

Maternal and Paternal Attachment in High-Risk Adolescents:
Unique and Interactive Associations with Anxiety and Depressive Symptoms

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Abstract

Anxiety and depressive symptoms are common, comorbid, and consequential for adolescents. Attachment theory suggests that styles of relationships with parents, developed from patterns of interactions over time, contribute to risk for these internalizing symptoms. This may be especially relevant for high-risk, clinically severe adolescents. However, most research focuses primarily on attachment relationships to mothers. Some theoretical perspectives also suggest that attachment to other caregivers (such as fathers) may not only be uniquely important for understanding internalizing symptoms but may also interact with maternal attachment. Therefore, it is important to examine these attachment relationships in tandem. The current study examines associations between attachment and internalizing symptoms in a sample of 1,141 youth (12-20 years old; 54.0% female, 96.5% White) from a multi-site residential treatment facility. Youth reported on attachment anxiety and avoidance with both parents, as well as anxiety and depressive symptoms. Response surface analyses were used to examine curvilinear, interactive, and fit effects using a model comparison approach. Overall, for patterns of anxious attachment, the best-fitting models reflected simple additive and linear effects. For avoidant attachment, best-fitting models included interactions and fit patterns, suggesting the meaning of maternal attachment was dependent on paternal and vice versa. After accounting for covariates, however, maternal attachment was the sole predictor in most models except attachment avoidance predicting depressive symptoms. These results have implications for attachment theory and research, and further work untangling these complex effects may inform clinical practice for high-risk adolescents.

Keywords: adolescents, attachment, anxiety symptoms, depressive symptoms, parents

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Among adolescents, anxiety and depressive symptoms are common, frequently comorbid, and consequential for functioning (Axelson & Birmaher, 2001; Beesdo et al., 2009; Substance Abuse and Mental Health Services Administration, 2020). Dysfunctional family factors comprise some of the most potent risk factors for depression and anxiety symptoms in adolescence (Schleider & Weisz, 2017). Attachment theory provides one lens through which to understand the association between family and internalizing symptoms (Bowlby, 1969). This theory posits that the quality of early parent and child interactions has a lasting impact on children's relational expectations and personality development. Specifically, when parents fail to be available and emotionally responsive, children develop insecure attachment styles (e.g., an anxious attachment characterized by fears of abandonment and rejection and a high need for closeness and/or an avoidant attachment characterized by feelings of distrust in others and avoidance of intimacy). Both dimensions of attachment insecurity have been associated with the development of internalizing symptoms of anxiety and depression (Brenning et al., 2012). However, most research focuses on attachment to mothers in a general population (Brumariu & Kerns, 2010). The current study investigates self-reported attachment to both mothers and fathers in relation to internalizing symptoms in a high-risk sample of adolescents in a psychiatric residential facility.

Internalizing disorders are among the most prevalent psychiatric illnesses affecting adolescents. In 2019, 15.7% of adolescents had at least one major depressive episode (Substance Abuse and Mental Health Services Administration, 2020), and the prevalence continues to accelerate (Weinberger et al., 2018). Similarly, anxiety disorders affect an estimated 15-20% of youth in the United States (Beesdo et al., 2009), and continue to increase among young adults

worldwide (Remes et al., 2016). Depression and anxiety are often comorbid (Axelson & Birmaher, 2001) and can have serious long-term consequences such as impaired school performance, poor social functioning, and increased risk of suicidal ideation and attempts (Boden et al., 2007; Mullen, 2018; Woodward & Fergusson, 2001). In the pursuit of mutable factors that can be targeted to treat anxiety and depression, better understanding the contribution of perceived parental attachment might point to some new psychosocial treatment targets.

Attachment theory offers some unique insights about the formation and maintenance of internalizing symptoms. This theory posits that patterns of interactions between parent and child have lasting impacts on children's perceptions of self and others. When parents lack emotional availability and sensitivity, children are more likely to develop insecure attachment orientations (patterns of anxious attachment or avoidant attachment). Consistent with this theory, research has found robust associations between insecure attachment and internalizing symptoms of anxiety and depression (Brumariu & Kerns, 2010; Madigan et al., 2016). Moreover, studies using questionnaire-based measures, which assess self-reported attachment anxiety and avoidance as separate dimensions, have often found both to be uniquely associated with depression (Brenning et al., 2012; Hankin et al., 2005). There is less research examining unique associations between anxiety symptoms with self-reported attachment anxiety and avoidance (Madigan et al., 2016). However, when semi-structured interviews are used to assess general attachment patterns, recent meta-analyses suggest that only the insecure-preoccupied pattern (the counterpart to anxious attachment), not the insecure-dismissing pattern (the counterpart to avoidant attachment), is associated with both anxiety and depressive symptoms (Dagan et al., 2018, 2020).

However, most studies examining parental attachment and internalizing symptoms have focused solely on maternal attachment, despite the potential importance of attachment to fathers

and other caregivers (see review by Brumariu & Kerns, 2010). Indeed, much attachment-focused research has failed to examine the independent contribution of self-reported attachment to fathers (see review by Bretherton, 2010), despite a history of criticism (e.g., Cowan, 1997; Rutter, 1979). Although the study of attachment to fathers remains underdeveloped, attachment to fathers likely has a unique contribution to normative and unhealthy development.

In addition to the undervaluing of father attachment, the relative exclusive focus on the mother-child dyad has led investigators away from a consideration of how multiple attachment relationships might interact with each other. Decades ago, van Ijzendoorn and colleagues (1992) suggested several possible models that could capture possible influences of multiple caregiver systems. According to this framework, the most commonly considered path is the *monotropy* model, where only the primary attachment figure, (typically the mother) is viewed as a primary source of attachment security. The *hierarchy* model assumes that the primary attachment figure (usually the mother) remains the most important, but secondary attachment figures make some (albeit smaller) contributions. The *independence* model assumes that each attachment figure is equally important, but may make specific contributions (e.g., mothers impact intimacy while fathers impact autonomy). Finally, the *integration* model assumes that attachment figures must be considered in tandem, understanding their interactive effects, to estimate the true associations with development. These models have continued to influence the developmental attachment tradition, including in a recent elaboration of the integration model by Dagan and Sagi-Schwartz (2018), but this framework has often gone underutilized in social and clinical psychology research.

Notably, when research does include attachment to fathers, there is strong evidence to suggest that the monotropic (maternal-only) model is unlikely to hold. Most studies in

nonclinical child and adolescent samples have found that both maternal and paternal attachment have at least some associations with internalizing symptoms (Agerup et al., 2015; Bosmans et al., 2011; Roelofs et al., 2006). Some studies have found stronger effects for paternal attachment (Noom et al., 1999; Roelofs et al., 2006); others have suggested more potent effects for maternal attachment (Breinholst et al., 2015; Duchesne & Ratelle, 2014). However, most of these studies have examined the effects of maternal and paternal attachment either in isolation (i.e., separate correlations or simple regressions) or in multiple regressions that excluded interactive, curvilinear, and other effects.

The integration model, which has received the least research, would suggest that maternal and paternal attachment should be understood in tandem, as part of a complex interconnected family system. Specifically, there are several possibilities we might expect. First, the effects of paternal attachment may differ based on the quality of maternal attachment and vice versa (statistically indicated by the presence of an *interaction*). Second, it is possible that different levels of attachment insecurity across parents have different associations with internalizing symptoms (statistically indicated by the presence of *curvilinear effects*). Finally, varying levels of “mismatch” (e.g., high maternal attachment avoidance but low paternal attachment avoidance) across parents may predict better or worse outcomes (statistically indicated by the presence of *fit effects*). One promising methodology that can test all of these effects involves polynomial regressions with response surface analyses (Schönbrodt, 2016). This approach has the advantage of testing interactions and quadratic effects simultaneously (Ganzach, 1997) as well as examining fit effects. Several possible models can be estimated and compared which constrain certain effects and allow for predictors to be recentered and rescaled.

In addition to the statistical approach, the current study is novel in other ways. Notably, some previous studies have found evidence of interactions between maternal and paternal attachment (Liu, 2008; Sim & Yow, 2011; Verschueren & Marcoen, 1999). However, nearly all of these studies have examined attachment as a dichotomous classification (e.g., security/insecurity), rather than continuous dimensions. Further, most studies have measured anxiety and depressive symptoms as a general internalizing domain, rather than exploring the possibly unique contributors to depression and anxiety symptoms separately. Finally, most studies have explored these questions in nonclinical samples. In contrast, the current study utilizes a highly distressed psychiatric residential sample, where we expect a bigger range of symptoms and family relationships. The current study will examine unique, interactive, non-linear, and fit pattern effects for maternal and paternal attachment on anxiety and depression symptoms. Dimensions of anxious and avoidant attachment will first be examined separately and then controlling for the other (along with covariates of age, gender, and race). These findings are expected to contradict the monotropic model, support the integrative model, and reveal more complex patterns of effects across parents and attachment orientation.

Method

Participants

Data for the current study were collected from 2019 to 2020 from a multisite psychiatric residential treatment center for adolescents. Overall, 1,141 patients were included in the current sample; 31 additional patients were removed because they completed no survey items, 2 because their age was over 20, 55 because they did not answer attachment questionnaires, and 73 because they reported on non-parental attachment figures. The sample was 54.0% female (331 patients

had missing data on gender due to a survey administration error), with an average age of 15.88 years ($SD = 1.46$, range: 12-20 years). The sample was 96.5% White and 99.4% non-Hispanic.

Procedure

All measures were administered by trained staff members to all incoming adolescent patients. The Newport Institute has 31 treatment facilities across five states. Using the electronic BH-Works platform (www.mdlogix.com), scores were automatically computed and uploaded into the electronic medical record system. As part of their research agreement with Drexel University, Newport Institute provides the researchers with de-identified data from quality improvement projects for analysis and publication; approval for use of this data for the current study was given by the Newport Institute. This research was submitted to the Drexel IRB, but was deemed “not human subjects research requiring IRB approval.”

Measures

Attachment

The Experiences in Close Relationships-Relationship Structures (ECR-RS) questionnaire (Fraley et al., 2011) was developed to assess relationship-specific attachment anxiety and avoidance. The ECR-RS has demonstrated strong reliability, factor validity, and distinctions from general assessments of attachment across relationships (Fraley et al., 2011). Respondents completed both scales of the ECR for their mother and father respectively; total scores were created by averaging each subscale (anxiety and avoidance) separately for each parent. As described above, most respondents completed the measure for their mother and their father (including stepparents or adoptive parents), but respondents identifying other figures (e.g., grandparents) were not included in the current study.

Depressive Symptoms

The Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) is an instrument for making criteria-based diagnoses of depressive and other mental disorders commonly encountered in primary care. The PHQ-9 depression scale is half the length of other depression measures, has comparable sensitivity and specificity, and consists of nine criteria based on DSM-IV depressive disorders (Titov et al., 2011).

Anxiety Symptoms

The Generalized Anxiety Disorder scale (GAD-7; Spitzer et al., 2006) is one of the most used diagnostic self-report scales for screening, diagnosis, and severity assessment of anxiety disorders. The GAD-7 has shown strong divergent, construct, criterion, and factor validation across multiple samples (Jordan et al., 2017; Spitzer et al., 2006).

Transparency and Openness

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures used in the study. This study was not preregistered. Materials for this study are not available. Analysis code is available on email request to the corresponding author. Data were analyzed using R version 4.0.5 and the R package RSA (Schönbrodt & Humberg, 2021).

Approach to Analysis

First, attachment anxiety and avoidance related to each parent were recoded to have a meaningful 0 at their shared scale midpoint (reflecting the response “neutral”; see Edwards & Shipp, 2007). Then, response surface analyses were estimated. As recommended by Schönbrodt (2016), multiple nested models were tested to determine the best-fitting polynomial model.

Generally, these models allow for the presence of *fit effects* (where there is an expected increase or decrease in the outcome variable based on matching levels of the two predictors) and/or *mean-level effects* (where there is an expected increase or decrease in the outcome variable based on the average level of the two predictors), along with coefficients that allow for predictors to be recentered and/or rescaled.

For example, *flat ridge* models allow only fit effects and not mean-level effects. That is, only the match between levels of attachment insecurity across parents matters (e.g., having similar levels of maternal and paternal avoidance), not the actual level. Given the known association between average level of attachment insecurity and internalizing symptoms, these models were not expected to fit the data well. The basic squared difference model (SQD) is a flat ridge model that assumes a “match” based on the actual values on the scale (i.e., around the same score on both predictors), whereas the shifted squared difference (SSQD), and shifted and rotated squared difference models (SRSQD) allow for shifts (recentering of the predictor), and both shifting and rotating (rescaling of the predictor), respectively. Therefore, based on the model, a “match” does not necessarily represent exactly the same score for both predictors.

On the other hand, *rising ridge* models allow both fit effects and mean-level effects. That is, increasing attachment insecurity across both parents should matter for internalizing symptoms, but so does the match between levels across parents. The basic rising ridge model (RR) also allows for shifted and rotated versions (SRR and SRRR). Notably, because the rising ridge model constrains the effects of the two predictors to be equal, a good fit for the basic rising ridge model (without transformations to the predictors) would suggest the effects of maternal and paternal attachment may be equivalent. Finally, the full unconstrained polynomial model was

tested, as well as nested models dropping terms from the full polynomial model (e.g., models dropping quadratic effects, interactions, or one predictor entirely).

Model comparisons were conducted primarily by examining AICc (Schönbrodt, 2016). Models with $<2 \Delta\text{AICc}$ were interpreted as plausible alternatives, and models with $<7 \Delta\text{AICc}$ compared to the best fitting model were considered as candidates (Burnham et al., 2011; Symonds & Moussalli, 2011). Overall model fit indices of CFI and SRMR were considered to identify the best model overall, and all models were expected to fit well ($\text{CFI} \geq .95$, $\text{SRMR} < .08$; Hu & Bentler, 1999). Model and model parameter interpretation followed guidelines by Schönbrodt (2016) and Humberg et al. (2019). Initial models contained only a single attachment dimension (anxiety or avoidance). Final models controlled for age, minority race status (dichotomized due to the almost-exclusively White sample), gender, and the other attachment dimension for both parents (anxiety for avoidance models, and avoidance for anxiety models). Missing data were handled with full-information maximum likelihood.

Results

Preliminary analyses

Mahalanobis Distance test detected and removed 13 outliers. Means, standard deviations, and alphas are in Table 1. To check multicollinearity, variance inflation factors (VIFs) were computed for a model containing all variables. All VIFs were below 5, indicating an acceptable degree of association between predictors (Fox, 2015). Percent of cases with discrepancies and congruence (using a cut point of $|\Delta z| = .5$, following standardization to the common mean and SD) for each pair of predictors was also checked, to ensure sufficient representation of discrepancies and congruence (Shanock et al., 2010). There were discrepant pairs in both

directions: for anxiety, approximately 14% reported more maternal anxiety, 22% more paternal anxiety, and 63% congruence between parents; for avoidance, approximately 18% reported more maternal avoidance, 36% more paternal avoidance, and 46% congruence between parents.

Model selection

Model comparison information for initial models (as described in the Approach to Analysis) predicting symptoms of anxiety and depression is found in Table 2. Of nine models considered for attachment anxiety predicting anxiety symptoms (based on $\Delta AICc < 7$), seven emerged as candidates (based on $\Delta AICc < 2$). In order of worst to best fit, these were the RR, SRRR, the full polynomial model, the interactions-only model, the SRR, the SRSQD, and the additive model. Of seven models considered for attachment anxiety predicting depression symptoms, all seven emerged as candidates: the SRRR, full polynomial, SRR, RR, SRSQD, interactions-only, and additive models. Of seven models considered for attachment avoidance predicting anxiety symptoms, three emerged as candidates: SRRR, RR, and SRR. Of the four models considered for attachment avoidance predicting depressive symptoms, two emerged as candidates: SRR, and RR.

Model interpretation

Figure 1 shows the best-fitting models for each attachment dimension and outcome. Regression parameters for all plausible candidate models are found in Table 3, and response surface parameters in Table 4.

For attachment anxiety, models generally suggested simple, linear effects. Specifically, both maternal (b_1) and paternal (b_2) attachment were significant predictors in most models for anxiety symptoms and all models for depressive symptoms, including the best-fitting and most

parsimonious (additive) models for both outcomes. Quadratic (b_3, b_5) and interactive (b_4) terms were not significant, except for the maternal anxiety quadratic effect in the SRSQD models (where it is constrained to equal $b_4/4b_5$, making interpretation difficult; Schönbrodt, 2016). Moreover, no models indicated a significant fit effect (a_4 or a'_4). Taken together, this suggests that the parsimonious additive model is likely to be the best fit to the data; both maternal and paternal attachment anxiety are uniquely associated with anxiety and depressive symptoms, but they do not appear to demonstrate more complex associations.

For attachment avoidance, on the other hand, there was evidence of more complex effects. In the best-fitting model for anxiety symptoms (the SRR), and in both candidate models for depressive symptoms (SRR and RR), there were significant linear, quadratic, interactive, and fit effects. Notably, per Humberg et al. (2019), after establishing a significant a_4 or a'_4 , other factors necessary to establish a fit effect were examined. For a “reverse” fit effect (more congruent scores are associated with fewer internalizing symptoms), this means that p_{20} is not significantly different from 0, p_{21} is not significantly different from 1, and a_3 is not significantly different from 0. All three of these effects are fixed to be true in the RR model, and the first two in SRR (a_3 , nonsignificant in these models, is shown in Table 4). As seen in Figure 1, this suggests that participants reported more internalizing symptoms not only when there are high levels of avoidant attachment to both parents, but also when there are increasing levels of “mismatch” (e.g., high avoidance with one parent and low with the other). Perhaps most notably, the simple rising ridge models (constraining maternal and paternal associations to be equal) fitting well, and the lack of significant shifting and/or rotating factors in the more complex models, suggests a similar size of unique effects between maternal and paternal avoidance.

Final models controlling for covariates

Finally, all candidate models were re-estimated with the addition of control variables (age, binary gender, and race, along with the other attachment dimension). Estimates from the best-fitting models, ΔR^2 of attachment anxiety and avoidance above control variables (including the other attachment dimension), and total R^2 for each outcome are found in Table 5. Female and older youth reported significantly more anxiety and depression. Examined separately, the additions of attachment anxiety (over avoidance and controls) and avoidance (over anxiety and controls) explained a significant percent of variance in all models. Overall, predictors explained around 14% of the variance in anxiety symptoms, and 21% in depressive symptoms.

After controlling for demographics and the other attachment dimension, regression estimates and response surface parameters were reexamined. For models of attachment anxiety predicting anxiety or depression symptoms, only maternal attachment anxiety remained significant in most models. The sole exception was the rising ridge (RR) model, which constrains the linear effects of maternal and paternal attachment anxiety to be equal. Similarly, for the model of attachment avoidance predicting anxiety symptoms, only maternal attachment avoidance was significant in models besides the simple RR model, and no quadratic, interactive, or congruence effects remained significant. On the other hand, for the models of attachment avoidance predicting depressive symptoms, results were largely unchanged, and continued to suggest unique linear, quadratic, interactive, and congruence effects in both candidate models.

Discussion

The current study examined complex associations between paternal and maternal attachment and anxiety and depressive symptoms in a high-risk residential sample of adolescents. Associations with attachment anxiety were simple, additive (not interactive), and linear. That is, although both maternal and paternal attachment anxiety were uniquely linked to

internalizing symptoms, the expected association between maternal attachment anxiety and internalizing did not differ based on paternal anxiety (and vice versa). On the other hand, associations with attachment avoidance were more complex, and suggested that not only did attachment with both parents uniquely matter, but that interactions and “mismatches” across parents were also associated with different levels of internalizing symptoms. However, after controlling for covariates and other attachment dimensions, paternal attachment dropped out of most models except attachment avoidance predicting depressive symptoms. These results suggest that the role of attachment differs across parents, dimensions (anxiety and avoidance), and symptoms.

When considering multiple-caregiver attachment models (Dagan & Sagi-Schwartz, 2018; van Ijzendoorn et al., 1992), results suggested that attachment anxiety may be more hierarchical or even monotropic; maternal attachment is the primary, or, after accounting for covariates, the sole predictor of internalizing symptoms. In contrast, avoidance may be more likely to reflect a “horizontal-additive” model (Dagan & Sagi-Schwartz, 2018), with more comparable and potentially interactive effects of maternal and paternal attachment. The “mismatch” effect appears to suggest that those with increasingly “mismatched” avoidance across parents (i.e., higher with one and lower with the other) have more severe symptoms (although not as severe as youth with two highly avoidant attachment relationships). This is consistent with Dagan and Sagi-Schwartz’s “additive” hypothesis, while also elaborating upon this model by suggesting that the degree of discrepancy across parents matters.

The more “hierarchical” attachment anxiety and more “horizontal” avoidance deserves further discussion. Although few studies have examined the possibility of these differences, at least one other study consistently found that anxious attachment to mothers was uniquely

important for well-being in young adulthood after accounting for other close relationships (Klohnen et al., 2005). This may be due to the primary caregiving role still more commonly occupied by mothers, but further research is needed to determine whether this pattern is consistent across populations and life stages. It is also interesting to note that anxious attachment was more strongly correlated across parents compared to avoidant attachment. Although this distinction was not hypothesized, it is consistent with other literature (e.g., Moreira, 2011). Given the idea that anxious attachment results in hyperactivation of negative affect and avoidant attachment in deactivation of affect (Shaver & Mikulincer, 2002), it could be possible that, if this idea is supported, that hyperactivation is more likely to generalize across figures (resulting in similar scores across parents), whereas deactivation is more likely to selectively shut off in regards to a specific figure (resulting in different scores across parents). Therefore, redundancy of the secondary attachment figure may be more likely for attachment anxiety. However, it is also important to remember that after accounting for covariates, paternal avoidance only remained significant in the depressive symptom models. Perhaps there is something unique about paternal avoidance for depression, specifically; previous findings have suggested that lack of paternal warmth predicts later depressive symptoms (Alloy et al., 2001). Further research is needed to determine if this effect is consistent across samples.

These findings have implications for theory, research, and treatment. The current study aligns with a growing body of literature emphasizing the need to understand family processes as part of an interconnected system, rather than as disconnected risk factors. Although attachment anxiety with mothers and fathers was best represented in a linear and additive manner when predicting internalizing symptoms, attachment avoidance with mothers and fathers demonstrated significantly more complex associations (e.g., Bowen, 1978; Davies & Cummings, 1994;

Diamond et al., 2013; Olson et al., 1989). Unfortunately, empirical research has rarely examined this level of interaction, possibly due to difficulties in assessment and modeling of these more complex processes. Advances in analytic models such as structural equation modeling, actor-partner interdependence modeling, and multilevel latent profile analyses may help explore the ways that multiple attachment figures and the dynamics between them, uniquely contribute to child development and psychological health. Although all theoretical and statistical models must make trade-offs between parsimony and detail, exploring these interdependent processes is necessary for improving understanding, identification, and intervention for those struggling with anxiety, depression, and other psychological challenges.

The current study suggests that it is important to distinguish attachment toward different figures. This is consistent with previous research finding that attachment to specific others is distinct from generalized attachment styles and may provide different information about relational and individual functioning (e.g., Cozzarelli et al., 2000). Interestingly, in contrast to the current findings, previous work has considered secure-insecure mismatches as enacting a (partial) protective buffering of the effects of an insecure relationship through a secure relationship (Bretherton, 1991; Verschueren & Marcoen, 1999). More work is needed to disentangle these effects. There is also a need to understand whether the meaning of these mismatches differs by parent (e.g., is it more beneficial to have an avoidant relationship with mother or father, if the other relationship is secure?). As quadratic response surface analysis does not reveal the effects of direction of incongruence (Humberg et al., 2019), further research should investigate this question using strategies like cubic response surface analysis.

The current study also has possible implications for treatment. A growing number of interventions aim to improve the quality of parent-child attachment. Well validated examples of

these treatments include Attachment-based Family Therapy (Diamond et al., 2013), Attachment and Biobehavioral Catch-up (Dozier & Bernard, 2019), CONNECT (Moretti & Obsuth, 2009), and Circle of Security (Powell et al., 2016). For these models, this research encourages interventionists to pay more attention to father engagement in the therapeutic process, particularly for youth high in avoidance. Mobilizing or improving trust in father's availability and emotional sensitivity could be a resource to increase security. Research examining these interventions should model underlying mechanisms, which may include more complex associations involving multiple attachment figures. A family systems framework would also encourage an examination of the quality of parental interaction with each other, to determine how interparental interaction might impact individual attachment relationships with the child. On the other hand, the maternal relationship may be especially relevant for attachment anxiety, and a growing body of research suggests that attachment anxiety is increasingly important for internalizing symptoms in adolescence and adulthood (see Dagan & Bernard, 2021). Clinical practice should continue to evolve alongside this developing line of research.

There are several limitations to the current study. First, the current sample and analyses were limited to youth with one male and one female parent or step-parent. Adolescents with only one parent, same-sex parents, more than two parents, or other key attachment figures (e.g., grandparents) were not included in this study due to its focus, which may limit the generalizability of the findings to these populations. Second, the current sample was racially homogeneous, limiting ability to explore the role of race or to generalize to more racially diverse samples. Third, responses reflected only the attachment style of the child, and not other salient family factors; however, recent work revealing significant discrepancies in reports of family functioning for avoidantly attached youth (Chang et al., 2020) suggests that parental perspectives

may be uniquely informative in understanding how family functioning more generally may affect youth. Finally, the direction of effects cannot be determined and is likely complex. Although parental attachment should have a basis in early childhood experiences (and should increase risk for depression and anxiety), it can also change over time (Fraley, 2002), and other factors may also influence both attachment and internalizing symptoms (such as parental internalizing symptoms; Brenning et al., 2012).

In conclusion, the preponderance of previous work has suggested that for adolescents, attachment to mothers can be a risk or protective factor against anxiety and depression. This paper demonstrates that in a high-risk psychiatric sample, and also finds that attachment to fathers can be related to severity of symptoms. Although maternal attachment was generally more robustly associated with internalizing symptoms, paternal attachment had unique contributions, particularly in terms of avoidant attachment and depression. Moreover, in support of the integration model, there was preliminary evidence for more interactive effects between maternal and paternal attachment, suggesting that consideration of multiple attachment figures may better help understand the functioning and treatment of these of these complex patient populations. Continued investigations of the unique role of fathers will not only advance theoretical understanding, but may also improve treatment outcomes for high-risk youth.

References

- Agerup, T., Lydersen, S., Wallander, J., & Sund, A. M. (2015). Associations between parental attachment and course of depression between adolescence and young adulthood. *Child Psychiatry & Human Development, 46*(4), 632–642.
<https://doi.org/10.1007/s10578-014-0506-y>
- Alloy, L. B., Abramson, L. Y., Tashman, N. A., Berrebbi, D. S., Hogan, M. E., Whitehouse, W. G., Crossfield, A. G., & Morocco, A. (2001). Developmental origins of cognitive vulnerability to depression: Parenting, cognitive, and inferential feedback styles of the parents of individuals at high and low cognitive risk for depression. *Cognitive Therapy and Research, 25*(4), 397–423. <https://doi.org/10.1023/A:1005534503148>
- Axelson, D. A., & Birmaher, B. (2001). Relations between anxiety and depressive disorders in childhood and adolescence. *Depression and Anxiety, 14*(2), 67–78.
<https://doi.org/10.1002/da.1048>
- Beesdo, K., Knappe, S., & Pine, D. S. (2009). Anxiety and anxiety disorders in children and adolescents: Developmental issues and implications for DSM-V. *The Psychiatric Clinics of North America, 32*(3), 483–524. <https://doi.org/10.1016/j.psc.2009.06.002>
- Boden, J. M., Fergusson, D. M., & Horwood, L. J. (2007). Anxiety disorders and suicidal behaviours in adolescence and young adulthood: Findings from a longitudinal study. *Psychological Medicine, 37*, 431–440.
- Bosmans, G., Braet, C., Beyers, W., Van Leeuwen, K., & Van Vlierberghe, L. (2011). Parents' power assertive discipline and internalizing problems in adolescents: The role of

attachment. *Parenting: Science and Practice*, 11(1), 34–55.

<https://doi.org/10.1080/15295192.2011.539507>

Bowen, M. (1978). *Family therapy in clinical practice*. Aronson.

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. Basic Books.

Breinholst, S., Esbjørn, B. H., & Reinholdt-Dunne, M. L. (2015). Effects of attachment and rearing behavior on anxiety in normal developing youth: A mediational study.

Personality and Individual Differences, 81, 155–161.

<https://doi.org/10.1016/j.paid.2014.08.022>

Brenning, K., Soenens, B., Braet, C., & Bal, S. (2012). The role of parenting and mother-adolescent attachment in the intergenerational similarity of internalizing symptoms. *Journal of Youth and Adolescence*, 41(6), 802–816.

<https://doi.org/10.1007/s10964-011-9740-9>

Bretherton, I. (1991). Pouring new wine into old bottles: The social self as internal working model. In *Self processes and development* (pp. 1–41). Lawrence Erlbaum Associates, Inc.

Bretherton, I. (2010). Fathers in attachment theory and research: A review. *Early Child Development and Care*, 180(1–2), 9–23. <https://doi.org/10.1080/03004430903414661>

Brumariu, L. E., & Kerns, K. A. (2010). Parent–child attachment and internalizing symptoms in childhood and adolescence: A review of empirical findings and future directions.

Development and Psychopathology, 22(1), 177–203.

<https://doi.org/10.1017/S0954579409990344>

- Burnham, K. P., Anderson, D. R., & Huyvaert, K. P. (2011). AIC model selection and multimodel inference in behavioral ecology: Some background, observations, and comparisons. *Behavioral Ecology and Sociobiology*, *65*(1), 23–35.
<https://doi.org/10.1007/s00265-010-1029-6>
- Chang, C. J., Ohannessian, C. M., Krauthamer Ewing, E. S., Kobak, R., Diamond, G. S., & Herres, J. (2020). Attachment and parent-adolescent discrepancies in reports of family functioning among suicidal adolescents. *Journal of Child and Family Studies*, *29*(1), 227–236. <https://doi.org/10.1007/s10826-019-01566-7>
- Cowan, P. A. (1997). Beyond meta-analysis: A plea for a family systems view of attachment. *Child Development*, *68*(4), 601–603. <https://doi.org/10.1111/j.1467-8624.1997.tb04222.x>
- Cozzarelli, C., Hoekstra, S. J., & Bylsma, W. H. (2000). General versus specific mental models of attachment: Are they associated with different outcomes? *Personality and Social Psychology Bulletin*, *26*(5), 605–618. <https://doi.org/10.1177/0146167200267008>
- Dagan, O., & Bernard, K. (2021). It takes a village: A call for engaging attachment with adjunct disciplines to clarify “in-house” clinical conundrums. *Attachment & Human Development*, *23*(4), 455–467. <https://doi.org/10.1080/14616734.2021.1918455>
- Dagan, O., Facompré, C. R., & Bernard, K. (2018). Adult attachment representations and depressive symptoms: A meta-analysis. *Journal of Affective Disorders*, *236*, 274–290.
<https://doi.org/10.1016/j.jad.2018.04.091>
- Dagan, O., Facompré, C. R., Nivison, M. D., Roisman, G. I., & Bernard, K. (2020). Preoccupied and dismissing attachment representations are differentially associated with anxiety in

- adolescence and adulthood: A meta-analysis. *Clinical Psychological Science*, 8(4), 614–640. <https://doi.org/10.1177/2167702620917455>
- Dagan, O., & Sagi-Schwartz, A. (2018). Early attachment network with mother and father: An unsettled issue. *Child Development Perspectives*, 12(2), 115–121. <https://doi.org/10.1111/cdep.12272>
- Davies, P. T., & Cummings, E. M. (1994). Marital conflict and child adjustment: An emotional security hypothesis. *Psychological Bulletin*, 116(3), 387–411. <https://doi.org/10.1037/0033-2909.116.3.387>
- Diamond, G. S., Diamond, G. M., & Levy, S. (2013). *Attachment-based family therapy for depressed adolescents*. American Psychological Association.
- Dozier, M., & Bernard, K. (2019). *Coaching parents of vulnerable infants: The Attachment and Biobehavioral Catch-Up approach*. Guilford Press.
- Duchesne, S., & Ratelle, C. F. (2014). Attachment security to mothers and fathers and the developmental trajectories of depressive symptoms in adolescence: Which parent for which trajectory? *Journal of Youth and Adolescence*, 43(4), 641–654. <https://doi.org/10.1007/s10964-013-0029-z>
- Edwards, J. R., & Shipp, A. J. (2007). The relationship between person-environment fit and outcomes: An integrative theoretical framework. In *Perspectives on organizational fit* (pp. 209–258). Lawrence Erlbaum Associates Publishers.
- Fox, J. (2015). *Applied regression analysis and generalized linear models*. SAGE Publications.

- Fraley, R. C. (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
- Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in close relationships—Relationship Structures Questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment*, 23(3), 615–625.
- Ganzach, Y. (1997). Misleading interaction and curvilinear terms. *Psychological Methods*, 2(3), 235–247. <https://doi.org/10.1037/1082-989X.2.3.235>
- Hankin, B. L., Kassel, J. D., & Abela, J. R. Z. (2005). Adult Attachment Dimensions and Specificity of Emotional Distress Symptoms: Prospective Investigations of Cognitive Risk and Interpersonal Stress Generation as Mediating Mechanisms. *Personality and Social Psychology Bulletin*, 31(1), 136–151. <https://doi.org/10.1177/0146167204271324>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Humberg, S., Nestler, S., & Back, M. D. (2019). Response surface analysis in personality and social psychology: Checklist and clarifications for the case of congruence hypotheses. *Social Psychological and Personality Science*, 10(3), 409–419. <https://doi.org/10.1177/1948550618757600>
- Jordan, P., Shedden-Mora, M. C., & Löwe, B. (2017). Psychometric analysis of the Generalized Anxiety Disorder scale (GAD-7) in primary care using modern item response theory. *PLoS ONE*, 12(8), e0182162. <https://doi.org/10.1371/journal.pone.0182162>

- Klohnen, E. C., Weller, J. A., Luo, S., & Choe, M. (2005). Organization and predictive power of general and relationship-specific attachment models: One for all, and all for one? *Personality and Social Psychology Bulletin*, *31*(12), 1665–1682.
<https://doi.org/10.1177/0146167205278307>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606–613.
<https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Liu, Y.-L. (2008). An examination of three models of the relationships between parental attachments and adolescents' social functioning and depressive symptoms. *Journal of Youth and Adolescence*, *37*(8), 941–952. <https://doi.org/10.1007/s10964-006-9147-1>
- Madigan, S., Brumariu, L. E., Villani, V., Atkinson, L., & Lyons-Ruth, K. (2016). Representational and questionnaire measures of attachment: A meta-analysis of relations to child internalizing and externalizing problems. *Psychological Bulletin*, *142*(4), 367–399. <https://doi.org/10.1037/bul0000029>
- Moreira, J. M. (2011). Adult attachment style across individuals and role-relationships: Avoidance is relationship-specific, but anxiety shows greater generalisability. *Journal of Relationships Research*, *2*(1), 63–72. <https://doi.org/10.1375/jrr.2.1.63>
- Moretti, M. M., & Obsuth, I. (2009). Effectiveness of an attachment-focused manualized intervention for parents of teens at risk for aggressive behaviour: The Connect Program. *Journal of Adolescence*, *32*(6), 1347–1357.
<https://doi.org/10.1016/j.adolescence.2009.07.013>

- Mullen, S. (2018). Major depressive disorder in children and adolescents. *The Mental Health Clinician*, 8(6), 275–283. <https://doi.org/10.9740/mhc.2018.11.275>
- Noom, M. J., Deković, M., & Meeus, W. H. J. (1999). Autonomy, attachment and psychosocial adjustment during adolescence: A double-edged sword? *Journal of Adolescence*, 22(6), 771–783. <https://doi.org/10.1006/jado.1999.0269>
- Olson, D. H., Russell, C. S., & Sprenkle, D. H. (1989). *Circumplex model: Systemic assessment and treatment of families*. Haworth Press.
- Powell, B., Cooper, G., Hoffman, K., & Marvin, B. (2016). *The circle of security intervention: Enhancing attachment in early parent-child relationships*. Guilford Press.
- Remes, O., Brayne, C., van der Linde, R., & Lafortune, L. (2016). A systematic review of reviews on the prevalence of anxiety disorders in adult populations. *Brain and Behavior*, 6(7), e00497. <https://doi.org/10.1002/brb3.497>
- Roelofs, J., Meesters, C., ter Huurne, M., Bamelis, L., & Muris, P. (2006). On the links between attachment style, parental rearing behaviors, and internalizing and externalizing problems in non-clinical children. *Journal of Child and Family Studies*, 15(3), 319–332. <https://doi.org/10.1007/s10826-006-9025-1>
- Rutter, M. (1979). Maternal deprivation, 1972-1978: New findings, new concepts, new approaches. *Child Development*, 50(2), 283–305.
- Schleider, J. L., & Weisz, J. R. (2017). Family process and youth internalizing problems: A triadic model of etiology and intervention. *Development and Psychopathology*, 29(1), 273–301. <https://doi.org/10.1017/S095457941600016X>

Schönbrodt, F. (2016). *Testing fit patterns with polynomial regression models.*

https://www.psy.lmu.de/gp/download/schoenbrodt/pub/rsa5_journal.pdf

Schönbrodt, F., & Humberg, S. (2021). *RSA: An R package for response surface analysis*

(*version 0.10.4*). <https://cran.r-project.org/web/packages/RSA/index.html>

Shanock, L. R., Baran, B. E., Gentry, W. A., Pattison, S. C., & Heggstad, E. D. (2010).

Polynomial regression with response surface analysis: A powerful approach for examining moderation and overcoming limitations of difference scores. *Journal of Business and Psychology*, 25(4), 543–554.

Shaver, P. R., & Mikulincer, M. (2002). Attachment-related psychodynamics. *Attachment &*

Human Development, 4(2), 133–161. <https://doi.org/10.1080/14616730210154171>

Sim, T. N., & Yow, A. S. (2011). God attachment, mother attachment, and father attachment in early and middle adolescence. *Journal of Religion and Health*, 50(2), 264–278.

<https://doi.org/10.1007/s10943-010-9342-y>

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing

Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine*, 166(10), 1092–1097. <https://doi.org/10.1001/archinte.166.10.1092>

Substance Abuse and Mental Health Services Administration. (2020). *Key substance use and mental health indicators in the United States: Results from the 2019 National Survey on Drug Use and Health (HHS Publication No. PEP20-07-01-001, NSDUH Series H-55).*

Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. <https://www.samhsa.gov/data/>

- Symonds, M. R. E., & Moussalli, A. (2011). A brief guide to model selection, multimodel inference and model averaging in behavioural ecology using Akaike's information criterion. *Behavioral Ecology and Sociobiology*, *65*(1), 13–21.
<https://doi.org/10.1007/s00265-010-1037-6>
- Titov, N., Dear, B. F., McMillan, D., Anderson, T., Zou, J., & Sunderland, M. (2011). Psychometric comparison of the PHQ-9 and BDI-II for measuring response during treatment of depression. *Cognitive Behaviour Therapy*, *40*(2), 126–136.
<https://doi.org/10.1080/16506073.2010.550059>
- van Ijzendoorn, M. H., Sagi, A., & Lambermon, M. W. E. (1992). The multiple caretaker paradox: Data from Holland and Israel. *New Directions for Child and Adolescent Development*, *1992*(57), 5–24. <https://doi.org/10.1002/cd.23219925703>
- Verschueren, K., & Marcoen, A. (1999). Representation of self and socioemotional competence in kindergartners: Differential and combined effects of attachment to mother and to father. *Child Development*, *70*(1), 183–201. <https://doi.org/10.1111/1467-8624.00014>
- Weinberger, A. H., Gbedemah, M., Martinez, A. M., Nash, D., Galea, S., & Goodwin, R. D. (2018). Trends in depression prevalence in the USA from 2005 to 2015: Widening disparities in vulnerable groups. *Psychological Medicine*, *48*(8), 1308–1315.
<https://doi.org/10.1017/S0033291717002781>
- Woodward, L. J., & Fergusson, D. M. (2001). Life course outcomes of young people with anxiety disorders in adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(9), 1086–1093.
<https://doi.org/10.1097/00004583-200109000-00018>

Table 1

Means and Standard Deviations

Scale	Range	Mean	SD	Alpha
Attachment anxiety				
Mother	1-7	2.57	1.62	.85
Father	1-7	2.77	1.74	.88
Attachment avoidance				
Mother	1-7	3.90	1.65	.91
Father	1-7	4.39	1.71	.92
Anxiety symptoms	0-21	9.57	6.35	.92
Depression symptoms	0-27	12.03	7.60	.90

Table 2

Model Comparison Information

Model	AICc	CFI	SRMR	R ²
<i>Maternal and paternal attachment anxiety, predicting anxiety symptoms</i>				
Mother-only (quadratic)	7397.73	.906	.013	.058
Mother-only	7397.55	.895	.017	.057
RR	7394.09	.956	.010	.061
SRRR	7394.00	.985	.006	.065
Full	7393.92	1	.000	.067
Interactions-only	7393.45	.978	.006	.063
SRR	7393.18	.982	.006	.064
SRSQD	7393.16	.982	.006	.064
Additive	7392.55	.977	.007	.062
<i>Maternal and paternal attachment anxiety, predicting depression symptoms</i>				
SRRR	7754.68	.983	.007	.084
Full	7754.09	1	.000	.086
SRR	7753.49	.985	.007	.083
RR	7753.26	.977	.009	.081
SRSQD	7753.23	.988	.006	.083
Interactions-only	7753.10	.989	.005	.083
Additive	7753.00	.980	.008	.082
<i>Maternal and paternal attachment avoidance, predicting anxiety symptoms</i>				
SRSQD	7415.06	.922	.010	.045
Additive	7413.35	.934	.010	.045
Interactions-only	7412.86	1	.000	.051
Full	7412.85	.962	.011	.047
SRRR	7410.83	1	.000	.051
RR	7410.59	.985	.008	.048
SRR	7409.02	1	.002	.050
<i>Maternal and paternal attachment avoidance, predicting depression symptoms</i>				
Full	7757.22	1	.000	.083
SRRR	7755.45	1	.004	.083
SRR	7753.49	1	.004	.083
RR	7752.34	1	.005	.082

Note. CFI = confirmatory fit index. SRMR = standardized root mean squared residual. Bolded text indicates models with <2 Δ AICc compared to the best-fitting model.

Table 3

Regression Parameters

Model	b_1	b_2	b_3	b_4	b_5
<i>Maternal and paternal attachment anxiety, predicting anxiety symptoms</i>					
Additive	0.70***	0.36*			
SRSQD	0.59***	0.35*	-0.08***	0.00	
SRR	0.74***	0.29	0.05	-0.10	0.05
Interactions-only	0.68***	0.27		-0.07	
Full	0.56**	0.38*	-0.10	-0.09	0.14
SRRR	0.72***	0.34*	0.03	-0.11	0.11
RR	0.51***	0.51***	0.03	-0.05	0.03
<i>Maternal and paternal attachment anxiety, predicting depression symptoms</i>					
Additive	0.86***	0.58***			
Interactions-only	0.82***	0.45*		-0.10	
SRSQD	0.69***	0.56***	-0.12***	0.00	
RR	0.70***	0.70***	0.04	-0.08	0.04
SRR	0.91***	0.49**	-0.04	-0.32	-0.04
Full	0.68***	0.57**	-0.12	-0.12	0.15
SRRR	0.89***	0.54**	0.04	-0.13	0.12
<i>Maternal and paternal attachment avoidance, predicting anxiety symptoms</i>					
SRR	0.69***	0.28*	0.09*	-0.17*	0.09*
RR	0.48***	0.48***	0.06	-0.12	0.06
SRRR	0.69***	0.27	0.06	-0.17*	0.11
<i>Maternal and paternal attachment avoidance, predicting depression symptoms</i>					
RR	0.74***	0.74***	0.11**	-0.22**	0.11**
SRR	0.86***	0.62***	0.12***	-0.25***	0.12***

Note. b_1 and b_2 indicate linear effects of each predictor (mothers, then fathers), b_3 and b_5 indicate the quadratic effects (mothers, then fathers), and b_4 indicates an interaction. Bolded models indicate the single best-fitting model.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 4

Response Surface Parameters

Model	a_1	a_2	a_3	a_4	a_5	a'_4	b_M	C	S
Maternal and paternal attachment anxiety, predicting anxiety symptoms									
Additive	1.06***		0.35						
SRSQD	0.93***	-0.08***	0.24	-0.08***	-0.08***	-0.03		235794.52*	-1.69
SRR	1.03***		0.46	0.20			1.03***	2.32	
Interactions-only	0.95***	-0.07	0.40	0.07					
Full	0.94***	-0.05	0.19	0.13	-0.24				
SRRR	1.06***	0.03	0.38	0.24	-0.09	0.44	1.87	2.69	0.47
RR	1.03***			0.10					
Maternal and paternal attachment anxiety, predicting depression symptoms									
Additive	1.44***		0.29						
Interactions-only	1.26***	-0.10	0.37	0.10					
SRSQD	1.26***	-0.12***	0.13	-0.12***	-0.12***	-0.08		346147.04***	-1.23*
RR	1.40***			0.15					
SRR	1.40***		0.42	0.24				1.73	
Full	1.25***	-0.09	0.11	0.14	-0.27				
SRRR	1.42***	0.02	0.35	0.28	-0.08	0.46	2.14	2.29	0.55
Maternal and paternal attachment avoidance, predicting anxiety symptoms									
SRR	0.97***		0.41	0.34*				1.21	
RR	0.96***			0.24					
SRRR	0.96***	0.01	0.43	0.35*	-0.05	0.45	1.18*	1.45	0.75
Maternal and paternal attachment avoidance, predicting depression symptoms									
RR	1.48***			0.44**					
SRR	1.48***		0.24	0.50***				0.48	

Note. For unrotated surfaces, $a'_4 = a_4$. C , S , and b_M (indicating the shift, rotation scaling factor, and mean-level effect, respectively) are derived from the regression parameters.

* $p < .05$ ** $p < .01$ *** $p < .001$

Figure 1

Response Surface Analyses

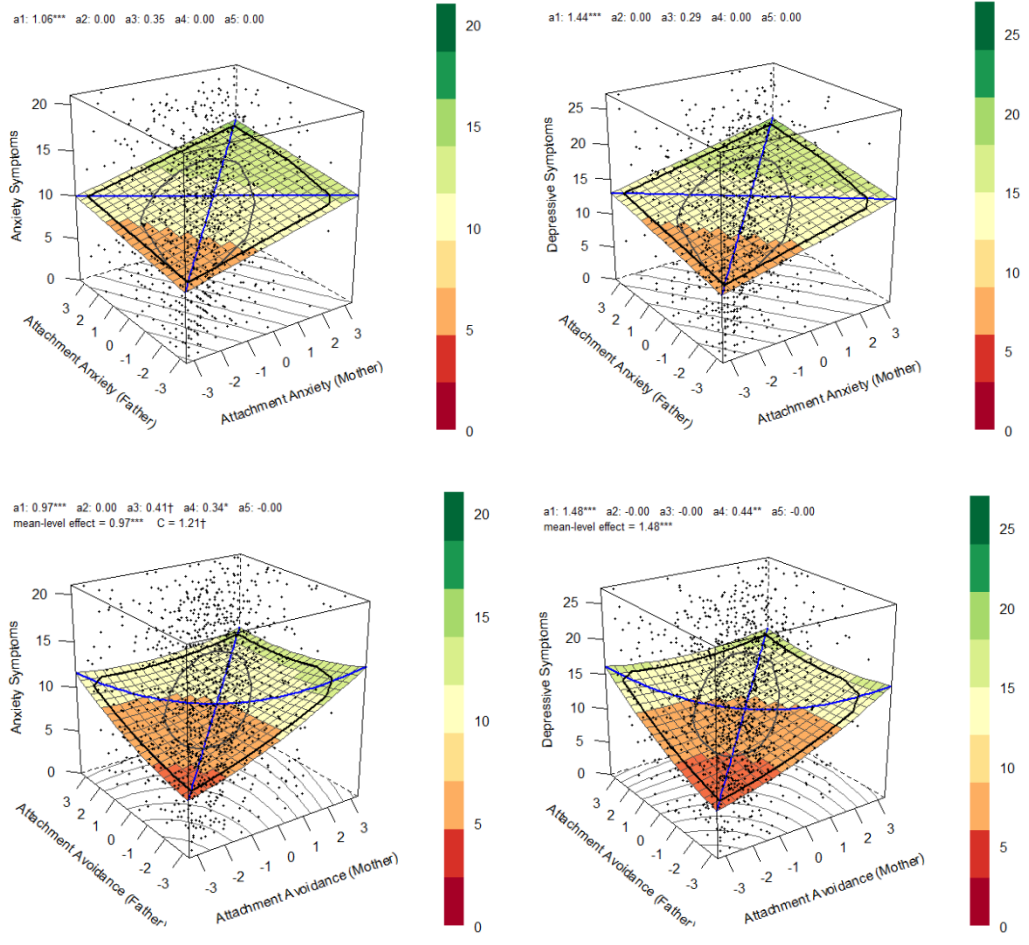


Table 5

Regression Parameters from Final Models

Variable	Anxiety Symptoms	Depression Symptoms
Demographics		
Age	0.26*	0.32*
Female gender	3.25***	4.68***
Minority race status	1.06	1.64
ΔR^2		
Attachment anxiety	0.02***	0.02***
Attachment avoidance	0.01**	0.02***
Total R^2	.14***	.21***

* $p < .05$ ** $p < .01$ *** $p < .001$