety and stress in different subgroups of first-year university students from 4-year cohort data. *Journal of Affective Disorders*, 274, 305–314. <https://doi.org/10.1016/j.jad.2020.05.041>
- Chris Fraley, R. (2002). Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. *Personality and Social Psychology Review*, 6(2), 123–151. https://doi.org/10.1207/S15327957PSPR0602_03
- Clarke, K., Cooper, P., & Creswell, C. (2013). The parental overprotection scale: Associations with child and parental anxiety. *Journal of Affective Disorders*, 151(2), 618–624. <https://doi.org/10.1016/j.jad.2013.07.007>
- Clayborne, Z. M., Kingsbury, M., Sampasa-Kinyaga, H., Sikora, L., Lalande, K. M., & Colman, I. (2021). Parenting practices in childhood and depression, anxiety, and internalizing symptoms in adolescence: A systematic review. *Social Psychiatry and Psychiatric Epidemiology*, 56(4), 619–638. <https://doi.org/10.1007/s00127-020-01956-z>
- Coan, J. A., Beckes, L., & Allen, J. P. (2013). Childhood maternal support and social capital moderate the regulatory impact of social relationships in adulthood. *International Journal of Psychophysiology: Official Journal of the International Organization of Psychophysiology*, 88(3), 224–231. <https://doi.org/10.1016/j.ijpsycho.2013.04.006>
- Cohodes, E. M., Kitt, E. R., Baskin-Sommers, A., & Gee, D. G. (2021a). Influences of early-life stress on frontolimbic circuitry: Harnessing a dimensional approach to elucidate the effects of heterogeneity in stress exposure. *Developmental Psychobiology*, 63(2), 153–172. <https://doi.org/10.1002/dev.21969>
- Cohodes, E. M., McCauley, S., & Gee, D. G. (2021b). Parental buffering of stress in the time of COVID-19: Family-level factors may moderate the association between pandemic-related stress and youth symptomatology. *Research on Child and Adolescent Psychopathology*, 49(7), 935–948. <https://doi.org/10.1007/s10802-020-00732-6>
- Çokluk, Ö., & Kayri, M. (2011). The effects of methods of imputation for missing values on the validity and reliability of scales. *Educational Sciences*, 11(1), 303–309.
- Conner, O. L., Siegle, G. J., McFarland, A. M., Silk, J. S., Ladouceur, C. D., Dahl, R. E., Coan, J. A., & Ryan, N. D. (2012). Mom—It Helps When You're Right Here! Attenuation of Neural Stress Markers in Anxious Youths Whose Caregivers Are Present during fMRI. *PLoS ONE*, 7(12), e50680. <https://doi.org/10.1371/journal.pone.0050680>
- Costa, N. M., Weems, C. F., & Pina, A. A. (2009). Hurricane katrina and youth anxiety: The role of perceived attachment beliefs and parenting behaviors. *Journal of Anxiety Disorders*, 23(7), 935–941. <https://doi.org/10.1016/j.janxdis.2009.06.002>
- Crocker, J., Canevello, A., Breines, J. G., & Flynn, H. (2010). Interpersonal goals and change in anxiety and dysphoria in first-semester college students. *Journal of Personality and Social Psychology*, 98(6), 1009–1024. <https://doi.org/10.1037/a0019400>
- Cummings-Robbeau, T. L., Lopez, F. G., & Rice, K. G. (2009). Attachment-related predictors of college students' problems with interpersonal sensitivity and aggression. *Journal of Social and Clinical Psychology*, 28(3), 364–391. <https://doi.org/10.1521/jscp.2009.28.3.364>
- de Wilde, A., & Rapee, R. M. (2008). Do controlling maternal behaviours increase state anxiety in children's responses to a social threat? A pilot study. *Journal of Behavior Therapy and Experimental Psychiatry*, 39(4), 526–537. <https://doi.org/10.1016/j.jbtep.2007.10.011>
- Dell'Acqua, C., Allison, G. O., Yun, C. H., & Weinberg, A. (2024). Linking social reward responsiveness and affective responses to the social environment: An ecological momentary assessment study. *Psychophysiology*, 61(10), e14640. <https://doi.org/10.1111/psyp.14640>
- Doom, J. R., Doyle, C. M., & Gunnar, M. R. (2017). Social stress buffering by friends in childhood and adolescence: Effects on HPA and oxytocin activity. *Social Neuroscience*, 12(1), 8–21. <https://doi.org/10.1080/17470919.2016.1149095>
- Doom, J. R., Hostinar, C. E., VanZomeran-Dohm, A. A., & Gunnar, M. R. (2015). The roles of puberty and age in explaining the diminished effectiveness of parental buffering of HPA reactivity and recovery in adolescence. *Psychoneuroendocrinology*, 59, 102–111. <https://doi.org/10.1016/j.psyneuen.2015.04.024>
- Drake, K. L., & Ginsburg, G. S. (2012). Family factors in the development, treatment, and prevention of childhood anxiety disorders. *Clinical Child and Family Psychology Review*, 15(2), 144–162. <https://doi.org/10.1007/s10567-011-0109-0>
- Eberly Lewis, M. B., Slater, J. J., McGinley, M., & Rote, W. M. (2024). Understanding the link between anxious parental overprotection and academic confidence in emerging adults: Mediation through interpersonal and intrapersonal processes. *Journal of Social and Personal Relationships*, 41(2), 390–412. <https://doi.org/10.1177/02654075231160131>
- Edwards, S. L., Rapee, R. M., & Kennedy, S. (2010). Prediction of anxiety symptoms in preschool-aged children: Examination of maternal and paternal perspectives. *Journal of Child Psychology and Psychiatry*, 51(3), 313–321. <https://doi.org/10.1111/j.1469-7610.2009.02160.x>
- Eisenberger, N. I., Taylor, S. E., Gable, S. L., Hilmert, C. J., & Lieberman, M. D. (2007). Neural pathways link social support to attenuated neuroendocrine stress responses. *NeuroImage*, 35(4), 1601–1612. <https://doi.org/10.1016/j.neuroimage.2007.01.038>
- Engel, M. L., & Gunnar, M. R. (2020). Chapter three—The development of stress reactivity and regulation during human development. In A. Clow, & N. Smyth (Eds.), *International Review of Neurobiology* (vol. 150, p. 41–76). Academic Press, <https://doi.org/10.1016/bs.irn.2019.11.003>
- Engert, V., Efanov, S. I., Dedovic, K., Duchesne, A., Dagher, A., & Pruessner, J. C. (2010). Perceived early-life maternal care and the cortisol response to repeated psychosocial stress. *Journal of Psychiatry and Neuroscience*, 35(6), 370–377. <https://doi.org/10.1503/jpn.100022>
- Epel, E. S., Crosswell, A. D., Mayer, S. E., Prather, A. A., Slavich, G. M., Puterman, E., & Mendes, W. B. (2018). More than a feeling: A unified view of stress measurement for population science. *Frontiers in Neuroendocrinology*, 49, 146–169. <https://doi.org/10.1016/j.yfrne.2018.03.001>
- Espejo, E. P., Ferriter, C. T., Hazel, N. A., Keenan-Miller, D., Hoffman, L. R., & Hammen, C. (2011). Predictors of subjective ratings of stressor severity: The effects of current mood and neuroticism. *Stress and Health*, 27(1), 23–33. <https://doi.org/10.1002/smi.1315>
- Ethridge, P., & Weinberg, A. (2018). Psychometric properties of neural responses to monetary and social rewards across development. *International Journal of Psychophysiology*, 132, 311–322. <https://doi.org/10.1016/j.ijpsycho.2018.01.011>
- Evans, G. W., Kim, P., Ting, A. H., Teshler, H. B., & Shannis, D. (2007). Cumulative risk, maternal responsiveness, and allostatic load among young adolescents. *Developmental Psychology*, 43(2), 341–351. <https://doi.org/10.1037/0012-1649.43.2.341>
- Farber, M. J., Kim, M. J., Knodt, A. R., & Hariri, A. R. (2019). Maternal overprotection in childhood is associated with amygdala reactivity and structural connectivity in adulthood. *Developmental Cognitive Neuroscience*, 40, 100711. <https://doi.org/10.1016/j.dcn.2019.100711>

- Farrell, A. K., Simpson, J. A., Carlson, E. A., Englund, M. M., & Sung, S. (2017). The impact of stress at different life stages on physical health and the buffering effects of maternal sensitivity. *Health Psychology*, 36(1), 35–44. <https://doi.org/10.1037/hea0000424>
- Fox, J. K., Ryan, J. L., Martin Burch, J., & Halpern, L. F. (2022). The role of parental overcontrol in the relationship between peer victimization, social threat cognitions, and social anxiety in school-age children. *School Mental Health*, 14(1), 201–212. <https://doi.org/10.1007/s12310-021-09466-2>
- Freeman, C., Carpentier, L., & Weinberg, A. (2023). Effects of the COVID-19 pandemic on neural responses to reward: A quasi-experiment. *Biological Psychiatry. Cognitive Neuroscience and Neuroimaging*, 8(9), 891–898. <https://doi.org/10.1016/j.bpsc.2023.02.009>
- Freeman, C., Panier, L., Schaffer, J., & Weinberg, A. (2023). Neural response to social but not monetary reward predicts increases in depressive symptoms during the COVID-19 pandemic. *Psychophysiology*, 60(4), e14206. <https://doi.org/10.1111/psyp.14206>
- Gee, D. G. (2016). Sensitive periods of emotion regulation: Influences of parental care on frontoamygdala circuitry and plasticity. *New Directions for Child and Adolescent Development*, 2016(153), 87–110. <https://doi.org/10.1002/cad.20166>
- Gee, D. G., Gabard-Durnam, L., Telzer, E. H., Humphreys, K. L., Goff, B., Shapiro, M., Flannery, J., Lumian, D. S., Fareri, D. S., Caldera, C., & Tottenham, N. (2014). Maternal buffering of human amygdala-prefrontal circuitry during childhood but not adolescence. *Psychological Science*, 25(11), 2067–2078. <https://doi.org/10.1177/0956797614550878>
- Giakoumaki, S. G., Roussos, P., Zourarakis, C., Spanoudakis, E., Mavrikaki, M., Tsapakis, E. M., & Bitsios, P. (2013). Sub-optimal parenting is associated with schizotypic and anxiety personality traits in adulthood. *European Psychiatry*, 28(4), 254–260. <https://doi.org/10.1016/j.eurpsy.2012.07.002>
- Ginsburg, G. S., Grover, R. L., & Ialongo, N. (2005). Parenting behaviors among anxious and non-anxious mothers: Relation with concurrent and long-term child outcomes. *Child & Family Behavior Therapy*, 26(4), 23–41. https://doi.org/10.1300/J019v26n04_02
- Goger, P., Rozenman, M., & Gonzalez, A. (2020). The association between current maternal psychological control, anxiety symptoms, and emotional regulatory processes in emerging adults. *Journal of Behavior Therapy and Experimental Psychiatry*, 68, 101563. <https://doi.org/10.1016/j.jbtep.2020.101563>
- González-Cámara, M., Osorio, A., & Reparaz, C. (2019). Measurement and function of the control dimension in parenting styles: A systematic review. *International Journal of Environmental Research and Public Health*, 16(17), 3157. <https://doi.org/10.3390/ijerph16173157>
- Gotlib, I. H., Mount, J. H., Cordy, N. I., & Whiffen, V. E. (1988). Depression and perceptions of early parenting: A longitudinal investigation. *The British Journal of Psychiatry*, 152(1), 24–27. <https://doi.org/10.1192/bjp.152.1.24>
- Gouze, K., Hopkins, J., Bryant, F., & Lavigne, J. (2016). Parenting and anxiety: Bi-directional relations in young children. *Journal of Abnormal Child Psychology*, 45(6), 1169–1180. <https://doi.org/10.1007/s10802-016-0223-z>
- Grant, K. E., Compas, B. E., Thurm, A. E., McMahon, S. D., Gipson, P. Y., Campbell, A. J., Krochok, K., & Westerholm, R. I. (2006). Stressors and child and adolescent psychopathology: Evidence of moderating and mediating effects. *Clinical Psychology Review*, 26(3), 257–283. <https://doi.org/10.1016/j.cpr.2005.06.011>
- Grolnick, W. S., & Pomerantz, E. M. (2009). Issues and challenges in studying parental control: Toward a new conceptualization. *Child Development Perspectives*, 3(3), 165–170. <https://doi.org/10.1111/j.1750-8606.2009.00099.x>
- Gunnar, M. (2017). Social buffering of stress in development: A career perspective. <https://journals.sagepub.com/doi/full/10.1177/1745691616680612>
- Hackman, D. A., Betancourt, L. M., Brodsky, N. L., Kobrin, L., Hurt, H., & Farah, M. J. (2013). Selective impact of early parental responsivity on adolescent stress reactivity. *PLoS ONE*, 8(3), e58250. <https://doi.org/10.1371/journal.pone.0058250>
- Hale, W. W., Klimstra, T. A., Branje, S. J. T., Wijsbroek, S. A. M., & Meeus, W. H. J. (2013). Is adolescent generalized anxiety disorder a magnet for negative parental interpersonal behaviors? *Depression and Anxiety*, 30(9), 849–856. <https://doi.org/10.1002/da.22065>
- Hammen, C., Brennan, P. A., & Shih, J. H. (2004). Family discord and stress predictors of depression and other disorders in adolescent children of depressed and nondepressed women. *Journal of the American Academy of Child and Adolescent Psychiatry*, 43(8), 994–1002. <https://doi.org/10.1097/01.chi.00000127588.57468.f6>
- Harris-McKoy, D. (2016). Adolescent delinquency: Is too much or too little parental control a problem? *Journal of Child and Family Studies*, 25(7), 2079–2088. <https://doi.org/10.1007/s10826-016-0383-z>
- Hettema, J. M., Neale, M. C., & Kendler, K. S. (2001). A review and meta-analysis of the genetic epidemiology of anxiety disorders. *American Journal of Psychiatry*, 158(10), 1568–1578. <https://doi.org/10.1176/appi.ajp.158.10.1568>
- Hibel, L. C., Granger, D. A., Blair, C., Cox, M. J., & The Family Life Project Key Investigators (2011). Maternal sensitivity buffers the adrenocortical implications of intimate partner violence exposure during early childhood. *Development and Psychopathology*, 23(2), 689–701. <https://doi.org/10.1017/S0954579411000010>
- Hiester, M., Nordstrom, A., & Swenson, L. M. (2009). Stability and change in parental attachment and adjustment outcomes during the first semester transition to college life. *Journal of College Student Development*, 50(5), 521–538.
- Hoskins, D. H. (2014). Consequences of parenting on adolescent outcomes. *Societies*, 4(3), 506–531. <https://doi.org/10.3390/soc4030506>
- Hostinar, C. E., Johnson, A. E., & Gunnar, M. R. (2015a). Early social deprivation and the social buffering of cortisol stress responses in late childhood: An experimental study. *Developmental Psychology*, 51(11), 1597–1608. <https://doi.org/10.1037/dev0000029>
- Hostinar, C. E., Johnson, A. E., & Gunnar, M. R. (2015b). Parent support is less effective in buffering cortisol stress reactivity for adolescents compared to children. *Developmental Science*, 18(2), 281–297. <https://doi.org/10.1111/desc.12195>
- Hovenkamp-Hermelink, J. H. M., Jeronimus, B. F., Myroniuk, S., Riese, H., & Schoevers, R. A. (2021). Predictors of persistence of anxiety disorders across the lifespan: A systematic review. *The Lancet Psychiatry*, 8(5), 428–443. [https://doi.org/10.1016/S2215-0366\(20\)30433-8](https://doi.org/10.1016/S2215-0366(20)30433-8)
- Hudson, J. L., & Rapee, R. M. (2001). Parent-child interactions and anxiety disorders: An observational study. *Behaviour Research and Therapy*, 39(12), 1411–1427. [https://doi.org/10.1016/S0005-7967\(00\)00107-8](https://doi.org/10.1016/S0005-7967(00)00107-8)
- Jeong, J., Pitchik, H. O., & Fink, G. (2021). Short-term, medium-term and long-term effects of early parenting interventions in low- and middle-income countries: A systematic review. *BMJ Global Health*, 6(3), e004067. <https://doi.org/10.1136/bmjgh-2020-004067>
- Jones, L. B., Hall, B. A., & Kiel, E. J. (2021). Systematic review of the link between maternal anxiety and overprotection. *Journal of Affective Disorders*, 295, 541–551. <https://doi.org/10.1016/j.jad.2021.08.065>
- Joo, S.-H., Durband, D. B., & Grable, J. (2008). The academic impact of financial stress on college students. *Journal of College Student Retention: Research, Theory & Practice*, 10(3), 287–305. <https://doi.org/10.2190/CS.10.3.c>
- Kahhalé, I., Barry, K. R., & Hanson, J. L. (2023). Positive parenting moderates associations between childhood stress and corticolimbic structure. *PNAS Nexus*, 2(6), pgad145. <https://doi.org/10.1093/pnasnexus/pgad145>
- Kahn, J. H., Kasky-Hernández, L. M., Ambrose, P., & French, S. (2017). Stress, depression, and anxiety among transitioning college students: The family as a protective factor. *Journal of the First-Year Experience & Students in Transition*, 29(2), 11–25.
- Kalton, G., & Kasprzyk, D. (1986). The treatment of missing survey data. *Survey Methodology*, 12(1), 1–16.
- Kazarian, S. S., Baker, B., & Helmes, E. (1987). The parental bonding instrument: Factorial structure. *British Journal of Clinical Psychology*, 26(3), 231–232. <https://doi.org/10.1111/j.2044-8260.1987.tb01353.x>
- Kenny, M. E., & Donaldson, G. A. (1991). Contributions of parental attachment and family structure to the social and psychological functioning of first-year college students.
- Körük, S., Öztürk, A., & Kara, A. (2016). The predictive strength of perceived parenting and parental attachment styles on psychological symptoms among Turkish university students. *International Journal of Instruction*, 9(2), 215–230. <https://doi.org/10.12973/iji.2016.9215a>
- Larose, S., & Boivin, M. (1998). Attachment to parents, social support expectations, and socioemotional adjustment during the high school—

- College transition. *Journal of Research on Adolescence* (Lawrence Erlbaum), 8(1), 1–27. https://doi.org/10.1207/s15327795jra0801_1
- Leung, J. T.-Y. (2021). Overparenting, parent-child conflict and anxiety among chinese adolescents: A cross-lagged panel study. *International Journal of Environmental Research and Public Health*, 18(22), 11887. <https://doi.org/10.3390/ijerph182211887>
- LeVine, R. A. (1988). Human parental care: Universal goals, cultural strategies, individual behavior. *New Directions for Child and Adolescent Development*, 1988(40), 3–12. <https://doi.org/10.1002/cd.23219884003>
- Lieb, R., Wittchen, H. U., Höfler, M., Fuetsch, M., Stein, M. B., & Merikangas, K. R. (2000). Parental psychopathology, parenting styles, and the risk of social phobia in offspring: A prospective-longitudinal community study. *Archives of General Psychiatry*, 57(9), 859–866. <https://doi.org/10.1001/archpsyc.57.9.859>
- Lu, L. (1994). University transition: Major and minor life stressors, personality characteristics and mental health. *Psychological Medicine*, 24(1), 81–87. <https://doi.org/10.1017/S0033291700026854>
- Lucas-Thompson, R. G. (2014). Relationship quality with parents, stressful life events, and cortisol production in emerging adulthood. *Emerging Adulthood*, 2(2), 92–104. <https://doi.org/10.1177/2167696813503313>
- Mackinnon, A. J., Henderson, A. S., & Duncan-Jones, P. (1989). The parental bonding instrument (PBI): An epidemiological study in a general population sample. *Psychological Medicine*, 19(4), 1023–1034. <https://doi.org/10.1017/S0033291700005754>
- Manzeske, D. P., & Stright, A. D. (2009). Parenting styles and emotion regulation: The role of behavioral and psychological control during young adulthood. *Journal of Adult Development*, 16(4), 223–229. <https://doi.org/10.1007/s10804-009-9068-9>
- Mathijs, L., Mouton, B., Zimmermann, G., & Van Petegem, S. (2023). Overprotective parenting and social anxiety in adolescents: The role of emotion regulation. *Journal of Social and Personal Relationships*, 41(2), 413–434. <https://doi.org/10.1177/02654075231173722>
- Mattanah, J. F., Lopez, F. G., & Govern, J. M. (2011). The contributions of parental attachment bonds to college student development and adjustment: A meta-analytic review. *Journal of Counseling Psychology*, 58(4), 565–596. <https://doi.org/10.1037/a0024635>
- McLafferty, M., Armour, C., Bunting, B., Ennis, E., Lapsley, C., Murray, E., & O'Neill, S. (2019). Coping, stress, and negative childhood experiences: The link to psychopathology, self-harm, and suicidal behavior. *PsyCh Journal*, 8(3), 293–306. <https://doi.org/10.1002/pchj.301>
- McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007). Examining the association between parenting and childhood anxiety: A meta-analysis. *Clinical Psychology Review*, 27(2), 155–172. <https://doi.org/10.1016/j.cpr.2006.09.002>
- McLoughlin, E., Fletcher, D., Slavich, G. M., Arnold, R., & Moore, L. J. (2021). Cumulative lifetime stress exposure, depression, anxiety, and well-being in elite athletes: A mixed-method study. *Psychology of Sport and Exercise*, 52, 101823. <https://doi.org/10.1016/j.psychsport.2020.101823>
- Meier, S. M., & Deckert, J. (2019). Genetics of anxiety disorders. *Current Psychiatry Reports*, 21(3), 16. <https://doi.org/10.1007/s11920-019-1002-7>
- Monroe, S. M. (2008). Modern approaches to conceptualizing and measuring human life stress. *Annual Review of Clinical Psychology*, 4(1), 33–52. <https://doi.org/10.1146/annurev.clinpsy.4.022007.141207>
- Moore, P. S., Whaley, S. E., & Sigman, M. (2004). Interactions between mothers and children: Impacts of maternal and child anxiety. *Journal of Abnormal Psychology*, 113(3), 471–476. <https://doi.org/10.1037/0021-843X.113.3.471>
- Moriarty, D. P., & Slavich, G. M. (2023). The future is dynamic: A call for intensive longitudinal data in immunopsychiatry. *Brain, Behavior, and Immunity*, 112, 118–124. <https://doi.org/10.1016/j.bbi.2023.06.002>
- Moutinho, I. L. D., Maddalena, N. de C. P., Roland, R. K., Lucchetti, A. L. G., Tibiriçá, S. H. C., Ezequiel, O. da S., & Lucchetti, G. (2017). Depression, stress and anxiety in medical students: A cross-sectional comparison between students from different semesters. *Revista Da Associação Médica Brasileira*, 63(1), 21–28. <https://doi.org/10.1590/1806-9282.63.01.21>
- Murphy, E., Wickramaratne, P., & Weissman, M. (2010). The stability of parental bonding reports: A 20-year follow-up. *Journal of Affective Disorders*, 125(1–3), 307–315. <https://doi.org/10.1016/j.jad.2010.01.003>
- Nijhof, K. S., & Engels, R. C. M. E. (2007). Parenting styles, coping strategies, and the expression of homesickness. *Journal of Adolescence*, 30(5), 709–720. <https://doi.org/10.1016/j.adolescence.2006.11.009>
- Ono, Y., Takaesu, Y., Nakai, Y., Ichiki, M., Masuya, J., Kusumi, I., & Inoue, T. (2017). The influence of parental care and overprotection, neuroticism and adult stressful life events on depressive symptoms in the general adult population. *Journal of Affective Disorders*, 217, 66–72. <https://doi.org/10.1016/j.jad.2017.03.058>
- Otani, K., Suzuki, A., Matsumoto, Y., Shibuya, N., Sadahiro, R., & Enokido, M. (2013). Parental overprotection engenders dysfunctional attitudes about achievement and dependency in a gender-specific manner. *BMC Psychiatry*, 13(1), 345. <https://doi.org/10.1186/1471-244X-13-345>
- Panier, L. Y. X., Park, J., Kreitewolf, J., & Weinberg, A. (2024). Multiple risk markers for increases in depression symptoms across two years: Evidence from the reward positivity and the error-related negativity. *Biological Psychology*, 193, 108897. <https://doi.org/10.1016/j.biopsycho.2024.108897>
- Parade, S. H., Leerkes, E. M., & Blankson, A. N. (2010). Attachment to parents, social anxiety, and close relationships of female students over the transition to college. *Journal of Youth and Adolescence*, 39(2), 127–137. <https://doi.org/10.1007/s10964-009-9396-x>
- Parenteau, A. M., Alen, N. V., Deer, L. K., Nissen, A. T., Luck, A. T., & Hostinar, C. E. (2020). Parenting matters: Parents can reduce or amplify children's anxiety and cortisol responses to acute stress. *Development and Psychopathology*, 32(5), 1799–1809. <https://doi.org/10.1017/S0954579420001285>
- Parker, G. (1981). Parental reports of depressives. An investigation of several explanations. *Journal of Affective Disorders*, 3(2), 131–140. [https://doi.org/10.1016/0165-0327\(81\)90038-0](https://doi.org/10.1016/0165-0327(81)90038-0)
- Parker, G. (1990). The parental bonding instrument: A decade of research. *Social Psychiatry and Psychiatric Epidemiology: The International Journal for Research in Social and Genetic Epidemiology and Mental Health Services*, 25(6), 281–282. <https://doi.org/10.1007/BF00782881>
- Parker, G., Tupling, H., & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology*, 52(1), 1–10. <https://doi.org/10.1111/j.2044-8341.1979.tb02487.x>
- Parra, L. A., Spahr, C. M., Goldbach, J. T., Bray, B. C., Kipke, M. D., & Slavich, G. M. (2023). Greater lifetime stressor exposure is associated with poorer mental health among sexual minority people of color. *Journal of Clinical Psychology*, 79(4), 1130–1155. <https://doi.org/10.1002/jclp.23463>
- Pegg, S., Ethridge, P., Shields, G. S., Slavich, G. M., Weinberg, A., & Kujawa, A. (2019). Blunted social reward responsiveness moderates the effect of lifetime social stress exposure on depressive symptoms. *Frontiers in Behavioral Neuroscience*, 13, 178. <https://doi.org/10.3389/fnbeh.2019.00178>
- Pinquart, M., & Kauser, R. (2018). Do the associations of parenting styles with behavior problems and academic achievement vary by culture? Results from a meta-analysis. *Cultural Diversity and Ethnic Minority Psychology*, 24(1), 75–100. <https://doi.org/10.1037/cdp0000149>
- Power, T. G. (2013). Parenting dimensions and styles: A brief history and recommendations for future research. *Childhood Obesity*, 9(Suppl 1), S-14–S-21. <https://doi.org/10.1089/chi.2013.0034>
- Quach, A. S., Epstein, N. B., Riley, P. J., Falconier, M. K., & Fang, X. (2015). Effects of parental warmth and academic pressure on anxiety and depression symptoms in chinese adolescents. *Journal of Child and Family Studies*, 24(1), 106–116. <https://doi.org/10.1007/s10826-013-9818-y>
- Renault, H., Freeman, C., Banica, I., Sandre, A., Ethridge, P., Park, J., & Weinberg, A. (2023). Neural response to rewards moderates the within-person association between daily positive events and positive affect during a period of stress exposure. *Psychophysiology*, 60(12), e14376. <https://doi.org/10.1111/psyp.14376>
- Rodriguez, N., Flores, R. T., London, E. F., Bingham Mira, C., Myers, H. F., Arroyo, D., & Rangel, A. (2019). A test of the main-effects, stress-buffering, stress-exacerbation, and joint-effects models among Mexican-origin adults. *Journal of Latinx Psychology*, 7(3), 212–229. <https://doi.org/10.1037/lat0000116>
- Rork, K. E., & Morris, T. L. (2009). Influence of parenting factors on childhood social anxiety: Direct observation of parental warmth and control. *Child & Family Behavior Therapy*, 31(3), 220–235. <https://doi.org/10.1080/07317100903099274>

- Sameshima, H., Shimura, A., Ono, K., Masuya, J., Ichiki, M., Nakajima, S., Odagiri, Y., Inoue, S., & Inoue, T. (2020). Combined Effects of Parenting in Childhood and Resilience on Work Stress in Nonclinical Adult Workers From the Community. *Frontiers in Psychiatry*, 11. <https://doi.org/10.3389/fpsyt.2020.00776>
- Sandre, A., Bagot, R. C., & Weinberg, A. (2019). Blunted neural response to appetitive images prospectively predicts symptoms of depression, and not anxiety, during the transition to university. *Biological Psychology*, 145, 31–41. <https://doi.org/10.1016/j.biopsycho.2019.04.001>
- Segrin, C., Wosidlo, A., Givertz, M., & Montgomery, N. (2013). Parent and child traits associated with overparenting. *Journal of Social and Clinical Psychology*, 32(6), 569–595. <https://doi.org/10.1521/jscp.2013.32.6.569>
- Sharma, S., Mustanski, B., Dick, D., Bolland, J., & Kertes, D. A. (2019). Protective factors buffer life stress and behavioral health outcomes among high-risk youth. *Journal of Abnormal Child Psychology*, 47(8), 1289–1301. <https://doi.org/10.1007/s10802-019-00515-8>
- Shields, G. S., Fassett-Carman, A., Gray, Z. J., Gonzales, J. E., Snyder, H. R., & Slavich, G. M. (2023). Why is subjective stress severity a stronger predictor of health than stressor exposure? A preregistered two-study test of two hypotheses. *Stress and Health: Journal of the International Society for the Investigation of Stress*, 39(1), 87–102. <https://doi.org/10.1002/smi.3165>
- Slavich, G. M. (2016). Life stress and health: A review of conceptual issues and recent findings. *Teaching of Psychology (Columbia, Mo.)*, 43(4), 346–355. <https://doi.org/10.1177/0098628316662768>
- Slavich, G. M., & Shields, G. S. (2018). Assessing lifetime stress exposure using the stress and adversity inventory for adults (Adult STRAIN): An overview and initial validation. *Psychosomatic Medicine*, 80(1), 17–27. <https://doi.org/10.1097/PSY.0000000000000534>
- Smout, A., Lazarus, R. S., & Hudson, J. L. (2020). The relationship between parenting and anxiety in emerging adulthood. *Cognitive Therapy and Research*, 44(1), 182–195. <https://doi.org/10.1007/s10608-019-10037-8>
- Spada, M. M., Caselli, G., Manfredi, C., Rebecchi, D., Rovetto, F., Ruggiero, G. M., Nikčević, A. V., & Sassaroli, S. (2012). Parental overprotection and metacognitions as predictors of worry and anxiety. *Behavioural and Cognitive Psychotherapy*, 40(3), 287–296. <https://doi.org/10.1017/S135246581100021X>
- Spokas, M., & Heimberg, R. (2009). Overprotective parenting, social anxiety, and external locus of control: Cross-sectional and longitudinal relationships. *Cognitive Therapy and Research*, 33(6), 543–551. <https://doi.org/10.1007/s10608-008-9227-5>
- Sturmbauer, S. C., Shields, G. S., Hetzel, E.-L., Rohleder, N., & Slavich, G. M. (2019). The stress and adversity inventory for adults (Adult STRAIN) in German: An overview and initial validation. *PLOS ONE*, 14(5), e0216419. <https://doi.org/10.1371/journal.pone.0216419>
- Sun, S.-W., Bell, N. J., Feng, D., & Avery, A. W. (2000). A longitudinal analysis of parental bonds and relational competencies during the college years. *International Journal of Adolescence and Youth*, 8(2-3), 149–181. <https://doi.org/10.1080/02673843.2000.9747849>
- Taylor, Z. E., Spinrad, T. L., VanSchyndel, S. K., Eisenberg, N., Huynh, J., Sulik, M. J., & Granger, D. A. (2013). Sociodemographic risk, parenting, and effortful control: Relations to salivary alpha-amylase and cortisol in early childhood. *Developmental Psychobiology*, 55(8), 869–880. <https://doi.org/10.1002/dev.21079>
- Thirlwall, K., & Creswell, C. (2010). The impact of maternal control on children's anxious cognitions, behaviours and affect: An experimental study. *Behaviour Research and Therapy*, 48(10), 1041–1046. <https://doi.org/10.1016/j.brat.2010.05.030>
- Toussaint, L., Shields, G. S., Dorn, G., & Slavich, G. M. (2016). Effects of lifetime stress exposure on mental and physical health in young adulthood: How stress degrades and forgiveness protects health. *Journal of Health Psychology*, 21(6), 1004–1014. <https://doi.org/10.1177/1359105314544132>
- Van Bronkhorst, S. B., Abraham, E., Dambreville, R., Ramos-Olazagasti, M. A., Wall, M., Saunders, D. C., Monk, C., Alegría, M., Canino, G. J., Bird, H., & Duarte, C. S. (2024). Sociocultural risk and resilience in the context of adverse childhood experiences. *JAMA Psychiatry*, 81(4), 406–413. <https://doi.org/10.1001/jamapsychiatry.2023.4900>
- van Rooij, S. J. H., Cross, D., Stevens, J. S., Vance, L. A., Kim, Y. J., Bradley, B., Tottenham, N., & Jovanovic, T. (2017). Maternal buffering of fear-potentiated startle in children and adolescents with trauma exposure. *Social Neuroscience*, 12(1), 22–31. <https://doi.org/10.1080/17470919.2016.1164244>
- Vigdal, J. S., & Brønnick, K. K. (2022). A systematic review of, helicopter parenting, and its relationship with anxiety and depression. *Frontiers in Psychology*, 13, 872981. <https://www.frontiersin.org/articles/10.3389/fpsyg.2022.872981>
- Wade, M., Sheridan, M. A., Zeanah, C. H., Fox, N. A., Nelson, C. A., & McLaughlin, K. A. (2020). Environmental determinants of physiological reactivity to stress: The interacting effects of early life deprivation, caregiving quality, and stressful life events. *Development and Psychopathology*, 32(5), 1732–1742. <https://doi.org/10.1017/S0954579420001327>
- Warren, S. L., & Simmens, S. J. (2005). Predicting toddler anxiety/Depressive symptoms: Effects of caregiver sensitivity of temperamentally vulnerable children. *Infant Mental Health Journal*, 26(1), 40–55. <https://doi.org/10.1002/imhj.20034>
- Waters, E., Hamilton, C. E., & Weinfield, N. S. (2000). The stability of attachment security from infancy to adolescence and early adulthood: General introduction. *Child Development*, 71(3), 678–683. <https://doi.org/10.1111/1467-8624.00175>
- Watson, D., O'Hara, M. W., Chmielewski, M., McDade-Montez, E. A., Koffel, E., Naragon, K., & Stuart, S. (2008). Further validation of the IDAS: Evidence of convergent, discriminant, criterion, and incremental validity. *Psychological Assessment*, 20(3), 248–259. <https://doi.org/10.1037/a0012570>
- Watson, D., O'Hara, M. W., Naragon-Gainey, K., Koffel, E., Chmielewski, M., Kotov, R., Stasik, S. M., & Ruggero, C. J. (2012). Development and validation of new anxiety and bipolar symptom scales for an expanded version of the IDAS (the IDAS-II). *Assessment*, 19(4), 399–420. <https://doi.org/10.1177/1073191112449857>
- Weinberg, A., Ethridge, P., Pegg, S., Freeman, C., Kujawa, A., & Dirks, M. A. (2021). Neural responses to social acceptance predict behavioral adjustments following peer feedback in the context of a real-time social interaction task. *Psychophysiology*, 58(3), e13748. <https://doi.org/10.1111/psyp.13748>
- Wilhelm, K., Niven, H., Parker, G., & Hadzi-Pavlovic, D. (2005). The stability of the parental bonding instrument over a 20-year period. *Psychological Medicine*, 35(3), 387–393. <https://doi.org/10.1017/S0033291704003538>
- Wilhelm, K., & Parker, G. (1990). Reliability of the parental bonding instrument and intimate bond measure scales. *The Australian and New Zealand Journal of Psychiatry*, 24(2), 199–202. <https://doi.org/10.3109/00048679009077683>
- Wintre, M. G., & Yaffe, M. (2000). First-year students' adjustment to university life as a function of relationships with parents. *Journal of Adolescent Research*, 15(1), 9–37. <https://doi.org/10.1177/0743558400151002>
- Wolfe, G. R., Narayan, A. J., Fox, K. R., & Doom, J. R. (2023). Adverse and Benevolent Childhood Experiences in University Students and Their Affective Forecasting and Event Predictions During the COVID-19 Pandemic. *Adversity and Resilience Science*, 2(3), 193–204. <https://doi.org/10.1007/s42844-023-00113-0>
- Wolfradt, U., Hempel, S., & Miles, J. N. V. (2003). Perceived parenting styles, depersonalisation, anxiety and coping behaviour in adolescents. *Personality and Individual Differences*, 34(3), 521–532. [https://doi.org/10.1016/S0191-8869\(02\)00092-2](https://doi.org/10.1016/S0191-8869(02)00092-2)
- Yao, H., Chen, S., & Gu, X. (2022). The impact of parenting styles on undergraduate students' emotion regulation: The mediating role of academic-social student-faculty interaction. *Frontiers in Psychology*, 13, 972006. <https://doi.org/10.3389/fpsyg.2022.972006>
- Yap, M. B. H., Morgan, A. J., Cairns, K., Jorm, A. F., Hetrick, S. E., & Merry, S. (2016). Parents in prevention: A meta-analysis of randomized controlled trials of parenting interventions to prevent internalizing problems in children from birth to age 18. *Clinical Psychology Review*, 50, 138–158. <https://doi.org/10.1016/j.cpr.2016.10.003>

- Yap, M. B. H., Pilkington, P. D., Ryan, S. M., & Jorm, A. F.** (2014). Parental factors associated with depression and anxiety in young people: A systematic review and meta-analysis. *Journal of Affective Disorders*, 156, 8–23. <https://doi.org/10.1016/j.jad.2013.11.007>
- Yirmiya, K., Motsan, S., Zagoory-Sharon, O., & Feldman, R.** (2020). Human attachment triggers different social buffering mechanisms under high and low early life stress rearing. *International Journal of Psychophysiology*, 152, 72–80. <https://doi.org/10.1016/j.ijpsycho.2020.04.001>
- Yu, Y., Liu, S., Song, M., Fan, H., & Zhang, L.** (2020). Effect of parent-child attachment on college students' social anxiety: A moderated mediation model. *Psychological Reports*, 123(6), 2196–2214. <https://doi.org/10.1177/0033294119862981>