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Children of parents with affective and non-affective psychoses: A longitudinal study of behavior problems

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Abstract

Objective—It is generally accepted that children of parents with schizophrenia or other forms of psychosis are at heightened risk for a range of behavioral problems. However, it remains unclear whether offspring of parents with different forms of psychosis (e.g., schizophrenia, other non-affective psychoses, and affective psychoses) have distinct forms of behavioral problems (i.e., internalizing and externalizing).

Method—Behavioral observations at ages 4 and 7 years of children of parents with psychosis (n = 281) and parents without psychosis (n=188) were examined.

Results—There were no significant differences between groups in behavior observed at age 4. At age 7, compared to children of unaffected parents, children of parents with psychosis had an adjusted odds ratio of 2.8 (95% CI = 1.5, 5.6) for externalizing problems, in particular for children of parents with schizophrenia (adjusted OR = 4.4; 95% CI = 1.7, 12.5). This increase in risk for externalizing problems was observed for females only (adjusted OR = 8.1; 95% CI = 2.5, 26.3). In contrast, male children were at increased risk for internalizing problems (adjusted OR = 3.6; 95% CI = 1.6, 8.3).

Conclusions—Children of parents with various forms of psychosis are at risk for internalizing and externalizing problems by age 7; this risk varies by gender of the offspring. Implications for treatment of parents with psychotic disorders and high-risk children are discussed.

Introduction

A large literature has documented that schizophrenia is a neurodevelopmental disorder resulting from genetic and environmental influences (1–5). Although the risk for schizophrenia is low (.75%–1.0%), this risk increases to approximately 12% for children of one parent with schizophrenia and between 35% and 46% for children of two parents with schizophrenia (6). Offspring of parents with schizophrenia are also at heightened risk for other types of psychopathology (7). Children of persons with schizophrenia show similar but milder neuropsychological abnormalities to those expressed by ill individuals (e.g., attentional and conceptual dysfunctions) (4, 8).

High-risk studies have found that offspring of parents with schizophrenia have elevated rates of social withdrawal, aggression, impaired social relationships, and neuromotor deficits which may be related to diagnosable disorder (2, 3, 4, 10). Early childhood behavior of high-risk offspring is characterized by a range of problematic behaviors (1, 11) that can be categorized broadly as “internalizing” and “externalizing” (12). Internalizing symptoms include shy, withdrawn behavior, somatic complaints, anxiety and depression while externalizing symptoms include aggressive and delinquent behavior, acting out, or unstable emotional responses. The literature is inconsistent regarding which types of problems are most prominent and whether male and female offspring at high-risk for schizophrenia have different forms of disturbance.

In the general population, studies have consistently reported: higher rates of internalizing symptoms in females and externalizing symptoms in males; more irritability and anger in males; more fearfulness in females; better affective-perspective taking in girls; and more frustration, anger, and emotional dysregulation in boys (13). Sex differences in rates and types of adult mental health disorders have also been found. For example, Pirkola et al. (14) reported parental divorce is associated with depression, anxiety, and alcohol use disorders among females but not males and a greater number of adversities in childhood are associated with mental disorders among females compared to males. Male compared to female children at high-risk for schizophrenia have also been found to exhibit different types of behavioral abnormalities. For example, Rolf (15) found that high-risk girls were rated as less emotionally stable and mature than controls however, this same difference was not observed between males. Nagler et al. (16) reported that high-risk boys showed more abnormalities in verbal communication, anxiety, and affective expression than high-risk girls.

Numerous studies on schizophrenia have also demonstrated that there are significant differences between men and women (e.g., premorbid history and expression of the illness) (17). To date, there are few studies that describe sex differences in behavioral outcomes of high-risk children. Furthermore, no studies have examined internalizing and externalizing behaviors in children to see if patterns vary across types of parental psychosis groups and gender of child.

Study Aims

The first aim of this study was to compare early childhood behavior among offspring of parents with and without psychosis. We hypothesized that high-risk children would exhibit more internalizing and externalizing behaviors than children of parents without psychosis. Elevated rates of these behaviors were expected to be observable at an early age and persist and intensify over time. The second aim was to determine whether type of parental psychosis was related to different forms of childhood behavioral problems. Compared to children of parents with no psychosis, children of parents with affective psychosis were hypothesized to have more internalizing behaviors (e.g., higher levels of shyness or fearfulness) whereas children of parents with schizophrenia and other non-affective psychoses were hypothesized to have higher levels of externalizing problems (e.g., oppositional and hyperactive behavior). In light of previous findings on sex differences in behavioral outcomes of high-risk and normal risk children and adults with schizophrenia (17), the third aim was to determine if the pattern of internalizing and externalizing behaviors was different for boys and girls.

Method

The Collaborative Perinatal Project Sample

Participants were selected from the Collaborative Perinatal Project's Providence and Boston cohorts (18), also known as the New England Family Study (NEFS; 19). Pregnant women receiving prenatal care in Providence and Boston were recruited between 1959 and 1966; 17,741 pregnancies (13,464 mothers) were followed prospectively, and events of gestation, labor, delivery, and the neonatal period were assessed. Children's development was assessed at various times up to 7 years of age.

High-Risk Follow-up Study

A detailed description of the high-risk study conducted between 1994 and 2002 is provided by Goldstein et al. (19). A total of 859 parents were identified as potentially psychotic (approximately .8% of the pool of parents reviewed). Of these parents, 755 were eligible and 444 were interviewed. A two-stage diagnostic procedure was used in which located

participants were invited to a screening interview; if psychosis was possible, a more comprehensive interview was conducted to determine lifetime prevalence of psychotic, major affective and bipolar disorders, and substance use disorders. Expert diagnosticians reviewed all information to determine final, best-estimate diagnoses. Case and control parents were excluded if they had a genetic disorder with known neurobiological deficits (e.g., Huntington's disease).

A sample of 212 parents with psychotic disorders resulted from 208 families (151 mothers; 57 fathers). In 4 families both parents had psychotic disorders; clinical judgment was used to select one parent to include in the final sample. The sample included 58 parents with schizophrenia/schizophreniform and 34 other non-affective psychoses (20) including: 11 schizoaffective disorder, depressed type, 18 psychosis not otherwise specified, and 5 delusional disorder; and affective psychoses (n = 116): 9 schizoaffective disorder, bipolar type, 48 bipolar disorder with psychotic features, 48 major depressive disorder with psychotic features; and 11 parents with histories of other mood disorders with brief psychotic features.

Control parents were selected to be comparable based on number of offspring in the Collaborative Perinatal Project, patient status (public or private), parent's age, ethnicity (Caucasian or other), study site, and offspring's age, sex, and history of chronic hypoxia (11). Matching for chronic hypoxia was done to ensure approximately equal proportions of case and control pregnancies with and without chronic hypoxia (11). Eligible controls included all members of the Collaborative Perinatal Project who were not identified as potential psychotic parents. A sample of 308 parents was identified, of which 131 met inclusion criteria after diagnostic assessment. Exclusion criteria included: history of psychiatric hospitalization; Axis I psychotic or bipolar disorder; recurrent major depression without psychotic features; or Axis II Cluster A personality disorders. Other exclusions for both mothers and fathers were: history of psychosis, mania, suicide, or genetic disorder with known neurobiological deficits in sibling or parent of mother or father. Parents in the control sample could have other forms of psychiatric illness (e.g., single episode major depression, alcohol dependence). The sample of 208 psychotic and 131 non-psychotic parents had a total of 466 pregnancies enrolled in the study: 167 children of parents with affective psychoses; 68 children of parents with schizophrenia; 46 children of parents with other non-affective psychoses; and 185 children of non-psychotic parents.

Measures

Experimenter Observations of Children's Early Childhood Behavior Collected from 1959–1973

At the ages of 4 and 7 years, psychologists administered a battery of cognitive and motor tests (8). Based upon this interaction and a period of free play, psychologists rated the child's behavior using structured scales; the reliability and validity of these ratings have been published (21). Of the 466 participants, observations were available for 377 children at 4 years (196 male; 181 female) and 408 children at 7 years (204 male; 204 female).

Children's Observed Behavior at 4 years was scored on 10 items: emotional reactivity; degree of irritability; degree of cooperation; degree of dependency to examiner; duration of attention span; goal orientation; response to directions; level of activity; nature of activity; and nature of communication.

Behavior at 7 Years was assessed with 15 items: separation from mother; fearfulness; rapport with examiner; self-confidence; emotional reactivity; degree of cooperation; level of

frustration tolerance; degree of dependency; duration of attention span; goal orientation; level of activity; nature of activity; nature of communication; assertiveness; and hostility.

Each behavior was rated on a scale from 1 to 5 with the midpoint reflecting adaptive functioning. Response options did not typically fall along a continuum, but instead poles reflected qualitatively different behaviors (22). For example, for *emotional reactivity*, one endpoint reflected “flat affect” and the other reflected “unstable emotional response”. For this reason, two variables were derived for each original item, each utilizing a three-point scale (0=not true; 1=somewhat true; 2=very true). Thus, for the original item of emotional reactivity, two new variables were created, “flat affect” and “unstable emotional response”. An individual who was rated as extremely flat (1) on the initial item was rescored as “very true” (2) on the new “flat affect” variable and 0 (none) on the “unstable emotional response” variable.

Principal Components Analysis

Using the full data set of children in New England Family Study, the 20 scores at age 4 were entered into a principal components analysis with varimax rotation. Two externalizing and one internalizing scale emerged that utilized a total of 14 items: *Oppositional behavior* (unstable emotional response, irritability, negativism/resistive, demands a lot of attention, unwilling to follow directions), *Hyperactive behavior* (brief attention span, no or brief effort toward goal, overactivity, impulsive/uncontrolled behavior) and *Internalizing behavior* (flat affect, phlegmatic, passivity, rigid, little or no communication). Cronbach’s alphas were .85, .80, and .75, respectively, for these scales in the whole cohort, and .87, .83, and .72 in the subsample examined in this study.

The same procedure was completed for the 30 scores at age 7. One internalizing and one externalizing scale emerged that utilized 12 items: *Internalizing behavior* (shy/withdrawn; flat affect; inactivity; little or no communication; fearful/apprehensive; and passivity), *Externalizing behavior* (negativism/resistive; assertive/willful; hostility; unstable emotional response; acts out/becomes upset; and impulsive/uncontrolled behavior). Cronbach’s alphas were .85 and .80, respectively, for these scales in whole cohort, and .80 and .83 in the subsample examined in the present study.

A binary variable was created for each of the scales at ages 4 and 7 (i.e., behavior problem present or absent) because the symptom count for the observed behaviors was not normally distributed. Subjects with scores one standard deviation above the mean were considered positive (abnormal) for that variable.

Data Analysis

Prevalence of behaviors observed at ages 4 and 7 across each of the high-risk and normal-risk groups is presented. Logistic regression analyses were used to estimate odds ratios for each behavioral disturbance, in association with parental history of psychosis along with a 95% confidence interval. Two potential confounders were included in analyses: family socioeconomic status and mother’s age at birth. Models also adjusted for correlation of observations among siblings. To examine potential gender differences we included gender interaction terms to the logistic models and present results stratified by gender.

For each of the five items that were used at both the 4 and 7 year assessments (i.e., unstable emotional response; flat affect; negativism/resistive; passivity; and little or no communication) we examined patterns of temporal stability. Among those rated without a particular behavioral problem at age 4 years we modeled rates of initiation by age 7, and

similarly, for those rated as positive at age 4 years we modeled rates of desistance by age 7 years.

Results

As shown in Table 1, parental diagnostic groups were comparable in terms of study site, sex of child, and maternal ethnicity. Parents with psychoses compared to parents without psychoses, were significantly younger ($t = 2.63$; $p < .01$) and had a marginally lower family socioeconomic status ($t = 1.61$, $p = .10$). Given the differences in these demographic variables across groups, subsequent analyses were adjusted for maternal age and family SES.

Table 2 displays the prevalence and odds ratios of behavioral problems observed at age 7 for children of parents with and without psychosis. Models adjusted for maternal age, family socioeconomic status, and intrafamilial correlation. The reference group is children of parents with no psychosis. Children at high-risk for any form of psychosis exhibited significantly more externalizing disturbances. Children of parents with any form of psychosis or affective psychosis were over two times more likely to have externalizing problems. The odds of externalizing problems were over four times greater for children of parents with schizophrenia or parents with other non-affective psychoses. The rates of behavior problems among offspring of affected mothers versus fathers were generally comparable. Comparable analyses were conducted examining rates of behavioral problems at age 4 years. Although not reaching statistical significance, the rates of all behavioral problems at age 4 in children of parents with psychosis were higher compared to rates for children of parents without psychosis.

Regression models were recalculated separately for male and female children to examine possible gender differences. Female children of parents with psychoses were significantly more likely to have externalizing problems compared to normal-risk female children. This finding was particularly strong for female children of parents with schizophrenia ($OR = 19.6$; $CI = 3.6, 107.6$). These gender differences were supported by statistically significant interaction terms (gender $\times$ parent psychopathology) in the logistic regression models. Male children of parents with affective psychosis or non-affective psychosis (not schizophrenia) were over four times more likely to have internalizing problems compared to normal-risk male children.

Subsequent analyses examined rates of individual behavioral problems included in the internalizing and externalizing scales. Table 3 shows that male children of parents with psychosis had higher rates of shyness and withdrawal compared to male children of unaffected parents. This finding was particularly strong for males of parents with affective psychoses and non-affective psychoses (not schizophrenia). Results in Table 4 indicate that female children at high-risk for psychosis exhibited more unstable emotional responses (i.e., variable mood) compared to female children of parents without psychosis. This finding was strongest for female children of parents with schizophrenia.

For five behaviors observed at both ages 4 and 7, we examined patterns of stability over time. Desistance rates were generally high across all groups (e.g., 44% to 100%) suggesting that early observed problems remitted prior to age 7. Initiation rates were generally low across all groups (e.g., .8% to 25%). There were no significant differences in initiation or desistance rates between children of parents with and without psychosis except for the initiation of unstable emotional response, which occurred more frequently among offspring of affected parents.

Discussion

These results support the hypothesis that by age 7 years, offspring of parents with psychosis exhibit more behavioral problems compared to offspring of unaffected parents. Patterns of children's behavioral problems differed for males and females and according to the type of parental psychosis. As hypothesized, offspring of parents with schizophrenia and other non-affective psychoses were at increased risk for externalizing behavior. Contrary to our hypothesis, offspring of parents with affective psychoses were also at increased risk for externalizing behaviors. For internalizing behavior, children of parents with affective psychoses were at marginally increased risk for internalizing behaviors.

At 4 years, rates of problem behaviors in offspring of parents at HR for psychosis were comparable to rates for normal-risk children. Non-significant findings may be due to limited variability in the 4-year observations. Findings at 4 years are similar to results reported by Bearden and colleagues (22) examining deviant behaviors at ages 4 and 7 among the Philadelphia cohort of the Collaborative Perinatal Project cohort. They found that there were no differences in social maladjustment between pre-schizophrenia subjects and controls at age 4 but by age 7 significant differences had emerged. Bearden et al. hypothesized that the requirements of normality became greater with age including increased demands from the social environment (e.g., school) and for this reason pre-schizophrenia individuals exhibit increases in behavioral problems from early to later childhood. The findings at age 7 are also consistent with those of Weintraub and Neale (23) and Garmezy and Devine (24) indicating that children with a parent with schizophrenia differ from children with normal parents on aggressiveness.

At age 7, consistent with the literature on sex differences in internalizing and externalizing problems in normative samples (13, 25), female children of non-psychotic parents had higher rates of internalizing problems than male children of non-psychotic parents. The opposite pattern of sex differences in behavioral disturbances was found for high-risk children: males exhibited more internalizing problems than females. Consequently, at age 7, there were sex differences between the children of high-risk versus normal-risk parents. High-risk females had significantly elevated rates of externalizing problems compared to normal-risk females and high-risk male children had significantly elevated rates of internalizing problems.

There are several possible explanations for these findings. The first is that the childhood behavioral problems observed among high-risk offspring are early manifestations of the heritable phenotype of schizophrenia. Similarly, these problems may reflect early expressions of sex differences observed among adults with schizophrenia regarding premorbid history and symptom expression (see review 17). For example, women with schizophrenia have been found to be more explosive, overtly hostile, physically active and dominating, sexually delusional, and to display more acting-out behavior, agitation, and more affective symptoms than men. Men with schizophrenia have been found to be more withdrawn, passive, isolated, less exhibitionistic, less hostile, and less impulsive (26).

The current findings are also consistent with sex differences observed among relatives of persons with schizophrenia, with female relatives exhibiting more irritability, emotional instability, and male relatives displaying more flat affect (27–28). A large literature has suggested that a substantial percentage of relatives of persons with schizophrenia who do not develop the disorder manifest social and other difficulties (2, 29) including alterations of brain structure and function (30).

Another explanation for the elevated rates of externalizing problems in high-risk female children and internalizing problems in high-risk male children may be related to parenting

and socialization practices among parents with schizophrenia. The nature of schizophrenia may prohibit parents from appropriately relating to and caring for children (31). For example, negative symptoms such as affective flattening, anhedonia, and apathy may influence the dyad through the absence of behaviors that promote a secure attachment (32).

Evidence suggests that deficits associated with parental psychopathology (e.g., rejection, criticism, lack of emotional warmth, and overprotection) may increase the risk for internalizing and externalizing problems (33). Similarly, elevated levels of internalizing problems among high-risk male offspring may be attributable to exposure to high levels of parental psychological control (34). These causal explanations are speculative and require further investigation.

Strengths of this study include the fact that behavioral problems were observed by psychologists who were blind to parental psychiatric status. The original Collaborative Perinatal Project study examined a broad range of physical and psychological factors which might affect child development and was not designed as a study of schizophrenia. For this reason, experimenter bias for specific outcomes is unlikely although it can not be completely ruled out, particularly if mothers exhibited frank psychosis at the time of the child assessments. Furthermore, all of the behaviors were observed during early childhood and accordingly are free from retrospective bias. The sample size may limit our ability to test certain hypotheses. Findings may not extend to other samples because behavioral problems were based upon observed behavior in a research setting. Further, the majority of ill parents in this study were mothers and inconsistencies regarding the impact of maternal versus paternal psychopathology have been reported (35). Another limitation is that the overall ascertainment rate for psychosis in this sample is somewhat lower than would be expected which might represent a potential selection bias.

The current findings may suggest several options for early identification and intervention efforts. First, clinicians should engage family members, including children, when treating parents with psychotic disorders. Integration of family strengthening approaches into treatment programs would be helpful to educate and train parents with psychoses about child development, emotional relatedness/attachment, behavioral control, and other adaptive parenting skills (31, 36).

Second, children's development should be monitored for early expression of behavioral problems by parents, primary care physicians, and school mental health professionals; and clinicians should identify and treat early signs of internalizing or externalizing behavior problems (37). A reasonably mature evidence base exists for the treatment of externalizing behavior problems (38), and many early intervention strategies that include targeting multiple risk and protective factors have been shown to improve a child's current psychosocial functioning and prevent future problem behavior (e.g., conduct disorder, substance abuse) (39). An emerging evidence base for early intervention of internalizing behavior problems includes individual, cognitive behavior therapy-informed coping skill enhancement efforts and family-educational approaches to reduce risk factors and build resiliency factors (40).

In closing, the results of this study add to the accumulating evidence that children of parents with various forms of psychosis are at risk for internalizing and externalizing problems by age 7 years and that this risk may vary according to offspring gender. Longitudinal studies examining the relationship of observed early childhood behavior problems to psychopathology in adolescence and adulthood can provide valuable information about the course and predictive validity of early childhood difficulties and help to inform early identification and intervention program development.

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TABLE 1

Demographic characteristics of children born to parents with and without psychosis

Parental Group	Boston		Male ^I		Caucasian		Maternal Age		Maternal Education		Family SES Index	
	n	%	n	%	n	%	Mean	SD	Mean	SD	Mean	SD
No Psychosis	141	76.10	94	50.80	168	91.00	27.07	6.36	11.35	2.42	5.80	1.97
Any Affective Psychosis	123	73.70	78	46.70	156	93.40	25.69	5.27	10.78	2.80	5.53	2.01
Schizophrenia	47	69.10	39	56.70	60	88.20	26.96	7.03	10.98	1.90	5.38	1.94
Other Non-Affective Psychosis	32	69.60	25	54.30	39	84.80	24.93	5.02	10.78	2.65	4.97	1.94
Any Psychosis	202	71.90	142	50.50	255	90.70	25.87	5.73	10.83	2.59	5.40	1.99

Relationship to Group with No Psychosis	OR		95% CI		OR		95% CI		t		t	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	t	SD	t	SD
Any Affective Psychosis	1.23	(.68–2.22)	1.00	(1.00–1.01)	1.12	(.53–2.38)	2.23*		1.08		.77	
Schizophrenia	1.72	(.85–3.45)	.97	(.88–1.08)	1.64	(.70–3.85)	1.35		1.03		1.57	
Other Non-Affective Psychosis	1.69	(.93–3.13)	1.00	(1.00–1.01)	.74	(.29–1.89)	2.14*		1.50		2.09*	
Any Psychosis	1.43	(.86–2.38)	.89	(.69–1.15)	1.56	(.60–4.17)	2.63**		1.50		1.61 ⁺	

^I Gender is missing for 3 children: 1 of parent with affective psychosis; 1 of parent with schizophrenia/nonaffective psychosis; and 1 of parent with no psychosis;

⁺ p < .10;

* p < .05;

** p < .01

TABLE 2
Prevalence of Child Behavior Problem at Age 7 Years in Relation to Parental History of Psychosis, Parent Gender, and Offspring Gender

7 Year Behavior	Mother n=319		Father n=86		Total Offspring Sample ¹ n= 405			Male Offspring ¹ n=202			Female Offspring ¹ n=203			
	%		%		%	OR ²	95% CI ³	%	OR ²	95% CI ³	%	OR ²	95% CI ³	
Externalizing														
No Psychosis ⁴	7.8		13.3		8.2	Referent		10.7	Referent		5.7	Referent		
Any Affective Psychosis ⁵	15.1		7.7		13.1	2.13 ^{**}	(1.03–4.44)	11.1	1.12	(.40–3.09)	15.1	6.56 ^{**}	(1.98–29.70)	
Schizophrenia ⁷	18.8		35.3		24.5	4.44 ^{**}	(1.70–12.50)	23.1	2.59 ^{**}	(1.78–8.57)	26.1	19.50 ^{**}	(3.30–107.50)	
Other Non-Affective Psychosis ⁶	25.0		13.3		20.9	4.14 ^{**}	(1.56–11.11)	13.6	1.78	(.34–10.00)	28.6	11.36 ^{**}	(2.79–46.30)	
Any Psychosis ⁸	17.5		15.5		16.9	2.83 ^{**}	(1.45–5.60)	14.2	1.45	(.59–3.49)	19.7	8.05 ^{**}	(2.50–26.30)	
Internalizing														
No Psychosis ⁴	17.6		6.7		16.4	Referent		9.5	Referent		23.0	Referent		
Any Affective Psychosis ⁵	21.7		25.6		22.8	1.68 ⁺	(.90–3.13)	29.2	4.04 ^{**}	(1.63–10.03)	16.4	0.68	(.29–1.61)	
Schizophrenia ⁷	15.6		11.8		14.3	1.06	(.41–2.75)	23.1	2.87 ⁺	(.84–9.89)	4.3	0.17	(.02–1.40)	
Other Non-Affective Psychosis ⁶	21.4		26.7		23.3	1.48	(.59–3.84)	27.3	3.84 [*]	(1.18–12.50)	19	0.63	(.16–2.44)	
Any Psychosis ⁸	20.5		22.5		21.1	1.49	(.85–2.70)	27.5	3.59 ^{**}	(1.56–8.30)	14.5	0.55	(.25–1.21)	

No psychosis group was used as the reference group. Models adjust for maternal age, family socioeconomic status, and intrafamilial correlation. Models adjust for maternal age, family socioeconomic status, and intrafamilial correlation.

¹Includes Mothers and Fathers;

²Odds Ratio.

³Confidence Interval.

⁴n = 168;

⁵n = 145;

⁶n= 43;

⁷n = 49;

⁸
n = 237;
⁺p < .10;
* p < .05;
** p < .01;
*** p < .001.

Table 3
Rates of Age 7 Behavioral Problems Among Male Children in Relation to Parental Mental Illness

Behavior	No Psychosis (n = 82)			Any Affective Psychosis (n = 73)			Other Non-Affective Psychosis (n = 21)			Schizophrenia (n = 26)			Any Psychosis (n = 119)		
	n	%		n	%		n	%		n	%		n	%	
Internalizing															
Shy and Withdrawn	11	13.4		23	32.4**		7	31.8 ⁺		6	22.2		36	30.0**	
Flat affect	8	9.4		13	18.3		5	22.7		4	14.8		22	18.3 ⁺	
Inactivity	5	5.9		11	15.3 ⁺		3	14.3		3	11.1		17	14.2 ⁺	
Little or no communication	22	27.1		26	36.1		8	36.4		6	23.1		40	33.3	
Fearful/apprehensive	13	15.3		17	23.6		3	13.6		5	18.5		25	20.7	
Passivity	11	12.9		17	23.6 ⁺		4	18.2		4	15.4		25	20.8	
Externalizing															
Negativism/resistive	3	3.5		4	5.6			0		3	11.1		7	5.8	
Assertive/willful	2	2.4		1	1.4			0			0		1	.8	
Hostility	7	8.2		1	1.4 ⁺		1	4.5		1	3.8		3	2.5 ⁺	
Unstable emotional response	6	7.1		4	5.6		1	4.5		6	22.2*		11	9.2	
Acts out/becomes upset	5	5.9		1	1.4			0		1	3.7		2	1.7	
Impulsive/uncontrolled behavior	5	5.9		3	4.3		2	9.1		2	7.4		7	5.9	

Results of logistic regression comparing rates of behavior problems to offspring of parents without psychosis adjusting for maternal age, family socioeconomic status, and intrafamilial correlation.

⁺ p < .10;

* p < .05;

** p < .01;

*** p < .001.

Table 4
Rates of Age 7 Behavioral Problems Among Female Children in Relation to Parental Mental Illness

Behavior	No Psychosis (n = 82)		Any Affective Psychosis (n = 73)		Other Non-Affective Psychosis (n = 21)		Schizophrenia (n = 26)		Any Psychosis (n = 119)	
	n	%	n	%	n	%	n	%	n	%
Internalizing										
Shy and Withdrawn	22	25.3	16	21.9	5	25.0	4	17.4	25	21.6
Flat affect	17	19.5	10	13.7	3	14.3	2	8.7	15	12.8
Inactivity	15	17.2	12	16.4	4	19	2	8.7	18	15.4
Little or no communication	29	33.7	17	23.3	9	42.9	4	18.2 ⁺	30	25.9
Fearful/apprehensive	12	13.8	11	15.1	4	19.0	2	8.7	17	14.5
Passivity	9	10.5	10	13.7	5	25.0 ⁺	4	17.4	19	16.4
Externalizing										
Negativism/resistive	3	3.4	3	4.1 ⁺	4	19.0 [*]	1	4.3	8	6.8 ⁺
Assertive/willful	1	1.2		0		0		0	0	0
Hostility	2	2.3	3	4.1 [*]	1	4.8	1	4.3	5	4.3
Unstable emotional response	1	1.1	7	9.6 [*]	1	4.8 [*]	5	21.7 ^{***}	13	11.1 [*]
Acts out/becomes upset		0		0		0		0	0	0
Impulsive/uncontrolled behavior	2	2.3	3	4.1	3	9.5 [*]	3	13.6 [*]	8	6.9 ⁺

Results of logistic regression comparing rates of behavior problems to offspring of parents without psychosis adjusting for maternal age, family socioeconomic status, and intrafamilial correlation.

⁺ p < .10;

^{*} p < .05;

^{**} p < .01;

^{***} p < .001.