

Mothers and fathers do not accurately report each other's psychopathology

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Abstract

It is unclear whether information obtained from a one parent can be used to infer the other parent's history of psychopathology. Two hundred and one parental dyads were asked to complete psychiatric interviews. Based on maternal report, non-participating husbands/fathers had higher rates than participating fathers of psychiatric illness. For fathers who did participate, maternal report did not match direct interview of paternal psychopathology with sensitivities less than 0.40 and positive predictive values of 0.33 to 0.74. Psychopathology may be over-represented among fathers who do not participate in research. Mother report of paternal symptoms is not an effective proxy. Alternative methods need to be developed to: i) improve father participation or ii) identify psychiatric status in fathers who do not participate in research projects.

Introduction

A common problem when studying families is that husbands/fathers participate in research studies at only about 2/3 of the rate of wives/mothers.¹⁻³ Families where the husband/father does not participate in research are associated with lower parental education, lower socioeconomic status, younger parental age, non-majority racial or ethnic status, and less stable marriages than families where the husband/father participates.^{1,4} Offspring from families where the father does not participate in research are more likely to be unplanned, smaller at birth, less healthy, have a more difficult temperament, and have more siblings.¹ Costigan and Cox have argued that limiting research to families where the father participates over-represents higher functioning fathers biasing results toward mothers as the primary source of offspring difficulties. This argues not only that families with non-participating husbands/fathers be included in family studies, but that alternative methods to both increase husband/father participation and to identify critical variables about non-participating fathers (*e.g.* the use of public records) be

employed.¹ Mental illness is one area where methods to increase information about husbands/fathers needs additional exploration. A history of mental illness has negative consequences for families. Individuals with a history of mental illness are more likely to marry before the age of 20,⁵ more likely to be involved in domestic violence,⁶ and more likely to have a marriage end in divorce.⁷ In addition, parental psychopathology is associated with increased risk of psychopathology in offspring, and the effect size is similar whether the psychopathology occurs in the mother or in the father.⁸ Given the consistent negative impact of mental illness on a broad swath of family and offspring outcomes, additional efforts to identify and evaluate mechanisms and potential interventions are critical, and a number of laboratories are involved in this area of research. However, scientific progress in this area requires the accurate assessment of psychopathology.

The most commonly accepted mechanism to assess for psychopathology is direct interview, although self-report forms are also sometimes used. However, the high rate of husband/father non-participation in family studies combined with suggestions that non-participants differ from participants in rates of depressive and psychotic symptoms raises generalizability questions for a direct interview strategy.⁹ A commonly used option is to employ the other parent's report as a proxy for direct interview. The ability of family members to accurately identify psychopathology has primarily been assessed within the context of genetic studies, where samples are generally a combination of controls and family members recruited because at least one, and often more than one, individual within the family has been identified as having a psychiatric illness of interest. Psychotic illnesses are the most accurately recognized by their relatives, with a sensitivity of 0.44-0.72 and specificity approaching 1.0;⁹⁻¹¹ substance use disorders are recognized with a sensitivity of 0.44-0.56 and specificity of 0.94-0.96;¹² depression recognition has a sensitivity of 0.18-0.68 and specificity of 0.74-0.97;^{9,12-14} and, combined diagnostic categories (*i.e.* general recognition of psychopathology) have sensitivities of 0.37-0.84 with specificities of 0.61-0.86.^{12,14} Individuals who have a psychiatric illness of interest have consistently higher sensitivity and specificity when reporting the same illness in family members. Individuals that are recruited from general population samples have the lowest sensitivity and specificity at identifying psychiatric illnesses in family members. Individuals without a specific psychiatric illness but who are members of a family with multiple cases of that illness have more intermediate sensitivity and specificity profiles. One of the limitations of the work to date is the focus on families with known men-

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tal illness. There has been only a limited effort where recruitment is not biased toward multi-affected families. In more general population samples, sensitivity for substance use disorders drops to 0.19-0.34 and for depression to around 0.29.^{15,16} A second limitation with previous work has been the failure to include information about the informant's psychiatric symptoms; *i.e.* does knowing whether the mother has depression alter the interpretation of her report about the father's depressive symptoms? This report attempts to expand that knowledge base by using a general population sample of young parents and by exploring multiple broad categories of psychiatric illness. The purpose of the current study is determine if, when one parent does not participate in a research project, that parent's psychiatric history can be inferred from information obtained from the other parent. When asked to rate the level of involvement in child rearing, self and the other parent's reports are fairly discrepant.¹⁷ Conversely, when mothers and fathers are asked to independently report on their children's psychopathology agreement is considered to be moderate, particularly when broad categorical diagnostic categories are used.¹⁸⁻²⁰ It is unclear if the critical variable is who is being rated (*i.e.* parents have higher agreement about their children than each other) or what is being rated (there is higher agreement about psychopathology than level of involvement). Thus, it is difficult to predict the potential agreement between parental dyads on their psychopathology.

Materials and Methods

Participants

This report is part of a larger study focusing on the relationship between parental psychopathology and infant development. Infants and their parents were recruited through a state birth registry. Potential families were randomly chosen from zip codes in a metropolitan region and then sent a letter describing the study and an addressed stamped postcard to return if they were interested in participating. The approximately 8% of families who returned the postcard were further contacted. All families who agreed to participate were included irrespective of the number of parents who agreed to participate. Demographics of participating families were monitored, and sampling rate by zip code adjusted with a goal that familial participation matched, as closely as possible, census-based local metropolitan area demographics for race and ethnicity. Two community-based families who contacted the study and requested to participate were also included. Infants participated in six to ten physiological and developmental assessments between enrollment and 18 months of age. Attempts to recruit parents to complete diagnostic interviews continued around each visit; attempts were made via phone, email, and via a participating partner. Parents who agreed to complete diagnostic evaluation by their child's 18-month birthday may have scheduled the evaluation for a time noticeably after their child's 18-month birthday. Parents received

\$10 per hour (minimum \$30) for participation. In general, parental diagnostic interviews took less than 3 hours to complete and thus almost all participants received \$30 for the diagnostic interview. Investigative procedures were approved and monitored by a local Institutional Review Board.

Two hundred-one (201) families participated. The infants include 112 females and 89 males. One hundred eighty-one (90%) the biological parents lived together. Demographic information is summarized in Table 1. The racial and ethnic distribution was similar to that found in the local metropolitan region.

Diagnostic interviews

Given the known difficulties in optimizing paternal participation, the window for acceptable paternal participation was broad covering a 16-to-17-month period from initial family enrollment (generally when the infant was around 4-6 weeks of age) until the infant was 18 months of age. Because of this broad recruitment period, and because the overall study included genetic contributions to infant development, diagnostic evaluations focused on lifetime diagnoses (*e.g.* whether the individual had met criteria for a diagnoses at any time during their life, including but not limited to current illness). Interviews focused on biological parents (biological relationship solely determined by parental report). Parents were individually interviewed with 2 diagnostic instruments: the structured clinical interview for diagnostic and statistical manual of mental disorders - fourth edition - about themselves and the family interview for genetic

studies (FIGS) about the other biological parent of the infant.^{21,22} A Spanish version of the structured clinical interview (SCID) and a Spanish version of the FIGS developed by our lab were utilized when appropriate.²³ While a generally accepted Spanish version of the Family Interview for Genetic Studies was not available at the time we initiated this study; later efforts have suggested that translations have reasonable reliability and validity.²⁴ All interviews were completed by an experienced research mental health clinician (psychiatric M.D. or M.S.W.) with translator services utilized as necessary. In order to maintain sufficient time for the interviews, the interview concerning the other parent emphasized three major diagnostic areas: psychotic illnesses, affective illnesses, and non-nicotine substance use disorders. Anxiety, personality, and nicotine use disorders were not a component of the structured interview concerning the other parent. For the other parent interviews, a positive diagnosis was based on either a description of a sufficient number of symptoms to meet diagnostic criteria (*e.g.* depressed mood, poor sleep, etc.) or if the individual reported that the other parent had been diagnosed or treated for a specific psychiatric illness. All evaluation summaries were reviewed by 2 or more experienced research clinicians, and the resulting diagnoses were best estimate diagnoses. While interrater reliability was not assessed for this sample, the SCID has good interrater reliabilities when experienced research clinicians with advanced degrees are utilized, (*k* 0.65-1.00).^{25,26}

Psychopathology can be conceptualized as

Table 1. Parental demographics. Results based on information form, depending on the variable, between 200 and 201 mothers and between 195 and 201 fathers.

	Mothers*	Fathers*
Age in years (Mean + standard deviation) ^o	30.76±5.9	33.1±7.0
Age range in years ^o	16.2-48.2	17.8-58.7
Race/ethnicity		
Caucasian non-Hispanic	145 (72%)	145 (72%)
Caucasian Hispanic	36 (18%)	36 (18%)
African-American	6 (3%)	10 (5%)
Mixed	9 (4%)	4 (2%)
Other/unknown	5 (2%)	5 (2%)
Socio-economic level		
Education (years) [#]	15±3	15±3
Socioeconomic occupational index [§]	48±23	55±22
Interview data		
completed self-report interview and had the other parent report on their symptoms	148 (74%)	147 (73%)
completed self-report interview but the other parent did not report	50 (25%)	5 (3%)
did not participate in self-report interview but had the other parent report	3 (2%)	43 (21%)
with no psychiatric interview information	0 (0%)	6 (3%)
Marital status		
married to the other biological parent		162 (81%)
living with the other biological parent		16 (8%)
not married to or living with the other biological parent		23 (11%)

*201 mothers, 201 fathers unless otherwise specified; ^o201 mothers, 197 fathers; [#]200 mothers, 196 fathers; [§]200 mothers, 195 fathers. Data based on Nakao and Treas.²⁸

either categorical or continuous variables. Continuous variables often have increased statistical power and have the potential of noting differences even in non-clinical populations. However, psychopathology is often defined as symptoms severe enough to cause dysfunction, and many psychiatric interviews thus focus on symptom identification. Some symptoms play a larger role in diagnostic schema than others and some symptom clusters co-occur at rates higher than chance. Given these issues, symptom counts are generally not considered appropriate reflections of illness severity; categorical identification of psychopathological diagnosis is often utilized as the primary definition of psychopathology. All reports therefore focused on the presence or absence of a history of psychopathology.

Data reduction

A primary goal of this study was to determine if one parent could accurately report on the other parent's psychopathology. There is increasing awareness that psychopathology crosses traditional diagnostic boundaries, so a focus on broader diagnostic categories was appropriate; Diagnoses were reduced to 4 symptomatic categories: illnesses with psychotic symptoms (schizophrenia, schizoaffective disorder, bipolar disorder with psychosis, major depression with psychosis, psychosis not otherwise specified), illnesses with manic-hypomanic symptoms (schizoaffective disorder-bipolar subtype, bipolar I, bipolar II, bipolar not otherwise specified), illnesses with affective symptoms (major depression, schizoaffective disorder, bipolar I, bipolar II, bipolar not otherwise specified), depressive disorder not otherwise specified), substance use disorders (all non-nicotine substance abuse or dependence diagnoses), and any of the above. Comorbidity in psychiatric illness is high, and the categories were not mutually exclusive.

Data analyses

The other parents' reports were assessed for their ability to substitute for the direct parent interview. This analysis produced 4 statistics: sensitivity (the percentage of ill parents correctly identified by the other biological parent as having that illness), specificity (the percentage of non-ill parents correctly identified by the other biological parent as not having that illness), positive predictive value (the likelihood that if identified as having an illness by the other biological parent, the direct interview identified the same illness), and negative predictive value (the likelihood that if identified as not having an illness by the other biological parent, the direct interview identified the same lack of illness). For disorders of low frequency, with measures of low sensitivity, the likelihood of correctly identifying a non-case is high, whether one used the instrument of interest or just

assumed all non-interviewed individuals are negative. Thus, specificity and negative predictive value contained little information and were included only for completeness. Sensitivity and positive predictability were generally more informative statistics; a low sensitivity reflects under-identification of illness; a low positive predictive value reflects over-identification of illness. It should be emphasized that families were selected randomly, regardless of illness status. Hence the study is cross-sectional and representative of families returning postcards from this metropolitan area. Unlike case-control studies examining these illnesses, prevalence, positive predictive values, and negative predictive values can be validly estimated here. To address whether utilizing all available psychiatric diagnostic information improved correct identification, all father diagnostic categories were regressed, using a step-wise logistic regression with $P < 0.05$ to enter, onto ten independent variables; five from mother's report of father's psychiatric illness categories - including psychosis, mania, any affective disorder, any non-nicotine substance use disorder, and any psychiatric disorder - and five SCID-based maternal diagnostic categories - including psychosis, mania, any affective disorder, any non-nicotine substance use disorder, and any psychiatric disorder. For each subject, the logistic regression computed a probability level based on the subject's predictors. For any given probability level the program computed sensitivity, specificity, positive predictive value, and negative predictive. For each diagnostic category, the probability level was chosen to be the prevalence rate of the illness in the paternal study group.

Results

Psychopathology based on direct parent interview

To adjust for the possibility that there is non-

random mating, the impact of gender on rates of illness was examined using binary logistic regression adjusting for family membership. Participating mothers had higher rates of a self-reported history of illness with affective symptoms than participating fathers and a trend toward higher rates of a self-reported illness with psychotic symptoms. Participating fathers had higher rates of self-reported substance use illness. Gender had no significant impact on the rates of manic/hypomanic illnesses or on rates of any psychopathology. Rates of psychopathology for each gender are summarized in Table 2. The maternal lifetime affective diagnosis rate of 42% may appear high, but it is similar to what has been reported for lifetime depression for women with an average age in the early 30's.²⁷

Parent participation

One hundred fifty-two (76%) fathers and 198 (99%) mothers participated in a structured psychiatric interview about their own psychiatric histories. This includes 4 fathers (3% of the participating fathers) and two mothers (1% of the participating mothers) who were mono-lingual Spanish speakers. Relative to fathers who completed a diagnostic interview, fathers who did not complete a diagnostic interview (non-participating fathers) were younger (31.1 ± 7.7 years *vs* 33.6 ± 6.8 years, students $t = 2.1$, $P = 0.03$), had a lower number of years of education (14 ± 4 *vs* 15 ± 3 , students $t = 2.2$, $P = 0.04$), had a lower Nakao and Treas socioeconomic occupational score (47 ± 22 *vs* 57 ± 22 , student's $t = 2.5$, $P < 0.01$),²⁸ were less likely to be Caucasian Non-Hispanic/Latino (57% *vs* 77%, Fisher's Exact Test = 0.01), and were less likely to be married to or living with the biological mother (69% versus 95%; Fisher's Exact Test < 0.0001). The number of non-participating mothers ($n = 3$) was too low to assess for differences between participating and non-participating mothers.

One hundred ninety mothers reported on the biological fathers; 93% of these mothers reported

Table 2. Percentage of parents with a lifetime history of illness based on a direct interview of the subject. Information based on direct interview of the mother (for mothers' diagnoses) and of the father (for fathers' diagnoses).

Diagnostic category	Mothers	Fathers	Impact of gender* P value
Number of participating subjects	198	152	
Percentage of families with participating parent	99	76	
Any psychotic illness	4.0	0.7	0.08
Any manic/hypomanic illness	6.6	3.3	0.64
Any affective illness	41.9	17.8	<0.001
Any non-nicotine substance use disorder	26.3	36.2	<0.001
Any of these diagnostic categories	52.5	45.4	0.43

*Presence or absence of illness in each diagnostic category was regressed, using binary logistic regression, onto gender and family. P-values reflect the impact of gender after adjusting for family. There was no significant effect, for any diagnostic category, for family.

that they had had contact with the biological father within 1 day of reporting on that father. One hundred forty-seven of these biological fathers also completed a structured psychiatric interview about themselves. One hundred fifty-one biological fathers reported on the biological mother; 99% of these fathers reported that they had had contact with the biological mother within 1 day of reporting on that mother. One hundred forty-eight of these mothers also completed a structured psychiatric interview about themselves.

Comparing psychopathology in participating vs non-participating fathers

Rates of psychopathology, based on maternal report, for participating versus non-participating fathers are summarized in Table 3.

Mothers reported higher rates of overall psychopathology for non-participating fathers than for participating fathers. Nonparticipating fathers also had higher reported rates than participating fathers of psychiatric disorders, and trended towards higher rates of affective and substance use disorders. The low rate of maternal non-participation provided insufficient power to compare non-participating to participating mothers.

Comparison of the other parent's report versus direct interviews for psychopathology

Interview information from both the individual and the other biological parent was avail-

able for one hundred forty-eight mothers and one hundred forty-seven fathers. Using the structured interview of the individual (self-report of symptoms) as the standard, sensitivity, specificity, positive predictive value and negative predictive value are summarized in Table 4. In general, when direct interview of the father suggested illness, the percentage of mothers who accurately identified that illness was low (sensitivities ranging from 0.00 to 0.32). Similarly, when mothers identified a psychiatric illness in the biological fathers, the likelihood that a direct interview of the father identified the same illness in themselves was also low (positive predictive values of 0.25 to 0.58, with the positive predictive value for psychosis undefined). When examining the more general question of whether the mother could accurately report whether the father had any of the studied illnesses, sensitivity and positive predictive values were only mildly better (0.40 and 0.75 respectively). Fathers' abilities to accurately identify maternal illness were similarly poor.

For the rarer diagnostic psychosis and mania/hypomanic categories, the logistic regression provided no benefit over the accuracy of identifying paternal illness based on mother report of diagnostic symptoms. For the more common illness categories of affective disorder, substance use disorders and any psychiatric disorder, the regression analysis sup-

Table 3. Percentage of psychopathological illness for participating and non-participating fathers as reported by the mothers.

Diagnostic category	Participating	Non-participating	Fishers Exact Test P value
Psychotic illness	0.0	4.7	0.05
Manic or hypomanic illness	2.7	7.0	0.19
Affective illness	12.9	25.6	0.06
Substance use disorder*	14.3	27.9	0.07
Any of these illnesses	23.8	39.5	0.05

Sample includes 190 fathers; 147 of whom participated in a structured diagnostic interview and 43 of whom did not. *Excludes nicotine use disorders.

Table 4. Sensitivity, specificity, positive predictive value and negative predictive value for the other parent's report of mental illness categories. For example, of 148 mothers in the study, criteria for a diagnosis of a lifetime history for a psychotic illness was met based on direct interview for 4 mothers, based on father interview for 2 mothers, and was identified by both interviews for 1 mother; thus, using the direct interview of the mother as the gold standard, the father's interview about the mother had a sensitivity of 0.25, specificity of 0.99, positive predictive value of 0.50 and a negative predictive value of 0.98. Similarly, 53 of 147 fathers had a history of a substance use disorder based on direct interview of the father, 26 of the 147 had a substance use diagnosis history based on maternal report, and a history of a substance use diagnosis was identified by both sources for 15 of the 147 fathers. using direct interview of the father as the gold standard, the mother's interview about the father had a sensitivity of 0.28, specificity of 0.93, positive predictive value of 0.58 and negative predictive value of 0.70.

Diagnostic category	Subjects with both direct interview and spousal interview	Cases based on direct interview	Cases based on the other parent's interview	Cases with agreement from both sources	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
Psychotic illness								
Mother	148	4	2	1	0.25	0.99	0.50	0.98
Father	147	1	0	0	0	1.00		0.99
Manic or hypomanic illness								
Mother	148	7	7	5	0.71	0.99	0.71	0.99
Father	147	5	4	1	0.20	0.98	0.25	0.97
Affective illness								
Mother	148	56	24	18	0.32	0.94	0.75	0.70
Father	147	27	19	9	0.33	0.92	0.47	0.86
Substance use disorder*								
Mother	148	35	9	6	0.17	0.97	0.67	0.79
Father	147	53	26	15	0.28	0.93	0.58	0.70
Any of these illnesses								
Mother	148	72	31	27	0.38	0.95	0.87	0.62
Father	147	67	36	27	0.40	0.89	0.75	0.64

* Excludes nicotine use disorders.

ported a model using two or more pieces of diagnostic information (Table 5). For these three diagnostic categories, adding maternal diagnostic information improved sensitivity for paternal illness with effects on positive predictive value either minimal or positive. Interestingly, the best predictor of paternal substance use disorder was knowing whether mother had a history of any psychopathology, although her report of paternal substance use history was also included in the final model.

Discussion

In this study of families, maternal participation in a structured diagnostic interview is high (99%). The results are different for fathers. The percentage of cases where the biological father is either unknown or unavailable is low (around 4%) and yet 25% of biological fathers did not participate, despite repeated recruitment efforts across a time period extending up to 18 months after an infant's birth. The issue of under-participation of fathers in research protocols is an ongoing problem,^{2,3,29} and the rate of paternal participation found here is similar to other reports.¹ Maternal reports of paternal psychopathology were much higher in fathers who did not participate in the study relative to fathers who did participate, particularly in rates of illicit substance use and psychotic disorders. Many psychopathological illnesses are associated with symptoms which might reduce participation, including low motivation in depressive and psychotic illnesses, paranoid thinking in psychotic illness, or impaired cognition and organizational skills that are often concurrent with psychosis, altered mood, or acute intoxication. It is also possible that father nonparticipation is reflective of a less positive maternal-paternal relationship that influences mothers to be more likely to report psychiatric symptoms. This study was not designed to differentiate between these possibilities. However, if the

maternal report of increased psychopathology in non-participating fathers reflects true increases in psychopathology, this raises concerns that studies which limit themselves to families with two participating parents may have under-representation of husband/father psychiatric illness and are therefore at risk for overestimating the role of wife/mother relative to husband/father psychiatric illness.

One method to increase accuracy of paternal psychiatric diagnosis would be to increase father participation. In this study, extending the recruitment efforts out to 18 months and allowing for scheduling for several months after that increased father participation rates. For a 6 month period, from when their child is 6 weeks to when their child is 7½ months of age, the likelihood of father involvement in a structured interview increased by 1% approximately every 4 days. After that time point, recruitment slowed, but continued at a steady rate. For the next 14 months, up to when the child was approximately 22 months of age, the likelihood of father participation increased by 1% approximately every two weeks. After 22 months of age, only 4 additional fathers participated; however, there were no active recruitment efforts after the child's 18-month visit. It is unclear if additional extension of recruitment efforts would further increase paternal participation rates. Extending the duration of recruitment efforts seems most appropriate when looking for a lifetime history of psychopathology. Extending the duration of recruitment efforts may be less useful when researching questions related to an acute exposure, such as a child's environmental exposure to a father's psychiatric illness at a specific stage of development. Given the rapidity at which fetuses and young infants develop, the window to assess fathers may be relatively short, perhaps during a specific trimester during pregnancy or during the first few weeks after birth. However, to our knowledge, accuracy of father recall of psychiatric illness over a 2- to 3-year time frame has never been studied. If reasonable recall can be demonstrated, more

extended data collection periods may also be appropriate for developmentally-specific exposure. As an alternative to increasing father recruitment, this study examined the accuracy of maternal report of paternal psychiatric illness as a proxy for direct evaluation of the father. For symptom categories with at least 10 affected individuals, the other parents' reports had low sensitivities (0.17-0.33), despite the broad diagnostic categories utilized. The *any psychopathology* category, reflective of general recognition of psychopathology, demonstrated slightly better, but still low utility sensitivities of 0.38-0.40. In addition, maternal report of paternal psychopathology had low positive predictive values for any specific illness grouping, ranging from 0.24-0.58 (with psychosis positive predictive value undefined). The positive predictive value of 0.75 for *any psychopathology* was moderately better, although still low enough to raise concerns. In short, maternal report of broad symptom-based paternal psychopathology is of low utility at compensating for low paternal participation.

In an attempt to increase the accuracy of paternal diagnosis based on information obtainable from the mother, logistic regressions were completed utilizing all results based on mother interview, including reports of self and the other biological parent. For more common paternal psychiatric illness categories, including information about mother's psychiatric status improved the accuracy of paternal diagnosis. Possible contributors to this finding include non-random mating (*e.g.* mothers with a history of psychiatric illness are more likely than mothers without such a history to become involved with a father with a history of a substance use disorder), secondary effects (*e.g.* fathers with a history of a substance use disorder increase psychopathology in the other biological parent), or view point differences (*e.g.* mothers with a history of affective illness are more aware of their partners' affective illness than mothers without such a history).

Table 5. Best predictors and sensitivity, specificity, positive predictive value and negative predictive value for father mental illness categories; sample includes 147 fathers father-mother dyads.

Paternal diagnosis	Best model*	Sensitivity	Specificity	Positive predictive value	Negative predictive val
Psychotic illness	None				
Manic or hypomanic illness	Father mania	0.20	0.98	0.25	0.97
Affective illness	Father affective Mother sub use Mother affective	0.50	0.85	0.42	0.89
Substance use disorder ^o	Mother any Father sub use	0.78	0.65	0.54	0.85
Any of these illnesses	Father any Mother sub use	0.62	0.84	0.76	0.73

*Father diagnoses are based on maternal report; maternal diagnoses are based on a structured diagnostic interview of the mother. Sub use = a history of any non-nicotine substance use disorder. Mania = history of mania or hypomania; sub use = history of a substance use disorder; any equals a history of psychotic, affective, or substance use psychiatric illness. ^oExcludes nicotine use disorders.

Adding information about maternal history of substance use disorder improved both sensitivity and positive predictive value for paternal substance use disorders. While the overall accuracy of identifying paternal psychopathology remained modest, these results suggest that, with additional research, alternative more accurate methods to infer paternal psychopathology may be possible.

Other methodologies for clarifying paternal psychopathology have been attempted. Gavin and colleagues attempted to visit the father in the father's home.³⁰ However, at least with low-income adolescent fathers, this approach was relatively ineffective achieving only 60% paternal participation. Caspi and colleagues noted that absolute levels of maternally-reported paternal antisocial behavior are markedly lower than paternal self-report;³¹ thus maternal report was a poor direct proxy for paternal antisocial personality disorder diagnosis. However, maternal report was correlated with paternal self-report, suggesting that if the scale was recalibrated, maternal report might provide a reasonable proxy. The low positive predictive values of maternal report in the current study suggests that this approach may not be equally valuable for other forms of psychopathology; however, the current study does suggest that additional indirect information, including psychiatric information about the informant, may improve accuracy of paternal diagnosis. A combination of these efforts or involvement of additional family members such as grandparents may be necessary to gain reasonable insight into non-participating husband/father psychopathology.³⁰

Results on the ability of mothers to identify paternal psychopathology are based on those families where fathers participated. Father non-participation may be reflective of less maternal-paternal interaction, and the low accuracy of maternal report may be even lower than reported here. A notable limitation of this study is the focus on lifetime diagnoses (*e.g.* a history of psychopathology at any time during an individual's life). Lifetime diagnoses are appropriate when considering genetic contributions to illness but may have less applicability when focusing on environmental effects. It is possible that there may be greater agreement between sources when specific symptoms (*e.g.* sleep impairment or depressed mood) are considered; however, given the difficulty of using symptom count to define severity of psychiatric illnesses, it is unclear whether greater agreement at the symptom level would provide information relevant to long-term outcome of either the family or the child. The moderate sample size did not permit appropriate validation of the predictors chosen by the step-wise logistic regression analyses. In addition, the moderate sample size limited the accuracy of estimated frequency of illness,

particularly for low frequency illness categories like schizophrenia and mania. For the sample size utilized here, results for higher frequency illness categories like affective disorders and substance use disorders may be more reliable.

Husbands and fathers play a major role in the health of a family, including both the stability of a marriage and the quality of child development. Yet, fathers under participate in research studies. One methodological option would be to substitute maternal report of psychopathology for direct interview of the father. This is the first report, using a broad array of diagnoses in a population based sample, to assess this possibility. In this study, mothers reported that the biological fathers who did not participate in a diagnostic interview had higher rates of psychopathology. However, given the low accuracy of the report, it is unclear whether the non-participating fathers truly had higher levels of psychopathology or whether this difference was a proxy for another issue, such as generally lower involvement in family activities. Either way, research projects which limit enrollment to families where fathers agree to participate are selecting for healthier fathers and/or healthier relationships and may underestimate the impact of husband/father psychopathology. Mother direct report of father psychopathology is not an effective proxy for direct paternal interview. Using a broader array of information, including psychiatric information about the female informant, improved accuracy; however, benefits were modest. Alternative methods to increase paternal involvement and/or identify proxies for psychopathology will need to be developed if we are to fully understand paternal impact on infant development.

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