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Anxiety, Mood, and Substance Use Disorders in Parents of Children With Anxiety Disorders

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Abstract Examined the prevalence of anxiety, mood, and substance use disorders in the parents of anxiety disordered (AD) children relative to children with no psychological disorder (NPD). The specificity of relationships between child and parent anxiety disorders was also investigated. Results revealed higher prevalence rates of anxiety disorders in parents of AD children relative to NPD children. Specific child–mother relationships were found between child separation anxiety and panic disorder and maternal panic disorder, as were child and maternal social phobia, obsessive compulsive disorder, and specific phobias. Findings are discussed with reference to theory, clinical implications, and future research needs.

Keywords Anxiety · Mood · Substance use · Parents · Children

Introduction

Previous research indicates that anxiety disorders aggregate in families. Top-down studies suggest that the offspring of parents with anxiety disorders are at a greater risk for developing an anxiety disorder than the offspring of parents without a history of psychopathology [1–4]. Similarly, bottom-up studies find increased rates of anxiety disorders [5–8] in parents of youth with anxiety disorders. The observed concordance between parent and child anxiety is believed to result from a combination of genetic factors [9], environmental influences [10], and parenting factors, including discouragement of social interaction [11], modeling of cautious or fearful responses [12–14], increased levels of parental control and emotional involvement [2, 15, 16], and less granting of autonomy [17].

The majority of studies in this area have looked at the familial aggregation of anxiety in general, rather than of specific anxiety diagnoses. However, a handful of adult studies have provided evidence for diagnostic specificity among first-degree relatives [18–20]. For

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example, Fyer et al. [18] reported that rates of DSM-III-R panic-agoraphobia and simple phobia in first-degree relatives of adults with the same disorder were significantly higher than in first-degree relatives of adults with other anxiety disorders. The rates of social phobia in relatives of socially phobic adults were higher than those in relatives of adults with panic-agoraphobia, but were not significantly different from relatives of adults with simple phobia.

Given that family members tend to be in closest proximity and to have the greatest influence on one another when offspring are in childhood or adolescence, it seems likely that children and their parents would exhibit levels of diagnostic specificity that are similar to, or higher than, those observed among adult first-degree relatives. An understanding of potential diagnostic specificities between child and parent anxiety diagnoses could have important clinical implications. For example, specificities between child and parent diagnoses could suggest that parents with anxiety disorders model or communicate through anxious self-talk their specific anxieties to their children, thereby placing them at greater risk for development of the same anxiety disorder. An understanding of diagnostic specificity between children and parents could also be helpful for treatment planning, given the important role that parents often play in their child's treatment [21].

The few studies that have examined parent–child concordance of specific anxiety disorders suggest that there may indeed be parent–child concordance for some anxiety disorders, but not for others [5–7, 22]. For example, preliminary research supports a significant parent–child association for obsessive-compulsive disorder [7] and a significant mother–child, but not father–child, association for social phobia [5]. In contrast, significant parent–child associations for parent–child generalized anxiety disorder (GAD) and specific phobias have not received preliminary support [5, 6]. Given the longstanding theory that panic disorder is the adult manifestation of separation anxiety disorder [23] and the preliminary evidence supporting this theory [24], studies have examined whether parents of a child with separation anxiety disorder (SAD) are more likely to have panic disorder as compared to parents of a child with another anxiety disorder [6, 22]. Contrary to theory, a specific relationship between child SAD and parent panic disorder has not been found. However, a specific relationship between child SAD and maternal lifetime SAD, as well as between child SAD and the putative diagnosis of adult SAD [25, 26] has been documented [5, 22].

In general, existing research in determining the specific concordance between parent and child anxiety is limited by (a) small samples precluding adequate power to examine the relationships between specific child and parent anxiety disorders; (b) a lack of blind evaluators and/or structured interviews, which may influence diagnoses; (c) no or low father participation; and/or (d) findings that predate changes to childhood anxiety disorders in the diagnostic statistical manual (i.e., DSM-IV) [27]. In the current nosology, overanxious disorder (OAD) and avoidant disorders are within GAD and SP, allowing for comparisons between child and parent anxiety diagnoses.

A multitude of studies indicate that anxiety disorders place individuals at greater risk for the development of mood and substance use disorders [28–32]. Numerous factors are believed to contribute to this phenomenon, including genetics [33], and negative interactions that may occur between parents or between parent and child [34–36]. Given that anxiety, mood, and substance use disorders tend to co-occur within an individual, it may also be the case that they aggregate in families of anxious youth. An understanding of the relationship between parent mood and substance use disorders and child anxiety could have important implications for the prevention and treatment of anxiety disorders. For example, were it to be the case that parents of anxious youth do indeed have higher rates of mood disorders, children of depressed parents could be targeted for prevention programs in which they are taught coping skills for managing anxiety. Recent findings of a twin-pair study [37] support a significant dose–response relationship between maternal depression in the first 5 years of the twins' lives and the behavioral problems displayed at 7 years of age. This would provide preliminary evidence for developing treatment for child anxiety that could include an optional module on coping with the challenges of living with a depressed parent. Were it to be the case that parents of anxious youth have higher rates of substance use disorders, similar prevention and intervention strategies could be implemented for the children of individuals who have a history of substance abuse.

Studies evaluating the prevalence of mood and substance use disorders among parents of anxious youth have led to conflicting results [5, 6]. Last et al. reported higher lifetime prevalence rates of substance use disorders, but not mood disorders in the first-degree relatives of anxiety disordered (AD) children. In contrast, Cooper et al. [5] found higher prevalence rates of mood disorders, but not substance use disorders, in the mothers and fathers of AD children. The Cooper et al. [5] study had low father participation, which may have precluded an adequate test. Furthermore, recent research suggests that the relationship between anxiety or depressive disorders in children and parent substance use problems may be accounted for by a positive history of anxiety or depressive disorders in the parents [33, 36, 38, 39]. Unfortunately, no study to date has examined the association between anxiety disorders in youth and the prevalence of substance use disorders in parents while controlling for parental anxiety.

The present study examined the lifetime rates of anxiety, mood, and substance use disorders in the mothers and the fathers of AD children as compared to the mothers and fathers of children with no psychological disorder (NPD). This study also examined group differences in self-reported anxiety and depressive symptoms as well as anxious and depressive self-talk. Further, we examined the relationships between specific anxiety disorders in children and their mothers and fathers in AD children diagnosed using blind structured diagnostic interviews and DSM-IV criteria. Given the mechanisms discussed above concerning the transmission of anxiety disorders, it was predicted that mothers and fathers of AD children would exhibit greater lifetime rates of anxiety, mood, and substance use disorders as well as anxious and depressive self-talk and self-reported symptoms than mothers and fathers of NPD children. In addition, it was hypothesized that the parents of AD children would demonstrate similar diagnostic pattern of anxiety diagnoses as their AD children (e.g., children with social phobia would have parents with social phobia). Given the relationship seen between SAD and panic disorder found in some studies, it was further hypothesized that mothers with panic disorder would have children with SAD.

Method

Participants

Participants were 230 children (178 AD; 52 NPD) presenting to the Child and Adolescent Anxiety Disorders Clinic (CAADC) and their parents. Children had an IQ > 80, were English-speaking, and were not taking any anti-anxiety or anti-depressant medication. All participants were administered the anxiety disorders interview schedule-parent and child versions for DSM-IV (ADIS-C) [40] to assess for child diagnoses.

The 178 AD youth were aged 7–14 (M = 10.30, SD = 1.78) and met diagnostic criteria for a principal anxiety disorder. Fifty-seven percent of children were diagnosed with more

Table 1 Percentage of ADyouth who met criteria for DSM-	DSM-IV disorder	AD (%)	
IV anxiety and mood disorders	Social phobia	51.7	
	Generalized anxiety disorder	51.3	
	Separation anxiety disorder	40.4	
	Specific phobia	30.4	
	Panic disorder	5.2	
	Obsessive compulsive disorder	3.9	
AD Anxiety disordered; DSM diagnostic and statistical manual	Mood disorder	11.7	

than one anxiety disorder, 12% met criteria for an additional mood disorder, 23% met criteria for an additional diagnosis of ADHD, 7% met criteria for an additional diagnosis of ODD, 6% met criteria for an additional diagnosis of selective mutism, and 4% met criteria for an additional diagnosis of functional enuresis. Percentage of children meeting criteria for specific child anxiety disorder and mood disorder diagnoses are presents in Table 1. Males comprised 53.4% of the sample; 85.8% of the sample were Caucasian and 14.2% identified as ethnic minority (i.e., African–American, Hispanic, "other").

The parents of the AD youth were 165 mothers and 157 fathers. Mothers ranged from 23 to 67 years of age (M = 40.28, SD = 5.98); 87.1% were Caucasian and 12.9% identified as ethnic minority (i.e., African-American, Hispanic). Fifteen percent of mothers reported having some graduate school training, 31.2% were college graduates, 25.3% had some college training, 25.3% were high school graduates (or GED), and 2.4% had less than a high school education. A majority (73.5%) of the mothers were employed at the time of the study. Fathers ranged from 26 to 63 years of age (M = 42.24, SD = 6.15); 87.1% were Caucasian and 12.9% identified as ethnic minority (i.e., African-American, Asian, Hispanic, "other"). Twenty-three percent of fathers reported having some graduate school training, 23.8% were college graduates, 20.0% had some college training, 29.4% were high school graduates (or GED), and 4.3% had less than a high school education. A majority of fathers (93.8%) were employed at the time of the study. Family income was below \$20,000 for 4.2%, between \$20,000 and 40,000 for 11.5%, between \$40,000 and 60,000 for 23.0%, between \$60,000 and 80,000 for 25.5%, and above \$80,000 for 35.8% of the sample. The majority of the AD parents reported their marital status as married (78.7%), with others being divorced (7.7%); separated (5.3%); never married (7.1%); and widowed (1.2%).

The 52 NPD children were aged 8–14 (M = 10.06, SD = 1.58). These youth were from the same communities as the AD youth, but responded to notices for families to participate in research. NPD youth did not meet criteria for any disorder. Males comprised 48.1% of the sample; 76.9% were Caucasian, 17.3% were African–American, and 5.7% identified as ethnic minority (i.e., Hispanic, "other").

The parents of NPD youth were 52 mothers and 50 fathers. Mothers ranged from 28 to 52 years of age (M = 41.22, SD = 6.10); 80.4% were Caucasian, 17.6% African-American, and 2.0% identified as Hispanic. Twenty percent of mothers reported having some graduate school training, 40.0% were college graduates, 30.0% had some college training, and 10.0% were high school graduates (or GED). The majority (82.0%) of mothers were employed at the time of the study. Fathers ranged from 33 to 56 years of age (M = 42.83, SD = 6.16); 75.5% were Caucasian, 22.4% African-American, and 2.0% identified as Hispanic. Fourteen percent of fathers reported having some graduate

school training, 30.6% were college graduates, 30.6% had some college training, 20.4% were high school graduates (or GED), and 4.0% had less than a high school education. The majority (95.9%) of fathers were employed at the time of the study. Family income of the NPD youth was below \$20,000 for 4.2%, between \$20,000 and 40,000 for 14.6%, between \$40,000 and 60,000 for 25.0%, between \$60,000 and 80,000 for 35.4%, and above \$80,000 for 20.8% of the sample. The majority (78.0%) of the NPD children's parents reported their marital status as married, 6.0% as divorced, 4.0% as separated, and 12.0% as never married.

Measures

Child Diagnostic Status

Anxiety Disorders Interview Schedule-Parent and Child Versions for DSM-IV (ADIS-C/P) [40]. The ADIS-parent version (ADIS-P) and ADIS-child version (ADIS-C) are semistructured diagnostic interviews administered to parents and children independently to assess for current DSM-IV anxiety disorders. The ADIS-C assessed symptomatology and severity of anxiety, mood, and externalizing disorders in youth. After completing the interview the ADIS-C has demonstrated acceptable reliability [41].

Parent Diagnostic Status

Anxiety Disorders Interview Schedule-IV-Lifetime Version (ADIS-IV-L). This interview assesses for the lifetime presence of DSM-IV disorders in adults [42] and was administered separately to each parent by an interviewer blind to the reason for the evaluation. Based on the diagnostic ratings, lifetime diagnoses were coded as either present or absent for the current study. The presence of the following parent lifetime diagnoses were coded for mother and for father: panic disorder with/without agoraphobia (PD); social phobia (SP), GAD, obsessive compulsive disorder (OCD), specific phobias (SP), mood disorders (i.e., Major Depressive Disorder, Dysthymia, & Bipolar Disorder), and substance use disorders (i.e., Alcohol Abuse/Dependence & Substance Abuse/Dependence).

Anxious Self-Statements Questionnaire (ASSQ). The anxious self-statements questionnaire (ASSQ) [43], for adults, is a 32-item self-report measure that assesses the frequency of self-talk associated with anxiety. Each item is rated on a five-point Likert scale from 1 (not at all) to 5 (all the time). This measure has demonstrated adequate internal consistency and distinguishes between depressive and anxious self-talk ($\alpha = 0.87$) [44].

Automatic Thoughts Questionnaire (ATQ-R). The automatic thoughts questionnairerevised (ATQ-R) [45] is a 40-item adult self-report questionnaire that consists of 30 negative self-statements related to depression and ten positive self-statements. Each item is rated on a five-point Likert scale from 1 (not at all) to 5 (all the time) to indicate the frequency of each thought during the preceding 2 months. The ATQ-R has good psychometric properties [46].

Beck Depression Inventory, Second Edition (BDI-II) [47]. The BDI-II is a 21-item self-report measure of depressive symptoms. Items are rated on a four-point scale, ranging from 0 to 3 and has demonstrated good reliability [48].

State-Trait Anxiety Inventory (STAI). The state-trait anxiety inventory (STAI) [49] is an adult self-report instrument with separate 20-item measures to assess state (STAI-S) and trait (STAI-T) anxiety. The STAI has demonstrated good reliability and concurrent validity [50].

Procedures

AD participants were referred from a variety of resources (e.g., clinics, schools, newspaper/community notices) and presented to the CAADC for the treatment of one or more anxiety disorders. Parents completed a telephone screening to determine the child's initial eligibility. If parents agreed and the child met initial criteria, children and their parents were scheduled for a diagnostic evaluation. Consent and assent forms were signed by parent and child, followed by separate administrations of the ADIS-C and ADIS-P by interviewers blind to reason for the evaluation. The child's diagnostic status was determined from the composite of interviews, as recommended in the ADIS-C. Self- and parentreport measures were administered to both parents and child. If the child met criteria for an anxiety disorder, parents were scheduled for a second assessment (typically on a separate day) to complete diagnostic interviews of each parent. Separate diagnosticians blind to child diagnoses and reason for the evaluation administered the ADIS-IV-L to each parent.

A sample of youth from the community and their parents served as a comparison group. Similar recruitment efforts were used (e.g., letters to schools, community notices). Families underwent an initial telephone screening to determine eligibility and if eligible were scheduled for an assessment. The parents and child signed consent and assent forms, respectively. These families were administered the same child and parent interviews by interviewers blind to reason for the evaluation, completed the same self-report questionnaires, and were paid \$150.

Diagnostic Reliability

Diagnosticians completed and passed a two-phase training process (for both the ADIS-C/P & ADIS-IV-L) before conducting interviews. First, they viewed taped and live diagnostic interviews. After meeting an initial criterion of 85% agreement based on ratings of the viewed interviews, diagnosticians completed a series of live interviews while observed by an experienced diagnostician until they met the criterion of 85% agreement (kappa). A random reliability check, in which each diagnostician watched seven videotaped interviews from the ADIS-C/P and ADIS-IV-L that were conducted over the course of the study, indicated that diagnosticians maintained reliability (i.e., kappa $\geq .85$).

Results

Multivariate analysis of variance (MANOVA) were conducted to examine between the AD and NPD youth on parental self-reports of anxiety, depression, and anxious and depressive self-talk. Logistic regressions examined child and parent anxiety, mood, and substance use disorders relative to the comparison group (see Table 2 for maternal and paternal diagnoses). Relationships between specific child and parent anxiety disorders were examined using logistic regression.

Preliminary Analyses

Preliminary analyses examined differences on demographics. Between subjects ANOVAs were used for continuous variables (e.g., age) and chi-square tests of independence were used for categorical variables (e.g., gender). No significant group differences emerged for gender of child, χ^2 (2, N = 230) = 0.45, p = .50; age of child, F(1, 228) = 0.76, p = .39,

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Lifetime DSM-IV disorder	AD youth		NPD youth	
	Mother	Father	Mother	Father
Any anxiety disorder	56	30	27	15
Panic disorder	14	7	4	0
Social phobia	24	16	10	8
Generalized anxiety disorder	15	11	6	0
Obsessive compulsive disorder	5	1	2	4
Specific phobia	21	10	12	8
Any mood disorder	32	13	27	12
Any substance-related disorder	7	25	6	12

Table 2 Percentage of mothers and fathers who met criteria for anxiety, mood, and substance use disorders

AD Anxiety disordered; NPD no psychological disorder; DSM diagnostic and statistical manual

mother F(1, 213) = 0.93, p = .34, or father F(1, 203) = 0.35, p = .56; race of child χ^2 (3, N = 228) = 4.01, p = .26, mother χ^2 (2, N = 221) = 4.27, p = .12, or father χ^2 (4, N = 212) = 8.62, p = .07; education of mother χ^2 (5, N = 220) = 6.94, p = .23, or father χ^2 (3, N = 211) = 2.28, p = .52; estimated family income χ^2 (8, N = 213) = 14.88, p = .06; and marital status of parents, χ^2 (4, N = 219) = 2.01, p = .73.

Group Differences on Mother and Father Self-Report Measures

Means and standardized deviations for the STAI-T, STAI-S, BDI, ATQ-R, and ASSQ are presented in Table 3. Results from the MANOVA revealed a significant difference with mothers of AD youth reporting higher levels of trait and state anxiety compared to mothers of NPD youth. Significant group differences in state anxiety, but not trait anxiety emerged for fathers of AD as compared to fathers of NPD youth. Both mothers and fathers of AD youth reported more depressive symptoms than mothers and fathers of NPD youth. Mothers, but not fathers, of AD youth reported more anxious and depressive self-talk than mothers of NPD youth.

Mother Anxiety, Mood, and Substance Use Disorders

A significant association between AD youth and lifetime maternal anxiety disorders was found (95% CI = 1.72–6.72, p < .01). The odds of any lifetime maternal anxiety disorder were 3.40 times higher in the mothers of AD youth relative to the mothers of NPD youth. When examining specific individual anxiety disorders, a significant association between AD youth and lifetime maternal social phobia was found (95% CI = 1.72–6.72, p < .03). The odds of lifetime maternal social phobia were 2.90 times higher for the AD than NPD youth. No significant differences were found for the rates of lifetime maternal PD, GAD, OCD, specific phobias, or for lifetime maternal mood or substance use disorders.

Father Anxiety, Mood, and Substance Use Disorders

A significant association between AD youth and any lifetime paternal anxiety disorder was found (95% CI = 1.03-5.29, p < .04). The odds of any paternal lifetime anxiety disorder

Measures	Reporter	AD youth Mean (SD)	NPD youth Mean (SD)	F
STAI-T	Mother	30.73 (10.69)	23.52 (9.78)	F(1, 184) = 15.62, p = .000
STAI-S	Mother	29.69 (10.56)	23.44 (10.21)	F(1, 184) = 11.72, p = .001
BDI	Mother	8.99 (6.84)	6.00 (5.68)	F(1, 184) = 6.82, p = .01
ASSQ	Mother	54.98 (19.85)	42.79 (15.23)	F(1, 184) = 13.74, p = .000
ATQ-R	Mother	77.68 (19.82)	67.82 (18.99)	F(1, 184) = 8.35, p = .004
STAI-T	Father	26.69 (10.58)	23.47 (10.36)	F(1, 184) = 3.10, p = .08
STAI-S	Father	27.67 (10.65)	23.90 (9.64)	F(1, 184) = 4.31, p = .04
BDI	Father	7.22 (6.28)	5.08 (6.27)	F(1, 184) = 3.82, p = .05
ASSQ	Father	49.05 (19.43)	44.81 (19.23)	F(1, 184) = 1.56, p = .21
ATQ-R	Father	73.78 (21.69)	69.81 (24.94)	F(1, 184) = 1.03, p = .31

 Table 3
 Mother and father means and (standard deviations) by group on the STAI-T, STAI-S, BDI, ASSQ and ATQ-R

AD Children with anxiety disorders; NPD no psychological disorder; STAI-T state-trait anxiety inventorytrait version; STAI-S state-trait anxiety inventory-state version; BDI Beck depression inventory; ASST anxious self-statements questionnaire; ATQ-R automatic thoughts questionnaire-revised

were 2.33 times higher in the AD relative to NPD youth. When examining specific anxiety disorders, no significant associations between lifetime paternal PD with or without agoraphobia, GAD, OCD, or specific phobias were found. No significant differences were found for mood disorders, but a significant association between AD youth and lifetime substance use disorders (95% CI = 1.01-6.29, p < .05) was found. The odds of paternal substance use disorders were 2.52 times higher in the AD relative to the NPD youth. To further examine for the relationship between AD youth and parent substance use disorder, independent of paternal anxiety, we controlled for paternal lifetime anxiety disorder. Results indicated that AD youth were no longer associated with lifetime paternal substance use disorder (OR = 2.17; 95% CI = .85-5.51, p < .11).

Specificity of Relationships Between Child and Parent Anxiety Disorders

Given the hypothesis that SAD and PD are both associated with parental PD, youth with either a diagnosis of SAD or PD were combined as one group (i.e., SAD/PD). A significant association between child SAD/PD and maternal lifetime PD was found (95% CI = 1.09-5.86, p < .03). The odds of a maternal lifetime PD were 2.53 times higher in youth with SAD/PD relative to youth without a diagnosis of SAD/PD. A significant association between child and mother SOP was also found (95% CI = 1.07-4.08, p < .03). The odds of maternal lifetime SP were 2.09 times higher in youth with SP relative to youth without SP. A significant association between child and mother OCD was found (95% CI = 1.36-42.59, p < .02). The odds of having OCD were 7.61 times higher in mothers of youth with OCD as compared to mothers of youth without OCD. A significant association between child and maternal lifetime specific phobia was also found (95% CI = 1.30–5.02, p < .01). The odds of a lifetime specific phobia diagnosis were 2.55 times higher in mothers of youth with the diagnosis as compared to those without the diagnosis. No other significant associations between child and mother diagnoses were observed. Furthermore, no significant associations between specific child and father diagnoses were found.

Discussion

Anxiety disorders aggregate in families. Consistent with previous research [6, 7, 51, 52], increased rates of anxiety disorders were found in the parents of youth with anxiety disorders as compared to the parents of non-disordered youth. In fact, mothers of AD youth were over three times more likely to meet criteria for any anxiety disorder and almost three times more likely to meet criteria for SP in particular as compared to mothers of NPD youth. Fathers of AD relative to NPD youth were over two times more likely to meet criteria for any anxiety disorder. Similar results were found when examining parent self-report of anxiety. Mothers of AD youth reported higher levels of trait and state anxiety and more frequent anxious self-talk as compared to mothers of NPD youth, and fathers of AD youth reported higher levels of SPD youth, and fathers of AD youth reported higher levels of NPD youth, and fathers.

Importantly, the present findings inform us about the specificity of anxiety diagnoses between child and parent. The results suggest similarity in the diagnoses of AD children and their mothers, but not their fathers. These findings are consistent with those reported by Cooper et al. [5], who found a significant relationship between mother and child, but not father-child, SP and SAD, and with a body of literature suggesting that the associations between mother and child psychopathology are stronger than those between father and child psychopathology [2, 53]. Potential mechanisms through which specific anxiety disorders may be transmitted between mother and child (e.g., modeling, genetics) were not evaluated. However, previous research assessing the transmission of anxiety more generally may inform the interpretation of results. Research suggests that parental modeling of catastrophic thinking and anxious avoidance are related to the etiology and maintenance of anxiety disorders in youth [54], and studies support the transmission of specific fears and avoidance through modeling [12, 55]. It is possible that the similarity between mother and child anxiety diagnoses observed in the present study is partially explained by maternal modeling of disorder-specific catastrophic thinking, as reflected in the current endorsement of high levels of maternal anxious self-talk and anxious avoidance. Given the secondary role that fathers often have in child rearing [56], children may spend less time observing their fathers and this may help explain the lack of similarity between child and father diagnoses. This notion may also help explain why specificity was not found for GAD, in which the avoidance is primarily internal [57]. The avoidance in GAD is less observable to the child of an affected parent, and less easily transmitted through modeling.

Alternatively, the presence of an AD child may be a stressor for parents and may affect parents' mental health [53]. Research suggests that women may be more likely than men to experience psychological distress in response to familial sources of stress, as women's self-perceptions have been found to be more centrally related to relationship considerations [58, 59]. Accordingly, child anxiety may contribute to higher levels of anxiety in mothers, but not fathers. Although research supports the bidirectional nature of child and parent psychopathology [60, 61], it is less clear why children and mothers show disorder similarity, in addition to higher rates of any anxiety disorder. To understand the mechanisms through which specific anxiety disorders are transmitted between mother and child, studies should examine parental stress and burden resulting from child symptomatology as well as the timing of onset for child versus parent disorders. Future studies should also collect gene samples.

Adding to empirical support for the specific relationship between SAD and PD [20, 22, 62], mothers of children with SAD or PD were approximately two and a half times more likely to meet criteria for panic disorder than mothers of children without SAD or PD. One explanation is the "separation anxiety disorder hypothesis" [63, 64], which postulates that

childhood separation anxiety places individuals at a greater risk for panic disorder in adulthood. Mothers of separation anxious youth, who meet PD criteria, may have had SAD as a child. Similarities in the biological correlates of SAD and PD may help explain the relationship observed between childhood SAD and PD in adulthood (e.g., behavioral inhibition and CO_2 hypersensitivity) [65–67]. For example, Pine et al. [67] reported patterns of respiratory abnormalities specifically in children with SAD, but not SP, that were similar to those found in adults with PD [68]. Although the present study did not gather psychophysiological data, previous research suggests that overlapping physiological patterns in SAD and PD, but not other anxiety disorders, may be a partial explanation for the observed similarity of child SAD and maternal PD.

Consistent with research demonstrating an association between anxiety disorders and problematic substance use [30, 69], fathers of AD youth had an increased risk for a lifetime substance use disorder. As was predicted [38, 39], this association disappeared when the presence of a paternal lifetime anxiety disorder was controlled, suggesting that the increased rates of a substance use disorder reported among fathers of AD youth were secondary to increased rates of paternal anxiety when compared to NPD fathers. Perhaps problematic substance use in the fathers of AD youth emerged as a way to reduce their own elevated levels of anxiety [70–73]. Alternatively, both anxiety and substance use disorders may share similar genetic or contextual risk factors, resulting in a high degree of anxiety and substance use disorder comorbidity among fathers of AD youth [73–78].

Parents of AD youth were not found to be at increased risk for a lifetime mood disorder based on structured diagnostic interview, although both mothers and fathers of AD youth self-reported higher levels of depressive symptomatology and mothers of AD youth reported more frequent depressive self-talk compared to their NPD counterparts. The lack of association between child anxiety disorder and higher lifetime prevalence rates of mood disorders in their parents is consistent with findings from Last et al. [79]. However, findings from other studies supported a link between parental MDD and child anxiety [5]. The rates of parental lifetime mood disorders were high in both the AD and NPD samples, particularly for the mothers (e.g., 32% AD and 27% NPD mothers met criteria for a lifetime mood disorder). It may be that parents of AD youth do not differ from those of NPD on the likelihood of having a mood disorder at some point during the lifespan, given the high rates of mood disorders observed in the general population [80], but differ on aspects measured by the self-report measures, such as severity or rates of current symptomatology.

Despite several strengths (e.g., large sample of AD youth identified through blind structured diagnostic interviews; inclusion of mothers and fathers), the present study it is not without potential limitations. First, as is common among children with anxiety disorders [81], many youth in the AD sample met criteria for multiple anxiety disorders or comorbid mood and externalizing disorders. Although the exclusion of youth who have more than one disorder would severely limit generalizability, the interpretation of the parent–child concordance of a single disorder when other disorders are also present can be difficult. Future studies may consider examining the parent–child specificity of a pairing or cluster of disorders, in addition to examining each disorder separately. Second, although the present focus is on the prevalence of an other-disordered comparison group limits the conclusions that can be drawn. One can not be certain whether the rates of lifetime anxiety, mood, and substance use disorders observed among parents of anxious youth are specific to this group or whether the rates would be seen in parents of youth with other disorders. Thus, is it unclear if our findings are specific to anxiety disorders or true for

psychopathology more generally. Although the findings from this study are still meaningful and add to the current child anxiety literature, future research should include a comparison group with other psychiatric disorders. The manner in which participants were recruited for the present study may limit the conclusions. Although families presenting to a child anxiety clinic can permit examination of youth with diagnosed levels of anxiety, clinic-referred youth may differ from youth in the community [82]. Lastly, given that the sample was predominately Caucasian families with children between the ages of 7– 14 years, it is unclear whether these findings will generalize to other ethnicities and older children. Thus, these findings need to be replicated with more ethnically diverse and adolescent samples.

The results offer clinical implications. Parents may play an important role in their child's anxiety treatment, either as co-clients or collaborators [21]. However, research examining parental psychopathology in relation to child anxiety treatment suggests that high levels of parental anxiety may be associated with poorer treatment response [83, 84]. The elevated rates of anxiety disorders observed among parents of AD youth and the similarity of specific disorders between children and their mothers may compromise the effectiveness of child treatment. By assessing for parental anxiety prior to child anxiety treatment response among anxious youth may be improved. Future studies are needed to evaluate this hypothesis.

Summary

Research indicates that anxiety disorders aggregate in families [1–7] and place individuals at greater risk for the development of mood and substance use disorders [28–32]. However, the majority of studies in this area have looked at the familial aggregation of anxiety in general and research on parent–child concordance of specific anxiety disorders is rare. Furthermore, studies evaluating the prevalence of mood and substance use disorders among parents of anxious youth have led to conflicting results.

The present study examined the lifetime rates of anxiety, mood, and substance use disorders in a large sample of AD children and their parents using blind structured diagnostic interviews. Furthermore, we investigated parent-child concordance of specific anxiety disorders. Results indicated increased rates of anxiety disorders in the parents of youth with anxiety disorders as compared to the parents of non-disordered youth. Specific child-mother relationships between child separation anxiety and panic disorder and maternal panic disorder, as were child and maternal social phobia, obsessive compulsive disorder, and specific phobias. Fathers of AD youth had an increased risk for a lifetime substance use disorder, but when the presence of a paternal lifetime anxiety disorder was controlled the association disappeared suggesting that the increased rates of a substance use disorder reported among fathers of AD youth were secondary to increased rates of paternal anxiety. Neither mothers nor fathers of AD youth were found to be at increased risk for a lifetime mood disorder. Findings from this study suggest that similarity in the diagnoses of AD children and their mothers, but not their fathers are consistent with a body of literature suggesting that the associations between mother and child psychopathology may be stronger than those between father and child psychopathology [2, 53]. Knowledge about the diagnostic specificity between children and parents may be helpful for treatment success, given that parental anxiety may be associated with poorer treatment response [83, 84]. By assessing for parental anxiety prior to child anxiety treatment and providing services to anxious parents, a positive treatment response among anxious youth may be improved.

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