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RESEARCH

Do Self-Processes and Parenting Mediate the Effects of Anxious Parents' Psychopathology on Youth Depression and Suicidality?

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Abstract

To understand how anxious parents' global psychopathology increases children's risks for depression and suicidality, we tested mediational pathways through which parent global psychopathology was associated with youth depression and suicidality over a six-year period. Parents (n = 136) who had an anxiety disorder at baseline reported global psychopathology and youth internalizing problems. Youth did not have any psychiatric disorder at baseline and they reported self-esteem, perceived control, and perceived parental warmth and rejection at baseline and 1-year follow-up. At 6-year follow-up, youth depression and suicidality were assessed via multiple reporters including the self, parent, and/or an independent evaluator. Results showed that parental psychopathology had an indirect but not direct effect on youth depression and suicidality via perceived control. No associations were found for the other hypothesized mediators. Perceived control might be a transdiagnostic intervention target in depression and suicide prevention programs for youth exposed to parental anxiety.

Keywords Anxiety · Depression · Suicidality · Parental psychopathology · Child · Adolescent

Among U.S. youth, rates of past-year major depressive episodes rapidly increase throughout adolescence from 11.2% (past-year prevalence) in 12- to 13-year-olds to 21.9% in 16- to 17-year-olds [1, 2]. Childhood depression predicts concurrent and subsequent adverse outcomes, leading to severe functional impairments [3]. The latest evidence has revealed a significant decline in the effectiveness of psychotherapies for treating youth depression over the past three decades [4] and the effects have remained modest [5]. A close relative of depression is suicidality, which can refer to a range of behaviors from suicidal thoughts to plans and attempts. A large genetic dataset based on children in the U.S. revealed a significant genetic basis of suicidality related to depression [6], suggesting possible shared etiology between child depression and suicidality. It is of critical importance to identify the developmental pathways, or mediators, via which childhood factors increase risks of depression and suicidality in youth, as such research can inform the design of more efficacious behavioral interventions by targeting modifiable mediators.

Anxiety is one of the most prevalent mental disorders with estimates that in 2019, about 243 million adults were affected worldwide and the COVID-19 pandemic has increased the prevalence of anxiety significantly by about 26% [7]. A substantial body of prior work has focused on the intergenerational transmission of anxiety (e.g., Eley et al. [8]; Pereira et al. [9]; Woodruff-Borden et al. [10]), showing that offspring of anxious parents are at elevated risk of developing anxiety disorders themselves, and that these youth are also subject to greater risk for other internalizing diagnoses such as depression [11–14]. Because epidemiological and clinical studies reveal high comorbidity between anxiety and depression [15, 16], parents diagnosed with one or more anxiety disorders likely experience psychiatric symptoms in other domains, including depression. These symptoms may or may not exceed diagnostic thresholds, but nevertheless contribute to an increase in global psychopathology that links to increased risks of depression and suicidality in their children [17–21]. Considering that the majority of the

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studies in the literature show that offspring of parents with a clinical disorder are at the highest risk for psychopathology and poor outcomes, it is especially important to study this clinical population of affected parents. The current study utilizes multi-informant data from the Child Anxiety Prevention Study [22, 23] to investigate hypothesized mediating pathways from anxious parents' global psychopathology to offspring's depression and suicidality over 6 years (Fig. 1). Specifically, based on extant literature, four mediating variables were examined: children's self-esteem and perceived control as well as parental warmth, and rejection.

Self-processes: Self-esteem and Perceived Control

Longitudinal research on depression and suicidality has highlighted the role of self-processes in the development of depression and suicidality outcomes in youth (e.g., Sandler et al. [41]; Zhang et al. [24]). Theorists have made the distinction between two interrelated aspects of self [25–27]: the *I-self* (the self as the subject, actor, or observer) and the *Me-self* (the self as the object to be known, observed, or described). Beliefs in one's ability to achieve an intended contingent outcome, or perceived control, are important aspects of the I-self, whereas evaluations of one's overall self-worth (i.e., global self-esteem) are important aspects of the Me-self. Children are able to experience and describe their control beliefs in middle childhood [28] and the sense of self-esteem might not be developed until late childhood [27, 29].

Although children's self-representation is relatively stable throughout development [28], parental psychopathology may contribute to some changes. Evidence suggests that mothers' depression is associated with expressed negative attitudes (e.g., critical, self-blaming, overinvolvement) and children's low self-esteem [30]. Research also demonstrates that parental anxiety, self-reported or observed during parent-child interactions, is associated with children's negative self-evaluations [31] and low self-esteem [32]. In addition, research supports the negative association between parents' overcontrol behaviors – commonly found in anxious parents – and children's perceived control [9]. Thus, parent psychopathology would be negatively associated with children's self-esteem and perceived control (a path).

In theory, self-esteem and perceived control both have important implications for the development of depression and suicidality in children. Low perceived control and self-esteem are aversive views of the I-self and the Me-self, respectively. Particularly in the face of adversity, aversive views of self can increase negative affect and a sense of hopelessness, leading to vulnerability to depression [33, 34]. "Failure" models imply that lack of self-worth can lead to depressive affect [35]. Furthermore, the escape theory of suicide (Baumeister, 1990) proposes that aversive views of self are related to attributions of stressful circumstances to the incompetence and inadequacy of the self; such attributions are proposed to cause negative affect and self-awareness, and ultimately suicide as an escalation of the desire to escape from it.

Research evidence is consistent in finding that low self-esteem and perceived control predict depression in children [36–38] as well as adolescents or young adults [39–41], although most of the research has been cross-sectional. With regard to suicidality, a longitudinal study showed that aversive self-views as indicated by low self-esteem and mastery were associated with having suicidal thoughts or attempts [24]. Thus, we hypothesized that self-esteem and perceived control would be negatively associated with depression and suicidality (b path of the mediation).

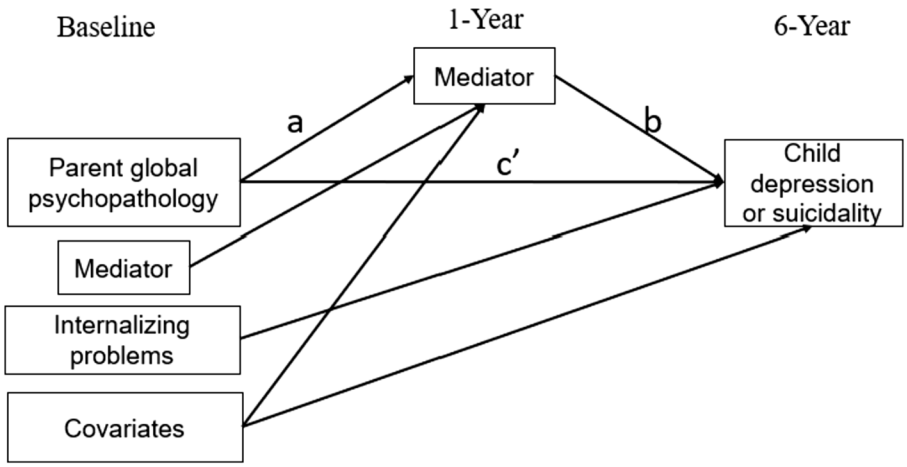

Fig. 1 Hypothesized mediation model. Mediators are self-esteem, perceived control, parental warmth and rejection. Mediator at baseline is controlled for in the model. Covariates were negative life events, child gender, child age, intervention status, and family income

Parenting Processes: Parental Warmth and Rejection

Parent global psychopathology as a source of family stress can influence parenting effectiveness [42]. According to the Family Stress Model [43], disrupted parenting mediates the negative impacts of family stress on children's mental health problems. We examined two aspects of parenting, parental warmth and rejection, as mediators of the effects of parent global psychopathology on children's depression and suicidality. Based on meta-analytic evidence that mothers' psychopathology was associated with maladaptive parenting [44] in general, and evidence that anxious parents tend to be less warm and more critical [45], we hypothesized that parent global psychopathology would be associated with lower parental warmth and higher rejection (a path of the mediation). Based on meta-analytic evidence for the effects of parent psychopathology on child depression [14, 46], and longitudinal studies showing a direct relation between negative parenting and suicidality in adolescence [47, 48], we hypothesized that lower parental warmth and higher rejection would be positively associated with children's depression and suicidality ("b" path of the mediation).

The Current Study

To summarize, theoretical and empirical evidence suggest that parent global psychopathology may be associated with increased offspring depression and suicidality via mediated effects of perceived control, self-esteem, parental warmth and rejection. In the current study, we analyzed multi-informant data collected over a 6-year period from a sample of families where the parent had at least one primary diagnosis of an anxiety disorder. Specifically, we hypothesized that the prospective relations between parent global psychopathology to youth depression and suicidality, as two related psychopathological outcomes, would be mediated by four variables: self-esteem, perceived control, parental warmth, and rejection. Understanding the mediating role of these variables will not only inform the etiology of depression and suicidality from a developmental perspective, but also help reveal specific and common pathways to different internalizing problems including depression and suicidality, which can inform the development and optimization of transdiagnostic preventive interventions.

Methods

Participants

Families were enrolled in a clinical trial of the Child Anxiety Prevention Study and were randomly assigned into a brief intervention aiming to prevent anxiety disorder onset among offspring of parents with an anxiety disorder or a control group (see Ginsburg et al. [22, 23]). The sample consisted of 136 youth (56% female) between the ages of 6 to 13 years at time of enrollment ($M = 8.69$; $SD = 1.81$) and their parent with at least one current anxiety disorder as primary diagnosis (78% mother and 22% father). Primary diagnoses (mutually exclusive) were generalized anxiety disorder/GAD (69%), social phobia (12%), panic disorder with agoraphobia (9%), obsessive-compulsive disorder/OCD (5%), panic disorder without agoraphobia (4%), and specific phobia (1%). When considering non-primary diagnoses, GAD was 90%, social phobia 37%, specific phobia 15%, panic 13%, OCD 12%, and agoraphobia 2% (not mutually exclusive). Almost half (40%) of the parents had at least one current comorbid disorder and 24% had three or more disorders. Comorbid disorders were GAD and phobia (45.6%), GAD and panic (21.3%), GAD and major depressive disorder/MDD (7%), and GAD and OCD (7%). Few parents had current MDD (8.8%), but the percentage is much higher for life-time MDD (37.1%).

The majority of parents reported their child as White (85%), with 7% identified as Black, 3% Asian, 2% other races. Most of the children were non-Hispanic/non-Latinx (96%). Families were mostly middle-to-upper class, with 78% reporting annual family income equal to or greater than $80,000. Most parents (87%) had a college or more advanced degree and were married (90%).

Procedure

The Child Anxiety Prevention Study was designed to prevent anxiety disorders in offspring of anxious parents via a family-based program to strengthen skills and knowledge that can reduce anxiety in children. All procedures of the Child Anxiety Prevention Study were approved by the University's institutional review board. Families were eligible to participate in the larger study if (1) the child was free of any anxiety diagnosis, not currently participating in active treatment for anxiety, and free of comorbid psychiatric symptoms warranting immediate treatment; and (2) at least one parent/caregiver met diagnostic criteria for an anxiety disorder as primary diagnosis. Anxiety diagnoses for children and their caregivers were established via administration of the Anxiety Disorders Interview Schedule (ADIS; see measures below) by a trained independent evaluator. Families were recruited through print and radio advertisements, mailings, and flyers distributed in the community. Phone screens were conducted to determine initial eligibility, and potential participants were scheduled to complete in-person baseline evaluations to complete questionnaires and interviews as administered by trained independent evaluators. Participants completed an informed consent/assent process prior to completing baseline evaluations. Eligible families were randomized evenly

into the Coping and Promoting Strengths intervention or a control condition. The families in the intervention group conducted eight 60-minute weekly meetings with a trained therapist and were offered three optional booster sessions. The session contents included psychoeducation on anxiety, problem-solving skills, exposure, relaxation, and contingency management. For more details of the intervention, see Ginsburg et al ([49]). The control group was Information Monitoring, which consisted of distribution of a pamphlet discussing anxiety. In the original study, all families completed evaluations at baseline, post-intervention (or eight weeks after study enrollment for control group), 6-month, and 1-year follow-up assessments. A 6-year follow-up study was later conducted in a separate study [23], where families originally enrolled in the study were recruited via targeted letter, social media, and telephone to complete the 6-year follow-up assessment to evaluate the long-term effects of the intervention. Families enrolled in the 6-year follow-up study completed an evaluation either in-person (77%) or by phone (23%). Phone evaluations were used for families who had moved or had limited availability given the extended follow-up period. Similar to the previous assessments, families completed questionnaires and interviews with a trained independent evaluator. Following each evaluation, the independent evaluator met with a senior child psychiatrist to establish consensus diagnoses.

Results from the randomized controlled trial suggested that children in the intervention group had significantly lower anxiety symptoms than the control group at 1-year follow-up [22]. Analysis of the 6-year follow-up data found that the effects mostly occurred during the first year, indicating a need for additional intervention enhancements to maintaining the program's effects over a longer term (Ginsburg et al. [23]). In the current analysis, data at the baseline, 1-year, and 6-year follow-up was used.

Measures

Parental psychopathology was assessed at baseline via parent-report using the 53-item Global Severity Index of the Brief Symptom Inventory (BSI; Derogatis and Spencer [50]). The reliability and validity of the BSI have been tested in numerous studies (e.g., Boulet and Boss [51]). Respondents rated each symptom on a 5-point scale (0 = *not at all*, 1 = *a little bit*, 2 = *moderately*, 3 = *quite a bit*, 4 = *extremely*). The BSI has 9 subscales and for each subscale the percentage of participants endorsing them (i.e., a score between 1 and 4) is described here, which indicates that the parent sample experienced global psychopathology including depression, anxiety, and other symptoms: Somatization (7 items; e.g., "faintness or dizziness"; 28.4%); Obsessive-Compulsive (6 items; e.g., "feeling blocked in getting things done"; 78.4%); Interpersonal Sensitivity (4 items; e.g., "feeling inferior to others"; 64.2%); Depression (6 items; e.g., "feeling blue"; 43.3%); Anxiety (6 items; e.g., "feeling fearful"; 59.7%); Hostility (5 items; e.g., "having urges to break or smash things"; 44.8%); Phobic Anxiety (5 items; e.g., "feeling uneasy in crowds"; 23.1%); Paranoid Ideation (5 items; e.g., "feeling that you are watched or talked about by others"; 30.6%); and Psychoticism (5 items; e.g., "the idea that someone else can control your thoughts"; 27.6%). For the current analysis, we used the Global Severity Index measure. Scores on all items were averaged. The scale had a Cronbach's alpha of 0.95 in the sample. Higher scores indicate higher global psychopathology. The current sample endorsed an average score of 1.00 (i.e., "a little bit") on global psychopathology, and the averaged severity was between "a little bit" and "moderate" for Obsessive-Compulsive (1.60), Interpersonal Sensitivity (1.38) and Anxiety (1.26). The averaged severity was "a little bit" for Depression (1.00) and Hostility (0.97), while for Somatization, Phobic Anxiety, Paranoid Ideation and Psychoticism the average severity was lower than "a little bit" (ranging from 0.57 to 0.77). In general, these were comparable to the scores of a psychiatric outpatient sample reported by Schulte-van Maaren et al. ([52]).

Self-esteem was assessed at baseline and 1-year follow-up via child-report using the global self-worth subscale of the Self-Perception Profile for Children [53], which is valid among children from 3rd to 8th grade [53]. This subscale has 6 items in which each item contains a positive statement and a negative statement (e.g., "Some kids are very happy being the way they are BUT Other kids wish they were different"). For each item, respondents rated which of the two statements was more like them. Positive items scored higher ("*Really true*" = 4; "*Sort of true*" = 3) than negative items ("*Sort of true*" = 2; "*Really true*" = 1). An average score was calculated for all of the 6 items such that higher scores indicate higher levels of self-esteem. The Cronbach's alpha was 0.73 at baseline and 0.83 at 1-year follow-up.

Perceived Control was assessed at baseline and 1-year follow-up via child-report using the Perceived Control Scale (PCS; Weisz et al. [54]). The PCS is a 24-item instrument that assesses perceptions of control over their ability to impact outcome in academic, social, and behavioral domains, and has been validated in children and adolescents. The PCS has 3 subscales (Academic: e.g., "I can get good grades if I really try"; Social: e.g., "I can make friends with other kids if I really try; Behavioral: e.g., "I cannot stay out of trouble no matter how hard I try [reverse-coded]"). Items are equally split between positive and negative wording and are rated on a 4-point scale (0 = *very false*, 3 = *very true*). Consistent with previous research, total scores comprising all three subscales were used in the current analysis. Cronbach's alpha was .86 and .92, at baseline and 1-year follow-up, respectively.

Parental warmth and rejection were assessed using the child-report versions of Emotional Warmth and Rejection subscales of the Egna Minnen Betraffande Uppfostran (Swedish for "My memories of upbringing"; Muris et al. [36]). The validity of the Egna Minnen Betraffande Uppfostran has been supported (e.g., Sentse et al. [55]). Each subscale consists of 10 items (Emotional Warmth: "Your parents like you just the way you are,"; Rejection: "Your parents wish that you were like somebody else"). All items were rated on a 4-point scale, (1 = *no*; 2 = *yes, but seldom*; 3 = *yes, often*; 4 = *yes, most of the time*). Consistent with prior research [56], total scores were used such that higher scores corresponded to greater levels of parental warmth or rejection, respectively. Cronbach's alpha was 0.73 for Warmth and 0.72 for Rejection at baseline, and.79 for Warmth and 0.81 for Rejection at 1-year follow-up.

Depression was assessed at 6-year follow-up using parent-report, child-report, and independent evaluator's ratings. Both the parent-report and child-report versions of the Beck Depression Inventory (BDI) - II [57] were used. The BDI-II is a widely used and well-validated measure [58] for differentiating depressed and non-depressed individuals. Respondents rated each of 21 symptoms or behaviors on a 4-point scale based on the extent to which that symptom had bothered their child (for parent-report) or themselves (for child-report) over the past 2 weeks (e.g., 0 = *I do not feel sad*; 3 = *I am so sad or unhappy that I cannot stand it*). Higher scores indicate higher depression severity. Cronbach's alpha was 0.89 for child-report and 0.92 for parent-report. The age-appropriate Anxiety Disorders Interview Schedule (ADIS) for DSM-IV (baseline) or V (follow-up) [59–61] was also administered by independent evaluators. The ADIS is a semi-structured interview which assesses a broad range of anxiety, mood, and externalizing behaviors in youth. Prior research has documented strong test-retest and inter-rater reliability for the ADIS (Silverman and Eisen [62]; Silverman and Nelles [63]). For Major Depressive Disorder, Clinician Severity Rating (CSR), which is the impairment rating, was calculated, with scores ranging from 0 to 8, where a CSR of 4 or higher indicates individuals meeting diagnostic criteria. We used two CSR scores: a *current* CSR score pertaining to the child's depression severity at the time of the interview and a *since-last-evaluation* CSR score pertaining to the child's depression severity during the time period from 1-year to 6-year follow-up. If there were multiple depressive episodes since-last-evaluation, the most severe episode was rated. At the 6-year follow-up, 6.2% of the sample (7/113) and 12.4% (14/113) had MDD based on current and since-last-evaluation CSR scores, respectively. We chose to include the since-last-evaluation CSR score for several reasons. First, it was possible that the child did not have depressive symptoms at the time of the interview but had depressive symptoms recently prior to the interview. Second, the current and the since-last-evaluation CSR scores were strongly correlated ($r = .55$) in the sample. Finally, it allowed us to test a measurement model using all four measures: parent- and child-reported BDI, current and since-last-evaluation CSR scores. Results from confirmatory factor analysis for the measurement model of depression showed optimal model fit, $\chi 2\ (1) = 0.011$, CFI = 1.00, RMSEA = 0.000, SRMR = 0.002. Factor loadings were 0.76, 0.72, 0.47, and 0.57 for the four variables mentioned above, respectively. Given the relatively small sample size, we extracted the depression factor scores (instead of including all indicators for a latent variable) in testing mediation models.

Suicidality was assessed at 6-year follow-up via the Brief Suicide Severity Rating Scale (BSSRS; Posner et al., 2011), administered by an independent evaluator to assess frequency and severity of suicidal ideation and behavior as reported by both the child and parent (i.e., parent-report of child's suicidal ideation and behaviors). Suicidal ideation was rated on a 0–5 scale (0 = *no ideation*, 78.8% in the current sample; 1 = *thoughts of death/wishing to be dead*, 11.5%; *2 = vague active thoughts*, 4.4%; *3 = active ideation with associated thoughts of method without intent*, 1.8%; *4 = active thoughts with some intent to act without clear plan*, 2.7%; 5 = *active ideation with plan and intent, 0.9%*). Suicidal behavior was rated on a 0–5 scale (0 = *no suicidal behavior*, 95.6% in the current sample; 1 = *preparatory acts or behavior*, 2.7%; 2 = *aborted attempt*, 0%; 3 = *interrupted attempt*, 0%; 4 = *actual attempt*, 0%; 5 = *multiple suicide attempts, 0.9%).* Because occurrences of *current* suicidal ideation (4.4%) and suicidal behavior (0.9%) at the time of the BSSRS interview were too low in the sample for logistic regression models, we also used *since-last-evaluation* suicidal ideation or behavior pertaining the time period from 1-year to 6-year follow-up. We created a dichotomized score (0 = *no suicidal ideation or behavior*; 1 = *presence of any suicidal ideation or behavior*) based on aggregated ratings of child- and/or parent- reports that the child endorsed either current or since-last-evaluation suicidal ideation or behavior, which yielded 21.2% (24/113) in the current sample.

Covariates

Baseline internalizing problems were controlled for in relation to the dependent variables of depression and suicidality. This was because a vast majority (97.8%) of the sample scored 0 on Major Depressive Disorder CSR at baseline, with only 2.21% scoring a 2 or 3 (i.e., no children had a diagnosis of MDD at baseline), and baseline suicidality data was not collected from children (the Brief Suicide Severity Rating Scale was not administered at baseline). Parents reported on the well-validated Child Behavior Checklist

(CBCL; Achenbach and Rescorla [64]). The internalizing problem subscale is composed of three syndromes: Anxious/Depressed (13 items; e.g., "cries a lot"), Withdrawn/Depressed (8 items; e.g., "refuses to talk"), and Somatic Complaints (11 items; e.g., "nightmares"). Parents were asked to rate the extent to which the items describe their child now or within the past 6 months on a 3-point scale (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*). The subscale score was calculated by summing the items such that higher scores indicate higher levels of internalizing problems. Internalizing reliability for the internalizing problems subscale is 0.85 in the current sample.

Baseline negative life events were controlled for because they can contribute to parents' and children's psychopathology (Dohrenwend [65]). Parents reported on the Life Events Checklist for children (LEC; Johnson and McCutcheon [66]), which consists of 36-items including negative events (e.g., parental divorce, death of a parent, suspension from school). Parents rated whether a given event has happened to their child (ever and within the past six months), and for items that have occurred, parents rated the impact of the event on the child using a 9-point scale (from 0 = "*Extremely bad*" to 4 = "*Neither good nor bad*" to 8 = "*Extremely good*"). Negative life events were scored if parents rated an event as either "*Extremely bad*", "*Very bad"*, "*Somewhat bad", or "Slightly bad"* (i.e., a count variable that sums up all "bad" events). Higher scores indicate more negative life events.

Baseline demographic variables were also controlled for, including child gender (1 = male; 2 = female), age (in years), and family annual income. In addition, we controlled for intervention status (1 = Coping and Promoting Strengths intervention, 0 = controls).

Analysis

All models were estimated in *M*plus 8.4 [67]. We first tested the associations between parental psychopathology and offspring depression/suicidality without mediators. We then tested the mediation pathways by computing a total of 8 time-ordered mediation models (Fig. 1). In models estimating the a, b, and c' paths predicting *depression*, if both a and b paths were statistically significant ($\alpha = 0.05$), bias-corrected bootstrapped 95% confidence intervals (CIs) for the indirect (mediation) effect (a*b) were computed (MacKinnon et al. [68]) with maximum likelihood (ML) estimation based on 5,000 bootstrap resamples. The bootstrapped method has better statistical power as compared to several other methods to detect mediation effects (MacKinnon et al. [68]). In models predicting suicidality as a binary outcome, maximum likelihood estimation with robust standard errors (MLR) was used and CIs were estimated without bootstrapping (unavailable in *M*plus 8.4 when using MLR). Mediation effects were considered statistically significant if the 95% CIs did not include zero. Model fit indices (ML estimation) were evaluated for depression models using recommended criteria (McDonald & Ho, 2002) such that a good-fitting model has a chi-square ratio below 2.0, a comparative fit index (CFI) close to 1 (above 0.95), standardized root-mean-square residual (SRMR) below 0.08, and root-mean-square error of approximation (RMSEA) below 0.08.

Missing Data

Baseline data contained very few cases of missing data on a few study variables (1.5% on parental psychopathology; 5.1% ~6.6% on mediator variables). At 1-year follow-up there were 25.7%~29.4% missing data on mediator variables. At 6-year follow-up, there were 24.3% and 16.9% missing data on depression and suicidality, respectively. No effects of the group assignment (intervention or control) were detected on missingness of the 1-year and 6-year data. Little's Missing Completely At Random (MCAR) tests did not reject the hypothesis that the missingness was at random ($p > .05$). Thus, missing data was handled using Full Information Maximum Likelihood (FIML) in *M*plus 8.4 [67].

Results

Descriptive statistics and correlation matrix of key study variables are presented in Table 1. The skewness and kurtosis statistics for all variables were within recommended limits (< 2 for skewness, < 7 for kurtosis; West et al. [69]) except that family income (Skewness = -2.85, Kurtosis = 7.76) had a slightly skewed distribution. Based on bivariate correlations, parent psychopathology was significantly correlated with child depression ($r = .20$, $p < .05$, small effect size) but not with suicidality ($r = .11$, $p > .05$). Depression and suicidality were significantly correlated ($r = .62$, $p < .01$, large effect size). Self-esteem, perceived control, and parental rejection were each significantly associated with suicidality ($rs = -0.24$, -0.43, and 0.28, respectively, $ps < 0.05$, medium effect sizes). Perceived control and parental rejection were significantly associated with depression ($rs = -0.41$, and 0.24, respectively $ps < 0.05$, medium effect sizes). Among covariates, being a girl (vs. boy) was significantly associated with higher depression ($r = .23$, $p < .05$, small effect size). Higher family income was significantly associated with lower depression ($r = -.21$, $p < .05$, small effect size). Negative life events were significantly associated with suicidality ($r = .20$, $p < .05$, small effect size), depression ($r = .27$, $p < .01$, medium effect size), and parent psychopathology ($r = .31$, $p < .05$, medium effect size). Internalizing problems were significantly associated with depression ($r = .19$,

Table 1 Bivariate correlation and descriptive statistics for study variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Suicidality	1.00																
2 Depression	**.62****	1.00															
3 Parent psychopathology	.11	**.20***	1.00														
4 Self-esteem baseline	−.13	−.13	−.07	1.00													
5 Self-esteem 1-year	**−.24***	−.17	−.05	**.36****	1.00												
6 Perceived control baseline	−.16	−.18	−.07	**.41****	**.24***	1.00											
7 Perceived control 1-year	**−.43****	**−.41****	−.18	**.21***	**.40****	**.42****	1.00										
8 Parent warmth baseline	−.03	−.04	−.12	**.35****	.11	**.37****	**.28****	1.00									
9 Parent warmth 1-year	−.12	−.15	−.14	**.42****	**.38****	**.29****	**.35****	**.38****	1.00								
10 Parent rejection baseline	.17	.12	.07	**−.23****	−.18	−.26**	-.07	**-.22***	**-.28****	1.00							
11 Parent rejection 1-year	**.28****	**.24***	.06	**−.34****	**−.49****	−.19	**−.28****	−.05	**-.42****	**.52****	1.00						
12 Intervention status[a]	.02	.17	−.02	−.07	−.04	.00	−.02	−.02	.03	−.06	−.04	1.00					
13 Child age	.14	.05	.14	−.01	.13	.07	.19	.02	.02	.12	−.04	−.09	1.00				
14 Child gender[b]	.18	**.23***	.00	.05	−.02	**.24****	.04	.10	.08	−.14	−.13	.14	.03	1.00			
15 Family income[c]	.04	**−.21***	**−.19***	−.04	.00	−.02	−.07	−.09	**.22***	-.15	.00	−.12	.01	−.13	1.00		
16 Negative life events	**.20***	**.27****	**.31****	**−.18***	−.08	**−.20***	.01	−.11	−.16	**.21***	.07	−.04	**.25****	.09	**−.32****	1.00	
17 Internalizing baseline	**.19***	.19	**.27****	−.11	−.15	−.08	**−.23***	.01	−.03	.12	.14	−.02	−.02	−.14	.07	.06	1.00
N	113	103	134	129	96	129	100	127	101	127	100	136	136	136	135	131	133
Min	0.00	−5.00	0.11	2.17	2.33	35.00	28.00	20.00	20.00	9.00	9.00	0.00	6.00	1.00	2.00	0.00	0.00
Max	1.00	21.09	3.27	4.00	4.00	72.00	72.00	40.00	40.00	24.00	26.00	1.00	13.00	2.00	9.00	13.00	32.00
M	0.21	0.00	1.00	3.52	3.69	62.54	63.93	33.22	34.16	13.89	13.52	0.51	8.69	1.56	8.41	3.08	10.30
SD	0.41	5.48	0.60	0.47	0.42	8.09	9.23	4.29	4.31	3.46	3.70	0.50	1.80	0.50	1.47	2.70	7.07
Skewness	1.43	1.78	1.04	−0.98	−1.40	−1.21	−1.64	−0.66	−0.88	1.01	1.02	−0.06	0.59	−0.24	−2.85	1.29	0.79
Kurtosis	0.03	3.13	1.35	0.39	1.20	1.37	2.42	0.09	0.77	0.78	0.77	−2.03	−0.78	−1.97	7.76	1.88	0.32

Statistically significant coefficients are given in bold

*$p < .05$; **$p < .01$

[a]0 = intervention group and 1 = controls

[b]1 = male and 2 = female

[c]1 = $0 - $11,999; 2 = $12k – $20,999; 3 = $21k – $30,999; 4 = $31k – $40,999; 5 = $41k – $50,999; 6 = $51k – $60,999; 7 = $61k – $70,999; 8 = $71k – $80k; and 9 = over $80k

$p < .05$, small effect size). Intervention status was not significantly associated with any of the mediators, suggesting that the intervention did not have direct impacts on child self-esteem, perceived control, parental warmth or rejection.

Results of two separate regression models showed that the direct effects of parental global psychopathology on offspring depression and suicidality six years later were not detected, while controlling for all covariates.

Results of the mediation models are presented in Table 2. In all models, intervention condition did not have significant impacts on any of the mediators or dependent variables ($ps > 0.10$). To summarize, perceived control was the only statistically significant mediator for the association between parental psychopathology and depression as well as suicidality. That is, parental global psychopathology had indirect effects on both depression (95% CIs: [0.097, 1.697]) and suicidality (95% CIs: [0.070, 1.130]) through its effects on decreased perceived control in children, above and beyond the covariates. Thus, more severe parental psychopathological symptoms were linked to lower child perceived control, which were in turn related to more severe depressive symptoms and endorsing suicidality.

Although there were no significant indirect effects for the other mediators, several secondary results were found concerning statistically significant a or b paths. Parental rejection, but not warmth, was associated with both depression ($B = 0.319$, $p < .05$, $\beta = 0.218$) and suicidality ($B = 0.239$, $p < .05$, $OR = 1.270$), such that higher parental rejection was related to more severe depressive symptoms and endorsing suicidality. Self-esteem was associated with suicidality ($B = -1.307$, $p < .05$, $OR = 0.271$) but not depression. That is, lower self-esteem was related to endorsing suicidality.

Discussion

This study examined the indirect effects of parent global psychopathology on offspring's depression and suicidality via mediated effect of child self-processes (self-esteem and perceived control) and parenting (parental warmth and rejection) in a sample of offspring of parents with an

Table 2 Estimates of mediated effects of parent global psychopathology on depression and suicidality

Variable IV = Parent psychopathology		Model estimates Unstandardized coefficient (Standard error) [Standardized coefficient] Odds Ratio (OR)				Model fit indices (Depression models)
Mediator	Dependent Variable	a path	b path	c' path	Indirect effect 95% CIs (a*b)	
Self-esteem	Depression	−0.031 (0.078) [-0.044]	−1.554 (1.241) [-0.120]	0.747 (0.931) [0.083]	[−0.200, 0.295]	χ^2 (2) = 1.448, $p > .05$ RMSEA = 0.000, CFI = 1.00, SRMR = 0.013
Self-esteem	Suicidality	−0.013 (0.109) [-0.019]	**−1.307 (0.618)*** **[-0.267]** **OR = 0.271*****	0.146 (0.513) [0.042] OR = 1.157	[−0.257, 0.292]	
Perceived control	Depression	**−3.661 (1.580)*** **[-0.241]**	**−0.214 (0.057)***** **[-0.364]**	−0.067 (1.157) [−0.008]	**[0.097, 1.697]**	χ^2(2) = 2.449, $p > .05$ RMSEA = 0.041, CFI = 0.99, SRMR = 0.016
Perceived control	Suicidality	**−4.080 (1.421)**** **[-0.261]**	**−0.147 (0.033)***** **[-0.548]** **OR = 0.863*****	−0.708 (0.530) [−0.169] OR = 0.492+	**[0.070, 1.130]**	
Warmth	Depression	0.191 (0.749) [0.027]	−0.153 (0.124) [-0.121]	0.597 (0.930) [0.066]	[−0.262, 0.203]	χ^2 (2) = 0.958, $p > .05$ RMSEA = 0.000, CFI = 1.00, SRMR = 0.003
Warmth	Suicidality	0.143 (0.760) [0.020]	−0.086 (0.063) [−0.182] OR = 0.917	0.076 (0.504) [0.022] OR = 1.079	[−0.141, 0.116]	
Rejection	Depression	0.094 (0.596) [0.015]	**0.319 (0.134)*** **[0.218]**	0.635 (0.911) [0.071]	[−0.342, 0.402]	χ^2 (2) = 0.796, $p > .05$ RMSEA = 0.000, CFI = 1.00, SRMR = 0.008
Rejection	Suicidality	−0.022 (0.719) [-0.003]	**0.239 (0.084)*** **[0.402]** **OR = 1.270****	0.172 (0.566) [0.045] OR = 1.187	[−0.342, 0.332]	

Statistically significant coefficients are given in bold

*$p < .05$;**$p < .01$;***$p < .01$

anxiety disorder. An important contribution made by this multi-informant longitudinal study is the evidence that child perceived control mediated the effects of parent psychopathology on depression and suicidality. Additionally, the findings provide further evidence on several risk or protective factors of depression or suicidality outcome, including self-esteem and parental rejection, although these factors were not related to parent psychopathology.

The finding that childrens' perceived control mediated the effects of parental psychopathology on both depression and suicidality has key implications for theory development and clinical practice. Perceived control reflects children's control beliefs regarding the I-self in relation to familiar external circumstances in academic, social, and behavioral domains. Beginning in early childhood, parents' behaviors during parent-child interactions can shape children's development of perceived control [70]. By middle and late childhood, children can reasonably describe their control beliefs. Although such beliefs tend to remain relatively stable [28], parental psychopathology had a small but significant effect on the decreases of children's perceived control one year later. This is in line with prior cross-sectional data showing that stress from multiple sources was associated with adolescents' maladaptive control beliefs, which in turn were associated with depression [71]. Self-determination theory holds that young people actively engage in their environment to gain competence and autonomy while developing an integrated sense of self (van der Kaap–Deeder et al. [72]). Anxious parents with higher levels of psychopathology may endorse higher levels of overprotection or overcontrolling behaviors that can hinder children's development of autonomy and contingency beliefs [73] which would explain its effects on children's perceived control. The pathway to increased child depression and suicidality via decreased perceived control may be unique to parents with anxiety specifically, as opposed to parents with elevated rates of global psychopathology or presenting predominantly with non-anxiety diagnoses. For parents with elevated depressive symptoms, for example, impacts have been shown on child adjustment via changes in parenting behavior [74]. Future work should aim to determine whether these results might be replicated with parents presenting with other forms of psychopathology.

A prior cross-sectional study (Weisz et al. [38]) showed that perceived control was predictive of depression in childhood, but it was perceived contingency and competence (vs. perceived control per se) that were predictive of depression in adolescence. In the current study we analyzed longitudinal data and found that perceived control during both late childhood and early adolescence predicted depression and suicidality five years later during adolescence. It appears that the decrease in perceived control over time might have contributed to the development of depression, which can only be modeled using longitudinal data. The role of perceived control for suicidality resonates with the escape theory of suicide, which pinpoints aversive self-awareness such as lack of perceived control as a key contributing factor of suicidality (Baumeister, 1990), and a suicide theory that emphasizes hopelessness, because lack of perceived internal control is a risk factor of hopelessness (Klonsky et al. [75]). Finally, a prior study (Becker et al. [76]) found that child external locus of control mediated the association between maternal and child anxiety and the association between maternal overcontrol behaviors and child anxiety. Our findings expand the outcome from child anxiety to depression and suicidality, indicating that perceived control may be a common risk factor of internalizing problems. Perceived control is malleable and can be strengthened through cognitive-behavioral intervention approaches (e.g., Schleider et al. [77]). Considering the impact of parent global psychopathology on children's perceived control, it may be beneficial to address both parental mental health and children's control beliefs in family-based intervention to prevent a range of internalizing problems.

Parent psychopathology was not related to child-perceived parental warmth or rejection. Although this is unexpected, prior evidence found that mothers' anxiety was associated with less warmth when assessed via mother-report but not child-report or independent observer (Drake and Ginsburg [78]). As certain child characteristics (e.g., extraversion) make children more likely to report higher parental warmth (de Haan et al. [79]), future research should examine whether child characteristics would moderate the influence of parental psychopathology on changes in child-perceived parental warmth or rejection over time.

The finding that parental rejection but not warmth was related to depression and suicidality highlights the importance of considering negative parenting behaviors in the context of parent psychopathology. Negative parenting behaviors such as criticism, hostility, and rejection are closely related to parenting stress, unsupportive emotion socialization, and negative emotional climate in the family, contributing to children's poor emotion regulation. Positive parenting in the context of parental psychopathology may be a moderator in predicting youth depression or suicidality [80].

The current study has limitations. First, the sample size is modest, and due to attrition, the estimate of the b path of the mediation was based on a smaller sample size than the a path. According to Fritz and MacKinnon (2007), our sample size is sufficient to detect medium or large effects for both a and b paths when using bias-corrected bootstrap method at 0.80 power. Second, due to the low endorsement rate of *current* suicidality at the 6-year assessment, we used the *since-last-evaluation* data on suicidality. Hence, our suicidality outcome reflects the period from 1- to 6-year follow-up, which make the b path of the mediation (from perceived control to suicidality) partially cross-sectional. This is less of

a concern for the depression outcome because most indicators used for the factor were anchored at the 6-year follow-up. Moreover, we were also unable to differentiate suicidal ideation from suicidal behavior and were unable to separate different kinds of suicidal ideation, due to the sample with only a few cases of suicidal ideation with intent or plan, which represent a different group than those without intent or plan. With a larger sample size and more specific measures of suicidality, researchers can investigate whether perceived control would influence different subtypes of suicidal ideation or suicidal behavior. Future research should also consider using more waves of data to test possible serial mediation models to investigate cascading effects of parent psychopathology on subsequent mediators that lead to increased depression or suicidality. Finally, the sample is demographically homogeneous, limiting generalizability to samples that are more economically, racially and ethnically diverse. Related, while anxiety disorders are often comorbid with other forms of psychopathology, the findings of this study may not generalize to samples with non-primary anxiety disorders.

Strengths of the current study include a multi-informant dataset, longitudinal mediation analyses, and the unique study design of the larger study with diagnosis-free children at baseline, revealing the development of depression and suicidality over six years across childhood and adolescence. We conclude that parent global psychopathology might increase children's risks of depression and suicidality via mediated effects of diminished perceived control. Future intervention research should focus on perceived control as an intervention target to prevent a range of internalizing problems in children exposed to parent global psychopathology.

Summary

Many parents with an anxiety disorder experience comorbid symptoms such as depression, which contribute to their global psychopathology that increases the risks of depression and suicidality in children. In this study, we analyzed a multi-informant dataset collected at baseline, 1-year, and 6-year post-baseline from 136 families in which the parent had at least one primary diagnosis of an anxiety disorder, but the child (between 6 to 13 years) did not have any psychiatric disorders at baseline. Findings from mediation analyses suggested that parents' global psychopathological symptoms were indirectly related to increased depression and suicidality in their child at 6 years via the effects on decreased perceived control at 1 year. Child self-esteem and perceived parental warmth and rejection were not statistically significant mediators. Intervention programs designed for children who are exposed to parental anxiety in particular and parental psychopathology in general should consider targeting perceived control which may help reduce both depression and suicidality.

Author Contributions NZ conceptualized the research question, conducted the analyses and wrote the main text of the paper. IS contributed to the Methods section. GG contributed to the conceptualization and provided the data. All authors made edits to the paper.

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Data Availability Datasets and model results can be accessed here https://osf.io/u59v3/?view_only=5f387caab9ab4dd591880a5725207141.

Declarations

Competing Interests The authors declare no competing interests.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the Institutional Review Board of University of Connecticut and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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