

Preschool Anxiety Disorders: Comprehensive Assessment of Clinical, Demographic, Temperamental, Familial, and Life Stress Correlates

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This study examined correlates of preschoolers' anxiety disorders using a comprehensive, multimethod design. Participants included a community sample of 541 three-year-old children, of whom 106 (19.6%) met criteria for at least 1 anxiety disorder. Child and parental psychopathology and life stress were assessed with clinical interviews. Child temperament and parenting behavior were assessed with laboratory observations. Mothers and fathers reported on their parenting styles. Compared to preschoolers with no anxiety disorder, preschoolers with an anxiety disorder were more likely to meet criteria for comorbid depressive and oppositional defiant disorders and to exhibit greater temperamental behavioral inhibition and lower positive affectivity, and more sleep problems. Children with anxiety disorders also experienced more stressful life events in the previous 6 months, and their mothers had a higher rate of current anxiety disorders. Compared to children with other anxiety disorders, children with only specific phobia exhibited a somewhat different pattern of associations than children with other anxiety disorders. Overall, the findings suggest that many of the correlates observed in older youth with anxiety disorders are also observed in preschoolers.

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Anxiety disorders are one of the most common mental disorders, highly comorbid with each other and with other disorders, and associated with substantial impairment across the lifespan (Beesdo, Knappe, & Pine, 2009; Kessler et al., 2005; Rapee, Schniering, & Hudson, 2009). Individuals with anxiety disorders are at increased risk for developing subsequent anxiety, depressive, and substance use disorders (Bittner et al., 2007). Evidence suggests that anxiety disorders often emerge early in life (Beesdo et al., 2009; Kessler et al., 2005). However, little is known about anxiety disorders during early childhood, as research has predominantly examined anxiety disorders in school-age children and adolescents. Further knowledge about anxiety disorders in early childhood is critical for improving early identification and informing efforts to intervene early and effectively during the preschool years (e.g., Hirshfeld-Becker et al., 2010).

It is only recently that developmentally sensitive, structured diagnostic interviews with parents for the assessment of preschool psychopathology have become available (e.g., Egger et al., 2006). Accumulating evidence supports the reliability and validity of structured diagnostic interviews in young children (e.g., Birmaher et al., 2009; Egger et al., 2006; Lavigne, LeBailly, Hopkins, Gouze, & Bins, 2009). This emerging research provides evidence that psychiatric disorders in preschoolers have similar prevalence rates to those observed in school-age children, show a similar structure as observed in older individuals, and are associated with significant impairment (e.g., for a review, see Egger & Angold, 2006; also see Bufferd, Dougherty, Carlson, & Klein, 2011; Lavigne et al., 2009; Sterba, Egger, & Angold, 2007). These studies also suggest that anxiety disorders are one of the most common forms of psychopathology in preschoolers, and a recent study found that anxiety symptoms during early childhood predicted later anxiety symptoms in kindergarten and second grade, highlighting the stability and clinical significance of early anxiety (Mian, Wainright, Briggs-Gowan, & Carter, 2011). Likewise, Hudson, Dodd, Lyneham, and Bovopoulous (2011) reported that anxiety disorders in 4-year-old children predicted anxiety disorders at age 6 years.

Most contemporary theoretical models of anxiety development propose multiple bidirectional influences on childhood anxiety, including internal (biological/genetic, cognitive/affective) and external (familial, social-environmental) risk factors, and within- and cross-level interactions of these factors in various contexts (for reviews see Murray, Creswell, & Cooper, 2009; Southam-Gerow & Chorpita, 2007; Weems & Stickle, 2005). Consistent with this framework, empirical evidence in school-age children and adolescents provides strong support that anxiety disorders are likely

multiply determined by a diverse array of individual and contextual-level factors. First, family aggregation and genetic studies indicate increased risk for anxiety in the offspring of parents with anxiety and depressive disorders (for a review, see Beesdo et al., 2009). The intergenerational transmission of risk may reflect both genetic factors and disruptions in parenting, particularly as anxious and depressed parents may exhibit greater parental control and rejection, which may limit the child's sense of competency and reinforce the child's anxious/avoidant behaviors (e.g., Goodman & Gotlib, 1999; Wood, McLeod, Sigman, Hwang, & Chu, 2003).

Second, developmental psychopathology research has provided considerable support for associations between child temperament and anxiety disorders, both concurrently and prospectively (Degnan, Almas, & Fox, 2010; Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Hirshfeld-Becker et al., 2003; Tacket, 2006). The majority of this research has investigated the role of behavioral inhibition (BI), which overlaps with the fearfulness facet of negative affectivity (NA), and is characterized by fear and a tendency to withdraw from novel and unfamiliar objects, situations, or people, and risk for subsequent anxiety disorders, particularly social anxiety (Degnan et al., 2010; Hirshfeld-Becker et al., 2003). In contrast, much less research has examined associations between positive affectivity (PA) and anxiety disorders. Theorists (e.g., Clark & Watson, 1999) have generally hypothesized that low PA is specific to depression; however, studies in older youth and adults have reported associations between low PA and anxiety, particularly social phobia (for a review, see Anderson & Hope, 2008).

Third, demographic and social-environmental characteristics may directly or in combination with other vulnerability factors (e.g., child temperament, genetic/familial risk) increase risk for anxiety disorders. Evidence suggests that anxiety disorders in older children are associated with female gender and several social-environmental factors including exposure to life stress, socioeconomic disadvantage, parenting, and learning processes, such as classical conditioning, modeling, and verbal transfer of information (for reviews, see Beesdo et al., 2009; Murray et al., 2009; Rapee et al., 2009). This work has particularly emphasized the role of parent-child relationships and parenting styles characterized by rejection and control, as well as broader parental socialization factors, such as limiting the use of daycare and exposure to challenging social contexts, in contributing to child anxiety (McLeod, Wood, & Weisz, 2007; Rapee & Szollos, 2003; van der Bruggen, Stams, & Bögels, 2008).

To our knowledge, only three studies have investigated correlates of anxiety disorders in early childhood (Hudson, Dodd, & Bovopoulous, 2011;

Shamir-Essakow, Ungerer, & Rapee, 2005; Wolfson, Fields, & Rose, 1987). Hudson and colleagues (2011) reported that in a sample of 202 preschool children selected on high- and low-BI status, the presence of a clinical anxiety diagnosis in preschoolers was associated with child BI and maternal anxiety; no significant effects of family environmental factors, such as parenting or attachment style, on preschool anxiety disorders were observed. Shamir-Essakow and colleagues (2005) reported that in a sample of 104 preschoolers selected on high- and low-BI status, total number of anxiety disorders, as assessed using a parent-reported clinical interview, was associated with observed BI, maternal trait anxiety, and insecure attachment styles. Last, in a sample of 47 four- to six-year-old children, Wolfson and colleagues (1987) reported an association between preschoolers' anxiety diagnoses, based on a psychiatric screening with parents, and difficult temperament. There has also been a series of seminal studies conducted by Scheeringa and colleagues (e.g., Scheeringa, Peebles, Cook, & Zeanah, 2001) examining the reliability and validity of posttraumatic stress disorder in preschool-age children. Although this work has been highly informative, it is limited to posttraumatic stress disorder and a few comorbid conditions in clinical samples. Thus, further studies of anxiety disorders in early childhood are needed to explore the validity and clinical significance of preschool anxiety disorders beyond posttraumatic stress disorder.

A number of studies have examined correlates of anxious (Edwards, Rapee, & Kennedy, 2010; Marakovitz, Wagmiller, Mian, Briggs-Gowan, & Carter, 2011; Willoughby, Angold, & Egger, 2008) and internalizing symptoms (Hastings et al., 2008; Manassis, Bradley, Goldberg, Hood, & Swinson, 1995; Morrissey, 2009; R. Robinson & Cartwright-Hatton, 2008) during early childhood. These studies suggest that several of the correlates of anxiety in older children, including BI and NA, maternal affective symptoms, sleep problems, negative life events, more frequent changes in childcare, and a range of parenting styles, including high control, low support, authoritarian, and permissive parenting, are associated with preschoolers' anxiety or internalizing symptomatology.

Although the few studies of anxiety disorders in preschoolers and the larger literature on anxiety symptoms provide a foundation for understanding preschool anxiety disorders, they have several important limitations. First, the studies examining anxiety disorders in preschool-age children used relatively small or selected samples and did not use standardized measures designed specifically for assessing psychiatric disorders during early childhood. Second, the majority of the studies used parent rating scales to assess children's anxious or internalizing symptoms rather than anxiety disorder

diagnoses that take into account the nature, severity, and duration of symptoms and associated impairment. Third, with one notable exception (Hudson et al., 2011), these studies did not examine associations between anxiety disorders and multiple factors simultaneously using a multivariate approach or incorporate multiple methods and informants. Finally, no study has taken preschoolers' psychiatric comorbidity into account, which is important given the high rates of comorbidity during this developmental period (Egger & Angold, 2006).

We previously reported on the rates of *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev. [DSM-IV-TR]; American Psychiatric Association, 2000) psychiatric disorders, including anxiety and depressive disorders, oppositional defiant disorder (ODD), and attention-deficit/hyperactivity disorder (ADHD) in a large community sample of 541 preschool-age children (Bufferd et al., 2011) and their relations with empirically derived temperament dimensions (Dougherty et al., 2011). This article extends our previous work and contributes to the extant literature by examining the correlates of preschool anxiety disorders assessed with a developmentally appropriate clinical interview with parents. As this is part of an ongoing longitudinal study, the current study aims to provide cross-sectional data on the validity of preschool anxiety disorders using the construct validation framework proposed by Robins and Guze (1970) for psychiatric disorders. This includes testing whether clinical characteristics, laboratory measures, and familial aggregation provide convergent validity consistent with etiological models of anxiety. Given the cross-sectional nature of this assessment, however, we cannot infer directionality of associations or determine whether the correlates observed are risks, concomitants, or consequences of the disorder. These critical questions will be addressed in future papers examining the developmental trajectories of preschool anxiety disorders over time.

For the current report, preschoolers with and without anxiety disorders were compared across multiple domains, including demographic and clinical characteristics, temperament, parental psychopathology, parenting, and life stress. Multiple methods were employed, including questionnaires, semistructured interviews, and laboratory observations. Based on theoretical models of anxiety development (for reviews, see Murray et al., 2009; Southam-Gerow & Chorpita, 2007; Weems & Stickle, 2005) and research with preschoolers with anxiety symptomatology, we hypothesized that preschoolers with anxiety disorders would exhibit greater temperamental BI and NA and lower levels of PA and would come from environments characterized by problematic parenting, parental anxiety and depressive disorders, high levels of life stress, and less time spent in nonparental care settings.

In addition, we had three exploratory aims. First, given the high rates of comorbidity in preschool psychopathology, we explored which significant bivariate correlates made a significant unique contribution in multivariate analyses, after accounting for comorbid diagnoses. Second, we explored whether the patterns of association differ by temperament and/or gender. With respect to temperament, we examined whether interactions between child temperament and social-contextual factors, including parental psychopathology, parenting, and life stress, contribute to child anxiety disorders, as emerging research suggests that children with temperamental vulnerabilities (i.e., BI and NA) are at greater risk for anxiety symptomatology in the context of environmental adversity (Crockenberg & Leerkes, 2006; Degnan, Henderson, Fox, & Rubin, 2008; Marakovitz et al., 2011). We did not anticipate findings to differ by gender, as the literature just reviewed suggests that patterns of association and moderation differ minimally for boys and girls.

Lastly, recent dimensional models of adult psychopathology suggest a distinction between fear- (phobic) and anxiety- (distress) related anxiety disorders (Vaidyanathan, Nelson, & Patrick, 2012; Watson, 2005). Support for a distinction between a fear factor, as exemplified by specific phobias, and an anxiety/distress factor has been documented using personality, diagnostic, and neurobiological data (Davis, Walker, Miles, & Grillon, 2010; Vaidyanathan et al., 2012). In addition, findings suggest that fear and anxiety are mediated by different neurobiological pathways and respond differently to anxiolytic medication (Davis et al., 2010). Therefore, we explored whether similar distinctions were evident in young children with anxiety disorders and examined whether findings differed between children with a specific phobia diagnosis only, which is the exemplar of fear-related disorders, and children with other anxiety disorders but no specific phobias.

METHOD

Participants

Families with a 3-year-old child living within 20 contiguous miles of Stony Brook, New York, were eligible to participate in a study of temperament and psychopathology (Dougherty et al., 2011). Potential participants were identified via a commercial mailing list, and eligible families had a child between 3 and 4 years of age with no significant medical conditions or developmental disabilities and at least one English-speaking biological parent. Of the 815 families who were identified as eligible, 66.4% ($n = 541$) entered the study and provided diagnostic information about the child. There were no significant

differences between families who did and did not participate on various demographic variables. The study was approved by the human subjects review committee, and informed consent was obtained from parents. Parents received \$10 or \$30 for completing questionnaires, \$50 for completing clinical interviews, and \$100 for completing laboratory visits.

Parents of 541 children (45.7% female) were interviewed with the Preschool Age Psychiatric Assessment (PAPA; Egger, Ascher, & Angold, 1999). Children's mean age was 3.6 years ($SD = 0.3$). The mean ages of mothers and fathers were 35.9 years ($SD = 4.4$) and 38.3 years ($SD = 5.4$), respectively. Most participants came from two-parent (94.8%), middle-class families, as measured by Hollingshead's (1975) Four Factor Index of Social Status ($M = 45.0$, $SD = 11.0$), which provides an index of a family's socioeconomic status based on both parents' levels of education and occupation. Participants were mostly White/non-Hispanic (86.9%), and 9.1% were Hispanic.

Families who completed assessments were compared to those who did not on all variables reported in the article, and three significant differences emerged. Mothers who completed self-reports of parenting had children who were significantly younger in age, $t(539) = -3.12$, $p = .002$. Fathers who completed self-reports of parenting were significantly more likely to be married, $\chi^2(1, N = 541) = 18.40$, $p < .001$, and more likely to have a coparent with a lifetime anxiety disorder, $\chi^2(1, N = 536) = 4.97$, $p = .026$.

Child Psychopathology and Functioning

Parents (98.0% mothers) were interviewed using the PAPA. The PAPA uses a structured format and an interviewer-based approach. The interviewer asks all required questions but also confirms the parent's understanding of the question, elicits examples, and adheres to guidelines for rating all items. Most symptoms are assessed for the 3 months prior to the interview to maximize recall. Adequate test-retest reliability for diagnoses has been reported using independent interviews ($\kappa = 0.49-0.74$; Egger et al., 2006).

The PAPA was used to derive *DSM-IV* diagnoses for the following diagnostic groups: any anxiety disorder (specific phobia, separation anxiety, social phobia, generalized anxiety, agoraphobia, selective mutism, and panic), any depressive disorder (major depression, dysthymia, and depression not otherwise specified), ODD, and ADHD. We also created dimensional symptom scales by summing the items included in each diagnostic category. Of the children, 19.6% ($n = 106$) met diagnostic criteria for at least one anxiety disorder, 1.8% ($n = 10$) for any depressive disorder, 9.4% ($n = 51$) for ODD, and 2.0% ($n = 11$) for ADHD (Bufferd et al.,

2011). With respect to specific anxiety disorders, 9.1% ($n=49$) of the children met diagnostic criteria for specific phobia, 5.4% ($n=29$) for separation anxiety disorder, 4.4% ($n=24$) for social phobia, 3.9% ($n=21$) for generalized anxiety disorder, 3.5% ($n=19$) for agoraphobia, 1.5% ($n=8$) for selective mutism, and 0.2% ($n=1$) for panic disorder. Of the children who met criteria for at least one anxiety disorder, 20.8% ($n=22$) met criteria for two anxiety disorders, and 10.4% ($n=11$) met criteria for three or more anxiety disorders. We compared children with one anxiety disorder ($n=73$) to children with more than one anxiety disorder ($n=33$) on all variables, and no significant differences were observed. Given the low frequency of children meeting diagnostic criteria for some of the individual anxiety disorders, and the considerable comorbidity between the anxiety disorders, we opted to examine the data at the level of whether the child met criteria for at least one anxiety disorder. None of the children with an anxiety disorder were taking psychotropic medication at the time of the interview. Four children (3.8%) with an anxiety disorder had received treatment.

Interviews were conducted by advanced graduate students in clinical psychology who received training on the administration of the PAPA from a member of the PAPA development team. Interviews lasted 1 to 2 hr and were conducted by telephone, as previous studies have demonstrated that face-to-face and telephone interviews yield similar results (Lyneham & Rapee, 2005). A second rater independently rated audiotapes of 21 PAPAs. Kappas for interrater reliability were 1.00 for all diagnoses. Interclass correlation coefficients (ICCs) for the symptom scales were as follows: depression (.85), anxiety (1.00), ADHD (.99), and ODD (.99). Internal consistency (α) values of the symptom scales were as follows: depression (.75), anxiety (.83), ADHD (.89), and ODD (.84).

The PAPA also assesses 41 stressful and traumatic events affecting the child, as well as a number of sleep-related problems (e.g., nightmares, difficult to rouse) in the past 3 months. For the study, we summed the total number of stressful life events occurring in the past 6 months ($ICC = .93$, $n = 21$) to yield an aggregate measure of life stress. In addition, seven sleep difficulties that did not overlap with any item used to derive diagnoses, dichotomously rated as absent or present, were summed to create a total sleep problems score ($ICC = 0.99$, $n = 21$).

Child Temperament

Children visited the laboratory for a 2-hr observational assessment of temperament that included a standardized set of 12 episodes from the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith, Reilly,

Lemery, Longley, & Prescott, 1995). Lab-TAB episodes are designed to elicit a variety of temperament-relevant emotions and behaviors (e.g., playing with novel and exciting toys; receiving a nicely wrapped "gift" that turns out to be an empty box; being left alone in a room and a stranger enters). Episodes were videotaped through a one-way mirror for observational coding. The experimenter and coders were blind to the PAPA interviews.

Given the substantial support for the relation between early temperament and anxiety disorders (Degnan et al., 2010; Rapee et al., 2009), we assessed BI, NA, and PA. Our coding system is described in detail elsewhere (Olino, Klein, Dyson, Rose, & Durbin, 2010). BI was coded only in the three episodes designed to assess this behavior. Specific behaviors, such as latency to touch objects, tentative play, gaze aversion, latency to vocalize, and approach to and avoidance of a stranger, were coded for each epoch, which spanned 20 to 30 s depending on the particular episode. Within each epoch, a maximum intensity rating of facial, bodily, and vocal fear was also coded. Except for latencies, behaviors were coded on 3- or 4-point scales. BI was computed as the average of the standardized ratings across epochs and episodes. BI exhibited good internal consistency ($\alpha = .80$) and interrater reliability ($ICC = .88$; $n = 28$). NA was the average of the standardized ratings of facial, vocal, and bodily sadness; fear; and anger across all episodes. PA was the sum of the standardized ratings of facial, vocal, and bodily positive affect across all episodes. Composite NA and PA scores had adequate internal consistency ($\alpha = .74$ and $.87$, respectively) and interrater reliability ($ICC = .82$ and $.92$, respectively; $n = 35$). NA correlated $-.01$ (ns) with PA and $.40$ ($p < .001$) with BI; the correlation between PA and BI was $-.08$ ($p = .05$).

Parent Psychopathology

Children's biological parents were interviewed using the Structured Clinical Interview for *DSM-IV*, Nonpatient version (SCID-NP; First, Spitzer, Gibbon, & Williams, 1996). The SCID is a widely used semistructured diagnostic interview that has been documented to have good reliability and validity. If a parent could not be interviewed, we obtained information from the coparent using the family history method (Andreasen, Endicott, Spitzer, & Winokur, 1977). The interviews were conducted by telephone by two master's-level clinicians. Of the 541 children, we had diagnostic information on 537 mothers and 530 fathers. Direct SCID interviews were obtained from 536 mothers and 446 fathers. Based on audiotapes of 30 assessments, interrater reliability (indexed by kappa) for lifetime anxiety and depressive disorder diagnoses were .91 and .93, respectively. Rates

of parental lifetime psychopathology are provided in Table 1.

Parenting Behavior

Of the 541 families who completed the PAPA interview, 524 children (96.9%) and their parents (93.5% mothers) returned for a second laboratory session that included a

modified version of the Teaching Tasks battery (Egeland et al., 1995). The battery included six standardized tasks (e.g., book reading, block building) designed to elicit different parent and child behaviors and interaction styles. For coding, a series of variables were rated on 5-point scales for each task, and ratings were averaged across tasks. The battery was coded by undergraduate psychology students, trained by a clinical psychology

TABLE 1
Characteristics of Preschoolers With an Anxiety Disorder Versus No Anxiety Disorder

	<i>No Anxiety Disorder Diagnosis^a</i>	<i>At Least One Anxiety Disorder Diagnosis^b</i>	<i>p</i>	<i>N per Group: No Anxiety Disorder/Any Anxiety Disorder</i>
Demographics				
Child Age in Years	3.62 ± 0.27	3.64 ± 0.27	.485	435/106
Child Gender, % Female	200 (46%)	47 (44%)	.762	435/106
Child Race/Ethnicity, % Caucasian	384 (88.3%)	86 (81.1%)	.181	435/106
Parental Marital Status, % Married or Cohabiting	416 (95.6%)	97 (91.5%)	.086	435/106
Maternal Age in Years	36.12 ± 4.33	35.7 ± 4.97	.380	432/106
Paternal Age in Years	38.41 ± 5.29	37.83 ± 5.94	.328	432/106
≥1 Parent College Graduate, %	304 (70.2%)	62 (58.5%)	.021	433/106
Hollingshead Social Status	45.42 ± 10.99	43.42 ± 11.06	.094	435/106
Childcare or School Status				
Hours per Week in Preschool	5.07 ± 6.22	5.50 ± 5.85	.302	432/105
Hours per Week in Daycare	5.32 ± 12.48	2.98 ± 9.76	.046	430/104
Total No. School/Daycare Transitions	1.29 ± 1.38	1.02 ± 1.04	.166	432/106
Child Psychopathology				
Depressive Disorder ^{c,d}	4 (0.9%)	6 (5.7%)	.005	435/106
Oppositional Behavior Disorder ^d	35 (8%)	16 (15.1%)	.026	435/106
Attention Deficit Hyperactivity Disorder ^c	8 (1.8%)	3 (2.8%)	.458	435/106
Child Sleep Problems ^d	.94 ± .85	1.20 ± 1.03	.016	435/106
Child Temperament				
Behavioral Inhibition ^d	-.02 ± .38	.08 ± .48	.024	435/106
Negative Affectivity	-.02 ± .53	.09 ± .67	.069	435/106
Positive Affectivity ^d	.05 ± .79	-.20 ± .79	.002	435/106
Parental Psychopathology				
Parental Lifetime Anxiety Disorder	185 (42.8%)	52 (49.1%)	.247	432/106
Parental Lifetime Depressive Disorder	169 (39.1%)	49 (46.2%)	.182	432/106
Observed Parenting Behavior				
Observed Parental Hostility	1.19 ± 0.32	1.23 ± 0.43	.424	418/106
Observed Parental Support	4.48 ± 0.57	4.34 ± 0.70	.035	418/106
Observed Parental Intrusiveness	1.47 ± 0.42	1.50 ± 0.47	.441	418/106
Perceived Parenting Style				
Maternal PSDQ Authoritative	61.32 ± 6.49	60.61 ± 7.24	.348	401/93
Maternal PSDQ Authoritarian	19.75 ± 4.11	20.9 ± 5.03	.041	400/93
Maternal PSDQ Permissive	10.64 ± 3.16	11.37 ± 3.37	.049	401/93
Paternal PSDQ Authoritative	56.54 ± 8.18	56.59 ± 8.55	.961	326/74
Paternal PSDQ Authoritarian	20.31 ± 4.60	20.97 ± 4.88	.267	326/74
Paternal PSDQ Permissive	11.06 ± 3.15	12.01 ± 3.21	.020	326/74
Life Stress				
No. of Stressful Life Events in the 6 Months Prior ^d	0.67 ± 0.93	0.93 ± 1.33	.016	434/106

Note: Of parents who participated in the observational assessment of parenting behaviors, 93.5% were mothers; temperament variable means and standard deviations are reported as *z* scores. PSDQ = Parenting Styles and Dimensions Questionnaire.

^a*n* = 435.

^b*n* = 106.

^cFisher's exact test.

^dRemained significant after Benjamini and Hochberg's (1995) procedure to correct for multiple comparisons within domains was employed. Benjamini and Hochberg-adjusted *p* values for statistical significance were as follows: demographic variables *p* < .006; child psychopathology *p* < .038; child temperament *p* < .033; parental psychopathology *p* < .025; observed parenting behavior *p* < .017; maternal PSDQ *p* < .033; paternal PSDQ *p* < .017; and stressful life events *p* < .05 (no adjustment necessary).

graduate student and the first author, until 80% accuracy was reached. Weekly coding meetings were held, and when discrepancies were noted, the interactions were coded again by the graduate student and/or the first author, who decided on the final value. Coders were unaware of child and parent diagnostic status and Lab-TAB data. We selected three indices of parental behavior with particular relevance for anxiety disorders (McLeod et al., 2007): parental support ($\alpha = .88$), hostility ($\alpha = .76$), and intrusiveness ($\alpha = .61$). Based on videotapes of 55 assessments coded independently by two raters, interrater ICCs were .85, .83, and .70, respectively.

Mothers ($n = 494$) and fathers ($n = 400$) also completed the Parenting Styles and Dimensions Questionnaire (C. C. Robinson, Mandleco, Frost Olsen, & Hart, 2001) to assess perceived parenting style. The Parenting Styles and Dimensions Questionnaire is a 37-item questionnaire with established reliability and validity. Parents rated each item on a 5-point scale ranging from 1 (*never*) to 5 (*always*). The questionnaire measures three parenting styles: authoritative (high control, high warmth), authoritarian (high control, low warmth), and permissive (low control, high warmth). Factors demonstrated adequate internal consistency: authoritative ($\alpha = .82$), authoritarian ($\alpha = .75$), and permissive ($\alpha = .74$).

Data Analyses

Pearson chi-square (or Fisher's exact test when sample sizes were small) and independent samples *t* tests were conducted between children with and without anxiety disorders on all variables in each of the following domains: demographics, nonparental childcare, child comorbid psychopathology and sleep problems, child temperament, parental psychopathology, observed parenting behaviors, parents' perceived parenting styles, and stressful life events. As these are relatively novel data, we report findings both with and without correction for multiple comparisons, although we emphasize the former in interpreting the findings. To adjust for multiple comparisons within each domain, we used the Benjamini and Hochberg (1995) procedure. Benjamini-Hochberg adjusted *p* values are reported in Table 1 and in the text for analyses not presented in Table 1.

To determine the unique associations of variables with preschool anxiety disorders, logistic regression analyses were performed using preschool anxiety disorder group as the dependent variable and variables that distinguished the two groups in the bivariate analyses (uncorrected $p < .05$) as independent variables. Last, we estimated a series of logistic regressions to test the interactive effects of temperament and gender.

RESULTS

Demographics

Children with and without anxiety disorders did not significantly differ on age, gender, ethnicity, parental marital status, Hollingshead's Four-Factor Index of Social Status, or school status (Table 1). Children with an anxiety disorder diagnosis were significantly less likely to have a parent who graduated from college, $\chi^2(1, N = 539) = 5.36, p = .021$, odds ratio (*OR*) = 0.60, and children with an anxiety disorder spent significantly fewer hours per week in daycare, $t(191.40) = -2.01, p = .046$, Cohen's $d = -0.20$, compared to children with no anxiety disorder. After correcting for multiple comparisons, however, these associations were no longer significant.

Child Psychopathology and Functioning

Children with and without an anxiety disorder were compared on any depressive disorder, ODD and ADHD diagnoses, and sleep problems (Table 1). Children with an anxiety disorder were more likely to have a comorbid depressive disorder ($p = .005$, Fisher's exact test, *OR* = 6.47) and ODD, $\chi^2(1, N = 541) = 4.96, p = .026, OR = 2.03$, and had more sleep problems, $t(141.82) = 2.44, p = .016$, Cohen's $d = 0.28$. These associations remained significant after correcting for multiple comparisons.

Child Temperament

Children with and without an anxiety disorder were compared on three temperament factors (BI, NA, PA; Table 1). Children with an anxiety disorder exhibited greater BI, $t(539) = 2.26, p = .024$, Cohen's $d = 0.24$, and less PA, $t(539) = -3.14, p = .002$, Cohen's $d = -0.33$. These associations remained significant after correcting for multiple comparisons. No significant differences were observed in NA. As certain facets of NA may be more specifically linked to anxiety disorders (i.e., fear), we compared the two groups of children on observations of fear, sadness, and anger. Children with an anxiety disorder exhibited significantly more sadness than children with no anxiety disorder, $t(539) = 2.24, p = .025$, Cohen's $d = 0.23$. No significant differences were observed for fear or anger (Cohen's $d = 0.16$ and 0.03 , respectively).

Parental Psychopathology

No significant differences were observed between groups on either parental lifetime anxiety or lifetime depressive disorder diagnoses (Table 1). When maternal and paternal psychopathology were examined separately,

children with an anxiety disorder were significantly more likely to have mothers who experienced an anxiety disorder in the past month (21.7% vs. 13.0%), $\chi^2(1, N = 536) = 5.09, p = .024, OR = 1.85$. This relation remained significant after correcting for multiple comparisons ($p < .025$). No other significant differences were observed for maternal or paternal lifetime or current psychopathology.

Parenting

Parents (93.5% were mothers) of children with an anxiety disorder were observed to be significantly less supportive of their child in the laboratory than parents of children without an anxiety disorder, $t(522) = -2.11, p = .035$, Cohen's $d = -0.22$; there were no significant differences in observed hostile or intrusive parenting behaviors. Mothers of children with an anxiety disorder rated themselves as more authoritarian, $t(122.12) = 2.07, p = .041$, Cohen's $d = 0.25$, and more permissive, $t(492) = 1.97, p = .049$, Cohen's $d = 0.22$, than mothers of children with no anxiety disorder (Table 1). Fathers of children with an anxiety disorder rated themselves as more permissive, $t(398) = 2.34, p = .020$, Cohen's $d = 0.31$. The associations between children's anxiety disorders and parenting behaviors did not remain significant after correcting for multiple comparisons.

Life Stressors

Children with an anxiety disorder experienced more life stressors in the prior 6 months, $t(538) = 2.41, p = .016$, Cohen's $d = 0.23$, than children with no anxiety disorder (Table 1). This relation remained significant after correcting for multiple comparisons.

Multivariate Analyses

Variables that significantly distinguished children with and without an anxiety disorder diagnosis at a p value of .05 or less were entered into a simultaneous multiple logistic regression analysis to determine which variables had unique associations with anxiety disorders after controlling for child comorbid psychiatric disorders.¹ Tolerance values for all variables in the model exceeded 0.70, indicating an acceptable degree of multicollinearity among the variables (Menard, 2002). As seen in Table 2, five variables made significant unique contributions to the model: greater child sleep problems, fewer hours

TABLE 2
Multivariate Analyses: Unique Correlates of Preschool Anxiety Disorders

	OR	95% CI
Parental Education	.69	0.40, 1.18
Hours per Week in Daycare	0.50*	0.28, 0.90
Child Sleep Problems	1.45**	1.10, 1.91
Behavioral Inhibition	2.69 [†]	0.84, 8.67
Positive Affectivity	0.25*	0.09, 0.74
Maternal Current Anxiety Disorder	1.47	0.74, 2.90
Observed Parental Support	0.77	0.52, 1.13
Maternal PSDQ Authoritarian	1.03	0.97, 1.09
Maternal PSDQ Permissive	1.00	0.92, 1.08
No. of Stressful Life Events in 6 Months Prior	1.25*	1.01, 1.54
Child Depressive Disorder	7.86*	1.39, 44.59
Child Oppositional Defiant Disorder	0.97	0.40, 2.39
Child Attention-Deficit/Hyperactivity Disorder	1.13	0.22, 5.89

Note: OR = odds ratio; CI = confidence interval; PSDQ = Parenting Styles and Dimensions Questionnaire.
[†] $p < .10$. * $p < .05$. ** $p < .01$.

per week in daycare, lower levels of observed child PA, greater number of life stressors experienced in the 6 months prior, and comorbid depressive disorder. Results were similar when PAPA symptom scales were included, rather than diagnoses.

Moderation models. There were no significant interactions between child temperament and parenting, parental psychopathology, or life stress, and no evidence of moderation by gender in predicting child anxiety disorders.

Specific phobia versus other anxiety disorder diagnoses. Of children with anxiety disorders, 32 had only specific phobias, 57 had other anxiety disorders but no specific phobia, and 17 had both a specific phobia and another anxiety disorder. We ran multiple linear regressions for each variable in Table 1 as the dependent variable. The two independent variables in each model were specific phobia diagnosis (absent or present) and other anxiety disorder diagnosis (absent or present), which allowed us to retain children with both specific phobia and other anxiety disorders to maximize power. After correcting for multiple comparisons, a diagnosis of specific phobia was associated with more life stressors in the 6 months prior ($b = .35, SE = .16, p = .024$). This association was not observed for the other anxiety disorders. The other anxiety disorders were associated with higher BI ($b = .06, SE = .03, p = .012$), lower PA ($b = -.08, SE = .03, p = .006$), higher sadness ($b = .09, SE = .04, p = .02$), and a higher rate of parents with a lifetime history of depression ($b = .15, SE = .06, p = .020$). These associations were not observed for a diagnosis of specific phobia.

¹We did not include paternal reports of permissiveness in the model, as its inclusion reduced the sample from 466 to 376 children. When we included paternal reports of permissiveness in the model, the results were similar and paternal permissiveness was not significant ($OR = 1.07, 95\% CI = .98-1.18, p = .114$).

DISCUSSION

This study examined correlates of anxiety disorders in preschool-age children and found significant bivariate associations with demographic, child, familial, and contextual characteristics. After correcting for multiple comparisons within domains, the most robust correlates included child comorbid depression and ODD, child sleep problems, child temperamental BI and low PA, maternal current anxiety disorder diagnosis, and exposure to life stress. In the exploratory multivariate analysis, five variables made significant unique contributions to preschool anxiety disorders: child comorbid depression, child sleep problems, child low temperamental PA, less time spent in daycare, and stressful life events. These findings were generally consistent with theoretical models of anxiety development, and provide important empirical support validating the construct validity of preschool anxiety disorders.

Preschool Anxiety, Comorbidity, and Parental Psychopathology

Preschoolers with an anxiety disorder diagnosis were more likely to meet criteria for comorbid depression and ODD, which is consistent with other studies of preschool samples (Birmaher et al., 2009; Lavigne et al., 1996; Lavigne et al., 2009). These effects remained significant after correcting for multiple comparisons. Moreover, comorbid depression, as indexed by a depressive disorder diagnosis or depressive symptom scores, remained a significant correlate in the multivariate analysis. This pattern of comorbidity, as well as the overlap among the individual anxiety disorders, is similar to that observed in older youth (for a review, see Rapee et al., 2009), and associations between anxiety and depression in adults. The finding with respect to comorbid depression requires replication as only 10 children met criteria for a depressive disorder; nevertheless, symptom scale scores yielded similar results.

A substantial body of research has supported the familial aggregation of anxiety disorders (for reviews, see Beesdo et al., 2009; Rapee et al., 2009). We found that preschoolers with an anxiety disorder diagnosis were more likely to have a mother with a current anxiety disorder diagnosis; the effect of current maternal anxiety remained significant after correcting for multiple comparisons, but it did not make a unique contribution in the multivariate analysis. No significant associations were observed for rates of anxiety disorders in fathers. The familial transmission of anxiety likely reflects both genetic and environmental factors. The stronger association between current maternal anxiety and preschoolers' anxiety disorder diagnoses is consistent with mechanisms of social learning, such as parental modeling

of anxious or avoidant behaviors or attitudes, as well as with the possibility that cases of current anxiety are more persistent and severe.

Child Temperament

We found that preschoolers with anxiety disorders exhibited both higher levels of BI and lower levels of PA in the laboratory. Both BI and PA remained significant correlates after correcting for multiple comparisons. There were no significant differences in the composite score of NA, but preschoolers with anxiety disorders exhibited higher levels of sadness in the laboratory and no significant differences in fear and anger. The finding that sadness and not fearfulness was associated with children's anxiety was unexpected but may point to the close relationship between anxiety and depression (see the upcoming text for further discussion of this finding).

Moreover, PA, and not BI, remained significant in the multivariate analysis. Differences in findings between the extant literature supporting associations with BI and NA and our findings may be due to methodological differences. For instance, even though BI was assessed using an approach that was similar to Kagan's (1989) traditional paradigms for assessing BI, there are modest differences, particularly with respect to the coding of BI, which is detailed next. In addition, our laboratory-based assessment of temperament has been shown in an independent sample to demonstrate concurrent validity with home observations, as well as moderate stability from age 3 to age 7 (Durbin et al., 2007); however, fear evidenced the lowest stability over time, suggesting that observations of fear may vary more with the nature of the task at each assessment compared to other traits. Moreover, correlations of laboratory and home observations with parent-reports are fairly modest (Durbin et al., 2007). Therefore, parent-reports and teacher-reports of children's fearfulness, which capture the child's behavior in multiple contexts over time, may provide additional information and yield different results.

High BI and low PA share the feature of low approach/engagement. Nevertheless, we have previously shown in this sample and in an independent sample (Laptook et al., 2008; Laptook, Klein, Olino, Dyson, & Carlson, 2010) that the methods employed here successfully distinguish the two constructs. Both high BI and low PA are associated with low approach in novel laboratory contexts, but only low PA is distinguished by low approach in nonnovel situations. Unfortunately, low PA and high BI are not always distinguished methodologically or conceptually in studies assessing temperament in young children, as laboratory measures of BI frequently include markers of PA, such as smiling. Moreover, PA is rarely examined in studies

of anxiety and temperament. Therefore, it is possible that if BI and PA were both measured in previous studies, anxiety disorders would have been associated with both temperament constructs. The present findings require replication, but they raise the possibility that PA plays an important role in anxiety disorders, at least in young children. It is also possible that young children's fears and anxieties interfere with their ability to experience pleasure, particularly in novel laboratory contexts. Associations between low PA, high BI, and anxiety in early childhood may also provide insight into the origins of the developmental pathways between anxiety and depression.

Parenting Behavior

Parenting behavior shapes children's emotional and behavioral development in many ways during early childhood. In preschoolers, anxiety or internalizing symptoms have been associated with several types of problematic parenting behaviors (Edwards et al., 2010; Hastings et al., 2008; R. Robinson & Cartwright-Hatton, 2008). Consistent with these studies, we found that preschoolers with an anxiety disorder were more likely to have parents (typically mothers) who were observed as less supportive during a parent-child interaction. Both mothers and fathers of preschoolers with an anxiety disorder also rated themselves as more permissive, and mothers rated themselves as more authoritarian (i.e., strict, controlling parenting). These findings support associations between parenting and child anxiety disorders, using both observational and parent-report measures and contribute to the scant research on paternal parenting and children's anxiety. Nevertheless, it is important to note that the findings with respect to parenting should be interpreted with caution and require replication, as these associations did not persist after correcting for multiple comparisons.

Sleep Problems

We found that preschoolers with an anxiety disorder had more sleep problems than those without an anxiety disorder. Sleep problems remained a significant correlate after correcting for multiple comparisons and emerged as a significant unique correlate in the multivariate analyses. Associations between sleep problems and anxiety have been documented in older youth (Alfano, Ginsburg, & Kingery, 2007; Forbes et al., 2007), and similar associations were reported in a sample of preschool-age children (Willoughby et al., 2008). Longitudinal studies provide evidence that sleep problems early in life are a unique predictor of the development of anxiety during adolescence (e.g., Ong, Wickramaratne, Tang, & Weissman, 2006). In addition, anxious arousal

appears to contribute to difficulties initiating and maintaining sleep (Tang & Harvey, 2004). It is important to identify the specific sleep disruptions observed in preschoolers with anxiety disorders and the mechanisms underlying the co-occurrence of anxiety and sleep problems, as this would aid in the development of interventions for anxious children and their families.

Social-Environmental Factors

Several social-environmental factors were related to preschoolers' anxiety disorders, including less parental education, more stressful life events in the previous 6 months, and fewer hours spent in daycare. After correcting for multiple comparisons, only the association between preschool anxiety disorders and stressful life events remained significant. Nevertheless, both stressful life events and hours spent in daycare emerged as significant unique correlates in the multivariate analysis. Stressful life events may reflect the presence of suboptimal environments for children. Studies in older youth have reported associations between anxiety disorders and low socioeconomic status (e.g., Cronk, Slutske, Madden, Bucholz, & Heath, 2004) and more negative life events (e.g., Rapee & Szollos, 2003). One longitudinal study reported that the impact of negative life events predicted anxious symptoms 1 year later in preschoolers (Edwards et al., 2010).

In the multivariate analyses, less time spent in daycare emerged as a unique correlate of preschool anxiety disorders. Similarly, Rapee and Szollos (2003) found that 7- to 16-year-old children with social phobia were more likely to have spent less time in daycare during early childhood. Identifying the reasons for this association is important: Anxious preschoolers may be more likely to avoid social contexts or resist parental separation, or parental characteristics (e.g., overprotection) may contribute to less daycare attendance in anxious children. Parents' decisions regarding use of daycare may limit the child's exposure to positive peer experiences and opportunities to develop coping skills that may protect against the development of anxiety. For example, exposure to childcare was beneficial in decreasing inhibited behavior in early childhood in high-risk infants (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001). Nevertheless, findings with respect to hours spent in daycare should be interpreted with caution, as this association did not persist after correcting for multiple comparisons.

Consistent with previous research, we did not observe gender differences in preschoolers with an anxiety disorder (Egger & Angold, 2006). Female gender has been related to risk for anxiety in older youth (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003), yet studies examining gender differences in anxiety across

development are limited. More research examining the emergence of gender differences in anxiety disorders is warranted.

Moderating Role of Temperament and Gender

Despite the theoretical foundation and emerging support for the moderating role of temperament, and to a lesser extent gender, in contributing to children's anxiety symptoms (for a review, see Degnan et al., 2010; Marakovitz et al., 2011), our findings did not differ by temperament or gender. Consistent with our findings, Hudson et al. (2011) reported no significant interactive effects between temperamental BI and family environmental factors as they relate to preschool anxiety disorders. Nevertheless, these questions are an important area of research, and we plan to continue investigating moderators as we examine the developmental progression of preschool anxiety disorders.

Specific Phobia versus Other Anxiety Disorders

Given the heterogeneity among anxiety disorders, we explored whether specific phobia and other anxiety disorders had different correlates. After correcting for multiple comparisons, we found that specific phobia was associated with a greater number of life stressors in the 6 months prior. In contrast, other anxiety disorders were associated with higher levels of BI and sadness, lower levels of PA, and parental history of depression. These findings are somewhat consistent with recent models of psychopathology that distinguish between fear- and distress-related anxiety disorders (Watson, 2005). Specific phobia is considered the prototype for fear disorders, as it is characterized by phasic or circumscribed fear to specific objects and/or contexts, whereas other anxiety disorders are characterized by a more diffuse or sustained anxiety/distress (Davis et al., 2010). In so far as the other anxiety disorders in this study overlap with the distress disorders, it is interesting that they were associated with sadness and parental depression, as the distress-related anxiety disorders are closely intertwined with depression and may have similar genetic influences (Watson, 2005). Our analyses were exploratory but suggest future avenues for differentiating anxiety disorders, even in very young children.

This study has several significant strengths. To our knowledge, this is the first study to examine correlates of anxiety disorders and account for psychiatric comorbidity in a large, unselected community sample of preschoolers using a multi-informant, multimethod approach. Given that the majority of children with mental health disorders are not referred for services (Lavigne et al., 2009; e.g., only 3.8% of children with an anxiety disorder had received treatment in the current sample),

the use of a community sample may permit greater generalization of results. In addition, we used the PAPA, which is one of the only psychiatric interviews designed for use with young children and that has demonstrated test-retest reliability.

The present study also had several limitations. First, data on child psychopathology were derived from parent reports. Although primary caregivers are the most knowledgeable of the child, validating caregiver reports is important. Hence, it is noteworthy that we demonstrated associations between caregiver-reported anxiety diagnoses and theoretically relevant variables derived from laboratory observations. Second, the sample was largely White and middle class. Further work is needed to examine anxiety disorders in more diverse populations. Third, our participants were recruited from the community and cannot be generalized to clinical populations. Fourth, many statistical tests were conducted, which may have yielded some false positives. Even though we report the results of adjusting for multiple tests, replication of our findings is necessary. Fifth, because of the high comorbidity and the few children meeting diagnostic criteria for some of the individual anxiety disorders, we were unable to examine correlates of each specific anxiety disorder. Last, the cross-sectional nature of the present study limits our interpretation about the directionality of the observed relations.

Implications for Research, Policy, and Practice

The present study adds to the nascent research characterizing psychopathology during early childhood. Our findings are particularly noteworthy given the difficulty of distinguishing some anxiety disorders from normative behavior during early childhood. Given the uncertainty of these boundaries, it is even more notable to find a meaningful set of significant associations that are consistent with theoretical models of the development of anxiety and parallel relations observed in older youth and adults. These results suggest that a number of child, familial, and environmental factors may be appropriate targets for early intervention or may be used to select high-risk preschoolers for targeted prevention programs.

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