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Longitudinal investigation of the relationship between family history of psychosis and affective disorders and Child Behavior Checklist ratings in clinical high-risk adolescents

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Abstract

This is the first study to investigate whether positive family history (FH) of psychosis and affective disorders moderates the relationship between child diagnostic status and parent-reported social and behavioral problems on the Child Behavior Checklist (CBCL) in clinical high-risk adolescents. This longitudinal investigation assessed 122 participants (mean age = 14.25 ± 1.8 years) from three groups (at-risk, other personality disorders, non-psychiatric controls) at baseline and one year follow-up. As predicted, there was a main effect of FH for a number of CBCL scales indicating higher scores for adolescents with positive FH. The findings also demonstrate a significant Diagnostic Status X Family History interaction for several behavioral scales providing support for FH as a concurrent and longitudinal moderator of the relationship between diagnostic status and CBCL scales. The moderating effect is present for areas of functioning associated with depression, anxiety, social adjustment, thought problems, attention problems, and aggressive behavior. The findings also indicate that both positive and negative symptoms are related to the genetic vulnerability for developing psychosis in clinical high-risk individuals, particularly those symptoms reflective of emotional, attentional, and interpersonal functioning. The present findings are novel and have significant clinical and research implications. This investigation provides a platform for future studies to clarify further the role of FH in clinical high-risk individuals and contribute to integration of this knowledge in the development of early intervention and prevention approaches in at-risk populations for the emergence of severe mental illness.

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Conflict of interest

The authors have no conflicts of interest to report.

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Keywords

Family history; Psychosis risk; Affective disorders; Clinical high-risk; Prodrome; Adolescents; CBCL; Early intervention; Prevention

1. Introduction

The present study addresses important, albeit largely unexplored research questions regarding the relationship between positive family history (FH) of psychosis and affective disorders and social and behavioral precursors of vulnerability to psychosis in clinical high-risk individuals, a population also variably referred to in the literature as 'psychosis risk syndrome,' 'ultra high-risk,' or 'prodromal' individuals. This work is an extension of our previous research investigating the clinical and diagnostic utility of the Child Behavior Checklist (CBCL; Achenbach, 1991) as an adjunctive risk screening measure in the early detection of at-risk adolescents likely to develop psychosis (Simeonova et al., 2014; Simeonova et al. 2011). This is an important area of investigation, because positive FH may be an indicator for one or more etiologic subtypes varying on clinical presentation or course (Esterberg et al., 2010). Also, a better understanding of this relationship could result in novel prevention and early intervention approaches in at-risk populations for the emergence of severe mental illness.

Family and twin studies of schizophrenia and affective psychoses indicate that psychosis aggregates in families (Ivleva et al., 2008). For instance, the lifetime risk for schizophrenia development increases 8- to 12-folds in first-degree biological relatives of schizophrenia probands. While a number of large epidemiological studies show that the familial risks for schizophrenia and bipolar disorders are mainly independent from one another (Kendler and Gardner, 1997; Laursen et al., 2005), there are also studies indicating co-aggregation of these disorders in families with bipolar disorder and schizophrenia patients (Arajärvi et al., 2006; Henn et al., 1995; Lichtenstein et al., 2009) and suggesting clear genetic links between these psychiatric conditions (Cosgrove and Suppes, 2013). Some family studies also indicate that there could be a familial relationship between the predispositions to schizophrenia and unipolar depression (Maier et al., 1993; Blackwood et al., 2001). Overall, at the present time the empirical data are not yet compelling enough to resolve the debate about the existing nosological boundaries of psychotic and affective illnesses and to progress to more continuous model of psychosis (Cosgrove and Suppes, 2013). Substantial evidence exists, however, that psychosis and affective disorders might be distributed across a dimensional spectrum (Craddock et al., 2006; Häfner et al., 2005). Therefore, the focus of the present study is on the relationship between FH of psychosis and affective disorders and social and behavioral precursors of vulnerability to psychosis in clinical high-risk individuals.

In the context of the present study, it is important to emphasize evidence for significant differences between psychiatric patients with positive FH and those without FH of psychosis and affective disorders. With respect to premorbid functioning, one study found FH of schizophrenia to be associated with poor overall premorbid adjustment during ages 5 to 11 in patients with schizophrenia (Foerster et al., 1991). Another family study comparing

patients with and without FH of schizophrenia found FH to be associated with worse premorbid adjustment related to attention problems and social problems (St-Hilaire et al., 2005). A third study with similar design examined differences in the premorbid adjustment, symptoms, and intellectual functioning between 28 first-episode schizophrenia spectrum patients (with diagnoses of schizophrenia, schizoaffective, and schizopreniform disorders) with positive FH and 28 matched patients without FH (Norman et al, 2007). The patients with positive FH showed poorer intellectual functioning, less reduction in clinical symptoms at 24 and 36 months follow-up, and more severe form of the illness. Similarly, a study examining the contribution of familial liability for schizophrenia found that patients from multiple affected families (i.e., with two or more first- and/or second-degree relatives with a psychotic disorder) had poorer premorbid social and academic functioning compared to patients from non-affected families and controls (Walshe et al., 2007). A significant decline of social functioning between childhood and adolescence was found only for the group of patients with familial schizophrenia. In addition, unaffected siblings of patients with familial schizophrenia demonstrated significantly worse academic functioning than controls during adolescence, and a significant decline in academic functioning between childhood and adolescence. Notably, the unaffected siblings of patients with familial schizophrenia had significantly greater deterioration in academic functioning compared to siblings from non-affected families, which the researchers interpreted as possibly related to a genetic risk for schizophrenia (Walshe et al., 2007). Furthermore, recent meta-analyses concluded that patients with a positive FH of psychosis are likely to have poorer long-term occupational and global outcome (Käkelä et al., 2014) and that CHR individuals with positive FH are at an increased risk for suicide and self-harm (Taylor et al., 2014).

Overall, the relationship between positive FH of psychosis and affective disorders and social and behavioral indicators of risk for psychosis (as indexed by parent-reported CBCL ratings) in clinical high-risk individuals has not received research attention. This is an important area of investigation, because a better understanding of this relationship has significant clinical and research implications for treatment and for the development of novel prevention and early intervention approaches in at-risk populations for the emergence of severe mental illness. Therefore, the purpose of the present study is to shed light on the following main research question: Does family history moderate the relationship between diagnostic status and CBCL ratings in an at-risk clinical population? The diathesis-stress model (Walker and Diforio, 1997) postulates that hereditary factors serve to trigger constitutional vulnerability for psychosis, which is expressed in multiple domains of behavior before the onset of psychosis. Thus, it is predicted that the at-risk adolescents in this study will be more sensitive to the potential moderating effect of genetic predisposition and FH of psychosis or affective disorders. The adolescent period is the focus of this study because it is characterized by a rapid increase in risk for psychosis onset, and it is likely to be a critical period for early intervention and prevention (Walker, 2002).

2. Methods

The study sample of 122 participants, ranging in age from 12 to 18 years, was enrolled in a prospective study at Emory University focused on neurobiological and behavioral aspects of clinical risk for psychosis in adolescents. The three diagnostic groups included 53

adolescents designated as at-risk (AR), 37 adolescents with other personality disorders (OPD), and 32 non-psychiatric controls (NC) (mean age = 14.2; SD = 1.8), who underwent assessments at baseline and at one year follow-up and for whom a CBCL had been completed. Participants were designated to the AR group if they met the DSM-IV diagnostic criteria for schizotypal personality disorder (SPD) (n=1), the Scale of Prodromal Symptoms (SOPS) criteria for attenuated positive symptoms (APS) (n=13), or both risk criteria (n=39). Demographic characteristics by diagnostic group are presented in Table 1.

The following instruments were administered to all study participants: Structured Interview for DSM-IV Personality Disorders (SIDP-IV) (Pfohl et al., 2001), Structured Clinical Interview for Axis I DSM-IV Disorders (SCID-I) (First et al., 1995), Structured Interview for Prodromal Symptoms (SIPS) (Miller et al., 2002, 2003), and CBCL parent-report scale (Achenbach, 1991). Participants were recruited through announcements directed at parents and clinicians. The exclusion criteria at study entry were neurological disorder, mental retardation, substance abuse/dependence, and current Axis I disorder as described by DSM-IV. Assent and written consent were obtained from all participants and a parent in accordance with the guidelines of the Emory University Human Subjects Review Committee. Previous reports provide a detailed description of the methodology approach (Simeonova et al., 2014; Simeonova et al., 2011).

To index the occurrence of mental illness and the rate of mental illness in first- and second-degree relatives of study participants, data on FH of mental disorders was collected. Although relatives were not directly interviewed, general information on mental disorders in first- and second-degree relatives was obtained from parents of participants. Specifically, the occurrence of psychosis, depression, and bipolar disorder was of critical interest. A broad definition of positive FH was employed in the present study, defined as having at least one first- or second-degree relative with diagnosis of psychosis spectrum disorder or affective disorder.

To test the hypothesis that participants with positive FH of psychosis or affective disorders in first- or second-degree relatives have more social and behavioral problems (as indexed by CBCL ratings) than participants without FH and to test whether FH moderates the relationship between diagnostic status and CBCL ratings a series of multivariate-analyses of variance (MANOVA) and repeated-measures analyses of variance (ANOVA) were conducted. MANOVAs were conducted with diagnostic status and FH as independent variables and CBCL individual and composite scores as dependent variables. In the repeated measures ANOVAs, CBCL scores of each time of assessment (baseline vs. one year follow-up) were the within-subject factor and diagnostic status and FH were the between-subject factors. Assumptions for parametric tests were met, with normal sample distribution and appropriate homogeneity of variances.

The cross-temporal stability of the CBCL scales was examined with correlational analyses for the entire sample and for each diagnostic group. The analyses revealed significant positive inter-correlations across assessment periods (baseline and one year follow-up) within each CBCL scale. These results suggest longitudinal stability of the ratings. All *p* values were .05.

3. Results

3.1. Family history and CBCL ratings at baseline

Analyses were first conducted to test for demographic differences among the three diagnostic groups. There were no significant age ($F(2,119) = 1.03, p = .358$) or sex differences ($\chi^2 = 4.14, p = .349$) between the groups.

The CBCL individual and composite scores and standard deviations by diagnostic group and FH at baseline are presented in Table 2. A number of univariate tests were significant, although no significant main effect or interaction effect for FH was found with the CBCL individual scales and the multivariate F value was not significant. The findings indicate significantly higher CBCL scores for adolescents with FH on the scales Thought Problems, $F(1, 98) = 6.58, p = .012, \eta^2 = .06$, Delinquent Behavior, $F(1, 98) = 4.43, p = .038, \eta^2 = .04$, and Aggressive Behavior, $F(1, 98) = 6.24, p = .014, \eta^2 = .06$. The finding for the scales Anxious/Depressed was not statistically significant, but there was a trend $F(1, 98) = 3.88, p = .052, \eta^2 = .04$. In addition, the univariate tests showed a significant Diagnostic Status X Family History interaction effect for the individual scales Anxious/Depressed, $F(2, 98) = 3.34, p = .040, \eta^2 = .06$, Social Problems, $F(2, 98) = 8.50, p = .000, \eta^2 = .15$, Thought Problems, $F(2, 98) = 6.56, p = .002, \eta^2 = .12$, Attention Problems, $F(2, 98) = 3.48, p = .035, \eta^2 = .07$, and Aggressive Behavior, $F(2, 98) = 4.48, p = .014, \eta^2 = .08$. As expected, FH moderates the relationship between diagnostic status and CBCL ratings. Univariate tests within FH groups revealed significant diagnostic group differences: Anxious/Depressed, $F(2, 100) = 3.51, p = .034, \eta^2 = .07$, Social Problems, $F(2, 100) = 8.67, p = .000, \eta^2 = .15$, Thought Problems, $F(2, 100) = 6.91, p = .002, \eta^2 = .12$, Attention Problems, $F(2, 100) = 3.53, p = .033, \eta^2 = .07$, and Aggressive Behavior, $F(2, 100) = 4.34, p = .016, \eta^2 = .08$. Figures 1 through 5 illustrate the significant Diagnostic Status X Family History interactions for CBCL rating scales at baseline.

Follow-up pairwise comparisons of the effect of FH on the AR, OPD, and NC diagnostic groups yield the following results: Positive FH led to higher scores on the Anxious/Depressed scale for the AR group ($F(1, 100) = 8.77, p = .004$), while for the OPD and NC groups FH had no effect. Positive FH led to higher scores on the Social Problems scale for the AR ($F(1, 100) = 11.67, p = .001$) and lower scores for the NC groups ($F(1, 100) = 5.98, p = .016$), while no FH effect was found for the OPD group. Positive FH led to higher scores on the Thought Problems scale for the AR ($F(1, 100) = 11.42, p = .001$) and OPD groups ($F(1, 100) = 8.65, p = .004$), while for the NC group FH had no effect. Positive FH led to higher scores on the Attention Problems scale for the AR group ($F(1, 100) = 3.92, p = .050$), while no FH effect was found for the OPD and NC groups. Positive FH led to higher scores on the Aggressive Behavior scale for the AR ($F(1, 100) = 5.50, p = .021$) and OPD groups ($F(1, 100) = 8.25, p = .005$), with no FH effect for the NC group.

No significant main effect or interaction effect for FH was found with the composite CBCL scales and the multivariate F value was not significant. Although not statistically significant, there was a trend for a main effect of FH, Wilks' $\Lambda = .88, F(3, 98) = 2.68, p = .051, \eta^2 = .06$. One univariate test was significant. Adolescents with presence of FH had higher scores on the scale Externalizing Problems, $F(1, 98) = 7.75, p = .006, \eta^2 = .07$. Also, the multivariate F

value was not significant for the Diagnostic Status X Family History interaction, but the univariate test for the scale Total Competence indicated a trend, $F(2, 98) = 2.97$, $p = .056$, $\eta^2 = .06$.

3.2. Family history and CBCL ratings at one year follow-up

The CBCL individual and composite scores and standard deviations by diagnostic group and FH at one year follow-up are presented in Table 3. There was no significant main effect or interaction effect of FH with the CBCL individual scales.

In the analyses with the CBCL composite scales the multivariate F value was significant for FH, Wilks' $\Lambda = .88$, $F(3, 64) = 2.98$, $p = .038$, $\eta^2 = .12$, indicating higher scores for participants with positive FH of psychosis or affective disorders. Adolescents with the presence of FH had higher scores on the scale Externalizing Problems, $F(1, 66) = 5.46$, $p = .023$, $\eta^2 = .08$.

3.3. Temporal progression of family history and CBCL ratings

The findings indicate a significant Time X Family History interaction for the competence scale Social, Wilks' $\Lambda = .90$, $F(1, 69) = 8.13$, $p = .006$, $\eta^2 = .11$, with scores of adolescents without FH decreasing significantly over time. There was also a significant Time X Family History interaction for the individual scale Thought Problems, Wilks' $\Lambda = .94$, $F(1, 71) = 4.35$, $p = .041$, $\eta^2 = .06$, with scores of adolescents with FH decreasing significantly over time. Figures 6 and 7 illustrate the significant Time X Family History interactions for the CBCL rating scales Social and Thought Problems.

There was a significant main effect for FH for the following individual and composite scales: Delinquent Behavior, $F(1, 71) = 5.30$, $p = .024$, $\eta^2 = .07$, Aggressive Behavior, $F(1, 71) = 5.77$, $p = .019$, $\eta^2 = .08$, and Externalizing Problems, $F(1, 71) = 8.71$, $p = .004$, $\eta^2 = .11$. Adolescents with positive FH on those scales exhibited significantly higher scores compared to adolescents without FH. Further, there were significant Diagnostic Status X Family History interactions for the individual scales Social Problems, $F(2, 71) = 5.20$, $p = .008$, $\eta^2 = .13$, Thought Problems, $F(2, 71) = 4.30$, $p = .017$, $\eta^2 = .11$, and Aggressive Behavior, $F(2, 71) = 4.40$, $p = .016$, $\eta^2 = .11$. As expected, FH moderates the relationship between diagnostic status and CBCL ratings longitudinally. Paired samples t tests were conducted to follow up on the significant interactions. Differences in mean ratings were significantly different between baseline and follow-up assessments, where AR participants showed a significant decrease over time in behavioral problems on the scale Social Problems, $t(38) = 2.29$, $p = .028$. Additionally, OPD participants showed a decrease over time in behavioral problems on the scales Social Problems, $t(28) = 2.98$, $p = .006$, Thought Problems, $t(28) = 2.99$, $p = .006$, and Aggressive Behavior, $t(28) = 5.30$, $p = .000$.

4. Discussion

This is the first study to investigate whether positive FH of psychosis and affective disorders moderates the relationship between diagnostic status and parent-reported social and behavioral problems on the CBCL in clinical high-risk adolescents. As predicted, there was a main effect of FH for a number of CBCL scales indicating higher scores for adolescents

with positive FH. The findings also demonstrate a significant Diagnostic Status X Family History interaction for several behavioral scales providing support for FH as a concurrent and longitudinal moderator of the relationship between diagnostic status and CBCL scales.

The results are consistent with the hypothesized relationships and with previous research showing that positive FH is associated with worse premorbid adjustment, poorer social functioning, higher levels of attention problems, and higher illness severity (St-Hilaire et al., 2005; Norman et al., 2007; Walshe et al., 2007). The cross-sectional data shows that compared to adolescents without FH, those with positive FH in the present study had higher scores on the individual scales Thought Problems, Delinquent Behavior, and Aggressive Behavior at baseline and on the composite scale Externalizing Problems at one year follow-up. Most notable are the baseline findings of a concurrent moderating effect of positive FH on the relationship between diagnostic status and the following CBCL scales: Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, and Aggressive Behavior. As predicted, positive FH led to higher scores for the at-risk group.

The general pattern of prospective findings of the relationship between FH and CBCL ratings parallels the significant concurrent main effects and moderating effects found in the cross-sectional data. Compared to adolescents without FH, those with positive FH had higher scores on the individual scales Delinquent Behavior and Aggressive Behavior and on the composite scale Externalizing Problems. Also, a moderating effect of FH was found for the scales Social Problems, Thought Problems, and Aggressive Behavior. Further, the findings demonstrate that the mean longitudinal trend across CBCL scales and within the three diagnostic groups was toward a decrease of social and behavioral problems over time. This finding is consistent with the literature on normative decrease of social and behavioral problems in the mid-adolescent period (Bongers et al., 2003, 2004; Dekker et al., 2007). There is variability within this general trend, with some participants manifesting stable or increasing behavioral problems. Nevertheless, it is noteworthy that although the prospective analyses did not show a shift in behavior toward greater social and behavioral problems in the at-risk adolescents over time as a function of FH, behavioral problems exhibited by the at-risk group with positive FH remained higher throughout the study than the other two groups.

The concurrent and longitudinal findings suggest that the moderating effect of positive FH of psychosis and affective disorders is present for areas of functioning associated with depression, anxiety, social adjustment, thought problems, attention problems, and aggressive behavior. These areas of functioning are reflective of behaviors in line with positive symptoms (i.e., thought problems) as well as negative symptoms (i.e., depression, social adjustment). Thus, the present data suggest that both positive and negative symptoms are related to the genetic vulnerability for developing psychosis in clinical high-risk individuals, particularly those symptoms concerning emotional, attentional, and interpersonal functioning. The findings are indicative of constitutional vulnerability underlying the risk for psychosis and support the neural diathesis-stress model (Walker & Diforio, 1997). Much of the human evidence supporting this model involves high-risk individuals as defined by family psychiatric history. Therefore, the present findings raise the possibility that FH may

moderate the neurotransmitter mechanisms underlying responses to stress in clinical high-risk individuals. This is a research question worthy of further investigation.

The study findings underscore both, the significance of assessing FH clinically and the importance of pursuing future research in this area of investigation. For example, research shows that only psychotic patients without FH report improvement of negative symptoms with antipsychotic medication and negative symptoms account for the most debilitating aspects of schizophrenia (Malaspina et al., 2000). For the treatment of clinical high-risk adolescents at risk for developing psychosis this means that individuals with positive FH presenting with affective disturbance and problems associated with social adjustment (in this study, increased scores on the CBCL scales Anxious/Depressed and Social Problems) might respond better to behavioral treatment approaches than to antipsychotic medications. If FH does contribute variance in symptoms associated with both negative and positive symptom responses, future research should consider evaluating the efficacy of medication treatments for these symptoms in clinical high-risk individuals with positive FH. Future studies to better understand the role of FH in this context, have the opportunity to facilitate both, research focused on parsing out the etiology of subtypes varying on clinical presentation and course and also contribute to the development of novel early intervention and prevention approaches in at-risk populations for the emergence of severe mental illness.

There were some limitations in this study. There might be a potential bias, because parents who are aware of a positive FH of psychiatric illness might be more inclined to rate their children as having behavioral and social problems on the CBCL. Also, the parental mood state during the evaluation of the adolescents in this sample was not assessed. Although parents' evaluations of their children's behavior can be influenced by their own mental state, research also indicates that parental symptoms do not bias child behavior reports significantly (Rice et al., 2007). The lack of direct interviews of relatives and the lack of a standardized FH measure (i.e., Family Interview for Genetic Studies/FIGS) are limitations. Further, because of stigma associated with mental illness, it is possible that some parents might have minimized their FH and thus introduced a response bias. In addition, some participants in the study were receiving psychotherapy and other clinical care, which most likely has impact on CBCL ratings over time. Future studies might also benefit from examination of other relevant variables in this context such as ethnicity and parental education.

In summary, the present findings represent the first report in the literature of positive FH of psychosis and affective disorders as a concurrent and longitudinal moderator of the relationship between diagnostic status and parent-reported social and behavioral problems on the CBCL in clinical high-risk adolescents. This moderating effect is present for areas of functioning associated with depression, anxiety, social adjustment, thought problems, attention problems, and aggressive behavior. The findings also indicate that both positive and negative symptoms are related to the genetic vulnerability for developing psychosis in clinical high-risk individuals, particularly those symptoms reflective of emotional, attentional, and interpersonal functioning. Future studies in this area of investigation have the opportunity to clarify further the role of FH in clinical high-risk individuals and

contribute to integration of this knowledge in the development of novel early intervention and prevention approaches in at-risk populations for the emergence of severe mental illness.

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Fig. 1.

Diagnostic Status X Family History interaction at baseline assessment for the CBCL Scale Anxious/Depressed

AR=at-risk, OPD=other personality disorders, NC=normal controls

Fig. 2.
Diagnostic Status X Family History interaction at baseline assessment for the CBCL Scale Social Problems
AR=at-risk, OPD=other personality disorders, NC=normal controls

Fig. 3.
Diagnostic Status X Family History interaction at baseline assessment for the CBCL Scale Thought Problems
AR=at-risk, OPD=other personality disorders, NC=normal controls

Fig. 4.
Diagnostic Status X Family History interaction at baseline assessment for the CBCL Scale
Attention Problems
AR=at-risk, OPD=other personality disorders, NC=normal controls

Fig. 5.
Diagnostic Status X Family History interaction at baseline assessment for the CBCL Scale Aggressive Behavior
AR=at-risk, OPD=other personality disorders, NC=normal controls

Fig. 6.
Time X Family History interaction for the CBCL Scale Social

Fig. 7.
Time X Family History interaction for the CBCL Scale Thought Problems

Table 1

Demographic characteristics of samples.

	AR	OPD	NC	Total
<u>Total (n)</u>	53	37	32	122
Males	35	17	16	68
Females	18	20	16	54
<u>Age</u>				
M (SD)	14.17 (1.70)	14.59 (1.83)	14.00 (1.93)	14.25 (1.80)
<u>Positive Family History (%)</u>				
Psychotic Disorders	11	8	3	8
Affective Disorders	57	54	47	53

AR=at-risk, OPD=other personality disorders, NC=normal controls

Table 2

CBCL mean *T* scores and standard deviations by diagnostic group and family history at baseline assessment.

	AR Mean(SD)		OPD Mean (SD)		NC Mean (SD)	
	-FH	+FH	-FH	+FH	-FH	+FH
<i>CBCL Individual Scales</i>						
Activities [▲]	44.38 (7.32)	42.35 (8.20)	44.11 (11.60)	45.45 (9.53)	44.47 (10.18)	43.80 (10.30)
Social [▲]	41.25 (8.25)	34.77 (8.71)	43.22 (7.68)	36.32 (10.12)	44.33 (10.78)	45.93 (13.93)
School [▲]	39.50 (7.93)	37.97 (8.16)	44.44 (8.50)	39.95 (10.02)	44.47 (8.83)	46.20 (9.14)
Anxious/Depressed ^{bDSxPH}	64.25 (11.53)	73.26 (11.11) [†]	60.00 (10.58)	66.85 (9.36)	57.27 (7.92)	54.13 (6.69)
Withdrawn/Depressed	65.00 (10.59)	69.65 (10.84)	61.00 (9.49)	64.45 (9.62)	56.53 (7.76)	56.27 (8.28)
Somatic Complaints	59.94 (10.53)	66.26 (11.03)	58.89 (9.65)	61.75 (8.10)	54.60 (4.91)	54.53 (8.55)
Social Problems ^{DSxPH}	63.38 (8.59)	73.26 (9.66) [†]	58.56 (12.01)	64.65 (10.33)	60.67 (10.59)	52.27 (3.54) [↓]
Thought Problems ^{DSxPH}	63.19 (8.56)	72.35 (8.98) [†]	57.44 (7.81)	67.85 (9.53) [†]	59.93 (8.58)	55.20 (8.49)
Attention Problems ^{DSxPH}	63.25 (8.51)	68.52 (9.05) [†]	58.89 (7.11)	65.60 (10.54)	58.67 (7.31)	54.47 (6.88)
Delinquent Behavior	58.44 (6.47)	61.52 (7.90)	59.67 (11.35)	67.65 (11.03)	56.07 (6.67)	56.60 (6.08)
Aggressive Behavior ^{DSxPH}	60.94 (9.44)	68.23 (10.56) [†]	60.56 (8.58)	72.20 (10.82) [†]	59.07 (11.44)	55.47 (7.86)
<i>CBCL Composite Scales</i>						
Total Competence [▲]	40.13 (7.54)	34.60 (7.83)	43.44 (11.02)	36.89 (9.21)	43.20 (9.54)	47.13 (11.70)
Internalizing Problems	64.06 (10.73)	72.19 (8.30)	58.67 (12.28)	65.85 (10.15)	52.60 (13.10)	50.00 (11.81)
Externalizing Problems	57.75 (13.06)	65.35 (9.12)	58.78 (12.24)	70.20 (9.33)	52.33 (15.08)	53.00 (10.23)

Note:

[▲] high scores indicate more social competencies,

AR = at-risk, OPD = other personality disorders, NC = normal controls, -FH = absent family history, +FH = positive family history, DSxPH = significant Diagnostic Status X Family History interaction, [†] = follow-up pairwise comparisons of the effect of FH on Diagnostic Status yield higher scores for participants with +FH, [↓] = follow-up pairwise comparisons of the effect of FH on Diagnostic Status yield lower scores for participants with +FH

Table 3

CBCL mean *T* scores and standard deviations by diagnostic group and family history at one year follow-up assessment.

	AR Mean (SD)		OPD Mean (SD)		NC Mean (SD)	
	-FH	+FH	-FH	+FH	-FH	+FH
CBCL Individual Scales						
Activities▲	44.31 (10.70)	43.00 (6.10)	39.00 (9.95)	42.38 (10.49)	47.63 (7.29)	45.83 (8.37)
Social▲	40.33 (7.68)	37.05 (7.33)	37.14 (6.36)	39.87 (8.94)	43.63 (9.27)	49.42 (5.14)
School▲	41.08 (7.42)	36.70 (8.38)	44.43 (5.97)	41.67 (8.17)	42.63 (10.45)	48.75 (6.90)
Anxious/Depressed	61.77 (14.62)	65.86 (9.13)	56.29 (10.10)	58.50 (8.60)	56.38 (12.17)	52.50 (3.26)
Withdrawn/Depressed	62.08 (14.16)	65.43 (11.67)	58.71 (12.65)	57.50 (10.29)	53.75 (6.45)	52.42 (4.85)
Somatic Complaints	58.69 (10.20)	60.86 (12.04)	56.14 (9.86)	56.25 (8.86)	53.63 (4.75)	50.58 (0.90)
Social Problems	59.54 (13.12)	68.52 (8.89)	53.57 (7.48)	58.69 (9.67)	57.63 (10.00)	52.50 (4.93)
Thought Problems	62.69 (8.85)	67.52 (9.39)	58.29 (9.03)	57.88 (11.58)	54.25 (6.21)	51.17 (2.73)
Attention Problems	61.77 (12.79)	67.71 (9.60)	56.14 (10.16)	61.56 (10.93)	56.88 (7.22)	53.00 (4.67)
Delinquent Behavior	58.92 (8.16)	62.95 (9.42)	57.14 (6.34)	63.56 (11.13)	55.13 (7.18)	55.25 (8.07)
Aggressive Behavior	59.69 (10.89)	64.71 (9.69)	53.86 (3.29)	65.94 (12.92)	55.13 (8.73)	52.50 (4.21)
CBCL Composite Scales						
Total Competence▲	40.91 (8.71)	36.40 (6.57)	36.57 (7.07)	40.57 (12.32)	44.75 (9.48)	49.58 (10.78)
Internalizing Problems	58.15 (16.39)	66.81 (11.30)	55.00 (11.86)	54.25 (14.01)	49.88 (11.98)	44.75 (9.01)
Externalizing Problems	55.92 (13.94)	65.86 (10.25)	52.43 (8.28)	64.06 (13.21)	48.63 (14.16)	49.67 (9.72)

Note:

▲ high scores indicate more social competencies,

AR = at-risk, OPD = other personality disorders, NC = normal controls, -FH = absent family history, +FH = positive family history