Examining the Developmental History of Child Maltreatment, Peer Relations, and Externalizing Problems among Adolescents with Symptoms of Paranoid Personality Disorder

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Abstract

This study examined the childhood history of maltreatment, peer relations, and externalizing problems among individuals who manifested low, moderate, or high symptom levels of paranoid personality disorder (PPD) in adolescence. Participants included 174 children who attended a longitudinal summer camp research program between the ages of 9 to 12. Multiple sources of information (self-, peer-, and counselor-reports) were utilized. Subsequently, they participated in a personality disorder assessment during adolescence (Mean age =15.30). The results indicated that children who manifested higher levels of PPD symptoms in adolescence had higher odds of having a history of child maltreatment. Children who manifested high levels of PPD symptoms in adolescence showed a faster growth rate for peer bullying and externalizing problems in childhood. In addition, their peers rated them as less cooperative, less likely to be leaders, and more likely to initiate fights. These finding suggested that children who manifested elevated PPD symptoms in adolescence had shown early signs of behavioral disturbances in childhood, some of which gradually worsened as they approach adolescence.

The symptomatology of paranoid personality disorder (PPD) centers around pervasive distrust and suspicion of others (American Psychiatric Association, 1994). PPD is one of the most common types of personality disorders. A recent epidemiological study based on a community sample of adults (18 years and older) in the U.S. reported that 4.4% of the general population had PPD, the second most prevalent personality disorder following obsessive-compulsive personality disorder (Grant et al., 2004). Similarly, in a study of a Norwegian community sample of adults (aged between 18 to 65), the prevalence rate of PPD was 2.4%, the second most prevalent category following avoidant personality disorder (Torgensen, Kringlen, & Cramer, 2001). Although PPD is a relatively prevalent type of personality disorder, its correlates and development are understudied (Cohen, Crowford, Johnson, & Kasen, 2005).

Personality disorders, including PPD, are often treated as a form of adult psychopathology (Cohen, 2008). This view is consistent with the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1994) in which the diagnosis of

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personality disorder is typically deferred until after adolescence. However, it is unlikely that manifestations of PPD suddenly appear only during emerging adulthood. Even before the emergence (or diagnosis) of a psychopathological disorder, there are pathways signifying adaptational compromises that probabilistically forebode later psychopathology (Cicchetti & Cohen, 1995; Cicchetti & Rogosch, 2002; Sroufe, 1997). The central question that guided this study was: Do individuals who eventually manifest high levels of paranoid symptoms in adolescence differ from their peers in their development of behavioral disturbances earlier in life? In particular, we focused on childhood history of maltreatment, peer relations, and externalizing problems in individuals who developed varying levels of PPD symptoms in adolescence.

Child maltreatment, peer relations, early maladaptations, and later paranoid symptoms

A core characteristic of PPD is distrust. Because of difficulty in trusting others' loyalty and commitment, individuals with PPD tend to have problems in forming relationships (American Psychiatric Association, 1994). This fractured trust in others is likely to be a product of betrayal and problems in important social relationships. Events involving victimization by significant others could potentially render children prone to become suspicious about others' loyalty and trustworthiness. Such traumatic events in childhood include child maltreatment and peer victimization. Indeed, child maltreatment has been linked to later personality disorders (e.g., Battle et al., 2004; Johnson, Cohen, Brown, Smailes, & Bernstein, 1999), including PPD (Grover et al., 2007; Johnson et al., 1999; Johnson et al., 2001). For example, the findings from the Children in the Community (CIC) Study, a community-based longitudinal study, demonstrated that childhood neglect was significantly associated with elevated levels of paranoid symptoms in young adulthood (Johnson et al., 1999).

In fact, research has shown that victims of child maltreatment tend to exhibit paranoid-like reactions, such as hyperarousal, excessive vigilance, and anxiety in social settings. The literature on social cognition and child maltreatment has documented maltreated children's hypervigilance toward negativity in social interactions. For instance, research has demonstrated that abused children tend to be excessively reactive to expressions of anger in faces (Pollak, Cicchetti, Hornung, & Reed, 2000; Pollak & Kistler, 2002; Pollak & Sinha, 2002) and voices (Pollak, Vardi, Putzer Bechner, & Curtin, 2005), are more attentive to threatening stimuli (Rieder & Cicchetti, 1989), and demonstrate inattention to positivity (Ayoub et al., 2006). Furthermore, maltreated children are likely to attribute hostility to others' behavior (Weiss, Dodge, Bates, & Pettit, 1992) and to verbally or physically retaliate as a reaction toward other people who may or may not have malicious intent (Teisl & Cicchetti, 2008). Together, this empirical evidence suggests similarities between the developmental sequalae of child maltreatment and paranoid symptoms. Therefore, we expected that adolescents with a history of maltreatment would be more likely to exhibit elevated levels of PPD symptoms.

Peer victimization is another form of traumatic social experience in childhood that may lead to a general propensity for distrust toward others. Little is known about the role of peer victimization in the development of PPD. However, the experience of peer victimization may be associated with paranoid symptoms because children who are frequent victims of peer harassment tend to be hypervigilant for threatening cues in social interactions (Rosen, Milich, & Harris, 2007; Schwartz et al., 1998). Indeed, chronic victims of peer aggression often come to view others as provocative, and become reactively aggressive (Schwartz et al., 1998). Because our knowledge on the association between peer victimization and paranoid symptoms is scant, the examination of this topic is an additional component of this study.

We expected adolescents with elevated levels of PPD symptoms would be more likely to have a history of peer victimization during childhood.

Paranoid thinking appears to be closely related to behavioral aggression because individuals with pervasive distrust and suspicion toward others may perceive a need for self-protection. Indeed, antisocial and aggressive behaviors appear to be a hallmark of psychosocial maladaption among adults with PPD (Berman, Fallon, & Coccaro, 1998; Johnson et al., 2000). For instance, childhood conduct problems have been shown to be an independent predictor of Cluster A personality disorder (personality disorders of an odd or eccentric nature including paranoid, schizoid, and schizotypal personality disorders) 10 years later (Bernstein, Cohen, Skodol, Bezirganian, & Brook, 1996). Johnson et al. (2000) reported that adolescents with PPD tended to commit a wide range of violent acts and criminal behavior in early adulthood. In the peer context, Coolidge, DenBoer, and Segal (2004) found that bullying behavior and PPD may be linked in middle school-aged children. While these studies are informative, questions remain as to how aggressive behaviors evolve as children approach the age at which PPD is typically diagnosed. This study re-examined the link between the development of behavioral aggression (i.e., bullying and general externalizing problems) and PPD symptoms in a prospective study.

Additionally, we were interested in the childhood peer-perceived social behavior of youths who manifested elevated levels of PPD symptoms in adolescence. Because PPD is a disorder whose problems unfold in social settings, interpersonal deficits may be already emerging in the childhood peer context. We expected that children who displayed high levels of paranoid symptoms in adolescence would have more negative peer social behavior in childhood than those with milder PPD symptoms.

The Present Study

The present study addresses a theoretically important issue about the development of paranoid personality disorders – whether children who eventually develop elevated PPD symptoms in adolescence differ in their developmental profile of behavioral disturbances in childhood. Specifically, we examined the differences in the history of child maltreatment, peer victimization, bullying, externalizing problems, and social behavior in childhood among individuals who eventually developed high, moderate, or low levels of PPD symptoms in adolescence. The following hypotheses were investigated:

1. Children who developed elevated levels of paranoid symptoms in adolescence would be more likely to have experienced maltreatment in childhood.

2. Children who had elevated paranoid symptoms in adolescence would be more likely to have experienced peer victimization in childhood.

3. Children who had elevated paranoid symptoms in adolescence would be more likely to have shown upward age-trajectories of general externalizing problems and peer aggression (i.e., bullying) during childhood.

4. Children who had elevated paranoid symptoms in adolescence would be more likely to have had negative social behavior with peers in childhood.

Methods

Participants and Procedures

The present study was based on a longitudinal study of 174 children (94 maltreated and 80 non-maltreated children) who participated at least once in the annual summer camp program between 1993 and 2002. The criteria for the inclusion in this study were two-fold: (a)

children attended the summer camp at least once between their ages of 9 to 12 during the study period, and (b) they participated in the assessment of personality disorders in adolescence. The average age of participants at the time of personality disorder assessment was 15.30 ($SD = 1.52$). Sixty-nine were girls and 105 were boys.

The summer camp was designed to provide maltreated and nonmlatreated children from families of low-socioeconomic background a recreational experience in which researchers could observe children's behavior and peer interactions in an ecologically valid setting (Cicchetti & Manly, 1990). Parents provided informed consent for their child's participation at summer camp and permission for checking any Department of Human Services (DHS) records pertaining to the family. Maltreated children were identified by the county DHS as having documented histories of abuse and/or neglect. Because maltreated children were predominantly from families with low socioeconomic background, demographically comparable non-maltreated children were recruited from families receiving Temporary Assistance for Needy Families (TANF). Their non-maltreatment status was verified by the DHS records. Trained research assistants also interviewed mothers of children recruited for the non-maltreatment group to confirm the absence of prior maltreatment experience. Each year the camp was held, maltreatment status was checked with the DHS records. In this report, children from families without any history of documented abuse and/or neglect were included in the non-maltreatment group. Previous work based on a similar sample documented that children in the maltreatment and non-maltreatment groups were comparable on family demographic characteristics (Manly, Kim, Rogosch, & Cicchetti, 2001).

Across the years from 1993 to 2002, participants were allowed to attend the camp in any years. As a result, the data structure employed in this current report did not assume invariance of timing of assessment across individuals. Table 1 illustrates the data used in the current investigation; 174 participants contributed 443 observations over time, covering ages 9 to 12. Seventy-nine percent of the sample participated in two or more camps during four years. The number of camps participants attended did not differ by cohort, $F(8,165) = .75$, n.s. Furthermore, neither cohort nor the number of attended camps was significantly associated with the levels of PPD symptoms or any other study variables, $rs < .07$, n.s. (Insert Table 1 about here)

Procedure

At the camp, children took part in a variety of recreational activities in a small group setting. Children were assigned to a group of 8 same-age peers, and approximately half of the group members were maltreated. Each group was staffed by two to three trained camp counselors, who were unaware of the maltreatment status of children and the research hypotheses. Camp activities lasted seven hours per day, providing 35 hours of intensive interaction among children and counselors during a week-long program (for detailed camp procedures, see Cicchetti & Manly, 1990). Children provided signed assent for research participation.

In a subsequent follow-up study during adolescence of prior children who had attended the camp, adolescents were individually interviewed and completed a variety of measures. As part of the research battery, the OMNI-IV was administered to assess personality disorders.

Measures

Assessments in Childhood

Child maltreatment: DHS records pertaining to the family were used to verify the presence and absence of child maltreatment. DHS records were checked annually to document any subsequent maltreatment occurrences. DHS maltreatment records were coded according to

the *Maltreatment Classification System* (MCS; Barnett, Manly, & Cicchetti, 1993). The subtypes of maltreatment that were classified included neglect, emotional maltreatment, physical abuse, and sexual abuse. In the current sample, we did not find any significant association between paranoid symptoms and the type or the number of maltreatment subtypes children experienced. Therefore, in this report, we used a global index of child maltreatment, coding non-maltreated children as 0, and maltreated children as 1.

Longitudinal Assessments in Childhood (Ages 9 to 12)

Peer victimization and bullying: Camp counselors, who observed children approximately 35 hours during the camp, reported each child's behavior associated with bullying and victimization using the Mt. Hope Family Center Bullying-Victim Questionnaire (Shields & Cicchetti, 2001). This 10-item questionnaire consisted of 5 items assessing bullying and 5 items for victimization. Bullying was defined in terms of systematic attempts to dominate peers via manipulation, coercion, and aggression, and victimization was defined as submissive, ineffective responses to peer aggression and dominance (Olweus, 1991). This scale has been used in previous studies based on a similar sample (Shields & Cicchetti, 2001). A sample item for the bullying subscale includes "manipulates or exploits peers by deceiving them, controlling resources, taking possessions, cheating at games, etc." The reliability coefficient ranged from .93 to .95 across the study period, with an average of .94. For the victimization scale, a sample item includes "tends to be gullible or vulnerable, is easily exploited". The Cronbach's alpha ranged from .63 to .83 over the study period, with an average of .71. The counselors rated each child using a four-point scale ranging from *never* (1) to *always* (4). Scores were computed by averaging across counselors' ratings.

Externalizing problems: The camp counselors rated children's behavior problems using the Teacher's Report Form of Child Behavior Checklist (TRF; Achenbach, 1991). The TRF is an extensively used and well-validated assessment to evaluate child and adolescent symptomatology. The TRF is composed of two broadband dimensions of child symptomatology: internalizing and externalizing problems. This investigation focused only on externalizing problems. For each child in respective groups, two to three camp counselors individually rated the frequency of occurrence of a listed 118 problem behaviors on a 3-point scale ranging from *not true* to *very true*. The scores were averaged across raters. Previous work with a similar sample has demonstrated acceptable interrater reliabilities for externalizing problems, ranging from .83 to .91 (Manly et al., 2001).

Peer social behavior: At the end of each camp week, children were asked to rate the other children in their group using a sociometric measure (Coie & Dodge, 1983). Children were instructed to individually nominate one peer who best fitted the description of six characters; "A fighter", "a cooperative child", "a disruptive child", "a leader", "a child who starts fights", and "a shy child". A photograph of the group was used to facilitate administration. Children were assured that their nominations were kept confidential. Nominations were based on approximately 30–35 hours of interactions. Previous studies have shown that nominations made by familiar and unfamiliar peers are significantly correlated (Coie & Kupersmidt, 1983). The total number of nominations each child received from their peers was counted. The raw number of nominations each child received was standardized to correct for differences in group size. Because the peer nomination measure required standardization in computing the scores, they were not suited to detect mean level changes in their scores over time. Therefore, we averaged the standardized scores across four age periods to summarize peer-appraised social behavior for each child during childhood.

Assessment in Adolescence

PPD group classification by the levels of PPD symptoms: The OMNI-IV Personality Disorder Inventory (Loranger, 2001) was administered when camp participants were in adolescence (mean age = 15.30). The OMNI-IV is a self-report questionnaire that consists of 210 items focusing on the symptoms of 10 personality disorders defined by the DSM. The current study is based on the subscale for PPD. Participants were asked to describe their characteristics or experiences in the past 5 years using a 7-point Likert scale. The OMNI-IV Software System was used to transform the raw scores into linear T-scores based on the OMNI-IV normative sample. Cases with T-scores equal to or greater than 70 on the PPD subscale indicate a clinically significant level of personality disturbance. In this sample of adolescents, however, there were only five individuals whose T-scores exceeded 70. In order to better capture the distribution, T-scores were then classified into three levels. T-scores below 44 were classified to low PPD symptoms, T-scores from 45 to 54 to moderate PPD symptoms, and T-scores at or above 55 to high PPD symptoms. Based on this classification, we identified 65 children in the low PPD symptom group, 54 in the moderate PPD group, and 55 in the high PPD group.

Analytical Strategies

Because the primary goal of the present investigation was to examine the differences in the developmental profiles of adolescents with varying levels of PPD symptoms, we first grouped adolescents into three groups (low, moderate, and high) to capture heterogeneity in adolescent PPD symptoms, and then to ascertain the group differences with potential childhood correlates of PPD. In particular, we were interested in whether three groups had distinctive childhood profiles on experience of child maltreatment, peer victimization and bullying, peer social behavior, and general externalizing problems.

The results are organized into three major sections. First, in order to test whether children who eventually developed high levels of PPD symptoms had experienced child maltreatment earlier in life (Hypothesis 1), we performed a chi-square test. Second, we examined the differences among three PPD groups in the trajectories of peer victimization and bullying, and general externalizing problems between ages 9 to 12 (Hypotheses 2 and 3). We first present descriptive statistics of these variables, then report results based on multilevel modeling using SAS PROC MIXED (Littell, Milliken, Stroup, & Wolfinger, 1996; Singer, 1994). Multilevel modeling is suited for the present investigation because it does not require the invariance in timing of assessment across participants while examining within-individual changes (Raudenbush & Bryk, 2002). Finally, we investigated the PPD group differences in the indices of childhood social behavior (Hypothesis 4) using an omnibus multivariate analysis of covariance (MANCOVA), which was followed up with a series of univariate analyses of covariance (ANCOVA) and post-hoc comparisons.

Results

Symptoms of PPD and Child Maltreatment

To examine whether children who developed higher levels of PPD symptoms in adolescence were likely to have experienced child maltreatment earlier in life, we performed a 2 (with vs. without maltreatment history) x 3 (high, moderate, low levels of PPD symptoms) chi-square test. The results indicated the likelihood of being maltreated in childhood significantly differed by the PPD groups, $\chi^2(2, n=174) = 6.62$, $p<.05$. For nonmaltreated children, the distribution of the low, moderate, and high PPD groups was 46%, 23%, and 31%, respectively. For maltreated children, the percentages were 30%, 38%, and 32%, respectively. The general pattern of the distribution implied that the group of nonmaltreated children was slightly over-represented by children with low PPD symptoms. The descriptive

results for maltreated children were suggestive in that the group of maltreated children was marginally over-represented by children in the moderate or high PPD groups. In order to further examine the pattern of the results, we performed logistic regression to compute the odds of having a history of child maltreatment by the PPD symptoms levels. Sex was included as covariate. The odds ratio of having a history of child maltreatment for the moderate and high PPD symptom groups was 1.96 (95% confidence interval, 1.04–3.69, $p < .05$), in comparison to the low PPD group. This finding indicated that having a history of child maltreatment was more prevalent in the moderate and high PPD groups than in the low PPD group.

PPD Group Differences in Childhood Developmental Profiles

Changes in childhood peer victimization, bullying, and externalizing problems by the PPD groups—One theoretically important question is whether children who eventually developed elevated levels of PPD symptoms in adolescence had already shown early behavioral signs of problems in childhood. Table 2 presents the means and standard deviations of childhood peer victimization, bullying, and general externalizing problems by the PPD groups.

We performed a series of multilevel modeling analyses with SAS PROC MIXED to investigate whether individuals who developed low, moderate, or high PPD symptoms in adolescence had differed in these problem behaviors during childhood. As preliminary steps (not shown), we examined alternative models for growth curves, including linear and quadratic terms. The quadratic term did not reach statistical significance either for peer victimization ($b = .01$, n.s.), or bullying ($b = .01$, n.s.), or externalizing problems ($b = .50$, n.s.). Therefore, we retained only the linear term in the following analyses. We also tested a series of interaction terms with the child's sex (age x sex, PPD group status x sex, age x PPD group status x sex), but none of these terms was statistically significant. For the parsimony of the models, we omitted these interaction terms from the subsequent analyses.

The results for the fixed effects from multilevel modeling are summarized in Table 3. To simplify the interpretation of the intercepts, age was centered at 12 years old and the reference was non-maltreated males in the low PPD group. Child sex and maltreatment status were included as covariates. For peer victimization, there was no systematic pattern of growth during the period between ages 9 to 12. Sex was significantly associated ($b = -.21$, $p < .001$), indicating that on average, boys were more likely than girls to be victimized by peers during this period. Child maltreatment was also a significant correlate ($b = .14$, $p < .05$); on average, maltreated children were more likely than non-maltreated children to be at risk for peer victimization. Contrary to our expectations, neither the main effect of the PPD group status nor its interaction with age was significantly associated with trajectories of peer victimization.

In predicting changes in peer bullying, there was a significant main effect for sex ($b = -.23$, $p < .001$), indicating girls showed fewer bullying behaviors than boys. Child maltreatment ($b = .24$, $p < .001$) was also significant, with maltreated children being more likely to bully their peers, relative to non-maltreated children. Importantly for this study, the main effect for the high PPD group status ($b = .33$, $p < .01$) and its interaction with Age ($b = .12$, $p < .05$) were significant. Figure 1a illustrates these findings. This finding indicated that children who manifested high levels of PPD symptoms in adolescence tended to have a history of bullying behaviors that aggravated over time. Their bullying had become increasingly severe with age during the ages between 9 and 12, and by age 12 they were significantly more likely than the low PPD group to bully their peers.

Externalizing problems declined from ages 9 to 12 ($b=-1.54$, $p<.05$). Child maltreatment had a significant main effect ($b=5.85$, $p<.001$), indicating that maltreated children, on average, had higher TRF scores than non-maltreated children. Importantly, the high PPD group had significantly higher externalizing problems than the low PPD group ($b=5.55$, $p<.001$). Furthermore, the rate of growth significantly differed between the high and low PPD groups ($b=2.18$, $p<.05$). These main and the interaction effect are summarized in Figure 1b. These findings altogether suggest that compared to the low PPD group, the high PPD group had an upward growth in externalizing problems between ages 9 to 12 while externalizing problems of other groups slowly declined. This increasing trend resulted in their higher levels of externalizing problems as they reached age 12. In other words, children who developed high levels of PPD in adolescence had already shown behavioral problems in childhood and the divergence between the high and low PPD groups had widened over time.

Peer-perceived social behavior—As mentioned earlier, the peer nomination measure required standardization. Thus, these data were not suited to detect mean changes over time. Therefore, we averaged the standardized scores across four age periods to summarize peer-rated social behavior. We then performed a multivariate analysis of covariance (MANCOVA) with sex and maltreatment status entered as covariates, the PPD groups as the independent variable, and peer nomination variables as the dependent variables. This analysis was designed to investigate whether children who developed high levels of PPD symptoms in adolescence had differed from their peers in terms of their social behavior in the peer context during childhood. Results of the omnibus MANCOVA included a significant overall F for maltreatment, $F(5,163) = 5.60$, $p<.001$. Importantly, a significant omnibus F was noted for the PPD group status, $F(10, 326) = 2.32$ $p<.01$.

To more closely investigate the associations between the PDD group status and the peer-rated social behavior, the omnibus MANCOVA was followed up with a series of univariate analyses of covariance (ANCOVA). Figure 2 presents the results of ANOVAs and means of standardized scores for the peer-nomination variables by the PPD groups. Results from an ANCOVA indicated significant differences among the PDD groups on peer nomination for Fighter, $F(2, 167) = 3.53$, $p<.05$, Cooperative Child, $F(2, 167) = 3.11$, $p<.05$, and Leader, $F(2, 167) = 3.27$, $p<.05$. A marginally significant difference was observed for peer nomination of Shy Child, $F(2, 167) = 2.50$, $p<.10$, and no group difference was detected for Disruptive Child. Post-hoc comparisons were then conducted to further examine the PPD group differences on peer nomination of Fighter, Cooperative Child, and Leader. Results revealed that children in the high PPD group ($M = 0.22$, $SD = .86$) received more nominations for Fighter than children in the moderate ($M = -.06$, $SD = .70$, $p <.05$) or low PPD groups ($M = -0.14$, $SD = .73$, $p <.05$). Additionally, children in the high PPD group received fewer nominations for Cooperative Child ($M = -.11$, $SD = .79$) than children in the low PPD group ($M = 0.88$, $SD = .88$, $p <.05$). For peer nomination for Leader, children in the high PPD group received the fewest nominations ($M = -.27$, $SD = .77$) compared to the moderate ($M = .03$, $SD = .82$, $p <.05$) or low PPD groups ($M = 0.01$, $SD = .65$, $p <.05$). Overall, these findings indicated that children who grew up to have higher levels of PPD symptoms in adolescence had already developed negative social behavior in childhood such that they were perceived as someone who liked to fight, behave uncooperatively, and were not leaders. (Insert Figure 2 about here)

Discussion

This study was designed to investigate how individuals who developed varying levels of PPD symptoms in adolescence differed in their developmental profile in childhood. By using longitudinal data reported by multiple sources of information, we enhanced our

understanding of how childhood history of maltreatment, peer relations, and externalizing problems leads to adolescent paranoid symptoms.

Several important findings emerged. First, the group of children who exhibited higher levels of paranoid symptoms in adolescence was more likely to have a history of child maltreatment than those with milder paranoid symptoms. This observation converges with previous studies identifying child maltreatment as a potential risk factor for later personality disorders (Battle et al., 2004; Grover et al., 2007; Johnson et al., 1999; Johnson et al., 2001).

How child maltreatment affects later paranoid symptoms still requires additional investigation. One possible explanation is that affective and cognitive processes of maltreated children eventually develop into general mistrust and suspicion toward others. The literature on the developmental sequelae of child maltreatment has documented mounting evidence that maltreated children tend to be hypervigilant and perceptually biased toward negativity when processing others' emotional states (Pollak et al., 2000; Pollak, Cicchetti, & Klorman, 1998; Pollak, Cicchetti, Klorman, & Brumaghim, 1997; Pollak & Kistler, 2002; Pollak & Sinha, 2002; Pollak et al., 2005). Psychological states, such as being preoccupied with hidden motives of others, feeling doubts about others' behavior without sufficient basis, and mistrusting others – all of which are primary symptoms of PPD—also require affective-cognitive information processing that is excessively attuned to negativity in interpersonal relationships. The similarities in the information processing styles by maltreated children and adult patients with PPD provide suggestive evidence that there may be a prospective pathway from maltreatment in childhood to later PPD via the compromised affective-cognitive information processing. It is important to note that the paranoid tendency of abused children may not be pathogenic per se. In fact, in the chaotic context where supposedly trustworthy others become perpetrators, it may be indeed adaptive to be vigilant about trusting others (Cicchetti & Lynch, 1995; Rogosch, Cicchetti, & Aber, 1995). However, it may become pathologically paranoid when the tendency of mistrusting others becomes so pervasive that it extends to non-threatening interpersonal relationships.

Attachment theory may provide an additional explanation of how maltreated children later develop an elevated tendency for paranoia. According to attachment theory, a child organizes an internal working model representing the relationship among self, the attachment figure, and the external world through affective and social experiences with primary caregivers (Bowlby, 1980). Later experience is interpreted on the basis of the internal working model, which provides continuity between earlier experience and later outcomes. Hence, unresponsive, rejecting, and violent parenting, which is overwhelmingly representative of parents of maltreated children (Rogosch, Cicchetti, Shields, & Toth, 1995), may foster the development of insecure internal working models in the children that color their later interpersonal experience in a paranoid-laden way. In fact, one study of psychiatric patients linked attachment and paranoid personality, showing that adolescents with paranoid personality traits were likely to have an insecure attachment (Rosenstein & Horowitz, 1996). Future research is encouraged to investigate attachment as a mediator of later emergence of paranoid personality.

Second, compared to adolescents with milder paranoid symptoms, adolescents with higher levels of paranoid symptoms had a childhood history of notable behavioral disturbances. Overall, these children engaged in higher levels of externalizing problems and bullying behavior toward peers. Their behavioral problems aggravated over time; indeed, by age 12, their externalizing and bullying behaviors were significantly higher than that of children in the low PPD symptom group. This finding not only converges with previous studies showing early behavioral problems and aggression as an independent predictor of later PPD (Bernstein et al., 1996), but also extends the research by indicating that the divergence

between the high and low PPD groups gradually widens over time during the transition from childhood to adolescence, possibly forecasting the emerging PPD. Interestingly, we did not find any significant association between childhood peer victimization and later paranoid symptoms. Adolescents with high paranoid symptoms were no more likely to evidence experience of peer victimization in childhood than were adolescents with fewer paranoid symptoms. Together, these results suggest that children at risk for developing PPD are likely to behave aggressively toward peers even in the absence of risk for being victimized. Children who traverse the pathway to PPD may use aggression as a means for preemptive self-protection.

Furthermore, we found that adolescents with high paranoid symptoms had negative peer social behavior in childhood. Results on childhood peer nominations indicated that compared to adolescents with milder paranoid symptoms, teens with high paranoid symptoms were rated as being less cooperative, quick in initiating fights, and lacking leadership. Given that these peer evaluations were made after only a week of interactions in a new social setting, their negative social behavior may reflect pervasive interpersonal deficits. It is interesting to note that there was no PPD group difference in two peer nomination indices, i.e., "shy child" and "disruptive child". This pattern of findings may suggest that individuals at risk of developing PPD do not simply have a general propensity for unfavorable social behavior; rather, their deficits are concentrated on interpersonal problem solving skills, such as cooperation and guidance, which require trust and reliance on others.

Credence of the findings in this report is enhanced by several methodological strengths adopted in the study. First, this study used multiple sources of information to create a design whereby no informant provided more than one piece of information of substantive interest in each statistical model. This mismatched informant design is one of the effective ways to address the issue of shared method variance (Bank, Dishion, Skinner, & Patterson, 1990). Second, although no longitudinal design alone can establish causal effects, the longitudinal design of this study assures the sequence of events.

Several caveats of the study need to be noted. First, the focus of the present study was symptom-level of paranoid personality disorder, rather than its clinical diagnosis. In fact, the majority of the current sample did not manifest clinical levels of PPD, with only five individuals meeting criteria for a clinical diagnosis of PPD. The clinical implications of this study may be limited. Second, paranoid symptoms were not followed longitudinally. Multiple assessments of paranoid symptoms over time are expected to bear fruit for understanding of its developmental course. Third, the present sample was recruited from families characterized by a low socioeconomic background. Generalization of the findings to middle and upper class families requires additional investigation. Fourth, due to the selected scope of this study and the sample size, we did not extend this study to address the issue of comorbidity. There is, however, an increasing awareness that personality disorders tend to overlap with other disorders in Axis I (Clark, 2007; Cohen, 2008; Crawford et al., 2008). Future studies should take comorbidity into account.

These limitations notwithstanding, the current investigation underscores the importance of a developmental perspective in that the processes underlying the path into adulthood PPD are well underway in childhood and adolescence. Our study demonstrated that adolescents who displayed high levels of paranoid symptoms had a distinctive childhood history: Compared to adolescents with milder PPD symptoms, they had higher odds of having a history of maltreatment, manifested elevated levels of behavioral disturbances (e.g., bullying and externalizing problems), and were perceived by peers as someone with unfavorable social behavior. Furthermore, their behavioral problems appear to exacerbate over time, which

may forecast diagnosable PPD. These findings have important implications for early identification of youths at risk for later PPD. Our knowledge on PPD may be enhanced by understanding how behavioral disturbances unfold well before a formal diagnosis is made.

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References

Achenbach, TM. Manual for the Teacher's Report Form and 1991 Profile. Burlington, VT: University of Vermont, Department of Psychiatry; 1991.

American Psychiatric Association.. Diagnostic and statistical manual of mental disorders. 4. Washington, DC: 1994.

Ayoub CC, O'Connor E, Rappolt-Schlichtmann G, Fischer KW, Rogosch FA, Toth SL, et al. Cognitive and emotional differences in young maltreated children: A translational application of dynamic skill theory. Development and Psychopathology. 2006; 18:679–706. [PubMed: 17152396]

Bank, L.; Dishion, TJ.; Skinner, M.; Patterson, GR. Method variance in structural equation modeling: Living with "glop". In: Patterson, GR., editor. Aggression and depression in family interactions. Hillsdale, NJ: Erlbaum; 1990. p. 247-280.

Barnett, D.; Manly, JT.; Cicchetti, D. Defining child maltreatment: The interface between policy and research. In: Cicchetti, D.; Toth, SL., editors. Child abuse, child development, and social policy. Norwood, NJ: Ablex; 1993. p. 7-73.

Battle CL, Shea MT, Johnson DM, Yen S, Zlotnick C, Zanarini MC, et al. Childhood maltreatment associated with adult personality disorders: Findings from the Collaborative Longitudinal Personality Disorders Study. Journal of Personality Disorders. 2004; 18:193–211. [PubMed: 15176757]

Berman ME, Fallon AE, Coccaro EF. The relationship between personality psychopathology and aggressive behavior in research volunteers. Journal of Abnormal Psychology. 1998; 107:651–658. [PubMed: 9830252]

Bernstein DP, Cohen P, Skodol AE, Bezirganian S, Brook JS. Childhood antecedents of adolescent personality disorders. American Journal of Psychiatry. 1996; 153:907–913. [PubMed: 8659613]

Bowlby, J. Attachment and loss: Vol 2. Loss. New York: Basic; 1980.

Cicchetti, D.; Cohen, DJ. Perspectives on developmental psychopathology. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology: Vol I. Theory and methods. New York: John Wiley & Sons Inc; 1995. p. 3-22.

Cicchetti, D.; Lynch, M. Failures in the expectable environment and their impact on individual development: The case of child maltreatment. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology: Vol 2. Risk, disorder and adaptation. New York: Wiley; 1995. p. 32-71.

Cicchetti, D.; Manly, JT. A personal perspective on conducting research with maltreating families: Problems and solutions. In: Brody, G.; Sigel, I., editors. Methods of Family Research: Vol. 2. Families at Risk. Hillsdale, NJ: Erlbaum; 1990. p. 87-133.

Cicchetti D, Rogosch FA. A developmental psychopathology perspective on adolescence. Journal of Counseling and Clinical Psychology. 2002; 70:6–29.

Clark LA. Assessment and diagnosis of personality disorder: Perennial issues and an emerging reconceptualization. Annual Review of Psychology. 2007; 58:227–257.

Cohen P. Child development and personality disorder. Psychiatric Clinics of North America. 2008; 31:477–493. [PubMed: 18638647]

Cohen P, Crowford TN, Johnson JG, Kasen S. The Children in the Community study of developmental course of personality disorder. Journal of Personality Disorders. 2005; 19:466–486. [PubMed: 16274277]

Coie JD, Dodge KA. Continuities and changes in children's social status: A five-year longitudinal study. Merrill-Palmer Quarterly. 1983; 29:261–282.

Coie JD, Kupersmidt JB. A behavioral analysis of emerging social status in boys' groups. Child Development. 1983; 54:1400–1416.

Coolidge FL, DenBoer JW, Segal DL. Personality and neuropsychological correlates of bullying behavior. Personality and Individual Differences. 2004; 36:1559–1569.

Crawford TN, Cohen P, First MB, Skodol AE, Johnson JG, Kasen S. Comorbid Axis I and Axis II disorders in early adolescence. Archives of General Psychiatry. 2008; 65:641–648. [PubMed: 18519822]

Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, et al. Prevalence, correlates, and disability of personality disorders in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. Journal of Clinical Psychiatry. 2004; 65:948–958. [PubMed: 15291684]

Grover KE, Carpenter LL, Price LH, Gagne GG, Mello AF, Mello MF, et al. The relationship between childhood abuse and adult personality disorder symptoms. Journal of Personality Disorders. 2007; 21:442–447. [PubMed: 17685839]

Johnson JG, Cohen P, Brown J, Smailes EM, Bernstein DP. Childhood maltreatment increases risk for personality disorders during early adulthood. Archives of General Psychiatry. 1999; 59:741–749. [PubMed: 12150651]

Johnson JG, Cohen P, Smailes EM, Kasen S, Oldham JM, Skodol AE, et al. Adolescent personality disorders associated with violence and criminal behavior during adolescence and early adulthood. American Journal of Psychiatry. 2000; 157:1406–1412. [PubMed: 10964855]

Johnson JG, Cohen P, Smailes EM, Skodol AE, Brown J, Oldham JM. Childhood verbal abuse and risk for personality disorders during adolescence and early adulthood. Comprehensive Psychiatry. 2001; 42:16–23. [PubMed: 11154711]

Littell, RC.; Milliken, GA.; Stroup, WW.; Wolfinger, RD. SAS System for mixed Models. Cary, NC: SAS Institute, Inc; 1996.

Loranger, AW. OMNI Personality Inventories: Professional manual. Lutz, FL: Psychological Assessment Resources; 2001.

Manly JT, Kim JE, Rogosch FA, Cicchetti D. Dimensions of child maltreatment and children's adjustment: Contributions of developmental timing and subtype. Development and Psychopathology. 2001; 13:759–782. [PubMed: 11771907]

Olweus, D. Bully/victim problems among school children: Basic facts and effects of a school based intervention program. In: Pepler, DJ.; Rubin, KH., editors. The development and treatment of childhood aggression. Hillsdale, MJ: Lawrence Erlbaum Associates, Inc; 1991. p. 411-448.

Pollak SD, Cicchetti D, Hornung K, Reed A. Recognizing emotion in faces: Developmental effects of child abuse and neglect. Developmental Psychology. 2000; 36:679–688. [PubMed: 10976606]

Pollak SD, Cicchetti D, Klorman R. Stress, memory, and emotion: Developmental considerations from the study of child maltreatment. Development and Psychopathology. 1998; 10:811–828. [PubMed: 9886228]

Pollak SD, Cicchetti D, Klorman R, Brumaghim JT. Cognitive brain event-related potentials and emotion processing in maltreated children. Child Development. 1997; 68:773–787.

Pollak SD, Kistler D. Early experience alters categorical representations for facial expressions of emotion. Proceedings of the National Academy of Sciences. 2002; 99:9072–9076.

Pollak SD, Sinha P. Effects of early experience on children's recognition of facial displays of emotion. Developmental Psychology. 2002; 38:784–791. [PubMed: 12220055]

Pollak SD, Vardi S, Putzer Bechner AM, Curtin JJ. Physically abused children's regulation of attention in response to hostility. Child Development. 2005; 76:968–977. [PubMed: 16149995]

Raudenbush, SW.; Bryk, AS. Hierarchical linear models: Applications and data analysis methods. 2. Thousand Oaks: Sage Publication; 2002.

Rieder C, Cicchetti D. Organizational perspective on cognitive control functioning and cognitive-affective balance in maltreated children. Developmental Psychology. 1989; 25:382–393.

Rogosch FA, Cicchetti D, Aber JL. The role of child maltreatment in early deviations in cognitive and affective processing abilities and later peer relationship problems. Development and Psychopathology. 1995; 7:591–609.

Rogosch, FA.; Cicchetti, D.; Shields, A.; Toth, SL. Parenting dysfunction in child maltreatment. In: Bornstein, MH., editor. Handbook of parenting, Vol. 4: Applied and practical parenting. Hillsdale, NJ: Erlbaum; 1995. p. 127-159.

Rosen PJ, Milich R, Harris MJ. Victims of their own cognitions: Implicit social cognitions, emotional distress, and peer victimization. Journal of Applied Developmental Psychology. 2007; 28:211–226.

Rosenstein DS, Horowitz HA. Adolescent attachment and psychopathology. Journal of Counseling and Clinical Psychology. 1996; 64:244–253.

Schwartz D, Dodge KA, Coie JD, Hubbard JJ, Cillessen AHN, Lemerise EA, et al. Social-cognitive and behavioral correlates of aggression and victimization in boys' play groups. Journal of Abnormal Child Psychology. 1998

Shields A, Cicchetti D. Parental maltreatment and emotion dysregulation as risk factors for bullying and victimization in middle childhood. Journal of Clinical Child Psychology. 2001; 30:349–369. [PubMed: 11501252]

Singer JD. Using SAS PROC MIXED to fit multilevel models, hierarchical models, and individual growth models. Journal of Educational and Behavioral Statistics. 1994; 24:323–355.

Sroufe LA. Psychopathology as an outcome of development. Development and Psychopathology. 1997; 9:251–268. [PubMed: 9201444]

Teisl M, Cicchetti D. Physical abuse, cognitive and emotional processes, and aggressive/disruptive behavior problems. Social Development. 2008; 17:1–23.

Torgensen S, Kringlen E, Cramer V. The prevalence of personality disorders in a community sample. Archives of General Psychiatry. 2001; 58:590–596. [PubMed: 11386989]

Weiss B, Dodge KA, Bates JE, Pettit GS. Some consequences of early harsh discipline: Child aggression and a maladaptive social information processing style. Child Development. 1992; 63:1321–1335. [PubMed: 1446555]
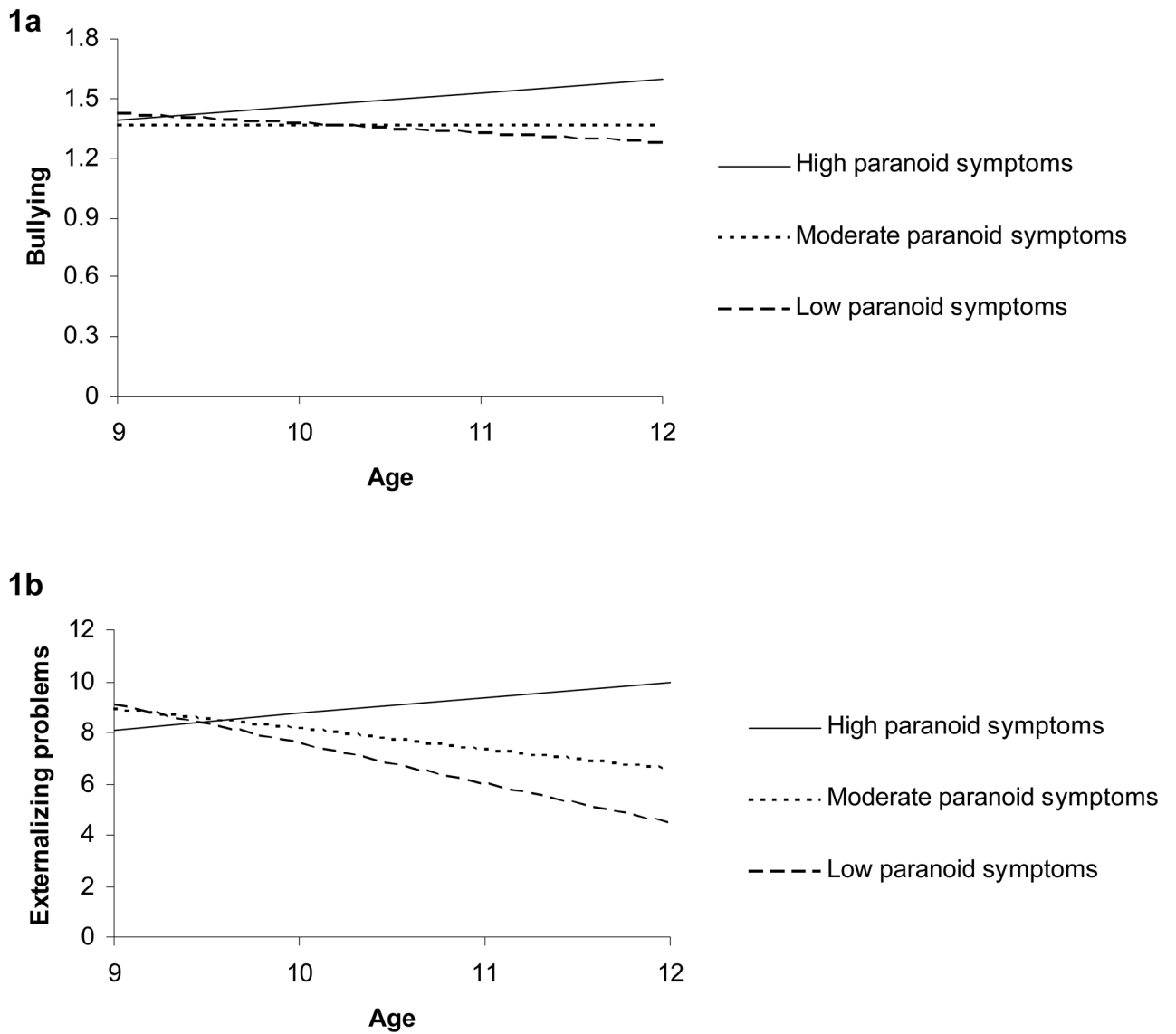
1a

1b

Figure 1.
Estimated age trajectories of bullying (1a) and externalizing problems (1b) by the groups of
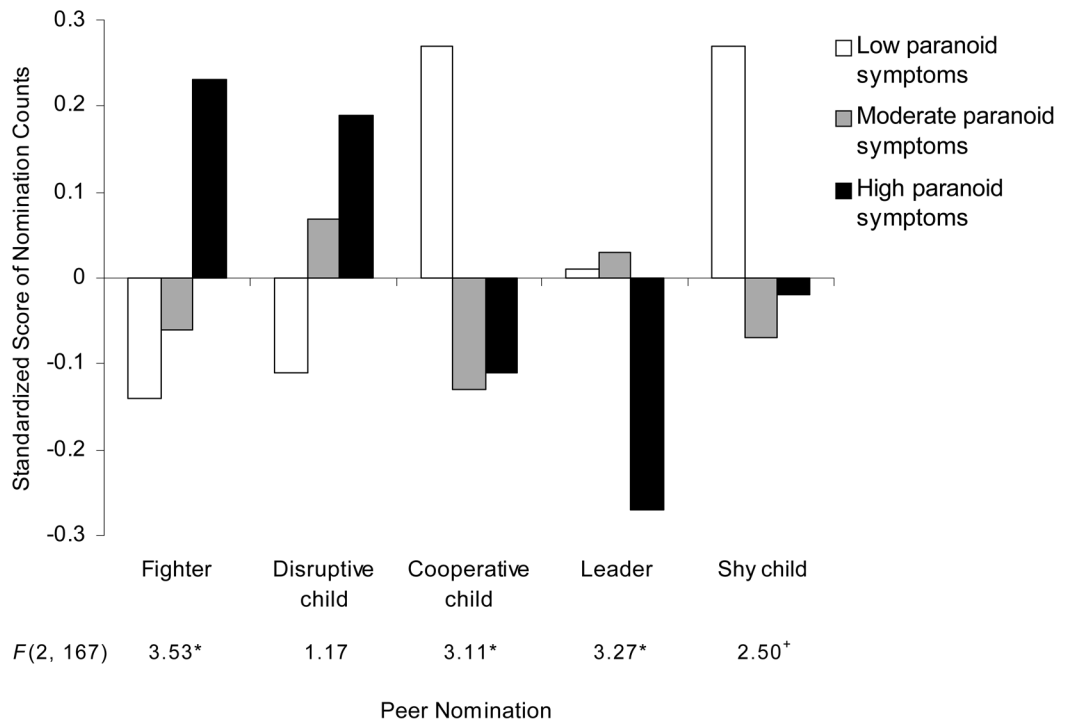low, moderate, and high levels of paranoid symptoms.

Figure 2.
Mean standardized scores of peer nomination by the groups of low, moderate, and high levels of paranoid symptoms.
Note. *$p < .05$. +$p < .10$.

Table 1

The Number of Participants by Year and Age (N=174)

Age	9	10	11	12	Total
Camp Year					
1993	3	1			4
1994	5	3			8
1995	19	3	0	1	23
1996	27	18	3	0	48
1997	25	27	17	3	72
1998	29	21	35	14	99
1999	17	26	15	26	84
2000		20	23	16	59
2001			19	15	34
2002				12	12
Total	125	119	112	87	443

Table 2

Descriptive Statistics of the Study Variables

Peer victimization

Groups by the levels of PPD symptoms

	Low		Moderate		High	
Age	Mean	SD	Mean	SD	Mean	SD
9	1.44	0.52	1.59	0.56	1.50	0.58
10	1.46	0.59	1.59	0.69	1.46	0.44
11	1.29	0.43	1.37	0.51	1.50	0.66
12	1.29	0.54	1.50	0.64	1.47	0.80

Peer bullying

Groups by the levels of PPD symptoms

	Low		Moderate		High	
Age	Mean	SD	Mean	SD	Mean	SD
9	1.44	0.64	1.44	0.67	1.48	0.68
10	1.35	0.54	1.44	0.66	1.60	0.72
11	1.28	0.55	1.33	0.50	1.44	0.47
12	1.22	0.45	1.40	0.55	1.70	0.68

Externalizing problems (TRF)

Groups by the levels of PPD symptoms

	Low		Moderate		High	
Age	Mean	SD	Mean	SD	Mean	SD
9	10.16	12.40	11.51	12.73	11.85	13.36
10	7.52	8.87	10.62	12.14	10.95	13.03
11	5.14	10.25	7.41	10.35	9.19	8.75
12	5.09	5.33	9.22	8.29	12.71	11.50

Note. PPD=Paranoid Personality Disorder assessed in adolescence. TRF=Teacher's Report Form.

Table 3

Fixed Effects from Growth Curve Models for Peer Victimization, Bullying, and Externalizing Problems between Ages 9 to 12 by History of Child Maltreatment and the Levels of Paranoid Personality Disorder Symptoms in Adolescence

	Victimization		Bullying		Externalizing Problems	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	1.34 ***	0.09	1.27 ***	0.10	4.45 ***	1.45
Age[a]	−0.05	0.04	−0.05	0.04	−1.54 *	0.64
Sex[b]	−0.21 ***	0.06	−0.23 ***	0.07	−4.41 ***	1.24
Child maltreatment[c]	0.14 *	0.06	0.24 ***	0.08	5.85 ***	1.30
PPD group status						
High	0.12	0.13	0.33 **	0.13	5.55 ***	1.93
Moderate	0.1	0.13	0.09	0.13	2.13	1.89
Age x PPD group status						
High	0.06	0.06	0.12 *	0.06	2.18 *	0.94
Moderate	0.01	0.06	0.05	0.06	0.77	0.93
AIC	761.6		719.8		3135.5	

Note.

[a] Age is centered at age 12.

[b] Sex, 0=Male, 1=Female.

[c] Child maltreatment, 0=no history of child maltreatment, 1= with history of child maltreatment.

[d] PPD=paranoid personality disorder. The reference of PPD group status is low paranoid group whose t-scores on OMNI-IV was below 45.

*
$p < .05$,

**
$p < .01$,

***
$p < .001$.