Published in final edited form as:

Child Psychiatry Hum Dev. 2013 October ; 44(5): 621–632. doi:10.1007/s10578-012-0356-4.

Longitudinal Associations Between Preschool Psychopathology and School-Age Peer Functioning

Allison P. Danzig,

Department of Psychology, Stony Brook University, Stony Brook 11794, New York

Sara J. Bufferd,

Department of Psychology, California State University San Marcos, San Marcos, CA, USA

Lea R. Dougherty,

Department of Psychology, University of Maryland, College Park, MD, USA

Gabrielle A. Carlson,

Department of Psychiatry and Behavioral Science, Stony Brook University, Stony Brook, New York

Thomas M. Olino, and

Department of Psychiatry, University of Pittsburgh, Pittsburgh, PA, USA

Daniel N. Klein

Department of Psychology, Stony Brook University, Stony Brook 11794, New York

Allison P. Danzig: allison.p.danzig@gmail.com

Abstract

The current study examined the effects of preschool psychopathology on peer functioning around school entry. Children ($N = 211$) were assessed at ages 3 and 6. A semi-structured diagnostic interview, the Preschool Age Psychiatric Assessment, was administered to a parent at both time points to assess psychopathology. The peer functioning constructs examined at age 6 included child popularity, socially inappropriate behavior, and conflicted shyness. Simultaneous multiple regressions revealed that age 3 anxiety disorder diagnosis was the only unique diagnostic predictor of age 6 socially inappropriate behavior and conflicted shyness, with age 3 anxiety dimensional scores uniquely predicting all three peer constructs. Age 3 anxiety disorder had direct effects on both socially inappropriate behavior and conflicted shyness, which were not mediated by concurrent anxiety disorder at age 6. Thus, preschool anxiety disorders may have enduring effects on child peer relationships in the early school-age years. Possible explanations and implications are explored.

Keywords

Preschool psychopathology; Diagnosis; Anxiety; Early childhood; Peer relationships

Introduction

There is a growing interest in exploring the prevalence and manifestations of psychopathology in preschool-aged children [1, 2]. However, many questions about the long-term implications of psychiatric diagnoses in preschoolers remain unclear. While much of the current research has focused on assessing the reliability and validity of preschool diagnoses, there has been less emphasis on examining specific areas of impairment for young children who meet criteria for psychiatric disorders. Moreover, longitudinal research assessing the implications of preschool psychopathology for later functional impairment is limited.

Recent research indicates that a substantial number of community preschoolers meet diagnostic criteria for psychopathology [3, 4]. Indeed, rates of psychiatric disorders in preschool are similar to rates in later childhood and adolescence [2], suggesting that psychopathology may have earlier origins than traditionally thought. However, as the DSM-IV criteria were established primarily for adults, there are important questions about whether the same nosological framework is appropriate for both young children and adults, and if so, how to translate adult criteria to the preschool population. Nonetheless, recent studies indicate that the structure of psychopathology in preschoolers resembles the structure observed in older children, adolescents, and adults [5, 6]. For example, anxiety in children is manifested much like that in adults, combining a high level of fear (e.g., of specific objects, social situations, uncertainty about the future) with distress and avoidance of these situations. There have also been findings suggesting that rates of different anxiety disorders vary over the course of development, with separation-related anxiety being higher in younger children and social fears increasing in frequency and severity as children age [7]. Depression also manifests similarly in children and adults, although modified criteria have been validated in children. Specifically, children tend to present with shorter duration of depressive episodes, greater irritability relative to sustained low mood, different manifestations of anhedonia (e.g., children cannot experience loss of libido), and enact suicide or death wishes via play as opposed to verbal report [8].

The growing ability to identify early psychopathology presents both benefits and concerns. One benefit is the possibility of targeting young children for early intervention, as there is evidence that psychiatric symptoms and disorders in some preschoolers may persist well into childhood [9, 10]. However, researchers have also expressed concern that early psychiatric diagnosis may pathologize normative developmental processes, transient adjustment problems, or problematic parent-child relationships, and possibly damage the child's self-image by labeling him/her as disordered [1].

As such, the usefulness of psychiatric diagnoses in early childhood is still being debated. One approach to evaluating their validity and utility is to determine whether preschoolers who meet criteria for DSM-IV diagnoses experience subsequent problems in developmentally significant areas of psychosocial functioning. In this study, we examined the associations between preschool psychopathology and aspects of later peer relationships around the time of entry into formal schooling (age 6). Peer functioning is especially

relevant at this age, when children are on the verge of transition to middle childhood and confront new social demands. Research suggests that friendships formed during the early school years predict subsequent friendship success, and that popular children who are well-liked by their peers at school entry are more likely to maintain stable relationships over time [11]. Thus, the early school-age period represents a critical period of learning to relate to peers that sets the stage for later friendships in middle childhood [12, 13].

Problematic peer relationships are also closely linked to psychopathology. There is a plethora of literature demonstrating that older children and adolescents suffering from psychological disorders experience impaired peer relationships [13]. The association between psychological dysfunction and peer relationships is complex and bidirectional; research documents psychiatric risk for unpopular children [14] as well as the adverse effects of emotional and behavioral problems on later peer relationships [15, 16]. However, research examining the effects of preschool psychopathology on peer functioning is extremely limited. The majority of studies have used cross-sectional designs, focusing on the association between preschoolers' peer relationship deficits and externalizing disorders, particularly attention deficit hyperactivity disorder (ADHD) [e.g., 17, 18]. There is little research on the effects of internalizing disorders on peer relationships, and even fewer longitudinal studies examining the effects of preschool psychopathology on later peer functioning, particularly during the transition to middle childhood.

The negative effects of externalizing disorders in school-age youths on peer functioning have been well-documented, with estimates suggesting that nearly half of all children with ADHD experience significantly impaired peer relationships, and that this social impairment persists in adolescents who retain the diagnosis of ADHD [19, 20]. Research conducted with preschoolers with ADHD has also revealed significant concurrent peer impairment in comparison with their non-ADHD contemporaries [17, 18, 21]. Findings suggest that preschoolers with ADHD display less competent social behavior and less overall engagement with peers compared with non-ADHD preschoolers [22], and are reported by teachers as being less liked and more often ignored by peers [23]. In a longitudinal study, 4–6 year old children with ADHD demonstrated significantly greater impairment than controls in early adolescence (age 11–14) across a variety of domains, including peer relationships. Importantly, very few adolescents who exhibited ADHD as young children were well-adjusted at the final assessment point, even if their symptoms had improved over time [24].

School-aged boys and girls with oppositional defiant disorder (ODD) also display impaired peer functioning [25]. This also appears to be true of preschool ODD. For example, one study with a community-sample of preschoolers demonstrated a higher level of teacher-rated conflictual peer relationships in children with ODD compared with a control group [21].

There is less research on the effects of anxiety and depressive disorders on peer relationships in preschool-aged children. For older children and adolescents, anxiety and depression are associated with significant impairment in peer relationships [e.g. 26, 27]. One study of adolescents found that individuals with heightened anxiety and depression symptoms exhibited impaired social skills with peers [28]. Furthermore, several studies have examined the effects of anxiety symptomatology and diagnoses on peer relationships in school-aged

children, and found an association between child-reported anxiety and teacher-reported social and peer deficits for these children [e.g. 29, 30]. In addition, significant associations of depressive symptoms with peer victimization and low-quality peer relationships, as rated by child self-report, teachers, and peers, have been reported for school-age children [31].

In one of the few studies of preschool depression, Luby and colleagues recently demonstrated that clinically depressed preschoolers exhibited significantly greater functional impairment, including in interpersonal relationships, than their non-depressed peers [32]. The majority of the literature on preschool anxiety concerns temperament traits associated with anxiety [33–35] and the effects of developmentally normative anxiety (e.g. normal-range separation anxiety) [36].

The purpose of this study is to explore the implications of preschool psychopathology for children's peer functioning 2–3 years later, around the age of entry to more formal school settings. We addressed this issue using a community sample of preschoolers, diagnoses and dimensional symptom scores obtained from a semi-structured interview, and a prospective, longitudinal design with multi-informant reports of peer functioning. Given the importance of multi-informant data in developmental research, we included only those children for whom we had both parent and teacher reports on peer functioning [37]. We focused on three areas of peer functioning that are particularly relevant to the early school-age period: popularity, socially appropriate behavior, and conflicted shyness/withdrawal. The socially inappropriate behavior and conflicted shyness domains were selected because of their documented roles in peer relationship functioning in school-age children; specifically, previous research notes that peers evaluate one another on a number of constructs when determining likability, including one's ability to exercise appropriate social and group-entry skills [38].

We hypothesized that: (a) children with any psychiatric diagnosis or elevated symptom scores at 3 years of age will experience low popularity among peers at age 6; (b) children with an internalizing disorder or elevated depression or anxiety dimensional sum scores in preschool will experience subsequent shyness difficulty with peers; and (c) children with an age 3 externalizing disorder or elevated ODD or ADHD dimensional sum scores will demonstrate behavior problems with peers at school-entry.

Method

Participants

The sample was drawn from a suburban community. Families eligible for participation in the study had a 3-year-old child and at least one biological parent living in the household. The primary caregiver was required to speak English, and children with significant medical disorders or developmental disabilities were excluded. Commercial mailing lists were used to recruit families. Importantly, there appear to be no significant differences in demographic and health-related variables between samples obtained using random digit dialing and those obtained using commercial databases such as this one [39]. Informed, voluntary, and written consent was obtained from a parent prior to participation. The study was conducted with full Institutional Review Board approval, and families were compensated.

Approximately two-thirds (66.4 %) of the 815 eligible families entered the study and provided diagnostic information about their child ($N = 541$). Only one child per family was assessed. Of the 541 children with diagnostic data, 408 also had complete parent-reported peer functioning data, and 229 teachers provided peer functioning reports. Of the children with complete teacher report data, 18 did not have parent report data at age 6. This report focuses on the 211 children with all three sets of variables (diagnostic interviews at age 3 and both parent and teacher peer functioning reports at age 6).

Of the children included in this report, roughly half were male (54.0 %), and most were White/European-American (89.1 %). The majority of the children's parents were married (95.5 %), and 59.6 % of the mothers and 51.5 % of the fathers had a college degree or higher. See Table 1 for additional demographic information on the study participants.

There were no significant differences between participants who were included in the analyses ($N = 211$) compared with the other participants ($N = 330$) on demographic (e.g. child age, sex, ethnicity, maternal or paternal education level, or parental marital status) and diagnostic variables (e.g. depression, anxiety, ADHD, and ODD diagnoses and dimensional scores).

Procedure

The first wave of data collection occurred when the child participants were 3 years old, between November 2004 and July 2007. The second wave of data collection occurred when the children were 6 years old, between September 2007 and December 2009.

At both data collection points, the child and primary parent attended lab visits, where parents completed interviews and questionnaires about their child's functioning while the child engaged in various lab procedures. In the initial assessment, parents also completed an interview over the telephone. Families were compensated with \$50 for the child interview at the initial interview and with \$100 for both the child interview and questionnaires at the second assessment. With parental consent, teachers were also contacted to fill out a questionnaire about the child's peer functioning at school, and the teachers were compensated with \$30.

Measures

Child Psychopathology—The Preschool Age Psychiatric Assessment (PAPA) is an interviewer-based structured diagnostic interview that assesses parent-reported psychiatric disorders in preschoolers between the ages of 2 and 5 years [40, 41]. The PAPA was administered to the parent with the greatest responsibility for childcare at the age 3 assessment. Due to the lack of structured diagnostic interviews appropriate for 6 year-olds, following other recent studies [32], and with Helen Egger's recommendation (personal communication), we elected to re-administer the PAPA when the children were 6 years old. As an interviewer-based structured interview, the interviewer adheres to the protocol and asks all required questions before applying a priori guidelines for rating symptoms using a glossary. Furthermore, the interviewer also elicits examples of relevant behaviors and

ensures that the parent understands each question. Adequate test–retest reliability has been reported using independent interviews [42].

The PAPA covers a comprehensive set of symptoms from the *DSM-IV-TR* [43] using the past 3 months as the time frame. *DSM-IV* diagnoses were derived using algorithms created by the PAPA's developers. Diagnostic categories used in this report include depressive disorder (major depressive disorder, dysthymia, and depression not otherwise specified), anxiety disorder (specific phobia, separation anxiety, social phobia, generalized anxiety disorder, agoraphobia, selective mutism, and panic disorder), ADHD, and ODD. We combined the depressive diagnoses due to the low number of cases in each category. Similarly, we aggregated the various forms of anxiety disorders due to the low number of cases and because of the high comorbidity between anxiety disorders in early childhood. Because of their rarity at ages 3 and 6, bipolar disorder, conduct disorder, eating disorders, posttraumatic stress disorder, and obsessive–compulsive disorder were not assessed [42, 44]. Additionally, dimensional symptom scales were created by summing items in each diagnostic category.

Due to concern about interview administration time at the first assessment, the Early Childhood Inventory-4 (ECI-4), a parent rating scale used to screen *DSM-IV* emotional and behavioral disorder in 3–6-year-olds, was used in the first 60 % of the sample ($n = 324$) for assessing ADHD and ODD symptomatology. If evidence from this screener indicated the child was very unlikely to meet diagnostic criteria, the interviewer briefly confirmed the absence of ADHD and ODD with the parent. If the parent continued to report that there was no evidence of ADHD and ODD, that section of the PAPA interview was skipped. In the remaining 40 % of the sample ($n = 217$), the PAPA ADHD and ODD sections were administered to all parents. For those children whose parents did not report any evidence of ADHD and ODD, scores of 0 were assigned on these symptom scales.

Graduate students in clinical psychology and M.A. level staff members conducted the PAPA interviews after receiving training from a member of the PAPA development group. At age 3, the interviews were conducted by telephone, and at age 6 they were conducted face-to-face. Diagnostic interviews with parents about their children administered by telephone yield equivalent results to inperson interviews [45]. Interviews lasted 1–2 h and were primarily conducted with mothers (97.9 %).

To examine interrater reliability, a second rater from the pool of interviewers independently rated audiotapes of 21 PAPA interviews at age 3 and 35 interviews at age 6. The interviews were randomly selected, but we oversampled participants who reported mental health problems. At age 3, the kappa (κ) values for depressive and anxiety disorders, ADHD, and ODD were all 1.00. The intraclass correlations (ICCs) for the sum scales at age 3 were .85 for depression, 1.00 for anxiety, .99 for ADHD, and .99 for ODD. The internal consistency (α) values of the sum scales were .75 for depression, .83 for anxiety, .89 for ADHD, and .84 for ODD. At age 6, the kappa (κ) values for diagnostic categories were .64 for depression, .89 for anxiety, .64 for ADHD, and .87 for ODD. The intraclass correlations (ICCs) for the sum scales were .95 for depression, .71 for anxiety, .97 for ADHD, and .97 for ODD. The

internal consistency (α) values of the sum scales were .74 for depression, .85 for anxiety, .88 for ADHD, and .79 for ODD.

Child Popularity and Appropriate Behavior—Children's peer behavior was measured using the Ratings of Children's Behaviors scale developed by Eisenberg and colleagues [46, 47] to elicit parent and teacher reports of child social competence. It includes seven items that are rated on a scale from 1 to 4, with the informant selecting whether each statement is like or unlike the child, with higher scores indicating greater difficulty. The scale consists of two subscales, a socially appropriate behavior subscale (four items; $\alpha = .80$ for the eight item parent-and teacher-report composite scale; possible range of scores is 8–32), and a popularity subscale (three items, $\alpha = .82$ for the six item parent and teacher composite scale; possible range of scores is 6–24). Items from the socially appropriate behavior subscale ask whether the child is well-behaved, acts appropriately, gets into trouble, and has good social skills; items from the popularity subscale ask whether it is hard for the child to make friends, the child has a lot of friends, and the child is popular with peers. The socially appropriate behavior and popularity scales were scored so that higher scores reflect increased peer difficulty.

Shyness—Parents and teachers also completed the conflicted shyness subscale of the Child Social Preference Scale [CSPS; 48]. The scale includes seven items that are rated on a scale from 1 to 5, with 1 indicating that the statement does not at all describe the child and 5 indicating that the statement is a lot like the child ($\alpha = .89$ for the 14 item parent-and teacher-report composite scale; possible range of scores is 7–35). Items ask whether the child is nervous around others, shy, initiates play, hovers, rarely initiates play, watches play, and desires play, with a higher score reflecting greater conflicted shyness.

There was moderate agreement between parent-and teacher-reports for each of the three peer relation scales, providing some justification for combining the two data sources. Specifically, parent and teacher reports correlated $r = .34$ ($p < .001$) for popularity, $r = .30$ ($p < .001$) for socially inappropriate behavior, and $r = .28$ ($p < .001$) for shyness.

Consistent with the notion that appropriate social and group-entry skills both contribute to popularity [38], there were moderate bivariate associations between the parent and teacher composite low popularity subscale and both the parent and teacher composite socially inappropriate behavior and shyness subscales (r 's = .43 and .64, respectively, both $p < .001$). In contrast, the parent and teacher composite socially inappropriate behavior and shyness subscales were not significantly correlated, $r = .08$, $p > .05$. Table 2 lists the means and standard deviations for all study variables.

Results

Associations Between Age 3 Child Psychopathology and Age 6 Peer Relation Difficulties

Bivariate associations between age 3 child psychopathology and age 6 low peer popularity, inappropriate social behavior, and shyness are shown in Table 3. The significant associations were modest in magnitude (r -range: .17–.34).

Prior to analyses, demographic variables (child sex, race, age, grade, and parental educational achievement) were correlated with both the age 3 child psychopathology and age 6 peer functioning variables to screen for possible confounders (see Table 4). Child sex was significantly correlated with both the age 3 ADHD dimensional sum score ($r = -.19, p < .01$) and the socially inappropriate behavior scale ($r = -.27, p < .001$), with males scoring significantly higher on ADHD symptoms and exhibiting more socially inappropriate behavior than females. Therefore, child sex was controlled for in all analyses that included the ADHD dimensional sum score and socially inappropriate behavior.

We conducted six simultaneous multiple regression analyses to examine associations of age 3 diagnoses and dimensional scores, respectively, with each parent and teacher-reported age 6 peer relationship scale. As reported in Bufferd et al. [4], there was considerable comorbidity in this sample at age 3. Hence, all four diagnostic categories (or dimensional scores) were included in each analysis in order to identify unique effects. Due to the number of analyses conducted in this study, we only interpreted the multiple regression analyses in which the overall R^2 was statistically significant. Five of the six regression models met this criterion: age 3 diagnoses and age 6 socially inappropriate behavior ($R^2 = .06, p = .02$) and conflicted shyness ($R^2 = .05, p = .04$), and age 3 dimensional sum scores and age 6 low popularity ($R^2 = .05, p = .03$), socially inappropriate behavior ($R^2 = .17, p < .001$), and conflicted shyness ($R^2 = .15, p < .001$) (see Table 5). The overall R^2 for the multiple regression analysis examining age 3 diagnoses and age 6 child popularity was not statistically significant ($p = .13$).

Age 3 anxiety dimensional symptom scores were the only unique predictor of age 6 low popularity (Table 5). Age 3 anxiety disorder diagnosis was the only unique diagnostic predictor of age 6 inappropriate behavior. In contrast, ODD and ADHD dimensional symptom scores were uniquely associated with age 6 inappropriate behavior, controlling for child sex. Finally, age 3 anxiety diagnosis was the sole unique diagnostic predictor of age 6 shyness. Similarly, the age 3 anxiety dimensional symptom score was the only unique dimensional predictor of age 6 shyness.

Associations between Age 3 Psychopathology and Age 6 Peer Relation Difficulties Controlling for Age 6 Psychopathology

Psychopathology was moderately stable from age 3 to age 6, both for diagnoses and dimensional scores (see reference [10]). Therefore, we examined whether this stability could account for the associations between age 3 psychopathology and age 6 peer relation difficulties. To address this, we selected the pairs of age 3 psychopathology and age 6 peer relation variables with unique associations and examined whether the corresponding form of concurrent psychopathology significantly mediated the effect. For each of these mediational models, age 3 psychopathology was the independent variable, age 6 psychopathology was the proposed mediator, and the age 6 peer relation variable was the dependent variable. We relied on estimates of indirect effects to assess mediation and used a bootstrapping approach [49], as implemented in Mplus [50] to estimate those indirect effects. Results for each of the models are shown in Table 6.

First, we examined the mediational models for age 3 PAPA diagnoses. The indirect effect of age 3 anxiety disorder on age 6 socially inappropriate behavior through age 6 anxiety disorder was non-significant. Similarly, the indirect effect of age 3 anxiety disorder on age 6 shyness through age 6 anxiety disorder was non-significant.

There was greater evidence of mediation by concurrent symptoms for age 3 dimensional scores. Specifically, the indirect effect of age 3 anxiety dimensional score on age 6 low popularity through age 6 anxiety dimensional score was significant, and the direct path was no longer significant when concurrent anxiety symptoms were included in the model ($t = 1.05, p = .30$). Similarly, the indirect effect of age 3 anxiety dimensional score on age 6 shyness through age 6 anxiety dimensional score was significant, and the direct path in this model, while a trend, was also no longer significant when concurrent anxiety symptoms were included in the model ($t = 1.83, p = .07$). Finally, the magnitude of the indirect paths between age 3 ODD ($t = 4.18, p < .001$) and ADHD ($t = 3.51, p < .001$) dimensional scores and age 6 socially inappropriate behavior were significant when the corresponding age 6 dimensional scores were included in the model, and the direct paths were no longer significant ($t = 1.12, p = .26$ and $t = .44, p = .66$, respectively).

Gender Differences

Finally, we examined gender differences in the associations between age 3 psychopathology and age 6 peer functioning using hierarchical multiple regression analysis. We were unable to test for gender differences among children with age 3 depression and ADHD diagnoses, as these children were all male. Interactions between gender and age 3 anxiety disorders and dimensional scores on subsequent peer functioning were not significant. However, there were significant interactions between gender and age 3 ODD diagnosis and dimensional scores on age 6 conflicted shyness ($t = -1.99, p = .05$ and $t = -2.17, p = .03$, respectively). The interaction took the same form for both ODD diagnosis and dimensional sum score: there was a crossover pattern, with non-significant simple slopes (see Fig. 1 for an illustration of the latter effect). In each case, males with an ODD diagnosis or elevated symptoms at age 3 exhibited higher levels of conflicted shyness at age 6 relative to males without an ODD diagnosis or lower levels of symptoms (values for simple slopes: $t = 1.24, p = .22$ and $t = 1.44, p = .15$, respectively). In contrast, females without an ODD diagnosis or with lower levels of symptoms at age 3 exhibited higher levels of shyness at age 6 compared to girls with ODD diagnoses/symptoms (values for simple slopes: $t = -1.57, p = .12$ and $t = -.80, p = .42$, respectively).

Discussion

The major finding from this study is that preschool anxiety disorders may have persisting effects on peer relationship functioning in the early school-age years. An anxiety diagnosis at age 3 was a unique predictor of difficulties with child socially inappropriate behavior and conflicted shyness at age 6. In both cases, the effects of age 3 anxiety disorder diagnoses on age 6 socially inappropriate behavior and shyness were not attributable to the persistence of anxiety disorder at age 6. Although the magnitude of the effects of anxiety on subsequent

peer functioning are modest, age 3 anxiety disorders may have persisting effects on child peer functioning at age 6, even when children no longer meet criteria for the diagnosis.

A dimensional measure of anxiety symptoms at age 3 was also uniquely associated with child low popularity, socially inappropriate behavior, and conflicted shyness at age 6. In contrast to the diagnostic findings, however, concurrent anxiety dimensional sum scores at age 6 significantly mediated the relationship of age 3 anxiety dimensional scores with all three child social functioning domains at age 6. This pattern of findings suggests that the effects of anxiety persist, despite subsequent remission, but only for more severe cases (i.e., those who meet criteria for a disorder). Alternatively, dimensional scores may have greater sensitivity to detect mediation.

There are a number of possible explanations for why preschool anxiety disorders may have negative effects on later peer functioning even when the child's anxiety symptoms have diminished. First, anxious children are less likely to interact with other children, so even with a subsequent reduction in anxiety, these children may not have the proper skills for successful peer interactions. Similarly, these children's avoidance behavior may be negatively reinforced, maintaining the avoidance despite remission from other anxiety symptoms. Second, early anxiety-laden family and peer interactions may establish a vulnerability to problematic peer relations in the face of stress. The school transition presents significant challenges, as children are expected to become more independent, interact more with peers, and function at a higher academic level. As such, previously-anxious children may be at increased risk for interpersonal difficulties with peers at school-entry due to the additional demands placed on them. A possible vulnerability affecting social interactions could be elevated rejection sensitivity. Anxious children may be prone to anxiously or angrily anticipate rejection, and react negatively to peers. A third explanation stems from the heterotypic stability of psychopathology. It is plausible that children who demonstrate heightened anxiety as preschoolers may present with other forms of psychopathology upon school-entry. Thus, their peer difficulties would not be accounted for by current anxiety. Finally, there may be third variables that contribute to the relationship between preschool anxiety and later deficits in peer functioning, such as deficits in emotion regulation. Children with anxiety disorders experience greater difficulties with emotion regulation, such as managing high-valence emotional experiences, and lack confidence in their ability to understand and cope with their emotional reactions [51]. At the same time, early elementary aged children who are better able to regulate emotion are better-liked by their peers [52].

There was less evidence for the potential persisting effects of age 3 depressive and externalizing disorders and symptoms on age 6 peer functioning. Within the externalizing domain, age 3 ODD and ADHD dimensional scores, but not diagnoses, were unique predictors of socially inappropriate behavior at age 6. Not surprisingly, these associations were accounted for by concurrent externalizing symptoms. It is interesting to consider why preschool ADHD and ODD did not appear to influence age 6 popularity. One explanation may be that children with externalizing symptoms and disorders can be well-liked by peers because of their energy, boldness, and the excitement they create [53]. The reason why preschool depressive disorders do not have effects on subsequent peer relationships is less

clear, although this could be due to the less persistent/more episodic nature of depression and the small number of children who met criteria for depressive disorders in preschool [4]. In contrast, rates of depressive disorders appear to increase by the age of school entry [2, 10].

Gender differences were observed in examining the associations between age 3 ODD and age 6 conflicted shyness with peers. The pattern of interaction was such that males with an ODD diagnosis or elevated dimensional sum score at age 3 exhibited higher levels of conflicted shyness at age 6 than males without ODD diagnoses/symptoms. In contrast, girls without ODD diagnoses/symptoms exhibited higher levels of subsequent shyness than girls with ODD diagnoses/symptoms. While this pattern was not expected, one possible explanation is that young boys may be prone to express symptoms of anxiety as oppositional behavior (e.g., resisting exposure to anxiety-arousing stimuli). In contrast, young girls may express anxiety in a more direct manner.

Although we focused on longitudinal relationships, we also observed a number of contemporaneous associations between internalizing and externalizing child psychopathology and peer functioning at age 6 (see Table 3). These findings are consistent with previous research conducted with school-age children in showing that both internalizing and externalizing psychopathology are associated with peer difficulties. Interestingly, we found that depressive disorders at age 6 appeared to have the broadest impact on concurrent peer functioning, as depressive diagnoses were associated with concurrent difficulties in all three areas examined in the study (popularity, socially appropriate behavior, and shyness). An anxiety diagnosis at age 6 was associated with concurrent low popularity and shyness. Finally, both ADHD and ODD diagnoses at age 6 were associated with concurrent socially inappropriate behavior.

This study had a number of strengths. The longitudinal design and timing of the follow-up at children's entry into formal schooling allowed for a prospective examination of the effects of preschool psychopathology on later peer functioning at an important point in development. State-of-the-art interviewer-based diagnostic tools were used to measure child psychopathology at both time points, and multi-informant reports were used to provide a more comprehensive picture of child functioning.

However, this study also had a number of limitations. First, many children did not have teacher reports of peer functioning, reducing the sample size and generalizability of the findings. However, it should be noted that we did not find systematic biases between children who did and did not have complete data. Second, there was no direct observation of children's peer functioning, although the use of both parents' and teachers' reports covered the settings in which children are most likely to interact with peers. Third, psychopathology was rated on the basis of parental report at both time points, which may not always accurately reflect child functioning, but there are currently no other validated alternatives to assessing psychopathology in preschoolers. Fourth, we used skip outs for ADHD and ODD for the first part of the sample, so we may have missed some symptoms in children with low levels of these disorders. Fifth, due to the low prevalence of depression at age 3, the diagnostic category primarily included not-otherwise-specified (NOS) diagnoses, which may

not have the same impact on later peer functioning as Major Depressive and Dysthymic Disorder. Sixth, due to high comorbidity and low prevalence of specific anxiety disorders, we combined these diagnoses into a single aggregate category; specific anxiety disorders may exhibit different associations with subsequent peer functioning. Seventh, there is conceptual overlap between some anxiety disorders (e.g., social phobia) and the conflicted shyness scale. However, in this study only 15 % (N = 7) of the children with an anxiety disorder diagnosis at age 3 met criteria for social phobia. Hence, most of the association between an age 3 anxiety diagnosis and age 6 shyness cannot be attributed to social phobia. Eighth, we did not examine peer relationships at age 3, as many of the children were not yet enrolled in school and had limited peer interactions. Unfortunately, this precluded us from examining whether preschool psychopathology predicts subsequent *change* in peer functioning. Ninth, we neglected to collect information on whether the child participants sought psychiatric treatment between the time points, which may have influenced their outcomes at age 6. Finally, participants were recruited using commercial mailing lists, which may have unknown biases, and the sample primarily consisted of middle-class and relatively highly educated Caucasian individuals.

Because this area has not been well-explored, there are many directions that future research can take. One extension could be to incorporate observational measures and child- and peer-reports of social functioning. It is also important to explore the bi-directional effects of psychopathology and peer relationship functioning, as this study only examined the relationship between early psychopathology and subsequent peer functioning. Exploring the effect from the other direction is challenging in children this young, though, as preschoolers do not have many peer relationships. Because anxiety is a heterogeneous disorder, examining the unique effects of different anxiety disorders on later psychosocial functioning would provide information on specificity. Finally, lengthier follow-up is pivotal for assessing the persisting effects of preschool psychopathology into later elementary school and middle school. Social pressures continue to increase during this time, and successful peer functioning assumes increasing importance for child well-being.

In conclusion, this study adds to the growing literature regarding the validity of early childhood psychopathology. In particular, preschool anxiety disorders and symptoms may have persisting effects on multiple aspects of peer functioning during the transition to middle childhood. In some cases, these effects are mediated by persisting anxiety, but in other cases the effects appear to be independent of concurrent anxiety disorders. As healthy early peer relationships lay the groundwork for later peer relationships and well-being [13], these results highlight the importance of early screening and intervention for preschoolers experiencing significant anxiety, as they are at increased risk for later peer functioning problems.

Summary

The present study examined the implications of preschool psychiatric diagnoses for later peer functioning. The study was conducted with a community sample of preschool children who were reassessed around the time of school-entry, utilizing an interviewer-based diagnostic interview and parent- and teacher-completed questionnaires. Results suggest that

anxiety may have unique and persisting effects on child peer functioning around the time of school-entry. These findings support the validity and potential utility of assessing early childhood psychopathology.

Acknowledgments

This work was supported by the following grants: NIMH RO1 MH069942 (DNK) and a GCRC Grant no. M01-RR10710 to Stony Brook University from the National Center for Research Resources.

References

1. Egger HL, Emde RN. Developmentally sensitive diagnostic criteria for mental health disorders in early childhood: the diagnostic and statistical manual of mental Disorders-IV, the research diagnostic criteria-preschool age, and the diagnostic classification of mental health and developmental disorders of infancy and early childhood-revised. *Am Psychol.* 2011; 66:95–106. [PubMed: 21142337]
2. Egger HL, Angold A. Common emotional and behavioral disorders in preschool children: presentation, nosology, and epidemiology. *J Child Psychol Psych.* 2006; 47:313–337.
3. Lavigne JV, LeBailly SA, Hopkins J, Gouze KR, Binns HJ. The prevalence of ADHD, ODD, depression, and anxiety in a community sample of 4-year-olds. *J Clin Child Adolesc.* 2009; 38:315–328.
4. Bufferd SJ, Dougherty LR, Carlson GA, Klein DN. Parent-reported mental health in preschoolers: findings using a diagnostic interview. *Compr Psychiatry.* 2011; 52:359–369. [PubMed: 21683173]
5. Sterba S, Egger HL, Angold A. Diagnostic specificity in the dimensions of preschool psychopathology. *J Child Psychol Psych.* 2007; 48:1005–1013.
6. Strickland J, Keller J, Lavigne JV, Gouze K, Hopkins J, LeBailly S. The structure of psychopathology in a community sample of preschoolers. *J Abnorm Child Psych.* 2011; 39:601–610.
7. Weems CF, Costa NM. Developmental differences in the expression of childhood anxiety symptoms and fears. *J Am Acad Child Psy.* 2005; 44:656–663.
8. Luby JL, Heffelfinger AK, Mrakotsky C, Hessler MJ, Brown KM, Hildebrand T. Preschool major depressive disorder: preliminary validation for developmentally modified DSM-IV criteria. *J Am Acad Child Psy.* 2002; 41:928–937.
9. Lavigne JV, Arend R, Rosenbaum D, Binns HJ, Christoffel KK, Gibbons RD. Psychiatric disorders with onset in the preschool years: I. stability of diagnoses. *J Am Acad Child Psy.* 1998; 37:1246–1254.
10. Bufferd SJ, Dougherty LR, Carlson GA, Rose S, Klein DN. Psychiatric disorders in preschoolers: continuity from Ages 3 to 6. *Am J Psychiat.* 2012; 169:1157–1164. [PubMed: 23128922]
11. Howes C. Social status and friendship from kindergarten to third grade. *J Appl Dev Psychol.* 1990; 11:321–330.
12. Brownell CA, Gifford-Smith ME. Context and development in children's school-based peer relations: implications for research and practice. *J School Psychol.* 2003; 41:305–310.
13. Parker, JG.; Rubin, KH.; Erath, SA.; Wojslawowicz, JC.; Buskirk, AA. Peer relationships, child development, and adjustment: A developmental psychopathology perspective. Wiley; Hoboken: 2006.
14. Parker JG, Asher SR. Peer relations and later personal adjustment: are low-accepted children at risk? *Psychol Bull.* 1987; 102:357–389. [PubMed: 3317467]
15. Cuevas CA, Finkelhor D, Ormrod R, Turner H. Psychiatric diagnosis as a risk marker for victimization in a national sample of children. *J Interpers Violence.* 2009; 24:636–652. [PubMed: 18445831]
16. Chen H, Cohen P, Johnson JG, Kasen S. Psychiatric disorders during adolescence and relationships with peers from age 17 to age 27. *Soc Psych Psych Epid.* 2009; 44:223–230.

17. DuPaul GJ, McGoey KE, Eckert TL, VanBrakle J. Preschool children with attention-deficit/hyperactivity disorder: impairments in behavioral, social, and school functioning. *J Am Acad Child Psy.* 2001; 40:508–515.
18. Wilens TE, Biederman J, Brown S, Tanguay S, Monuteaux MC, Blake C, et al. Psychiatric comorbidity and functioning in clinically referred preschool children and school-age youths with ADHD. *J Am Acad Child Psy.* 2002; 41:262–268.
19. Guevremont DC, Dumas MC. Peer relationship problems and disruptive behavior disorders. *J Emot Behav Disord.* 1994; 2:164–172.
20. Milich, R.; Landau, S. Socialization and peer relations in hyperactive children. JAI; Greenwich: 1982.
21. Gadow KD, Nolan EE. Differences between preschool children with ODD, ADHD, and ODD + ADHD symptoms. *J Child Psychol Psc.* 2002; 43:191–201.
22. Alessandri SM. Attention, play, and social behavior in ADHD preschoolers. *J Abnorm Child Psych.* 1992; 20:289–302.
23. Lahey BB, Pelham WE, Stein MA, Loney J, Trapani C, Nugent K, et al. Validity of DSM-IV attention-deficit/hyperactivity disorder for younger children. *J Am Acad Child Psy.* 1998; 37:695–702.
24. Lee SS, Lahey BB, Owens EB, Hinshaw SP. Few preschool boys and girls with ADHD are well-adjusted during adolescence. *J Abnorm Child Psych.* 2008; 36:373–383.
25. Carlson CL, Tamm L, Gaub M. Gender differences in children with ADHD, ODD, and co-occurring ADHD/ODD identified in a school population. *J Am Acad Child Psy.* 1997; 36:1706–1714.
26. Gaspar de Matos M, Barrett P, Dadds M, Shortt A. Anxiety, depression, and peer relationships during adolescence: results from the Portuguese national health behavior in school-aged children survey. *Eur J Psychol Educ.* 2003; 18:3–12.
27. Garber, J.; Gallerani, CM.; Frankel, SA. Depression in children. Guilford Press; New York: 2009.
28. McClure EB, Parrish JM, Nelson EE, Easter J, Thome JF, Rilling JK, et al. Responses to conflict and cooperation in adolescents with anxiety and mood disorders. *J Abnorm Child Psych.* 2007; 35:567–577.
29. Mesman J, Koot HM. Child-reported depression and anxiety in preadolescence: i. associations with parent- and teacher- reported problems. *J Am Acad Child Psy.* 2000; 39:1371–1378.
30. Strauss CC, Frame CL, Forehand R. Psychosocial impairment associated with anxiety in children. *J Clin Child Psychol.* 1987; 16:235–239.
31. Morrow MT, Hubbard JA, Rubin RM, McAuliffe MD. The relation between childhood aggression and depressive symptoms: the unique and joint mediating roles of peer rejection and peer victimization. *Merrill Palmer Quart.* 2008; 54:316–340.
32. Luby JL, Belden AC, Pautsch J, Si X, Spitznagel E. The clinical significance of preschool depression: impairment in functioning and clinical markers of the disorder. *J Affect Disorders.* 2009; 112:111–119. [PubMed: 18486234]
33. Fox NA, Henderson HA, Marshall PJ, Nichols KE, Ghera MM. Behavioral inhibition: linking biology and behavior within a developmental framework. *Annu Rev Psychol.* 2005; 56:235–262. [PubMed: 15709935]
34. Reznick JS, Kagan J, Snidman N, Gersten M, Baak K, Rosenberg A. Inhibited and uninhibited children: a follow-up study. *Child Dev.* 1986; 57:660–680.
35. Rubin KH, Coplan RJ, Bowker JC. Social withdrawal in childhood. *Annu Rev Psychol.* 2009; 60:141–171. [PubMed: 18851686]
36. Altman C, Sommer JL, McGoey KE. Anxiety in early childhood: what do we know? *J Early Child Infant Psychol.* 2009; 5:157–175.
37. Kraemer HC, Measelle JR, Ablow JC, Essex MJ, Boyce WT, Kupfer DJ. A new approach to integrating data from multiple informants in psychiatric assessment and research: mixing and matching contexts and perspectives. *Am J Psychiat.* 2003; 160:1566–1577. [PubMed: 12944328]
38. Gifford-Smith ME, Brownell CA. Childhood peer relationships: social acceptance, friendships, and peer networks. *J School Psychol.* 2003; 41:235–284.

39. Olson SH, Mignone L, Harlap S. Selection of control groups by using a commercial database and random digit dialing. *Am J Epidemiol.* 2000; 152:585–592. [PubMed: 10997549]
40. Egger, HL.; Angold, A. *The Preschool Age Psychiatric Assessment (PAPA): A structured parent interview for diagnosing psychiatric disorders in preschool children.* Oxford University Press; New York: 2004.
41. Egger, HL.; Ascher, BH.; Angold, A. *The preschool age psychiatric assessment: version 1.1.* Durham, NC: Center for Developmental Epidemiology, Department of Psychiatry and Behavioral Sciences, Duke University Medical Center; 1999.
42. Egger HL, Erkanli A, Keeler G, Potts E, Walter BK, Angold A. Test-retest reliability of the preschool age psychiatric assessment (PAPA). *J Am Acad Child Psy.* 2006; 45:538–549.
43. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders.* 4. American Psychiatric Association; Washington, DC: 2000. Text Revision ed
44. Luby, JL. *Handbook of preschool mental health: Development, disorders, and treatment.* Guilford Press; New York: 2006.
45. Lyneham HJ, Rapee RM. Agreement between telephone and in-person delivery of a structured interview for anxiety disorders in children. *J Am Acad Child Psy.* 2005; 44:274–282.
46. Eisenberg N, Fabes RA, Guthrie IK, Reiser M. Dispositional emotionality and regulation: their role in predicting quality of social functioning. *J Pers Soc Psychol.* 2000; 78:136–157. [PubMed: 10653511]
47. Eisenberg N, Fabes RA, Guthrie IK, Murphy BC, Maszk P, Holmgren R, et al. The relations of regulation and emotionality to problem behavior in elementary school children. *Dev Psychopathol.* 1996; 8:141–162.
48. Coplan RJ, Prakash K, O'Neil K, Armer M. Do you “want” to play? Distinguishing between conflicted shyness and social disinterest in early childhood. *Dev Psychol.* 2004; 40:244–258. [PubMed: 14979764]
49. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Meth.* 2008; 40:879–891.
50. Muthen, LK.; Muthen, BO. *Mplus User's Guide.* 7. Los Angeles, CA: Muthen and Muthen; 1998–2012.
51. Suveg C, Zeman J. Emotion regulation in children with anxiety disorders. *J Clin Child Adolesc.* 2004; 33:750–759.
52. Lengua LJ. The contribution of emotionality and self-regulation to the understanding of children's response to multiple risk. *Child Dev.* 2002; 73:144–161. [PubMed: 14717249]
53. Milich R, Landau S, Kilby G, Whitten P. Preschool peer perceptions of the behavior of hyperactivity and aggressive children. *J Abnorm Child Psych.* 1982; 10:497–510.

Fig. 1.

Multiple regression interaction analysis of the role of child sex in moderating the relationship between ODD and conflicted shyness. Females with high ODD symptoms demonstrate lower levels of conflicted shyness whereas males with high ODD symptoms demonstrate higher levels of conflicted shyness. ODD *dimensional* symptom scores are used as an illustration here, although the interaction between conflicted shyness and ODD diagnosis as moderated by child sex demonstrated the same pattern of findings

Table 1

Demographic characteristics of sample (N = 211)

Demographic variable	
Child sex: male [% (n)]	54.0 (114)
Child age at T1 (years) [mean (SD)]	3.5 (.3)
Child grade level at T2	
2nd grade [% (n)]	2.9 (6)
1st grade [% (n)]	32.2 (67)
Full-day kindergarten [% (n)]	55.3 (115)
Half-day kindergarten [% (n)]	4.8 (10)
Other [% (n)]	4.8 (10)
Child race/ethnicity [% (n)]	
White	89.1 (188)
Black/African-American	.5 (1)
Hispanic/Latino	4.3 (9)
Asian	1.4 (3)
Other	4.8 (10)
Parental marital status	
Married [% (n)]	95.5 (192)
Non-married [% (n)]	4.5 (9)
Maternal education	
High school graduate or GED [% (n)]	13.6 (27)
Some college or 2-year degree [% (n)]	26.8 (53)
Four-year college degree [% (n)]	31.3 (62)
Master's degree [% (n)]	27.3 (54)
Doctoral degree [% (n)]	1.0 (2)
Paternal education	
Some high school [% (n)]	1.5 (3)
High school graduate or GED [% (n)]	17.3 (34)
Some college or 2-year degree [% (n)]	29.6 (58)
Four-year college degree [% (n)]	36.7 (72)
Master's degree [% (n)]	11.2 (22)
Doctoral degree [% (n)]	3.6 (7)

Table 2

Means, standard deviations, and range of study variables (N = 211)

	%/mean	N/SD	Actual (possible) range
Age 3 PAPA variables			
Depression diagnosis	1.9 %	4	
Anxiety diagnosis	22.3 %	47	
ODD diagnosis	9.5 %	20	
ADHD diagnosis	1.4 %	3	
Depression dimensional score	1.92	2.43	0–20
Anxiety dimensional score	8.10	7.12	0–40
ODD dimensional score	7.50	6.06	0–29
ADHD dimensional score	4.04	5.66	0–36
Age 6 PAPA variables			
Depression diagnosis	3.8 %	8	
Anxiety diagnosis	16.6 %	35	
ODD diagnosis	6.6 %	14	
ADHD diagnosis	2.8 %	6	
Depression dimensional score	3.89	3.20	0–17
Anxiety dimensional score	11.72	9.24	0–47
ODD dimensional score	2.36	2.58	0–13
ADHD dimensional score	1.98	3.21	0–18
Age 6 peer variables			
Low popularity			
RCB items (6)	8.91	2.94	6–19 (6–24)
Behavior problems			
RCB items (8)	12.04	3.79	8–25 (8–32)
Shyness			
CSPS items (14)	24.65	8.53	14–59 (14–70)

PAPA Preschool Age Psychiatric Assessment, ODD oppositional defiant disorder, ADHD attention deficit/hyperactivity disorder, RCB Ratings of Children's Behaviors Scale (parent & teacher report), CSPS Child Social Preference Scale (parent & teacher report)

Table 3

Bivariate correlations between age 3 and age 6 PAPA diagnoses and dimensional scores and age 6 Popularity, Behavior, and Shyness Peer Difficulty Scales (N = 211)

	Popularity	Behavior	Shyness
Age 3			
Depression diagnosis	.06	.05	.10
Anxiety diagnosis	.17*	.19**	.18**
ODD diagnosis	.08	.17*	-.01
ADHD diagnosis	-.02	.10	.01
Depression dimensional sum	.13	.10	.09
Anxiety dimensional sum	.22**	.12	.34***
ODD dimensional sum	.09	.27***	.00
ADHD dimensional sum	.09	.31***	-.01
Age 6			
Depression diagnosis	.15*	.25***	.15*
Anxiety diagnosis	.19**	.07	.21**
ODD diagnosis	.08	.29***	-.03
ADHD diagnosis	.03	.21**	.00
Depression dimensional sum	.28***	.32***	.30***
Anxiety dimensional sum	.28***	.15*	.41***
ODD dimensional sum	.14*	.44***	.10
ADHD dimensional sum	.22***	.54***	.01

PAPA Preschool Age Psychiatric Assessment, ODD oppositional defiant disorder ADHD attentional deficit/hyperactivity disorder

*
p < .05;

**
p < .01;

p < .001

Table 4
Bivariate correlations among demographic, PAPA, and Peer functioning variables (N = 211)

	Child sex	Child race	Child age (T1)	Child grade (T2)	Parental Education-College degree	
					At least 1 parent	Both parents
Age 3 PAPA diagnoses						
Depression	-.13	-.05	.03	.03	-.07	-.11
Anxiety	-.13	.11	.01	-.08	-.17*	-.09
ODD	-.01	-.01	.06	.01	-.03	-.08
ADHD	-.11	-.04	-.07	-.02	.08	-.10
Age 3 PAPA symptoms						
Depression	-.04	.01	.04	-.03	-.11	-.17*
Anxiety	-.11	.04	-.03	-.01	-.17*	-.18**
ODD	-.08	-.01	.03	-.06	-.10	-.11
ADHD	-.19**	.09	-.02	.01	.02	-.10
Peer functioning						
Popularity	-.06	-.00	.02	.04	.02	.01
Behavior	-.27***	.16*	.03	-.10	.02	-.05
Shyness	-.01	.00	.00	.04	.04	.04

PAPA Preschool Age Psychiatric Assessment, ODD oppositional defiant disorder, ADHD attentional deficit/hyperactivity disorder

* $p < .05$;

** $p < .01$;

*** $p < .001$

Table 5

Significant multiple regression analyses between age 3 PAPA diagnoses and dimensional sum scores and age 6 peer relation difficulty scales (Parent- and Teacher-Combined) (N = 211)

	B	SE	Beta	Significance	Semi-partial
Popularity					
Depression symptoms	-.03	.17	-.02	.87	-.01
Anxiety symptoms	.13	.05	.22	.01**	.18
ODD symptoms	-.00	.06	-.01	.95	-.00
ADHD symptoms	.03	.06	.04	.67	.03
Behavior					
Depression diagnosis	-2.28	2.79	-.06	.41	-.06
Anxiety diagnosis	1.99	.82	.17	.02*	.16
ODD diagnosis	2.45	1.28	.15	.06	.13
ADHD diagnosis	3.06	2.96	.07	.30	.07
Control variables					
Child sex	-2.10	.65	-.21	.001***	-.21
Depression symptoms	-.32	.19	-.16	.09	-.11
Anxiety symptoms	.03	.06	.05	.55	.04
ODD symptoms	.16	.07	.20	.02*	.15
ADHD symptoms	.19	.07	.23	.01**	.18
Shyness					
Depression diagnosis	.50	.35	.11	.15	.10
Anxiety diagnosis	.26	.10	.18	.01**	.18
ODD diagnosis	-.18	.16	-.09	.26	-.08
ADHD diagnosis	-.06	.37	-.01	.87	-.01
Depression symptoms	-.02	.02	-.09	.34	-.06
Anxiety symptoms	.04	.01	.44	<.001***	.36
ODD symptoms	-.01	.01	-.08	.33	-.06

	B	SE	Beta	Significance	Semi-partial
ADHD symptoms	-.01	.01	-.06	-.44	-.05

PAPA Preschool Age Psychiatric Assessment, *ODD* oppositional defiant disorder, *ADHD* attentional deficit/hyperactivity disorder

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

Table 6

Indirect effects for mediational models between age 3 PAPA diagnoses and dimensional sum scores and age 6 peer relation difficulty scales (Parent- and Teacher-Combined), with corresponding age 6 PAPA diagnosis or dimensional Sum score as proposed mediator, using bootstrapping methods (N = 211)

Model	Path (SE)	95 % CI	t Value	Direct path (SE) (without mediator)	Portion of mediated direct effect (%)
Age 3 anxiety diagnosis to Inappropriate Behavior	.18 (.45)	-.70-1.07	.41	2.19 (.90)*	8.2
Age 3 anxiety diagnosis to shyness	.12 (.06)	-.001-.23	1.94	.27 (.11)*	44.4
Age 3 anxiety symptoms to popularity	.08 (.03)	.02-.14	2.54*	.13 (.04)**	61.5
Age 3 anxiety symptoms to shyness	.02 (.01)	.01-.03	3.43**	.029 (.006)***	58.6
Age 3 ODD symptoms to inappropriate Behavior	.16 (.04)	.08-.23	4.18***	.22 (.05)**	72.7
Age 3 ADHD symptoms to inappropriate behavior (controlling for child sex)	.21 (.06)	.09-.32	3.51***	.24 (.07)**	83.3

Unstandardized coefficients are presented. PAPA preschool age psychiatric assessment, CI confidence interval, IV Age 3 PAPA disorder or dimensional sum score (symptoms); DV Age 6 peer relation difficulty scales; Mediator: Corresponding age 6 PAPA disorder or dimensional sum score

* $p < .05$;

** $p < .01$;

*** $p < .001$