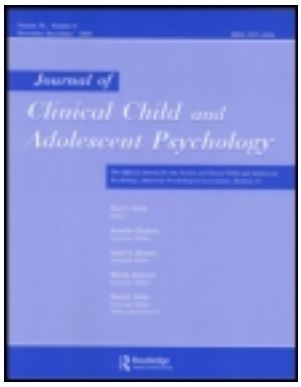

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Psychological Symptoms in Youth and Later Socioeconomic Functioning: Do Associations Vary by Informant?

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Psychological Symptoms in Youth and Later Socioeconomic Functioning: Do Associations Vary by Informant?

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We examined whether associations between symptoms of attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), depression, and anxiety assessed in a sample of 2,026 youth aged 6 to 16 years and socioeconomic functioning measured 18 years later varied as a function of whether parents or teachers had rated symptomatology. After accounting for confounding variables (e.g., family socioeconomic status in childhood), psychological symptoms explained 2.78% of the variability in adult socioeconomic status. Much of that variance was unique to teachers or parents (0.90% and 1.41%, respectively). Moreover, several informant-specific associations emerged: teacher-rated depression and parent-rated ADHD and ODD were significant predictors of later socioeconomic functioning. Overall, these findings provide further evidence that differences between informants are meaningful and support the utility of maintaining the unique perspective of each rater in analytic and measurement strategies.

Concerns about the reliability of self-reported psychological symptoms obtained from young children have led mental health clinicians and psychiatric epidemiologists to rely on assessments collected from parents and teachers to measure childhood emotional-behavioral problems. Numerous studies have documented low to moderate associations between parent and teacher reports of children's psychological symptoms, with Pearson correlations varying from approximately .20 to .40 (Achenbach, McConaughy, & Howell, 1987). Furthermore, prevalence estimates of childhood psychiatric disorders depend on the informant (e.g., Boyle et al., 1996; Drabick, Gadow, & Loney, 2007; MacLeod, McNamee, Boyle, Offord, & Friedrich, 1999), and there is evidence that parent and teacher ratings are differentially useful for predicting psychiatric diagnoses (Owens & Hoza, 2003). Interpretation of these discrepancies has stimulated lively debate, although some consensus is emerging that these differences reflect meaningful variability in informants' perspectives and experiences with a given child (see De Los Reyes & Kazdin, 2005). The current study contributes to this discussion by examining the relative contribution of unique and shared variance associated with parent and teacher reports of youth psychopathology to the prediction of socioeconomic status (SES) in early adulthood and whether the association between specific symptom types and later SES varies as a function of informant. These questions hold theoretical and practical importance; addressing them will contribute to our understanding of the meaning of informant discrepancies as well as improve our measurement of psychological symptoms in childhood by highlighting how much emphasis should be placed on unique versus shared variance in our assessment and analytic strategies.

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INTERRATER DISCREPANCIES IN THE ASSESSMENT OF YOUTH PSYCHOPATHOLOGY

Measurement of psychological symptoms in children and adolescents is complicated by the absence of an accepted external criterion or "gold standard" (Faraone & Tsuang, 1994). This leads clinicians and researchers to obtain as much information as possible about a target child's emotional and behavioral problems. In the assessment of youth psychopathology, the best practice is to obtain information from multiple individuals likely to have knowledge of the child's behavior, such as peers, parents, and teachers (Kraemer et al., 2003).

Although there is consensus that data must be collected from multiple informants, there is less agreement concerning how to use these different reports. Often, investigators employ techniques that emphasize interrater agreement, such as combining data from different informants to form summary ratings (see De Los Reyes & Kazdin, 2004). Similarly, if binary judgments are of interest, investigators may classify disorder only when all informants agree that a child meets criteria (see Youngstrom, Findling, & Calabrese, 2003). Such approaches explicitly treat shared variance between raters as the "signal" and the variance unique to each informant as "noise." Another common strategy is to use an "either or" algorithm, such that children are classified with disorder if they meet criteria based on any informants' rating (e.g., Fergusson & Woodward, 2002; Woodward & Fergusson, 2001). Thus, children for whom there is consensus about classification are viewed to be equivalent to those for whom there is disagreement. In pooling shared and unique variance between raters, this strategy treats both as "signal" and makes no distinction between them, even though unique variance may be "noise."

In general, most measurement and analytic approaches make no attempt to understand the extent to which unique variation associated with informant ratings is meaningful. It has been suggested that informants' ratings reflect (a) characteristics of the child; (b) the context in which the child is acting; (c) the experience, insight, and knowledge of the informant, and (d) measurement error (Kraemer et al., 2003). The second and third influences offer the promise of substantively useful information that is informant specific. If this is the case, it will be important to capture and maintain the unique perspectives of informants, avoiding analytic and measurement strategies that combine ratings using simple rules.

Several lines of evidence suggest that discrepancies between parent and teacher ratings do in fact reflect more than measurement error. First, ratings provided by different informants are highly reliable (see Drabick et al., 2007). Second, a recent study demonstrated that children's behavior in different observational contexts was associated differentially with parent and teacher ratings of disruptive behavior (De Los Reyes, Henry, Tolan, & Wakschlag, 2009). Specifically, disruptive behavior with a parent predicted parent ratings of disruptive behavior, whereas disruptive behavior with an examiner was associated with teacher ratings. This pattern of results suggests that situation specificity of behavioral problems explained at least part of the discrepancy between parent and teacher judgments.

Third, the presence of interrater discrepancies can be predictive of youth outcomes. Ferdinand, van der Ende, and Verhulst (2004) found that in a community sample of adolescents, differences between parent- and self-reported emotional and behavioral problems predicted a variety of youth outcomes measured 4 years later. For example, when parents reported more attention problems than their children, youth were more likely to be expelled from school, whereas when children reported more attention problems than their parents, they were more likely to be referred to mental health services. These investigators have also examined the predictive utility of parent-teacher discrepancies in reports of youth psychological symptoms (Ferdinand, van der Ende, & Verhulst, 2007b). In a community sample of children aged 12 to 14 years, parent and teacher discrepancies in ratings of psychological symptoms (calculated by subtracting teacher scale scores from parent scale scores) predicted the presence of a number of mental health problems 14 years later. For instance, higher parent ratings of aggressive behavior, relative to teachers, were associated positively with subsequent suicide attempts. However, in a clinical sample, such discrepancies did not predict several indices of functioning assessed approximately 6 years later, including disciplinary problems at school and alcohol use (Ferdinand, van der Ende, & Verhulst, 2007a).

Taken together, then, research suggests that some portion of the differences among raters of youth psychological symptoms, including parents and teachers, captures meaningful variation. If this is true, the associations between these ratings and correlates of disorder might vary as a function of informant. Some studies have examined this hypothesis using parent and teacher ratings of psychiatric symptomatology in children and adolescents (see Collishaw, Goodman, Ford, Rabe-Hesketh, & Pickles, 2009, for review). Much of this work has focused on externalizing behaviors. For example, Hart, Lahey, Loeber, and Hanson (1994) studied clinically referred boys aged 7 to 12 years and found that (a) teacher-reported oppositional defiant disorder (ODD) showed stronger associations with poor peer relationships and peer-reported aggression than parent-reported ODD and (b) teacher-reported conduct disorder (CD) showed stronger associations with school suspensions

than parent-reported CD. In a series of studies involving boys aged 6 to 10 years recruited from clinics and other sources, Drabick and colleagues have demonstrated a number of unique parent and teacher associations. For example, one investigation found that boys with ODD identified by their parents were rated as having higher levels of maternal detachment than boys classified with ODD based on teacher report, whereas boys with teacher-identified ODD were rated higher on social problems than those with maternally reported ODD (Drabick et al., 2007, 2008; Drabick, Gadow, & Sprafkin, 2006; Gadow et al., 2004). Offord et al. (1996) examined similar questions using a large general population sample comprised of boys and girls between 6 and 16 years of age. The findings of this study indicated that only teacher-reported CD was associated positively with being male and from a lower-income family, whereas only parent-reported CD was associated with maternal depression and family dysfunction. Maternally identified ODD was also associated positively with these variables, whereas only teacher-reported ODD predicted being from a single-parent family (also see Boyle et al., 1996).

Fewer studies have assessed whether the links between internalizing symptoms (i.e., anxiety and depression) and key correlates vary as a function of informant. Frick, Silverthorn, and Evans (1994) found that parent-, but not teacher-, rated anxiety was associated with having a maternal history of anxiety in two samples of clinically referred children (ages 6 to 8 years and 9 to 13 years). Using a more global index of psychological symptoms, Fitzmaurice, Laird, Zahner, and Daskalakis (1995) examined the associations between parent- and teacher-rated internalizing symptoms in a community sample of boys and girls aged 6 to 11 years. The pattern of results indicated that children's poor health, family stress, and maternal distress all showed stronger associations with parent judgments of symptomatology.

Each of these studies suggests that there is value in conceptualizing psychopathology as "source-specific syndromes" by maintaining teachers and parents as separate raters (Drabick et al., 2007; Offord et al., 1996). A handful of studies have tested the utility of a source-specific approach when examining prospective associations. In one such investigation, Fergusson, Boden, and Horwood (2009) assessed symptoms of oppositionality and conduct disorder in a birth cohort of boys and girls on repeated occasions at ages 7, 8, and 9. Latent-class modeling techniques were used to identify four groups of children: no conduct problems, parent-reported conduct problems only, teacher-reported conduct problems only, and both parent- and teacher-reported conduct problems. Results indicated that, when assessed an average of 8 years later, children with conduct problems reported by one of parents or teachers went on to experience greater problems with mental health, criminality, substance dependence, and relationships than children with no reported conduct problems. Children with conduct problems identified by both parents and teachers were the most likely to experience these negative outcomes, although these probabilities did not differ significantly from those of children with problems identified by one informant. Results of this investigation suggest that variance unique to one rater (i.e., teacher-reported conduct symptoms or parent-report conduct symptoms) is an important predictor of later functioning, although the outcomes for all three groups with reported conduct symptoms were similar.

Other studies have included a wider spectrum of disorders. Loeber, Green, Lahey, and Stouthamer-Loeber (1991) enlisted a clinically referred sample of prepubertal boys to examine correlations among parent, teacher, and self-reported symptoms of attention-deficit/hyperactivity disorder (ADHD), CD, and ODD and parent-reported school suspensions, police contacts, grade repetition, and special class placement 1 year later. Several informant-specific associations emerged: teacher-reported symptoms predicted suspensions (ADHD) and special class placement (ADHD, ODD); parent-reported ODD and CD were associated with police contacts. A second study with clinically referred youth (boys and girls age 6–12 years) examined the associations between psychopathology rated by parents, teachers, and clinicians and a number of negative outcomes, including receiving mental health services, school problems, and police contacts, measured approximately 3 years later (Ferdinand et al., 2003). Results indicated that ratings of aggressive behavior by teachers predicted problems at school and receiving outpatient treatment, and parent-rated aggression predicted police contacts. Neither parent- nor teacher-rated anxiety and depression were associated with negative outcomes.

Findings based on a community sample, however, indicated that internalizing symptoms, as rated by teachers, did predict subsequent negative outcomes. Verhulst, Koot, and Van der Ende (1994) assessed internalizing and externalizing syndromes, as reported by parents and teachers, in a community sample of boys and girls aged 4 to 11 years, and their associations with the following indices of functioning measured 6 years later: referral to mental health services, parent report of need for mental health services, academic problems, school behavior problems, police contact, and suicidal behavior. In one set of analyses, parent and teacher ratings served as predictor variables in stepwise logistic-regression models. Results indicated that parent-rated attention problems and delinquent behaviors, and teacher-rated somatic complaints, social problems, and delinquent behaviors predicted poor functioning, defined as the presence of at least one of the negative outcomes. Looking at

broadband measures of symptomatology, only teacher-rated internalizing symptoms were associated with poor functioning, whereas both parent- and teacher-rated externalizing symptoms were significant predictors.

ASSOCIATIONS BETWEEN CHILDHOOD PSYCHOPATHOLOGY AND ADULT SOCIOECONOMIC FUNCTIONING

The current study builds on these prospective investigations in two key ways. First, we quantified and compared the amount of explained variance in the outcome that can be attributed to parent ratings, teacher ratings, and the variance shared between them. Previous studies have compared children with elevated symptom ratings from multiple informants to those receiving high ratings from only one (Fergusson et al., 2009), or have examined beta coefficients associated with specific symptoms obtained from regression analyses (e.g., Verhulst et al., 1994). Neither of these approaches provides estimates of the overall amount of variability attributable to unique and shared variance. Delineating the contribution of parent and teacher ratings to the prediction of outcome variables in this way can provide further insight into the meaning of interrater discrepancies as well as contributing to our understanding of best practices for handling data provided by multiple informants (see Collishaw et al., 2009). If the variance shared between informants explains the majority of the variability in the outcome, then the optimal strategy would involve combining ratings. If, however, the variance unique to each rater explains a significant portion of the outcome, then it might be better to keep ratings separate.

Second, this study focused on a different outcome variable than previous investigations; specifically, we examined associations between psychopathology assessed in childhood and adolescence and socioeconomic functioning in adulthood. Higher SES is associated strongly with better functioning in a number of domains, and as such, is an important outcome to study (see House, Kessler, & Herzog, 1990). Numerous studies have demonstrated positive linkages between psychopathology and lower SES (e.g., Costello et al., 1996; Costello, Compton, Keeler, & Angold, 2003). Two interrelated theoretical reasons for this association have been advanced (Dohrenwend et al., 1992; see also Costello et al., 2003; Johnson, Cohen, Dohrenwend, Link, & Brook, 1999). Social causation models posit that the adverse circumstances associated with poverty (e.g., life stress, limited access to resources) cause psychological disorder. Social selection models, on the other hand, suggest that genetic and environmental factors contribute to psychopathology, and psychopathology in turn leads an individual to "drift down" to low SES.

Social selection theory, then, predicts that youth with psychopathology should be more likely to experience poor socioeconomic functioning in adulthood, after taking into account confounding variables experienced in childhood, such as family SES (Johnson et al., 1999). Several longitudinal studies have tested this hypothesis for externalizing behavior problems. Manuzza, Klein, Bessler, Malloy, and LaPadula (1993) compared a clinically referred sample of boys aged 6 to 12 years who were diagnosed with ADHD based on parent, teacher, and clinician report to a control group of boys matched for family SES. They assessed participants 13 to 19 years later and found that the boys with ADHD had completed an average of 2.5 fewer years of education and also held significantly less prestigious occupations. Findings from a community sample of boys and girls first assessed between 9 and 18 years of age also indicated that youth diagnosed with a disruptive behavior disorder (i.e., one of ADHD, CD, or ODD, as determined by self- and parent ratings) were more likely to drop out of high school and less likely to continue their education past high school (Johnson et al., 1999). Two other studies focused more specifically on symptoms of oppositionality and conduct disorder. Fergusson, Horwood, and Ridder (2005) assessed disruptive, oppositional, and conduct disordered behaviors when boys and girls were between 7 and 9 years of age. These symptoms exhibited no statistically significant associations with educational attainment or unemployment assessed approximately 14 years later, after controlling for confounding variables, such as family SES. In these analyses, symptoms of inattention and hyperactivity were also treated as covariates, and were found to be significantly associated with both outcomes. A second study, however, focused only on adolescent girls and did find a significant association between oppositionality, disruptive behavior, and conduct problems assessed at age 13 using parent and teacher report and educational achievement measured in late adolescence, even after controlling for problems with attention/hyperactivity (Fergusson & Woodward, 2000).

These studies suggest that externalizing behavior problems, particularly ADHD, contribute to later socioeconomic difficulties. The evidence for the association between internalizing symptoms and later SES, after accounting for confounding variables, is not as strong. In their study, Johnson et al. (1999) found that anxiety and depression diagnoses did not predict poor educational outcomes. In fact, anxiety and depression were associated with a lower likelihood of dropping out of school. A second study with a community sample found that depression diagnoses in adolescence were not associated with leaving school or entering university or other training, as assessed in early adulthood (Fergusson & Woodward, 2002). Another analysis with the same

sample did indicate that adolescents diagnosed with a number of anxiety disorders were less likely to enter university (Woodward & Fergusson, 2001).

The current study aims to contribute to existing research by disaggregating the explained variance in adult SES associated with parent and teacher assessments of psychopathology in childhood. Most of the available studies have combined information from different informants. Given the evidence reviewed earlier that associations with prospective outcomes may vary as a function of informant, techniques that emphasize shared variance between raters may be underestimating the contribution of psychopathology to the prediction of SES. Furthermore, only a handful of these studies included ratings by teachers, and in general, teachers provided information about disruptive behaviors (e.g., Fergusson et al., 2005; Fergusson & Woodward, 2000). Typically, reports of anxiety and depression are obtained from parents and the youth themselves. This choice is consistent with the general perception of researchers and clinicians that children and parents are better informants of youth internalizing problems than teachers (Loeber, Green, & Lahey, 1990). However, teachers are able to provide valid and reliable reports of symptoms of both anxiety and depression (e.g., Drabick et al., 2008; Ines & Sacco, 1992). Furthermore, their judgments may be particularly useful when attempting to predict subsequent socioeconomic functioning. Academic performance and behavior at school are likely to be associated with later SES (e.g., Boyle, Georgiades, Racine, & Mustard, 2007). Thus, children experiencing symptoms severe enough to be problematic in this context and noticeable to teachers may be at risk for poor socioeconomic outcomes. In addition, teachers are exposed to many children from various backgrounds and thus may have a better normative framework for assessing symptoms.

THE CURRENT STUDY

In this investigation we examined the associations between psychopathology measured in childhood and socioeconomic functioning assessed 18 years later. We assessed symptoms associated with four different disorders: ADHD, ODD, anxiety, and depression. We chose these symptom types for three reasons. First, they represent the broad spectrum of psychological difficulties faced by children and adolescents. Second, previous studies have demonstrated that ADHD and ODD are associated with negative academic and employment outcomes. Third, although previous studies have not demonstrated robust associations between youth anxiety and depression and later socioeconomic functioning, these investigations have generally not considered teacher-rated symptoms, which may be particularly important for the prediction of later SES. The current study tests this hypothesis.

We focused on two central questions. First, how much variability in adult socioeconomic outcomes can be attributed to (a) variance associated uniquely with parent ratings of psychopathology, (b) variance associated uniquely with teacher ratings of psychopathology, and (c) variance shared between parents and teachers. Based on earlier studies, which demonstrate numerous informant-specific associations, both concurrently and prospectively, we expected that the unique variance associated with both parent and teacher ratings would be significantly greater than zero and that these unique variance components would account for at least as much variability in the outcome as the variance shared between raters.

Second, are there informant-specific associations between types of psychological symptoms and later socioeconomic functioning? We expected that teacher, but not parent, ratings of anxiety and depression might be associated with adult SES. Earlier studies have not focused on associations between teacher ratings of anxiety and depression and later SES. However, as reviewed previously, there is theoretical rationale for doing so, and one investigation has shown that teacher-rated internalizing symptoms are associated prospectively with poorer functioning (Verhulst et al., 1994). In contrast, earlier work suggests that parent-rated depression would not be a significant predictor of this outcome (e.g., Fergusson & Woodward, 2002; Johnson et al., 1999) and only one study has demonstrated a positive link between number of anxiety diagnoses and subsequent educational attainment (Woodward & Fergusson, 2001). We expected that both parent- and teacher-rated ADHD and ODD would be associated with later SES. As discussed earlier, previous studies in both clinic and community samples have demonstrated that these disorders, as rated by parents and teachers, exhibit differential associations with correlates of interest. Although the specific pattern of linkages varies as a function of informant, ratings by both informants are still associated prospectively with problematic outcomes (e.g., academic problems, police contacts), which are likely to exert an influence on subsequent SES. Note that prior investigations suggest that ODD may not be a significant predictor when ADHD is also included in the model (Fergusson et al., 2005).

METHOD

Participants

Data for this study come from the first (1983) and third (2001) waves of the Ontario Child Health Study, a prospective investigation of child health, psychological

disorder, and substance use, implemented in cooperation with Statistics Canada. Prospective participants were all children born from January 1, 1966, to January 1, 1979, who lived in a household dwelling in Ontario (Boyle et al., 1987). The sampling frame was the 1981 Canadian census, the sampling unit was households, and sample selection was completed using stratified, clustered, and random sampling. The sample was designed to be representative of the general population of Ontario, with the exception of 3.3% of children living (a) on First Nations (i.e., Aboriginal) reservations; (b) in collective dwellings such as institutions; or (c) in dwellings built after June 1, 1981 (i.e., Census Day). Thus, the sampling procedures covered 96.7% of the target population. Sample weights were developed based on the probabilities of selection and enlistment and applied to improve the accuracy of the statistical estimates.

Among eligible families, 1,869 (91.7%) agreed to participate, resulting in an initial sample of 3,294 children aged 4 to 16 years. In this study, we included only the 2,355 (71.5%) children who went on to participate in the follow-up study completed in 2001. As described in detail in Boyle et al. (2007), nonresponse was modeled using 14 variables, many of which were associated significantly with participation in 2001. For example, nonrespondents were more likely than respondents to live in rental housing, 30.2% versus 17.6%, respectively. A weighted complete-case analysis approach (Little & Rubin, 2002) was used to develop attrition weights, which were then applied to the original 1983 sample weights.

As we wished to examine teacher ratings of children's behavior, we focused on youth 6 years of age and older, resulting in a final sample of 2,026 youth aged 6 to 16 years in 1983 ($M = 11.09$ years, $SD = 3.12$). Teacher questionnaires were obtained for 1,633 of these participants (80.6%). Missing data were addressed using a multiple-imputation procedure, as described in the analyses.

Measures

Psychological symptoms. We included teacher- and parent-reported measures of ADHD, ODD, depression, and anxiety. To create scales corresponding to each of these constructs, we matched the Child Behavior Checklist items (Achenbach & Edelbrock, 1981) included in the Ontario Child Health Study to the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*)-oriented scales rated by experts as consistent with *DSM–IV* categories (Achenbach, Dumenci, & Rescorla, 2003). Identical items were used for both informants. This matching was done to facilitate comparison of parent and teacher ratings. Additional items will increase reliability, which may strengthen prediction of the dependent variable, thereby complicating interpretation of the findings. For example, if teachers completed a longer scale than parents, a stronger association between teacher ratings and socioeconomic status in adulthood may be an artifact of the greater number of items evaluated, rather than due to meaningful differences between teachers and parents. We elected to include symptoms of ODD rather than CD because our sample included a significant number of younger children who would be more likely to display symptoms of oppositionality rather than conduct problems. To examine the generalizability of our findings, however, models were run a second time using CD instead of ODD.

Respondents were asked to rate each item as 0 (*never/not true*), 1 (*sometimes/somewhat true*), or 2 (*often/very true*) and their answers were summed to form separate scales for ADHD (9 items), ODD (5 items), depression (11 items), and anxiety (16 items). Cronbach's alphas for the scales were as follows: ADHD parent, .79; ADHD teacher, .88; ODD parent, .70; ODD teacher, .82; depression parent, .76; depression teacher, .79; anxiety parent, .84; anxiety teacher, .84. Using the test detailed by Feldt and Kim (2006), we determined that the teacher versus parent ratings of ADHD, ODD, and depression exhibited significantly higher alphas (reliability).

Covariates. The following covariates were also examined: child's age in 1983, child's gender, child's school performance, family income, and maternal education. Children's school performance was a composite variable based on parent and teacher report. Children received a score of 1 if their parents reported that they had failed a grade or they had received full-time remedial education. All other children received a score from 2 to 6 based on teacher response to the following question: How would you describe this child's current school performance overall? Response options were 2 (*below grade level*), 3 (*somewhat below grade level*), 4 (*at grade level*), 5 (*somewhat above grade level*), and 6 (*far above grade level*).

Estimates of family income were based on parents' responses to the following question: "Which category on this page represents the total family income, before taxes, in 1982. Please include income from all sources such as wages, salaries, commissions, pensions, family allowance, rental income and so forth." Respondents chose from 13 intervals which were recoded to the midpoint. The lowest interval was *less than $5,000* and the highest was *$60,000 or more.* Maternal education was based on parents' responses to this question: "What is the highest grade or level of education you ever completed?" Response options were 0 (*no schooling*), 1 (*some primary or elementary education*), 2 (*completed primary or elementary education*), 3 (*some secondary education*), 4 (*completed secondary education*), 5 (*some community*

or technical college), 6 (*completed community or technical college*), 7 (*some university or teacher's college*), and 8 (*completed university or teacher's college*). Responses were recoded into years. All data based on parents' reports were collected during a structured interview conducted in their homes. Teachers completed questionnaires they received in the mail.

Socioeconomic functioning. We used factor-analytic techniques to create a composite variable based on the following four items: (a) self-reported number of years of education, not including grade repetition; (b) total household income; (c) occupational prestige; and (d) percentage of time in the last 2 years spent in school or employed. Household income was based on responses to the following question: "What is your best estimate of your total household income, from all sources in the last tax year, that is, the total income from all household members, before taxes and deductions?" Occupational prestige was assessed with the Pineo–Porter–McRoberts scale (Pineo, Porter, & McRoberts, 1977). Participants reported their occupation, which was coded into 1 of 16 categories reflecting increasing levels of occupational status. To determine the percentage of time spent in school or employed, participants were given a calendar showing the previous 43 months and asked to indicate for each month whether they had been employed or self-employed, enrolled in school, unemployed, or engaged in other activities. One factor was extracted from these variables, which captured 46.15% of the variance. Factor loadings were years of education, .77; household income, .28; occupational prestige, .68; and percentage of time employed or in school, .31.

Procedures

All measures and procedures were approved by the Research Ethics Board at McMaster University. Parent information was collected voluntarily in 1983 during a structured home interview protected by Canada's Statistics Act. Parents were asked to consent orally to share their anonymous responses with the study sponsors. With parental written consent, questionnaires were sent by mail for teachers to complete. Data concerning socioeconomic functioning in adulthood (2001) were collected during a structured interview in the participants' homes.

Data Analyses

Before beginning the analyses, the multiple-imputation procedure in SPSS v. 17.0 was used to estimate values for data missing from teacher and parent ratings of psychopathology, as well as the covariates and the four variables used to operationalize socioeconomic functioning. Briefly, data were imputed using a fully conditional-specification approach. This technique is an iterative Markov Chain Monte Carlo method that uses a linear regression model to estimate missing values for a given variable (SPSS, 2010). Five imputed data sets were created. All variables in the final model served as predictor variables during the imputation process. Note that teacher- and parent-rated psychopathology was imputed at the item level and scales were computed separately for each imputed data set. Results presented represent values combined across the imputed data sets.

To provide a basic picture of the magnitude and nature of the discrepancies between parent and teacher ratings, we computed the raw difference scores and zero-order correlations for parent and teacher scales, as well as the kappa coefficients for ratings of each item. Then, to gain an overall sense of the links between psychopathology in childhood and socioeconomic functioning in adulthood, we derived eight part (or semipartial) correlations by regressing self-reported SES in 2001 on each informant-specific symptom scale, controlling for child age, sex, and school performance; maternal education; and family income. Thus, these part correlations provide an estimate of the maximum amount of variability that can be attributed uniquely to a specific symptom cluster as rated by a particular informant, net of demographic and socioeconomic characteristics of the children and their families. In some cases, measures were obtained from multiple children in a family. To accommodate this clustering in the data, a robust-sandwich estimator was used to calculate standard errors in these and all subsequent analyses (Williams, 2000). Note that teachers did not provide ratings for more than one child.

Next, we partitioned the variance explained in socioeconomic functioning. To determine how much variability could be attributed to psychological symptoms overall, as well as to examine the beta coefficients associated with each type of symptom, we constructed a model in which the covariates were entered in the first block and ADHD, ODD, anxiety, and depression as rated by parents and teachers were entered in the second block. Given correlations among the ratings of psychological symptoms, all psychopathology scales were mean centered. Then, we decomposed the variability explained by psychological symptoms into (a) unique variance associated with parent ratings, (b) unique variance associated with teacher ratings, and (c) the variance shared between parent and teacher ratings. To do this, we contrasted the incremental (unique) variance explained by one informant (Block 2) after controlling for all covariates and the other informant (Block 1). The Δr^2 for the second block indicated the percentage of variability explained by psychological symptoms assessed by that informant. Subtracting the unique variance associated with both parent and teacher ratings from the total

variance explained by psychological symptoms, then yielded the amount of variability predicted by variance shared between parent and teacher ratings. Bootstrapping techniques were used to determine the statistical reliability of these estimates. Five hundred samples of a total size of 2,026 were drawn with replacement and the regression models were estimated for each of these samples. We calculated the mean amount of variability attributable to parent ratings, teacher ratings, and the variance shared between them, as well as the standard errors of the estimates, across the 500 bootstrapped samples. These data were used to construct 95% confidence intervals (CIs), allowing us to determine whether these values differed significantly from zero, which would suggest that a given source was explaining a significant amount of the variability in the outcome, as well as from each other. Our study included a large sample representative of the population from which it was drawn, making bootstrapping particularly appropriate (Mooney & Duval, 1993).

It is possible that psychological symptoms may mediate, at least partly, the association between the covariates and socioeconomic functioning. Because the covariates and psychopathology were assessed concurrently in 1983, removing their shared variance will result in a conservative estimate of the strength of the association between psychological symptoms and the outcome variable. Although an accurate estimate of this effect requires data collected at multiple time points, we elected to estimate the maximum amount of variance that could be attributed to psychopathology by running a regression model that included all psychological symptoms but none of the covariates.

RESULTS

Correlations between parent- and teacher-report symptoms are presented in Table 1. To determine the direction of interrater discrepancies at the scale level, raw difference scores were calculated by subtracting the mean teacher rating from the mean parent rating. Mean difference scores indicated that parents reported greater numbers of symptoms for anxiety ($M = 1.16$, 95% CI = 0.91–1.43; depression, $M = 0.21$, 95% CI = 0.07–0.35; and ODD, $M = 0.82$, 95% CI = 0.07–0.93), whereas teachers reported greater numbers of symptoms for ADHD ($M = 0.21$, 95% CI = 0.05–0.37). Review of the 95% CIs associated with these estimates indicates that each of these scores is significantly greater than zero. Kappa scores were computed to provide information about interrater agreement at the item level. In general, kappas were very low, with average values ranging from .04 for depression to .13 for ADHD.

Next, we computed the part correlations examining the associations between each type of symptom as rated by either parents or teachers and subsequent SES, after controlling for age, gender, family income, maternal education, and school performance. Results are shown in Table 2. Even after accounting for the covariates, ADHD and depression, as rated by both parents and teachers, were associated significantly with socioeconomic functioning in adulthood. Only parent ratings of ODD were associated significantly with SES, and neither informant's judgments of anxiety had a significant association with the outcome. For each type of symptom, the 95% confidence intervals for parent and teacher ratings overlapped, indicating

TABLE 1
Zero-Order Correlations Among Parent and Teacher Ratings of Psychopathology and Covariates

	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8.*	*9.*	*10.*	*11.*	*12.*	*13.*
Teacher Ratings													
1. ADHD	—	.69**	.51**	.31**	.36**	.29**	.11**	.00	−.06**	−.25**	−.32**	−.07**	−.07**
2. ODD		—	.60**	.30**	.24**	.27**	.09**	.00	.00	−.15**	−.20**	−.07**	−.09**
3. Depression			—	.58**	.17**	.21**	.14**	.04**	.04	−.07**	−.27**	−.12**	−.13**
4. Anxiety				—	.08*	.06*	.12**	.12**	−.03	.05*	−.08**	−.01**	−.07**
Parent Ratings													
5. ADHD					—	.54**	.51**	.43**	−.14**	−.12**	−.18**	−.04	−.08**
6. ODD						—	.64**	.41**	−.03	−.05*	−.13**	−.01	−.04
7. Depression							—	.62**	−.02	.05*	−.08**	−.03	−.02
8. Anxiety								—	−.04	.10**	−.03	−.09**	−.06**
Covariates													
9. Age									—	.00	−.10**	−.13**	−.01
10. Gender										—	.15**	−.05*	.00
11. Academic Performance											—	.24**	.15**
12. Maternal Education												—	.40**
13. Family Income													—

Note: Gender dummy coded males = 0. ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.
*$p < .05$. **$p < .01$.

TABLE 2
Associations Between Psychological Symptoms Rated by Parents and Teachers in 1983 and Socioeconomic Functioning in 2001

Symptom Type	*Informant*	*Part Correlation*[a]	*95% CI*
ADHD	Parent	−.09**	−.13, −.05
	Teacher	−.06**	−.11, −.02
ODD	Parent	−.10**	−.14, −.06
	Teacher	−.04	−.08, .00
Depression	Parent	−.06**	−.10, −.02
	Teacher	−.07**	−.12, −.03
Anxiety	Parent	−.02	−.06, .02
	Teacher	−.01	−.05, .04

Note: Part correlations were computed separately for each symptom cluster as rated by a specific informant. CI = confidence interval; ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.

[a]The following variables measured in 1983 were covariates: child age, child gender, child's school performance, family income, and maternal education.

**$p < .01$.

that none of the part correlations differed significantly between raters.

The regression analyses used to partition the variance explained in socioeconomic functioning, which included all covariates and symptom ratings of ADHD, ODD, depression, and anxiety, is presented in Table 3. This analysis indicated that covariates and psychological symptoms accounted for 28.94% and 2.78% of the variability in adult SES, respectively. Of the 2.78% explained by psychological symptoms, 0.90% (95% CI = 0.43–1.37%) was attributable to teacher ratings uniquely, 1.41% was attributable to parent ratings uniquely (95% CI = 0.93–1.89%), and 0.47% (95% CI = 0.39–0.55%) of the variability was attributable to the variance shared between parent and teacher ratings. Four of five covariates emerged as significant predictors of socioeconomic functioning: age, $\beta = .06$, $p < .05$; school performance, $\beta = .33$, $p < .01$; family income, $\beta = .18$, $p < .01$; and maternal education, $\beta = .12$, $p < .01$. Among the measures of disorder, three significant predictors emerged: teacher-rated depression, $\beta = -.10$, $p < .01$; parent-rated ADHD, $\beta = -.05$, $p < .05$, and parent-rated ODD, $\beta = -.07$, $p < .05$. When covariates were excluded from the model, psychological symptoms predicted 9.48% of the variance in the outcome.

TABLE 3
Results of Hierarchical Regression Analysis Examining the Associations Between Psychological Symptoms Rated by Parents and Teachers in 1983 and Socioeconomic Functioning in 2001

	Beta Weight	*95% CI*
Block 1: Covariates		
Age	.06*	.01, .09
Gender	−.02	−.14, .03
Family Income	.18**	.12, .21
Maternal Education	.12**	.08, .16
Academic Performance	.33**	.24, .34
% Variance Explained: 28.94%**		
Block 2: Psychopathology		
Parent Anxiety	.03	−.02, .08
Parent Depression	.00	−.07, .07
Parent ODD	−.07*	−.13, −.01
Parent ADHD	−.05*	−.10, −.01
Teacher Anxiety	.05	.00, .11
Teacher Depression	−.10**	−.16, −.03
Teacher ODD	.05	−.02, .11
Teacher ADHD	−.04	−.09, .02
% Variance Explained: 2.78%**		

Note: Gender dummy coded males = 0. CI = confidence interval; ADHD = attention-deficit/hyperactivity disorder; ODD = oppositional defiant disorder.

*$p < .05$. **$p < .01$.

To assess the generalizability of the findings, the regression analysis was rerun using parent- and teacher-reported CD instead of ODD. Cronbach's alphas for parent- and teacher-rated CD were .73 and .84, respectively. In the hierarchical regression model, neither parent-rated ($\beta = -.03$, $p > .05$) nor teacher-rated CD ($\beta = -.02$, $p > .05$) was associated significantly with adult SES. Including CD rather than ODD increased the total amount of explained variance to 3.22%. The variability attributable to teacher ratings, uniquely, was 1.20% (95% CI = 0.99–1.41%). Parent ratings also accounted for 1.20% of the variance (95% CI = 1.10–1.34%), and the amount of variability explained by shared variance was 0.82% (95% CI = 0.64–1.00%). As with the model including ODD, variance attributable to both parents and teachers explained a significant amount of the variability, and variability unique to parents explained significantly more variability than the variance shared between parents and teachers. Variance unique to teachers did not differ from shared variance or variance unique to parents.

DISCUSSION

Consistent with numerous previous studies (see De Los Reyes & Kazdin, 2005), we found that agreement between parent and teacher ratings of youth psychological symptoms was quite low. At the scale level, zero-order correlations varied from .12 (anxiety) to .36 (ADHD), with agreement being generally better for externalizing symptoms. Difference scores indicated that parents reported more symptoms of anxiety, depression, and ODD, and teachers reported greater numbers of symptoms of ADHD. This pattern of differences is consistent with work conducted with a community sample of youth which found that the prevalence of ADHD was higher based on teacher report, and the prevalence of emotional disorder (i.e., anxiety and depression)

was higher based on parent report (MacLeod et al., 1999), as well as work by Offord et al. (1996) with a community sample which found that the prevalence of ODD was higher for parent than teacher report (also see Drabick et al., 2008). At the item level, kappas were very low, indicating poor agreement between informants.

Given these marked differences between parent and teacher report of youth psychopathology, the first question considered by this investigation was whether parent and teacher ratings of youth psychological symptoms made unique contributions to the prediction of socioeconomic functioning in early adulthood. The amount of variance attributable to parent and teacher ratings of psychopathology, uniquely, was 1.41% and 0.90%, respectively. Both of these values differed significantly from zero, suggesting that variance unique to each rater is explaining a reliable portion of the variability in the outcome. Variance shared between the raters accounted for 0.47%, a value significantly greater than zero but significantly smaller than the variability attributable to parents uniquely. This pattern of results, which was replicated when symptoms of CD were substituted for ODD symptoms, suggests the value of examining parent and teacher ratings separately. Using an analytic approach that emphasized shared variance would have resulted in a loss of 2.31% of the variability predicted in the outcome (or 83.09% of the total variance explained). Our findings are consistent with the suppositions of Kraemer et al. (2003), in that informant-specific characteristics and experiences appear to play a significant role in the prediction of later socioeconomic functioning. Furthermore, it appears that both parents and teachers are valuable sources of information concerning youth psychopathology, as the variance explained by each rater uniquely did not differ statistically.

At the level of individual symptoms, part correlations revealed that, after controlling for child's age, gender, school performance, family income, and maternal education, ADHD and depression as rated by both parents and teachers were associated significantly with adult SES. The part correlation between parent-rated, but not teacher-rated, ODD and the outcome variable was significant. However the confidence intervals for the two estimates overlapped, suggesting that the difference between the two correlations was not statistically reliable. Neither parent- nor teacher-rated anxiety was associated with adult SES. A previous study did find a negative association between number of anxiety disorders in adolescence and the likelihood of going on to enter university (Woodward & Fergusson, 2001). Several factors may have resulted in this difference between the studies. Participants in this investigation were older than those in our sample, the length of time between assessments was shorter, and the outcome variable was education, rather than SES more broadly. In addition, in this study number of anxiety diagnoses was the independent variable. We used number of symptoms, and it may be that this approach does not result in as much variability to predict the outcome variable.

In addition to constructing part correlations, we entered all four scale scores, as rated by both informants, into a hierarchical regression model. When assessing the importance of each symptom type, this analysis controls not only for the covariates but also for the variability shared among different types of symptoms rated by the same informant and the same symptom type rated by the two informants. Three significant predictors emerged: teacher-rated but not parent-rated, depression, and parent-rated but not teacher-rated ODD and ADHD. It is notable that the 95% confidence intervals for each of these beta weights overlapped with ratings of the same symptom type by the other informant, indicating that differences between parent and teacher ratings were not statistically reliable. This pattern of findings is consistent with the work of Verhulst et al. (1994) who found that only parent-reported ADHD and only teacher-reported internalizing symptoms predicted the presence of a negative mental health, criminal, or academic outcome 6 years later. It also attests to the utility of modeling informant ratings separately and raises some questions about the conventional view that teachers are better reporters of ADHD and parents are better reporters of anxiety and depression (Loeber et al., 1990).

There are several possible reasons why these informant-specific associations may have emerged. First, differences in reliability between raters may account for some of the variability in patterns of associations. In our study, teachers did provide statistically more reliable ratings of depression than parents. However, the actual magnitude of this difference was quite small. Furthermore, parent ratings of ODD and ADHD were less reliable than those provided by teachers, suggesting that this explanation did not account for the observed differences. A second reason for the unexpected source-specific associations between both ADHD and ODD and adult SES is differential associations between parent and teacher ratings of these symptoms and the covariates. Consistent with previous studies (e.g., Offord et al., 1996), teacher-rated ODD and ADHD shared stronger associations with maternal education and academic performance than did parent ratings (see Table 1). These greater linkages may have attenuated the association between teacher-rated ODD and ADHD and the outcome variable. Inclusion of the covariates may also explain, at least in part, the difference between our findings and those of Fergusson et al. (2009). This study found that oppositionality, disruptiveness, and conduct-disordered behaviors as rated

by parents only, teachers only, and both parents and teachers all predicted subsequent problems with criminality, mental health, substance use, and interpersonal relationships. These associations, however, did not appear to be adjusted for covariates (e.g., family SES). Other discrepancies between these two studies that may have contributed to the variability in the results include different approaches to measuring psychopathology, varying lengths of time between assessments, and different outcome variables.

Although differential associations between parent- and teacher-rated disorders and the covariates likely played a role in our results, the observed pattern of associations may also be due, in part, to more substantive theoretical reasons concerning the meaning and interpretation of ratings of psychopathology obtained from different informants. Generally, informant discrepancies have been explained in terms of the situational specificity of behavior (e.g., Achenbach et al., 1987; see De Los Reyes & Kazdin, 2005). That is, informants interact with children in different contexts and are therefore basing their judgments on a different behavioral sample. This may explain, in part, the differential association between parent- and teacher-rated ODD and adult SES. In this sample, parents reported higher numbers of ODD symptoms than did teachers. It may be that youth are engaging in more of these behaviors at home, which may make parents better informants of this type of symptom and their ratings particularly useful for the prediction of subsequent outcomes. Contextual features will also influence parent and teacher ratings. For example, parents are exposed to their children's behavior for extended periods, and generally, they will have limited experience with other children. In contrast, teachers experience children's behavior for much briefer periods but can compare children to a much larger sample of their peers. These differing ''frameworks'' for evaluating children's symptoms may have contributed to the differential associations between parent- and teacher-rated depression and later SES. It may be that depressive symptoms that are severe enough to be noticed by teachers in a comparatively short period and relative to the behavior of other children are a stronger predictor of subsequent functioning.

Although several source-specific associations emerged, overall we found that psychopathology in youth is predictive of socioeconomic functioning 18 years later. This result is consistent with the social-selection hypothesis (see Johnson et al., 1999), and suggests that something associated with the experience of psychopathology in youth is contributing to lower SES later in life. The amount of variability attributable to psychopathology uniquely was 2.78%, a statistically significant but small effect, using Cohen's criteria (Cohen, 1988). Even this small percentage of the variance, however, may be of clinical, or practical, significance. For example, in our sample 2.78% of the variability in years of education translates to 0.50 years of school, and 2.78% of the variability in household income is $10,000 per annum.

The relatively small amount of variance attributable to psychological symptoms may be due to several factors. Our sample, with a mean age of 11.09 years in 1983, was younger than those considered in many previous investigations, which have focused on adolescents (e.g., Fergusson & Woodward, 2002; Woodward & Fergusson, 2001). In addition, the interval between assessments was lengthy (18 years). It is also important to note that psychological symptoms and confounding variables were assessed concurrently. This is a limitation of this study, as it is likely that psychopathology will mediate, at least partially, the association between the assessed child and family characteristics and later SES. To address this issue, we ran a model that did not include the covariates, allowing us to determine the maximum amount of variability that could be attributed to psychopathology. In this analysis, symptoms explained 9.48% of the variability in socioeconomic functioning.

Implications for Research, Policy, and Practice

It will be important for future studies to examine psychopathology and related risk factors (e.g., family SES) at multiple time points, which would allow for a more precise accounting of the order and magnitude of these associations. Such work could also assess factors that mediate the association between psychological symptoms in childhood and adolescence and later SES. Although a number of studies have demonstrated that psychopathology in youth predicts poorer socioeconomic functioning in adulthood, less is known about the precise mechanisms underlying this association. A number of different constructs might be of interest, such as academic factors like achievement and attendance, as well as interpersonal functioning.

These questions might also be investigated in a clinical sample. Although the large, representative community sample was a strength of this study, there are reasons to expect that the results might differ had the work been conducted with clinically referred youth. Youth seeking mental health services will be experiencing more severe symptoms, higher rates of comorbidity, and poorer functioning, all factors which could impact the association between symptomatology and adult outcomes. In addition, the source-specific associations between psychopathology and later SES may also differ in a clinical sample. There is evidence, for example, that the informant impacts the prevalence rates of ODD and CD and that this effect is moderated by whether the

sample is community based or clinically referred (MacLeod et al., 1999).

In summary, this study examines the associations between ODD, ADHD, anxiety, and depression rated in youth and socioeconomic functioning measured 18 years later. Parent and teacher ratings of psychopathology both exhibited significant associations with SES in adulthood, with informant-specific associations emerging for teacher-rates depression, and parent-rated ODD and ADHD. These results highlight the utility of examining youth psychopathology as "source-specific syndromes," incorporating the unique information contributed by each rater into our analytic approaches, rather than focusing entirely on shared variance. Furthermore, although the magnitude of the association between youth psychopathology and adult SES is small, it may be of practical importance and is consistent with the idea that reducing psychopathology in childhood and adolescence may impact positively on later socioeconomic functioning.

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