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Socioeconomic Factors in Relation to Discrepancy in Parent versus Teacher Ratings of Child Behavior

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Abstract

Discrepancies between observers are common in studies of child behavior problems that rely on behavior ratings. Although modest concordance between informants is well-documented, little is known about characteristics that predict discrepancies. In 477 children aged 5 to 12 years, maternal age and indicators of socioeconomic status (SES; maternal education, family income) were evaluated in relation to score discrepancies between the Child Behavior Checklist and Teacher Report Form for Total, Externalizing and Internalizing Problems. Family income < \$35,000 was independently associated with discrepancies in which mothers rated more clinically significant child behavior problems than teachers for Total, Externalizing and Internalizing Problems [odds ratio (OR) = 3.26, 95% confidence interval (CI), 1.19-8.96, OR = 2.76, 95% CI 1.03-7.34 and OR = 3.07, 95% CI 1.30-7.26, respectively]. Maternal education was not associated with discrepancies, but younger mothers were less likely to rate child's behavior in the clinical range for Externalizing Problems than teachers (OR per year of age = 0.88, 95% CI 0.81-0.96). These results suggest that studies that utilize only maternal or teacher report of child behavior may have misclassification of outcomes that is dependent on SES and could produce biased results.

Keywords

Informant discrepancy; child behavior ratings; CBCL; TRF; AESBA; socioeconomic status

Introduction

Studies of problematic child behaviors and mental health concerns often rely on the reports of different informants who interact with the child in varying environments (e.g., home versus school or daycare) (Achenbach, McConaughy et al. 1987; De Los Reyes and Kazdin 2005). Studies have shown that scores from different informants (e.g., parents versus teachers) are usually consistent when evaluating children with severely problematic behaviors (Kolko and Kazdin 1993; Hartman, Rhee et al. 2007). At the same time, in non-

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clinical samples, discrepancies between informants are common and inter-rater agreement tends to be low to moderate (Achenbach, McConaughy et al. 1987; Epkins and Meyers 1994; Epkins 1996; Rubio-Stipec, Fitzmaurice et al. 2003).

Although the developers of behavior rating scales attempt to minimize subjectivity (e.g., focusing on specific behaviors and operationally defined ‘anchors’ to determine frequency or severity), scores inherently incorporate the informant's perception of a child's behavior. Differences between reporters' perceptions, particularly mothers' and teachers' perceptions, are associated with maternal age, socioeconomic status (SES), race, depression and stress, as well as child's age and sex -- at least in children who were referred to mental health clinics (Achenbach, McConaughy et al. 1987; Kolko and Kazdin 1993; Kohen, BrooksGunn et al. 1997; Cai, Kaiser et al. 2004; De Los Reyes and Kazdin 2005; Hartman, Rhee et al. 2007; Kerr, Lunkenheimer et al. 2007; Bayer, Hiscock et al. 2008; University of Vermont 2009). However, the factors associated with discrepant child behavior ratings in other, non-clinical samples may differ. Because it is often impractical to collect child behavior data from multiple informants, researchers may rely on either parent or teacher report alone. Therefore, it would be useful to identify the variables that are associated with discrepancies among informants to better understand potential sources of bias.

SES has been examined in relation to discrepancies between parent and child report in a variety of clinical populations (Achenbach, McConaughy et al. 1987; Kolko and Kazdin 1993; Kohen, BrooksGunn et al. 1997; Cai, Kaiser et al. 2004; De Los Reyes and Kazdin 2005; Hartman, Rhee et al. 2007; Kerr, Lunkenheimer et al. 2007; Bayer, Hiscock et al. 2008; University of Vermont 2009) and in samples of children at risk for developmental or behavioral concerns, such as children born with low birth weight (Kohen, Brooks-Gunn et al. 1997) or to young teenage mothers (Trautmann-Villalba, Gerhold et al. 2004). Although there are a few studies that included community-sampled preschoolers (e.g. (Martini, Root et al. 2004; Robinson, Oddy et al. 2008)), we are not aware of similar studies with school-aged children. In a community sample of children ages 5-12 years, we examined SES and maternal age in relation to discrepancies on the parent and teacher report forms of the Achenbach System of Empirically Based Assessments (ASEBA; (Achenbach and Rescorla 2001; Achenbach and McConaughy 2003))

Materials and Methods

Participants

Study subjects were mothers and teachers of children born without known birth defects who participated in three earlier studies (Werler, Sheehan et al. 2004; Collett, Speltz et al. 2011; Dufton, Speltz et al. 2011). The initial case-control study ascertained cases with hemifacial microsomia, a craniofacial anomaly, from clinics and controls without major malformations from the case's pediatrician in 26 metropolitan areas in the US and Canada from 1996 to 2002. Information about pregnancy risk factors was obtained from mothers in this first study. The second study followed case and control children when they were in elementary school. Control children whose mothers and teachers participated in the follow-up study were eligible for the present analysis.

Follow-up study procedures

Case and control families who participated in the case-control study were invited to participate in the follow-up study, with exception of 5% of subjects who had to be excluded due to IRB restrictions. Parent report data were collected to assess parenting stress, parent and child quality of life, and child psychosocial and neurocognitive outcomes, including the parent report form of the ASEBA (Achenbach and Rescorla 2001). Mothers also identified a

teacher, who was sent the teacher report form of the ASEBA and other questionnaires not included in this analysis (Collett, Speltz et al. 2011).

This study was approved by the NAME Institutional Review Board and was completed in full compliance with HIPAA standards.

Measurements

Socioeconomic Factors and Covariates—In the initial case-control study, mothers were asked about their age, education and household income at the time of the pregnancy and their race/ethnicity. In the follow-up study, further information was collected on maternal current marital status, number of children under 18 in household, and age of child at testing. Indicators of SES evaluated as potential correlates of mother and teacher rating discrepancies were: maternal age (as a continuous variable), maternal education (< 12 years vs. >12 years), and annual household income (< \$35,000 vs. ≥ \$35,000). Mothers with missing data on any of the three indices were excluded. Covariates included maternal race/ethnicity (white, non-Hispanic vs. non-white or Hispanic), child's age (5-7 years vs. 8-12 years), father living with mother, maternal reported use of psychiatric medication and, as an indicator of mothers' experience with child development, number of children under 18 living at home (1 vs. ≥ 2 children). Mother's stress level, measured using the Parenting Stress Index (PSI;(Abidin 1995)) Parent Domain score, was considered as an intermediary.

Outcome Measures—The ASEBA includes the 120-item parent report Child Behavior Checklist (CBCL) and the 121-item Teacher Report Form (TRF) (Achenbach and Rescorla 2001). These measures are widely used screening instruments in the assessment of children's behavior, with well-established psychometric properties including good inter-rater and intra-rater reliability(Leary, Collett et al. 2009). Both the CBCL and the TRF include questions on anxiety/depression, social withdrawal, somatic complaints, aggressive behavior delinquent behavior and attentional/hyperactive behavior. Items are rated using a 3-point scale, with anchors ranging from 0=Not True, 1=Somewhat or Sometimes True, to 2=Very True or Often True. CBCL questions pertain to the child's behavior as present now or within the last 6 months, whereas the TRF questions pertain to behavior observed within the past 2 months. The CBCL is designed to be completed independently within 20 minutes and requires a 5th grade reading level. Scores on both the CBCL and TRF are converted to T-scores, with a normative mean of 50 and standard deviation of 10. Broad band scores are generated for Externalizing Problems (e.g., defiant and “acting out” behavior); Internalizing Problems (e.g., anxious/depressed behaviors, somatic complaints); and Total Problems, a composite encompassing externalizing and internalizing behaviors as well as other problem behavior (e.g., attention and social problems).

Discrepancy was defined as one rater scoring the child in the clinical range (≥ 64) and the other rater scoring the child <64. When a child received discrepant scores, we classified the discrepancy as ‘Mother > Teacher’ (i.e., child score ≥64 based on maternal report and <64 based on teacher report) or ‘Teacher > Mother’ (i.e., child score <64 based on maternal report and ≥ 64 based on teacher report).

Data Analysis: Frequency distributions of SES indicators and covariates were compared for each discrepancy outcome for the ASEBA Total Problems, Externalizing Problems and Internalizing Problems composite scores. Odds ratios (ORs) were then calculated, with the non-discrepant group (i.e., both raters scored <64 or both scored ≥ 64) as the reference category. Logistic regression models were used to estimate crude and multivariable-adjusted ORs and 95% confidence intervals (CI). Because the three indicators of SES are correlated, we measured their independent associations with discrepancy outcomes by including terms

for all three in “crude” logistic regression models. To evaluate potential confounding, we used the ‘change in estimate’ approach (Weng, Hsueh et al. 2009) by adding maternal race, marital status, use of psychiatric drugs, child's age, and number of children at home separately to the crude model and retaining in the final model any covariate that changed the crude OR by >10%. To evaluate mother's stress as a potential intermediary in any associations between socioeconomic indicators and discrepancy outcomes, the Parent Domain Total score was entered into final models. To evaluate potential effect modification by child's sex, we also examined score discrepancies separately for males and females. Analyses used SAS version 9.2 (SAS Institute, Inc., NC).

Results

Of the 884 control children whose mothers participated in the original case-control study, 839 were eligible for the follow-up study and 568 subjects participated. We excluded 91 subjects who had missing items in either the CBCL or TRF, or who were missing information on either maternal education or annual income, leaving 477 subjects for our analysis. When the primary teacher was not available or declined to complete the TRF (n=19), another school professional (e.g., a speech therapist, school counselor) was identified by the family and asked to complete the TRF.

As shown in Table 1, 26.0% of the subjects had 12 years of education, 20.9% had an income <\$35,000, 75.9% were white, 82.8% had the child evaluated at age 5-7 years, 48.6% had a male child, and 85.8% had 2 children living at home. Less than 10% of children had discrepant reporters, with Mother > Teacher for the Internalizing Behavior scale being most common (7.3%) and Teacher > Mother for same scale being least common (4.2%). Among males, Mother > Teacher discrepancy was greatest for Internalizing behaviors (9.9%) and Teacher > Mother discrepancy was least prevalent (2.6%) for Externalizing behaviors. Among females, Mother > Teacher discrepancy outcomes were less common but Teacher > Mother discrepancy outcomes were more common for Externalizing behaviors (7.8%) and less common for Internalizing behaviors (2.9%). Across Mother > Teacher discrepancy outcomes, the maternal mean age showed little variation. However, the proportions of mothers with <12 years of education and lower income (<\$35,000/year) were higher than the overall study population (Table 2). For Teacher > Mother discrepancy outcomes, the proportion with family income <\$35,000/year was higher than the overall study population (36.0%).

We examined potential confounders, including child's age, maternal marital status, maternal race, number of children living at home, and maternal use of psychiatric medications. Child's age and maternal marital status did not modify the crude ORs and were therefore not retained in the final models. Maternal age and maternal education were not associated with Mother > Teacher discrepancy outcomes, but ORs for lower family income (<\$35,000/year) were more than doubled for all three behavior scales (Table 3). Only maternal age was associated with Teacher > Mother discrepancy for the Externalizing Behavior scale, with a 12% decrease in the OR for every year of age.

When parenting stress score was added to logistic regression models, ORs for income and Mother > Teacher discrepancies were attenuated (Total Problems OR = 1.54; Externalizing Problems OR = 1.29; Internalizing Problems OR = 1.90). The inverse association between maternal age and Teacher > Mother discrepancy for Externalizing Problems was not materially changed with Parenting Stress added to the model (data not shown).

Effect Modification of Child's Sex on Discrepancy

The associations between SES indicators and discrepancy outcomes appear to differ by child's sex (Table 4). Increased ORs for lower income and Mother > Teacher discrepancies remained for both males than females, but were more than 4-fold for Total and Externalizing Behavior Problem scales in females and less than 1.8-fold in males. Conversely, Mother > Teacher discrepancy for the Internalizing Behavior Scale was associated with an increased 3.2-fold OR for family income <\$35,000/year in males compared to a 2-fold in females. Confidence intervals included 1.0 for these ORs except for lower income and Internalizing Behavior in males (OR=3.21, 95% confidence interval, 1.06-9.72). When parenting stress score was added to these models, these patterns of ORs remained (data not shown).

The inverse association with maternal age that was observed for Teacher > Mother discrepancy of Externalizing Behavior was present in both males and females but was stronger among females (OR=0.87 for every year of age). For all three Teacher > Mother discrepancy outcomes, maternal education 12 years was associated with approximate doubling in ORs among males and protective ORs in females, but confidence intervals were wide and all included the null value of 1.0. The addition of parenting stress score had little effect on ORs for maternal age and Externalizing Problems in male children and maternal education and all three behavior discrepancy outcomes in male and female children (data not shown). Maternal age and Teacher > Mother for Externalizing Behavior discrepancy was attenuated with parenting stress score in the model (OR = 0.96).

Discussion

In many child mental health studies, limited budgets require restricting data collection to maternal observations which are easier, and less expensive, to collect than teacher observations. Nonetheless, it has long been recommended that behavioral observations be obtained from several informants who are significant in the child's life in different contexts (e.g., mother, father, teacher or daycare provider, and the child himself). Concordance among these raters tends to be relatively good for children who have moderate to severe psychopathology. However, studies of at-risk children have found that mother- and teacher-ratings of child behaviors are frequently discrepant (Achenbach, McConaughy et al. 1987; McConaughy, Stanger et al. 1992; Konold, Walthall et al. 2004). Among children with mild psychopathology, frequent rating discrepancies increase the usefulness of multiple informants, and the need to identify predictors of discrepancies. Our study is the first to examine socioeconomic factors in relation to behavior rating discrepancies in school-age, nationally-sampled children. We found that discrepancies in mother- and teacher- ratings were more frequent in lower SES families. Compared to teachers, mothers identified more internalizing and externalizing behavior problems than teachers in both sons and daughters, but the magnitude of the association was greater in boys for internalizing problems and greater in girls for externalizing problems. The effect of low family income was independent of maternal age, years of education, race, use of psychiatric medications, and number of children at home.

Prior studies of clinic-referred and older non-referred children have also observed that child's sex impacts the relation between low maternal education and direction of rater discrepancy (Hubbstait, Osofsky et al. 1994; Martini, Root et al. 2004; Trautmann-Villalba, Gerhold et al. 2004). However, other studies have noted no such relationship (Verhulst and Akkerhuis 1989; Hubbstait, Osofsky et al. 1994).

In our study, we considered maternal age, maternal education, and family income simultaneously, to measure their independent effects on discrepancies of childhood behavior ratings. An independent effect of young maternal age and Teacher > Mother discrepancy of

externalizing behavior but not internalizing behavior suggests that mothers view externalizing behavior more similarly to the teachers' perspective as the mothers' age increases. Previous studies in both clinically-referred and at-risk children had identified maternal age as predictive of rating discrepancies, but this association was not adjusted for other SES or demographic factors (Trautmann-Villalba, Gerhold et al. 2004; Mejias 2007).

Younger mothers are more likely to have a lower family income and family income was the strongest factor associated with mothers rating their child's behavior as worse than the teacher's rating for all three domains of behavior problems, independent of other SES indicators. Low family income may be associated with discrepancies through several mechanisms. Low income can lead to increased stress, which lowers the parent's tolerance of the child's behaviors. This mechanism is supported by our findings that some of the associations between low income and Mother > Teacher discrepancy and between young maternal age and Teacher > Mother discrepancy in females were accounted for by parent stress. Other research supports the concept that situational specificity and context play a role in discrepant observations. The child may in fact behave differently at home versus school because the qualities and attributes of both the mother and the home are distinct from those of the teacher and the school (De Los Reyes and Kazdin 2005). Home versus school contextual differences may be especially relevant in families from low SES backgrounds, resulting in more pronounced differences in child behavior across settings.

Our study has limitations to note. First, mothers who participated in the case-control study but declined participation in the subsequent follow-up study may have been different with regard to SES and discrepancy of reporters compared to the mothers who participated. Next, although we evaluated parenting stress concurrent with child behavior ratings as an intermediary factor, we were not able to assess other relevant aspects of maternal mental health (e.g., depression). Several large studies have shown a significant association between increased odds of Mother > Teacher discrepancies and mother's mental health status (Stanger, MacDonald et al. 1996; De Los Reyes, Goodman et al. 2008; Robinson, Oddy et al. 2008; De Los Reyes, Henry et al. 2009). We used reported use of psychiatric medication during pregnancy as a proxy, but it is conceivable that maternal mental health at the time of ratings could confound our results. Also, we lacked data on teacher's race. Differences in race between teacher and mother correlate with reporting discrepancies in other studies (Kaufman, Swan et al. 1980; Wall and Paradise 1981; Kohen, BrooksGunn et al. 1997). However, in these studies, the association between 'non-white' race and discrepancies may have been confounded by low income.

We were able to present the three domains of the CBCL and the TRF, but not sub-scale or individual item scores. In future studies, item-level analyses may help to identify specific sources of discrepancy among reporters. As parents observe their children in environments distinctly different from the classroom environment, data on specific questions could clarify what role situational specificity has in discrepant scores. Studies of preschool children have found that Mother > Teacher discrepancies occur most frequently for behaviors related to managing family life whereas Teacher > Mother discrepancies occur most frequently for behaviors that are more directly related to the child's learning and peer interactions (De Los Reyes and Kazdin 2005; De Los Reyes, Henry et al. 2009). In addition, we defined discrepancy as a dichotomy, raising the possibility that a relatively small difference in scores but one that encompasses the cut-off value of 64 would be considered a discrepancy. We considered an alternative approach that defined a discrepancy of 1 standard deviation between mother and teacher scores. This alternative definition produced many more discrepancies (18 to 24%), but the same pattern of results was observed as for discrepancies based on the dichotomy of <64 and ≥64. Interestingly, however, maternal age was not inversely associated with Teacher > Mother discrepancy for Externalizing Behavior

Problems when based on the 1 standard deviation definition. This outcome also did not appear to operate through parenting stress, suggesting that it may be driven more by teachers of children with younger mothers rating those children as having more externalizing behavior problems and these young mothers not recognizing behavior problems in their children, rather than young mothers being stressed.

Numerous studies have helped identify factors that predict child psychopathology through the use of the CBCL and TRF. Frequently, discrepancies between mother-child and teacher-child ratings ensue. Yet, little is known about what factors are associated with these discrepancies, and what impact do these discrepancies have upon research. In a research setting, the imbalance in quantity, if not quality, between mothers' observations of behaviors and teachers' observations is likely to be even greater than in a clinical setting. Often, research settings collect information on child behavior from only a parent or a teacher, but not both. Our analysis suggests that studies of children from low SES backgrounds may be particularly vulnerable to bias when they rely on data from only one rater.

In our study, younger maternal age and lower family income were associated with mother-child and teacher-child behavior rating discrepancies that warrant further investigation. Future studies should consider including maternal health and teacher's race as covariates, if possible, as well as including a larger group of younger mothers and lower income mothers.

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Table 1
Study Population Characteristics

Characteristics	n=477	
Maternal age mean (SD)	29.2 yrs. (5.6)	
Maternal Education (12 years)	26.0%	
Family Income (< \$35K)	20.9%	
Child's Age mean (SD)	6.8 yrs. (1.0)	
5-7 years	82.8%	
8-11 years	17.2%	
Child's sex (male)	48.6%	
Maternal race (white)	75.9%	
Mother lives with father (yes)	80.0%	
No. of children at home (2)	85.8%	
Maternal psychiatric medication use (any in pregnancy)	2.7%	
Discrepancies in Behavior Scores	Discrepancies n (%)	
Mother > Teacher		
Total Problems	26 (5.5%)	
Externalizing	28 (5.9%)	
Internalizing	35 (7.3%)	
Teacher > Mother		
Total Problems	28 (5.9%)	
Externalizing	25 (5.2%)	
Internalizing	20 (4.2%)	
Discrepancy by Child Sex	Males (%)n=242	Females (%) n=245
Mother > Teacher		
Total Problems	18 (7.8%)	8 (3.3%)
Externalizing	17 (7.3%)	11 (4.5%)
Internalizing	23 (9.9%)	12 (4.9%)
Teacher>Mother		
Total Problems	14 (6.0%)	14 (5.7%)
Externalizing	6 (2.6%)	19 (7.8%)
Internalizing	13 (5.6%)	7 (2.9%)

Table 2
Characteristics of mothers with discrepancies

	Maternal Age, years Mean (SD)	Maternal Education 12 years (%)	Family Income < \$35,000 (%)
Total N= of 477	29.4 yrs. (5.5)	24.7%	20.0%
Mother > Teacher			
Total Problems N=26	30.5 (5.5)	34.6%	38.5% *
Externalizing N=28	28.0 (6.4)	42.9% *	39.3% *
Internalizing N=35	28.3 (5.8)	34.3%	42.9% *
Teacher > Mother			
Total Problems N=28	29.2 (5.4)	32.1%	28.6%
Externalizing N=25	25.4 (6.0)	28.0%	36.0% *
Internalizing N=20	30.4 (4.6)	30.0%	25.0%

*
p< 0.05 for comparison with total study population.

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Table 4
The Association of Mother's Age, Education and Income on Discrepancy of Mother and Teacher Ratings of Child's Behavior, stratified by Child' Sex

Discrepancy Mother > Teacher	Adjusted Odds Ratio ^a (95% CI)							
	Male				Female			
	Age (Years) ^b	Education	12 years	Income < \$35,000	Age (Years) ^b	Education	12 years	Income < \$35,000
Total Problems	1.10 (1.00, 1.23)	1.68 (0.49, 5.75)		1.72 (0.45, 6.58)	0.97 (0.83, 1.12)	1.13 (0.23, 6.47)		5.21 (0.95, 28.63)
Externalizing	0.99 (0.89, 1.10)	1.56 (0.46, 5.26)		1.61 (0.41, 6.36)	0.95 (0.83, 1.09)	3.13 (0.73, 13.43)		4.23 (0.86, 20.92)
Internalizing	1.00 (0.93, 1.09)	0.76 (0.25, 2.30)		3.21 (1.06, 9.72)	0.94 (0.84, 1.07)	1.47 (0.38, 5.68)		2.02 (0.46, 8.78)
Teacher > Mother								
Total Problems	1.05 (0.95, 1.17)	2.26 (0.65, 7.84)		2.48 (0.62, 9.88)	0.97 (0.87, 1.08)	0.71 (0.17, 3.01)		1.11 (0.24, 5.16)
Externalizing	0.91 (0.77, 1.07)	2.05 (0.31, 13.85)		0.39 (0.05, 3.34)	0.87 (0.78, 0.97)	0.45 (0.12, 1.71)		1.50 (0.41, 5.54)
Internalizing	1.10 (0.98, 1.23)	2.15 (0.58, 8.04)		3.14 (0.74, 13.32)	0.97 (0.82, 1.14)	0.59 (0.01, 6.03)		1.13 (0.10, 11.98)

^a Adjusted for mother's age, education, income, race, and psychiatric medication use and number of children at home.

^b OR per increasing year of age.