

The Longitudinal Consistency of Mother–Child Reporting Discrepancies of Parental Monitoring and Their Ability to Predict Child Delinquent Behaviors Two Years Later

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Abstract This study examined the longitudinal consistency of mother–child reporting discrepancies of parental monitoring and whether these discrepancies predict children’s delinquent behaviors 2 years later. Participants included 335 mother/female-caregiver and child (46% boys, >90% African American; age range 9–16 years [$M = 12.11$, $SD = 1.60$]) dyads living in moderate-to-high violence areas. Mother–child discrepancies were internally consistent within multiple assessment points and across measures through a 2-year follow-up assessment. Further, mothers who at baseline consistently reported higher levels of parental monitoring relative to their child had children who reported greater levels of delinquent behaviors 2 years later, relative to mother–child dyads that did not evidence consistent discrepancies. This finding could not be accounted for by baseline levels of the child’s delinquency, maternal and child emotional distress, or child demographic characteristics. This finding was not replicated when relying

on the individual reports of parental monitoring to predict child delinquency, suggesting that mother–child reporting discrepancies provided information distinct from the absolute frequency of reports. Findings suggest that mother–child discrepancies in reports of parental monitoring can be employed as new individual differences measurements in developmental psychopathology research.

Keywords Correspondence · Depression-distortion · Disagreement · Informant discrepancies · Multiple informants

Introduction

A key tenet of psychological assessments of children and adolescents (hereafter referred to collectively as “children” unless otherwise specified) is the employment of multiple informants’ reports within these assessments (e.g., parent, child, clinician, laboratory observer, biological indices). However, multiple informants often disagree, both in the level or severity of their behavioral reports in community settings and on whether a child should be diagnosed with a mental disorder in clinic settings (De Los Reyes and Kazdin 2005, 2006a). It is common to observe the levels of agreement between informants’ reports of the same behaviors in the low-to-moderate range (e.g., r ’s ranging from .20 to .60; Achenbach 2006).

Disagreements among informants’ reports (hereafter referred to as “informant discrepancies”) are some of the most consistent effects observed in the psychological sciences (Barrett 2006; De Los Reyes et al. 2009; Richters 1992; Saudino et al. 2004; Tein et al. 1994). Further, prior work has long attested to observing high levels of informant discrepancies between parent and adolescent reports

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of the adolescent's behavior (Achenbach et al. 1987; Ferdinand et al. 2004; Frank et al. 2000; Krenke and Kollmar 1998; Phares and Compas 1990; Phares and Danforth 1994; Verhulst and van der Ende 1992; Youngstrom et al. 2003). However, these informant discrepancies have also been observed for parent and adolescent reports of the parent's behavior and aspects of the parent-adolescent relationship (De Los Reyes et al. 2008; Gonzales et al. 1996; Guion et al. 2009; Pelton and Forehand 2001).

Beyond the mere observation of informant discrepancies in reports of youth and family behavior, the presence of these discrepancies often makes it difficult for researchers, policymakers, and clinicians to interpret the findings of important studies (for reviews see De Los Reyes and Kazdin 2008, 2009; Koenig et al. 2009). For instance, in samples of adolescents referred for clinical assessments of pediatric bipolar disorder, the rates of comorbid internalizing (e.g., anxiety and depressive symptoms) and externalizing (e.g., hyperactivity and aggressive symptoms) problems range from 5.4 to 74.1% depending on whether one relies on the parent, teacher, child, or combinations of these informants to assess comorbid dysfunction (Youngstrom et al. 2003). Additionally, the effects of psychological treatments for child and adolescent depression are estimated at magnitudes that are three times higher when based on self-report, relative to parent report (Weisz et al. 2006). In short, when different reports about the same behavior tell you different things, it becomes quite difficult to understand what that behavior is and who displays it, what caused it, and how it develops over time.

Because there is no definitive way to determine who is an "accurate" informant, researchers have long struggled with how to interpret informant discrepancies. In fact, the dominant views by researchers—and even the informants themselves (see Bidaut-Russell et al. 1995)—have involved attributing discrepancies to either informants' perceptual biases (e.g., as a result of informants' emotional distress) or measurement error (e.g., Fisher et al. 2006; Krosnick 1999; Richters 1992). In fact, recent work observing discrepancies among various family members' reports of adolescents' behavior has gone so far as to state, "the clinical use of family members' ratings to assess problem behavior of individuals is not valid" (see p. 1337; Manders et al. 2009). The implications of such interpretations cannot be understated: These views likely have influenced researchers to compensate for informant discrepancies with such strategies as identifying "optimal" informants in assessments of specific behaviors (e.g., Bird et al. 1992; Loeber et al. 1989). This is a crucial issue because such determinations of "optimal" informants are made within research literatures that readily acknowledge the lack of definitive methods to identify "accurate" informants. Thus, understanding what informant discrepancies represent is important because

researchers' interpretations of informant discrepancies may greatly influence the design and execution of studies and interpretations of the findings of studies when informant discrepancies arise.

Informant discrepancies are particularly important to understand in reference to assessments of a key construct in the developmental literature: parental monitoring of child whereabouts and behaviors. Parental monitoring is a multidimensional construct representing what a parent knows about their child's everyday whereabouts (Parental Knowledge), how they gain access to information about their whereabouts (Parental Solicitation), and what information the child willingly discloses to their parents about their whereabouts (Child Disclosure) (Kerr and Stattin 2000). Parental monitoring is thought to comprise both child-driven and parent-driven processes, with parent and child actively contributing to expressions of these behaviors.¹

Interestingly, prior work suggests that when based on parent or child reports, the presence of high levels of parental monitoring serves as a protective factor against the development of child maladjustment, with one particularly robust outcome being protections from the child engaging in delinquent behavior (e.g., Kerr and Stattin 2000; Lahey et al. 2008; Soenens et al. 2006; Stattin and Kerr 2000).

¹ Recently, researchers have argued that parental monitoring is primarily accounted for by the Parental Knowledge domain of the construct (Kerr and Stattin 2000; Soenens et al. 2006; Stattin and Kerr 2000). Moreover, some researchers maintain that parental knowledge is primarily child-driven (e.g., through disclosure; Kerr and Stattin 2000), whereas other researchers emphasize the direct influence of parent behaviors (Fletcher et al. 2004). Despite debate over the relative contribution of parent and child behaviors to parental knowledge, research and theory across diverse areas of the clinical and developmental sciences suggest that parent-child relationships are bi-directional; parent and child behaviors exert dynamic effects (e.g., Caspi et al. 2002; Granic and Patterson 2006; Laird et al. 2003; Stice and Barrera 1995).

Additionally, we decided to assess and examine parental monitoring across the three domains of Parental Knowledge, Parental Solicitation, and Child Disclosure. We did so because prior work suggests that mother-child reporting discrepancies across all three parental monitoring domains correlate with salient mother and child characteristics, namely their depressive symptoms (De Los Reyes et al. 2008). This observation is consistent with a long line of research and theory on informants' mood-congruent reporting of child and family behavior as a factor that partially accounts for informant discrepancies (see De Los Reyes and Kazdin 2005; De Los Reyes and Prinstein 2004; Richters 1992). Our key goal with this study was to advance understanding of informant discrepancies and more specifically the ability of these discrepancies to demonstrate both consistency over time and prediction of important behaviors. Therefore, the goals of this study are greatly supported by using both multiple measures of informant discrepancies as well as discrepancies on constructs for which prior work suggests meaningfully correlate with the characteristics of the informants reporting on the constructs. Thus, there was a strong empirical and conceptual rationale to examine reporting discrepancies across these three domains of parental monitoring, rather than any one of them individually.

However, rarely are both informants used in research, and not surprisingly, mothers and their children often evidence low levels of agreement between their parental monitoring reports (r 's ranging from .23 to .33; De Los Reyes et al. 2008). Although one may be quick to dismiss these discrepancies as merely measurement error or evidence of informant biases, recent studies in the adolescent development literature point to the utility of the discrepancies between parent and adolescent reports for predicting important behaviors over time. For instance, greater levels of parent and adolescent discrepancies in reports of adolescent driving restrictions longitudinally predict over a 9-month period adolescent self-reports of greater levels of risky driving behaviors (Beck et al. 2006). Additionally, greater discrepancies between parents and adolescents in their reports of parenting behaviors longitudinally predict increases in adolescents' internalizing symptoms and deficits in social competence (Guion et al. 2009). Thus, preliminary work suggests that parent–child discrepancies in reports of parenting and parenting-related variables have utility for predicting poor child outcomes over time.

Although prior work in other areas of child and family development has dedicated attention to the implications of parent–child reporting discrepancies for predicting child outcomes, parent and child reports of parental monitoring are rarely examined simultaneously in a study. Therefore, absent is knowledge of the predictive value of parent–child reporting discrepancies of parental monitoring behaviors. It may be that because parental monitoring behaviors serve as a protective factor for child delinquency (e.g., Kerr and Stattin 2000), parent–child discrepancies in parental monitoring reports may be particularly robust predictors of such behaviors. Yet, one can argue that, in contrast to parental monitoring itself, discrepancies between parent and child reports of parental monitoring might actually serve as risk factors for the presence of child delinquent behaviors. Indeed, normatively parental monitoring behaviors decrease over the course of adolescent development (see Crouter et al. 1990; Darling et al. 2006; Kerr et al. 1999). That is, in large part because adolescents, relative to younger children, spend more time outside of the home, over time parents in general grow less knowledgeable about their adolescents' whereabouts, activities, and peer associations. However, mothers and children commonly disagree in their parental monitoring reports and a child's age is not significantly related to these discrepancies (De Los Reyes et al. 2008).

Taken together, prior work suggests that, whereas the construct upon which reports are taken (parental monitoring) changes over time, mother–child discrepancies in reports of the construct remain relatively stable over time. If this is the case, one can surmise that the links among child delinquent behavior, parental monitoring, and mother–child discrepancies in reports of parental monitoring suggest that

parental monitoring discrepancies may longitudinally predict the presence of children's delinquent behavior. In particular, discrepancies in parental monitoring behaviors may be predictive when mothers report higher levels of monitoring relative to their children. This is because this discrepancy may signify that mothers do not have adequate information about their children's whereabouts and activities to protect their children from developing increases in psychosocial maladjustment. Further, the consistently low levels of agreement across reports of parental monitoring domains (Parental Knowledge, Parental Solicitation, and Child Disclosure; see De Los Reyes et al. 2008) suggest that multiple measures of these discrepancies also may exhibit similar consistencies over time. Therefore, discrepancy in perceived parental monitoring is a novel construct to examine the longitudinal consistency and predictive utility of informant discrepancies in developmental psychopathology research.

The Current Study

The present study extends the literature on informant discrepancies in developmental psychopathology. We extended the literature by addressing two key aims. First, we examined the internal consistency of mother–child parental monitoring discrepancies across domains and over 2 years. Second, we used a person-centered approach (i.e., latent profile analysis) to examine whether mother–child parental monitoring discrepancies predict the child's delinquent behavior 2 years later (Bartholomew 2002). We used a person-centered approach because we were interested in identifying groups of mother–child dyads that were distinguished by the magnitude and direction of discrepant reports on parental monitoring. Latent profile analysis uses continuous scores (as opposed to latent class analysis, which focuses on categorical or ordinal scores) to identify groups of participants such that the associations among variables (e.g., reporting discrepancies) are similar within groups and different between groups (i.e., locally independent classifications of groups of participants; see McCutcheon 1987). Specifically, using multiple indicators of mother–child discrepancies across the three parental monitoring domains would allow us to identify classes of dyads that may be distinguished by the direction of reporting discrepancies (i.e., dyads that vary with regard to whom reports higher levels of parental monitoring). Thus, our key aims involved examining the ability of mother–child discrepancies in reports of parental monitoring behaviors to demonstrate consistency across reporting domains and time and utility in longitudinally predicting children's delinquent behaviors.

We were interested in identifying subgroups of mother–child dyads that varied in their magnitude and direction of reporting discrepancies. In particular, we were interested in examining mothers who report higher levels of parental monitoring relative to their child’s report. Thus, in this study, we addressed four hypotheses. First, we expected that mother–child discrepancies would be internally consistent across parental monitoring domains and over time, or across each of the study’s three assessments (baseline, 1- and 2-year follow-ups). Second, we expected that greater mother–child discrepancies in the direction of mothers reporting higher levels of parental monitoring, relative to the child’s report would longitudinally predict variance in the child’s delinquent behaviors, when controlling for baseline delinquency. We hypothesized predictive effects in this particular direction because we surmised that the converse discrepancy direction (children reporting higher levels of parental monitoring, relative to the mother’s report) may simply result in a child engaging in less delinquent behavior (i.e., from the child’s perspective, their whereabouts and activities were being monitored). Third, we expected that the relationships identified in tests of Hypothesis 2 would be robust when taking into account baseline levels of informant characteristics known to relate to either reporting discrepancies generally or parental monitoring discrepancies in particular: *maternal depressive symptoms and stress and child depressive symptoms* (De Los Reyes et al. 2008; De Los Reyes and Kazdin 2005). Finally, we expected that the utility of informant discrepancies in predicting children’s delinquent behavior would provide unique information relative to the predictive utility demonstrated by the individual mother and child reports. In sum, we expected that mother–child discrepancies in reports of parental monitoring behaviors would exhibit consistency across reporting domains and time, predict children’s delinquent behaviors over time, and the predictive utility of these reporting discrepancies would not be better accounted for by either informant characteristics or the individual informants’ parental monitoring reports.

Method

Participants

Participants included 335 mother/female-caregiver and child (153 boys, 182 girls) dyads that participated in a larger community study of 358 dyads. By “mother,” we mean a female caregiver, whether biological, adoptive, foster, or other relative (e.g., grandmother) that serves the maternal role in the household. The sample included families with a 5th or 8th grade child who lived in a

moderate-to-high violence area of a midsize southern city. Police crime statistics were used to identify neighborhoods that were moderate-to-high in crime. Thus, this was a community sample that was not screened a priori for the presence of psychopathology. At the baseline assessment, children were enrolled in 5th (53%) and 8th (47%) grades, with an age range of 9–16 years ($M = 12.11$, $SD = 1.60$). Children primarily self-identified as African American (91.3%), with a minority identifying as Caucasian or European American (3.6%), American Indian (2.4%), Asian American (.3%), or other (2.4%).

At the baseline assessment, female caregivers had a mean age of 36.60 years ($SD = 6.30$, range of 24–56). Caregivers were primarily biological mothers (86%), with a minority identifying as grandmothers (7%), adoptive mothers (2%), stepmothers (1%), or other female relatives (3%). Approximately one-third (34%) of the families had a weekly household income of \$300 or less; 30% earned \$600 or more per week. About a quarter (23%) of the caregivers had not completed high school, 31% had completed high school or had a general education diploma, 23% had some education beyond high school but had not completed a post-high school degree, and 22% had completed either an Associate’s, Vocational, Bachelor’s, or Master’s degree. Caregiver marital status varied, with 40% of the caregivers never married, about one-third (32%) of caregivers married or cohabitating at the time of the study, 14% separated, 11% divorced, and 2% widowed.

In order to participate in the study, families had to speak English, understand the consenting and interview process, and have completed information on constructs of interest at a baseline assessment and then again at 1- and 2-year follow-up assessments. Specifically, 358 families completed the baseline assessment, the 1-year follow-up assessment included 319 families, and the 2-year follow-up assessment included 272 families. Requiring information on constructs of interest resulted in a final baseline sample of 335, a final 1-year follow-up sample of 294, and a final 2-year follow-up sample of 267. (As an aside, reliability analyses collapsed across the three samples were based on 245 participants and predictive tests of delinquency at 2-year follow-up were based on 248 participants.) These retention rates are better than many community-based studies for recruiting participants from disadvantaged neighborhoods (cf., Luthar and Goldstein 2004). Further, 2-year follow-up families did not significantly differ from families that did not participate at the 2-year follow-up (but participated in the baseline assessment) on baseline levels of parent- and child-reported parental monitoring or baseline child-reported delinquent behaviors. Additionally, 2-year follow-up families did not significantly differ from families that did not participate at the 2-year follow-up (but participated in the baseline assessment) on child

demographic variables of age, gender, or ethnicity/race. Nevertheless, we controlled for child age, gender, and ethnicity/race in all analyses.

Measures

Monitoring-Relevant Behaviors

Three scales were included to assess important parental monitoring constructs (Child Disclosure, Parental Knowledge, and Parental Solicitation). For each scale, mothers and children answered parallel items with minor word changes as needed to frame the questions appropriately for the informant. Mother and child responded to all items with a response scale ranging from 1 (no, never) to 5 (yes, always). Stattin and Kerr (2000) reported internal consistencies for all scales (.69–.82) and extensive evidence supporting construct validity.

Child Disclosure

This parental monitoring scale (5 items) assessed how often children spontaneously disclosed information to their parents as well as efforts to conceal information (e.g., “Do you keep a lot of secrets from your parents about what you do during your free time?”). At baseline, alpha coefficients for this sample were .76 for the child-report items and .72 for the parent-report items. Average inter-item correlations were .40 for the child-report items and .35 for the parent-report items. At 1-year follow-up, alpha coefficients for this sample were .78 for the child-report items and .78 for the parent-report items. Average inter-item correlations were .42 for the child-report items and .41 for the parent-report items. At 2-year follow-up, alpha coefficients for this sample were .78 for the child-report items and .78 for the parent-report items. Average inter-item correlations were .42 for the child-report items and .42 for the parent-report items.

Parental Knowledge

A second parental monitoring scale (9 items) assessed parents’ knowledge of the child’s whereabouts, activities, and associations (e.g., “Do your parents know what you do during your free time?”). At baseline, alpha coefficients for this sample were .80 for the child-report items and .78 for the parent-report items. Average inter-item correlations were .32 for the child-report items and .30 for the parent-report items. At 1-year follow-up, alpha coefficients for this sample were .85 for the child-report items and .81 for the parent-report items. Average inter-item correlations were .38 for the child-report items and .34 for the parent-report items. At 2-year follow-up, alpha coefficients for this sample were .87 for the child-report items and .81 for

the parent-report items. Average inter-item correlations were .43 for the child-report items and .34 for the parent-report items.

Parental Solicitation

A third parental monitoring scale (5 items) assessed parents’ efforts to gather information about the child’s whereabouts, activities, and relationships (e.g., “How often do your parents initiate a conversation about things that happened during a normal day at school?”). At baseline, alpha coefficients for this sample were .75 and .65 for the child and parent-report items, respectively. Average inter-item correlations were .38 for the child-report items and .29 for the parent-report items. At 1-year follow-up, alpha coefficients for this sample were .78 for the child-report items and .65 for the parent-report items. Average inter-item correlations were .42 for the child-report items and .29 for the parent-report items. At 2-year follow-up, alpha coefficients for this sample were .77 for the child-report items and .66 for the parent-report items. Average inter-item correlations were .41 for the child-report items and .30 for the parent-report items.

Reporting Discrepancies of Monitoring-Relevant Behaviors

Mothers’ and children’s perceived parental monitoring were assessed using index scores for mother- and child-rated Child Disclosure, Parental Knowledge, and Parental Solicitation. Discrepancies were measured using standardized difference scores (SDS), consistent with current recommendations and practices (e.g., De Los Reyes et al. 2008; De Los Reyes and Kazdin 2004, 2006b; Guion et al. 2009; Owens et al. 2007; Weems et al. 2007). Specifically, SDS were created by first converting each child’s ratings and their mother’s ratings of each parental monitoring subscale into z scores, and then subtracting the child’s z score for each subscale from the mother’s z score on that same subscale (hereby referred to as parental monitoring-Standardized Difference Scores [PM-SDS]). This resulted in three PM-SDS (one for each parental monitoring domain), with negative scores representing instances in which the child reported higher levels of parental monitoring, relative to the mother, and positive scores representing the mother reporting higher levels of parental monitoring relative to the child. By “higher levels” we mean instances in which one informant would be more likely than the other informant to report that: (a) the child tends to willingly disclose information to parents, (b) the parent tends to know their child’s whereabouts and activities, and/or (c) the parent tends to make active efforts to solicit information from others about their child’s whereabouts and activities. The mathematical properties of SDS,

along with the rationale for choosing the SDS over other measures (e.g., residual difference scores) have been demonstrated, reported, and reviewed elsewhere (De Los Reyes and Kazdin 2004, 2005; Guion et al. 2009; Owens et al. 2007).

Child Delinquent Behaviors

The Delinquency subscale of the Problem Behavior Frequency Scales (PBFS; Farrell et al. 2000) assessed children's reports of delinquent behaviors. The eight-item Delinquency subscale included both illegal behaviors such as shoplifting and vandalism, and school-related problems such as truancy. At each assessment point, children reported how frequently they engaged in each behavior during the past 30 days, based on a six-point scale (1 = Never, 2 = 1–2 times, 3 = 3–5 times, 4 = 6–9 times, 5 = 10–19 times, 6 = 20 times or more). Scores taken from the scale represented the mean response to the individual items, with higher scores indicating more delinquency. In the current study, alpha coefficients for the Delinquency subscale at baseline, 1-year follow-up, and 2-year follow-up assessments were .66, .74, and .72, respectively. The average inter-item correlations for this sample at baseline, 1-year follow-up and 2-year follow-up were .25, .35, and .25, respectively.

Depressive Symptoms

Depressive symptoms were assessed at baseline with two widely used self-report measures. The Child Depression Inventory (CDI; Kovacs 1985) is a 27-item measure used to assess child depressive symptoms. The alpha coefficient for this sample was .84. The average inter-item correlation for this sample was .17. The depressive symptoms subscale of the Brief Symptoms Inventory (BSI; Derogatis and Melisaratos 1983) is comprised of 6 items and assessed maternal depressive symptoms. Mothers indicated the extent to which they experienced symptoms during the past week using a Likert scale ranging from 0 (not at all) to 4 (extremely); the possible range of scores was 0–24 (six items comprised the subscale). The alpha coefficient for this sample was .87. The average inter-item correlation for this sample was .54.

Maternal Life Stress

Major life stress was assessed at baseline by the Life Stresses Scale (LSS), a 20-item measure that assesses life stressors mothers experienced in the past 6 months. Fourteen items were based on a measure developed by the Conduct Problems Prevention Research Group (1998), and six items were developed for use in the Multisite Violence Prevention

Project (Miller-Johnson et al. 2004) to reflect the concerns of an urban sample. Respondents rated each item on a three-point scale (0 = did not occur, 1 = caused minor stress, or 2 = caused major stress). Item scores were averaged to obtain a mean severity rating, with high scores reflecting higher stress levels. In the current sample, the alpha coefficient was .83. The average inter-item correlation was .19.

Demographic Characteristics

All demographic data were obtained through child and caregiver interviews. Children reported their age, gender, and ethnicity. Caregivers reported on their age, relationship to the child, marital status, education, employment, and family income.

Procedure

Participants were recruited through community agencies and events, and via flyers posted door-to-door in qualifying neighborhoods (i.e., neighborhoods targeted because of moderate-to-high rates of violent crime activity). Specifically, flyers advertising the study were posted in community agencies that served these neighborhoods (e.g., Parks and Recreation, Boys and Girls Clubs, churches). Approximately two-thirds (63%) of the families who contacted research personnel about the study and were eligible to participate agreed to participate in the study. This figure is better than many community-based studies for recruiting participants from disadvantaged neighborhoods (cf. Luther and Goldstein 2004). Further, the final sample was demographically representative of the geographic area (United States Census Bureau 2004; <http://quickfacts.census.gov/qfd/states/51/5167000.html>). Although this recruitment strategy did not involve a clinical screening process, the ranges on measures were comparable to what we would expect, based on prior community-based studies (cf., Farrell et al. 2006; Kliewer et al. 2004; Sullivan et al. 2006). Participants completed a baseline assessment of all variables of interest, and then an assessment of these same variables approximately 1 and 2 years later.

After respondents were screened for eligibility over the telephone, interviews were scheduled. To be eligible to participate in the study, families needed to have a 5th or 8th grader and female caregiver present for the interview. Interviews were conducted in participants' homes unless a family requested to be interviewed elsewhere. Additionally, interviewers completed extensive training before being approved to interview families. Specifically, interviewers were trained on research protocols and general interviewing techniques including multicultural sensitivity. Interviewer training took place over the course of 4 weeks with didactic sessions, practice sessions, and homework. Interviewers

also were required to audiotape practice sessions with each other, and with participants from the community who volunteered to be part of the interviewers' training. The study supervisor analyzed these tapes and gave written and verbal feedback to the interviewers. Interviewers were not released into the field until they had successfully completed training. Further, a random sample of 10% of the families were called and queried about the interviewers to ensure that interviewers maintained professional standards.

Teams of two interviewers conducted in-home interviews. After the caregiver provided written consent, the dyad separated for interviews, with children providing assent before their interview. Interviews were conducted face-to-face with visual aids, and all questions were read aloud, with the exception of a small portion of the child interview. Specifically, children who passed a reading-screening test responded to CDI items in a booklet without assistance. The parental monitoring items were interviewer-administered, with the interviewer reading the questions aloud. Families received a total of \$50 in Wal-Mart gift cards at each assessment point.

Results

Preliminary Analyses

Frequency distributions for all variables were examined before conducting primary analyses, to detect deviations from normality. We identified mild-to-high positive skewness for baseline scores on the BSI-Depression subscale ($n = 335$; $M = 9.80$; $SD = 4.69$) and baseline ($n = 330$; $M = 1.41$; $SD = 2.48$), 1-year follow-up ($n = 298$; $M = 1.71$; $SD = 3.14$), and 2-year follow-up ($n = 269$; $M = 1.77$; $SD = 3.14$) PBFS-Delinquency subscale scores (skewness = 1.8, 2.7, 4.0, and 2.7, respectively). Therefore, these scores were log-transformed according to recommendations by Tabachnick and Fidell (2001). The transformation resulted in some improvement (skewness ≈ 1), and the transformed variables were employed for all analyses. Following transformation, means and standard deviations for each of the four variables were as follows: baseline BSI-Depression subscale: $M = .95$; $SD = .17$; baseline PBFS-Delinquency subscale: $M = .24$; $SD = .31$; 1-year follow-up PBFS-Delinquency subscale: $M = .27$; $SD = .33$; and 2-year follow-up PBFS-Delinquency subscale: $M = .27$; $SD = .34$.

Domain-Level and Longitudinal Consistency of Parental Monitoring Discrepancies

To test the domain-level and longitudinal consistency of parental monitoring discrepancies, internal consistency

analyses were conducted separately for the three PM-SDS domain measurements at baseline, 1-year follow-up, and 2-year follow-up. Additionally, a fourth analysis was conducted on the nine PM-SDS measurements combined across baseline, 1-year follow-up, and 2-year follow-up. Specifically, each PM-SDS was treated as an "item" on a measure of mother-child parental monitoring discrepancies and entered into an internal consistency reliability analysis. The internal consistency estimates for the three parental monitoring domains at the baseline assessment were quite high given the low number of items on the scale, $\alpha = .71$, inter-item correlation = .45. We replicated the level of these internal consistency estimates for assessments at the 1-year follow-up, $\alpha = .78$, inter-item correlation = .54, and 2-year follow-up, $\alpha = .75$, inter-item correlation = .50. Most crucially, when combined across baseline, 1-year follow-up, and 2-year follow-up, the PM-SDS measures demonstrated additional increases in internal consistency over time, $\alpha = .84$, inter-item correlation = .37. These estimates were within the range considered acceptable estimates of internal consistency (Nunnally and Bernstein 1994) and supported the hypothesis that parental monitoring discrepancies would demonstrate consistency over time and across domains.

Latent Profile Modeling of Mother-Child Parental Monitoring Discrepancies

Before examining the predictive utility of mother-child parental monitoring discrepancies, we conducted an exploratory latent profile analysis on the three PM-SDS computed at the baseline assessment (LPA; Bartholomew 2002). Like cluster analysis, LPA attempts to identify groups of cases based on similar patterns of indicator variables. Like confirmatory factor analysis, LPA computes tests of relative model fit, yielding indices such as the Bayesian Information Criterion (BIC) to compare whether a given model is a more or less parsimonious solution to the data than competing solutions, with lower scores indicating greater parsimony (Raftery 1986). Latent profile analysis employs continuous indicators to identify case groupings. *Latent profile analysis* procedures are considered a variant of another form of latent variable modeling, *latent class analysis*, which uses categorical or ordinal variables to identify groupings (McCutcheon 1987). Latent profile analysis identifies groups within which there is local independence of indicators (i.e., indicators are statistically independent within levels of each group). Thus, LPA is a "person-centered" approach to data analysis that identifies case profiles exhibiting similar data patterns across multiple indicators. Probabilities provided by a latent profile solution may be used to assess the confidence with which cases are assigned, and to assign new cases based on a solution.

We expected that the LPA would identify the following profiles of reporting discrepancies: (a) mother–child dyads that did not tend to display extreme disagreements in either direction or within specific domains, (b) children who consistently reported higher levels of parental monitoring across domains, relative to their mother, and (c) mothers who consistently reported higher levels of parental monitoring across domains, relative to their child. We tested 1- through 4-profile solutions, evaluating the fit and interpretability of each.

The 3-profile solution fit the data best, $LL = -1,505.95$, $BIC = 3,128.18$. The BIC index for the 3-profile solution was lower relative to those of the 2- and 4-profile solutions— $LL = -1,550.43$, $BIC = 3,176.45$ and $LL = -1,490.75$, $BIC = 3,138.49$, respectively—suggesting superior model fit (Raftery 1986). Consistent with our hypotheses, the 3-profile solution yielded the following profiles of mother–child discrepancies ($n = 335$): (a) neither mother nor child likely to over-report, relative to each other (No Consistent Disagreements) ($n = 214$, latent profile probability = .60, latent assignment probability = .87), (b) child likely to over-report, relative to mother (Child Consistently Over Parent) ($n = 74$, latent profile probability = .24, latent assignment probability = .87), and (c) mother likely to over-report, relative to child (Parent Consistently Over Child) ($n = 47$, latent profile probability = .15, latent assignment probability = .86).

Each of the profiles identified in the 3-profile solution yielded consistently different directions of mother–child reporting discrepancies (relative mother or child over-reporting). For instance, the Parent Consistently Over Child profile represented a group for which dyads evidenced large, mean positively signed PM-SDS across the three indicators (mean PM-SDS for Child Disclosure, Parental Knowledge, and Parental Solicitation were 1.59, 1.51, and 1.04, respectively). This can be contrasted with the mean PM-SDS for the Child Consistently Over Parent profile, which evidenced large, mean negatively signed PM-SDS across the three indicators (mean PM-SDS for Child Disclosure, Parental Knowledge, and Parental Solicitation were -1.36 , -1.13 , and $-.94$, respectively). In contrast to both of these profiles the No Consistent Disagreements profile evidenced mean PM-SDS near zero across the three indicators (mean PM-SDS for Child Disclosure, Parental Knowledge, and Parental Solicitation were .16, .08, and .15, respectively). Of note is that the LPA profiles reflected similar patterns of PM-SDS, regardless of the parental monitoring domain. In other words, children who over-reported relative to mother when rating the Child Disclosure domain also tended to engage in the same over-reporting when rating the Parental Knowledge domain. The same was true for mother–child discrepancies patterns in which the mother over-reported relative to the child. The

structure and composition of the 3-profile solution was essentially identical to the solution obtained when controlling for child age, gender, and ethnicity/race, $\chi^2(4) = 624.70$, Cramer's $V(2) = .96$, $p < .001$. This is consistent with prior work indicating that mother–child parental monitoring discrepancies are unrelated to child demographic characteristics (De Los Reyes et al. 2008). Nevertheless, as mentioned previously, we controlled for these child demographic characteristics in our analyses.

Predicting Child Delinquent Behavior from Mother–Child Parental Monitoring Discrepancies

Prediction of Child Delinquent Behavior by Mother–Child Parental Monitoring Discrepancies

Relative to mother–child dyads that did not evidence consistent reporting discrepancies in either direction (i.e., maternal or child over-reporting, relative to each other), we hypothesized that baseline mother–child parental monitoring discrepancies and particularly mothers reporting higher levels of parental monitoring relative to their child's report would predict variance in child delinquent behaviors at 2-year follow-up, when controlling for baseline levels of child delinquent behaviors, maternal stress, mothers' and children's depressive symptoms, and baseline child age, gender, and ethnicity/race. To test this, we conducted a univariate analysis of covariance with the 2-year follow-up PBFS-Delinquency subscale score as the criterion variable, the baseline PM-SDS profile assignment entered as the independent variable, and the baseline scores taken from the PBFS-Delinquency subscale, LSS-Average Severity of Mother's Stressors, BSI-Depression subscale, and CDI total entered as covariates, along with baseline child demographics.

Results for analyses examining whether discrepancies predict variance in child delinquent behaviors are presented in Table 1. Specifically, covariates significantly predicted child delinquency scores at 2-year follow-up, and the significant covariates were baseline child delinquency, child depressive symptoms, and child ethnicity/race. Consistent with our hypotheses, baseline mother–child parental monitoring discrepancies significantly predicted variance in child delinquency scores at 2-year follow-up over and above the control variables.

To examine the direction of the effect of the profiles of parental monitoring discrepancies, we compared the marginal means (i.e., means when accounting for all covariates) of the PBFS-Delinquency subscale scores at 2-year follow-up between the Parent Consistently Over Child and No Consistent Disagreements profiles, as well as the Child Consistently Over Parent and No Consistent Disagreements profiles. As shown in Table 1, the Parent Consistently Over

Table 1 Univariate analysis of covariance contrasting profile groups of mother–child parental monitoring discrepancies on levels of children’s delinquent behavior at 2-year follow-up ($n = 248$)

| Variable | Delinquent behavior, 2-year follow-up | | |
|---|---------------------------------------|------------------|----------|
| | <i>df</i> | Partial η^2 | <i>F</i> |
| Total model | 9 | .19 | 6.16** |
| Baseline delinquent behavior | 1 | .05 | 13.34** |
| Maternal depressive symptoms | 1 | 0 | .17 |
| Child depressive symptoms | 1 | .02 | 6.33* |
| Maternal stress | 1 | 0 | .52 |
| Child age | 1 | 0 | 0 |
| Child gender | 1 | .01 | 3.49 |
| Child ethnicity/race | 1 | .03 | 7.21* |
| Profile group of mother–child discrepancies | 2 | .03 | 4.26* |

| Follow-up group contrasts | <i>M</i> | <i>SE</i> | <i>CE</i> | <i>SE</i> | <i>p</i> -value | (95% <i>CI</i>) |
|--|----------|-----------|-----------|-----------|-----------------|------------------|
| Parent Consistently Over Child vs. No Consistent Disagreements | .38 | .05 | | | | |
| Contrast statistics | .22 | .02 | .15 | .06 | .01 | (.035, .275) |
| Child Consistently Over Parent vs. No Consistent Disagreements | .32 | .04 | | | | |
| Contrast statistics | .22 | .02 | .09 | .05 | .06 | (−.003, .198) |

Follow-up group contrasts based on estimated marginal means and standard errors

CE contrast estimate, *SE* standard error, *95% CI* 95% confidence interval, Child gender was coded as 0 = male, 1 = female. Child ethnicity was coded as 0 = African American, 1 = all other ethnicities

* $p < .05$, ** $p < .001$

Child profile evidenced significantly greater child delinquency scores at 2-year follow-up, relative to the No Consistent Disagreements profile. Further, there was a significant trend for the Child Consistently Over Parent profile to evidence significantly greater child delinquency scores at 2-year follow-up, relative to the No Consistent Disagreements profile. These results supported the hypothesis that mother–child parental monitoring discrepancies—and in particular in the direction of mothers reporting higher levels of parental monitoring relative to their child’s report—would longitudinally predict variance in child delinquent behaviors at 2-year follow-up.²

² As mentioned previously, prior work has identified no significant relationships between a child’s age and mother–child discrepancies in parental monitoring reports (De Los Reyes et al. 2008). At the same time, the broader literature on informant discrepancies in assessments of children and adolescents has been inconsistent as to whether such discrepancies relate to a child’s age (for a review see De Los Reyes and Kazdin 2005). To address these inconsistencies, we report results of analyses examining: (a) the relationships among the latent profiles of mother–child discrepancies in parental monitoring reports and two different indices of child age (dichotomous and continuous) and (b) whether the conclusions of our main tests (see Table 1) change as a

Alternative Tests Based on Individual Mother and Child Parental Monitoring Reports

We were interested in examining whether the prediction of child delinquent behavior by mother–child reporting discrepancies would be redundant with the predictive value of

Footnote 2 continued

function of which index of child age we use (dichotomous vs. continuous). For the dichotomous age variable, we took a median split of the sample in which we coded children ages 9–12 “0” ($n = 181$) and children ages 13–16 “1” ($n = 154$). Consistent with prior work on mother–child discrepancies in reports of parental monitoring (De Los Reyes et al. 2008), we found no significant relationships in chi-square tests of the distributions of dichotomous child age scores and the latent profiles of mother–child reporting discrepancies, as well as ANOVA tests of the differences among latent profiles in continuous age scores, both p ’s $> .09$. Further, our main tests (see Table 1) yield the same conclusions, regardless of whether the dichotomous or continuous age variable is used in the tests. In fact, in both circumstances for the child age variable the Partial η^2 was 0 and the F was 0. These findings speak to the lack of evidence supporting the idea that youth age relates to mother–child discrepancies in parental monitoring reports in this sample or that age has any bearing on the patterns of effects that we identified.

the individual mother and child reports. To test this, we conducted two multiple regression analyses. For these analyses, to reduce multicollinearity among the parental monitoring subscales two separate composite scores were created with baseline assessment data; one for child report and one for parent report. To create each composite score, the informants' reports across the three parental monitoring subscales were converted into z scores and then averaged. The separate mother and child composite scores were those used in each of the multiple regression analyses we describe below.

In the first regression analysis, the 2-year follow-up PBFS-Delinquency subscale score was used as the criterion variable in a hierarchical regression analysis, with the baseline scores taken from the PBFS-Delinquency subscale, LSS-Average Severity of Mother's Stressors, BSI-Depression subscale, and CDI total, as well as baseline child age, gender, and ethnicity/race (coded as "African-American" vs. "other ethnicity/race") entered in the first step, and the baseline mother and child parental monitoring composite scores entered into the second step as independent variables. In the first step of the equation, mother depression and stress and child depression and child demographic characteristics were related to child delinquency scores at the 2-year follow-up, $R = .40$, $R^2\Delta = .16$, $F\Delta (7, 240) = 6.53$, $p < .001$. In this step, the significant predictors were baseline child delinquency, $\beta (246) = .24$, baseline child depression, $\beta (246) = .20$, and child ethnicity, $\beta (246) = .15$, all p 's $< .05$. In the second step of the equation, the mother and child parental monitoring composite scores did not predict child delinquency scores at the 2-year follow-up, $R = .42$, $R^2\Delta = .01$, $F\Delta (2, 238) = 2.09$, *ns*. Neither the mother, $\beta = -.08$, nor the child, $\beta = -.10$, parental monitoring reports were significant predictors in the second step. Thus, individual mother and child parental monitoring reports did not longitudinally predict child delinquency.

With the second regression analysis, we wanted to ensure that the null effects of mother and child parental monitoring reports in the first regression analysis were not due to non-linear relationships between mother and child reports and child delinquency at the 2-year follow-up. Thus, we conducted a multiple polynomial regression analysis to test for non-linear effects. As in the first equation, the 2-year follow-up PBFS-Delinquency subscale score was used as the criterion variable in a hierarchical regression analysis, with the baseline scores taken from the PBFS-Delinquency subscale, LSS-Average Severity of Mother's Stressors, BSI-Depression subscale, and CDI total, as well as baseline child age, gender, and ethnicity/race entered in the first step, and the baseline mother and child parental monitoring composite scores entered into the second step as independent variables. Additionally, we

created quadratic (i.e., squared) scores for each of the continuous variables in the equation and entered them in their respective steps of the regression analysis (e.g., both quadratic representations of mother and child parental monitoring composite scores were entered in the second step, along with their linear representations). All continuous variables were converted to z scores prior to computing quadratic scores. As in the first regression analysis, in the first step of the equation mother depression and stress and child depression and child demographic characteristics were related to child delinquency scores at the 2-year follow-up, $R = .46$, $R^2\Delta = .21$, $F\Delta (12, 235) = 5.32$, $p < .001$. In the second step of the equation, the mother and child parental monitoring composite scores did not predict child delinquency scores at the 2-year follow-up, $R = .49$, $R^2\Delta = .02$, $F\Delta (4, 231) = 2.04$, *ns*. Neither the mother, $\beta = -.12$, nor the child, $\beta = -.13$, linear composite scores were significant predictors in the second step, and neither were their quadratic representations, $\beta = .01$ and $\beta = -.05$, respectively. In sum, mother and child parental monitoring reports did not predict child delinquency when both reports were considered independently of each other and examined in the same statistical model. This suggests that mother-child discrepancies provided information distinct from the absolute frequency of reports.

Discussion

Discrepancies between informants' reports are consistently observed across assessments taken in the psychological sciences and in examinations of parent and adolescent reports of youth and family behavior in particular (Achenbach 2006; De Los Reyes and Kazdin 2005; Gonzales et al. 1996; Guion et al. 2009). Recently, these same discrepancies have been observed for mother and child reports of parental monitoring behaviors (De Los Reyes et al. 2008). Although informant discrepancies have often been interpreted as measurement error or evidence of informant biases, recent work in the adolescent development literature suggests that they may predict important child outcomes over time (Beck et al. 2006; Guion et al. 2009). With regard to parental monitoring, understanding whether discrepancies between mother and child reports exhibit similar predictive utility may enrich our understanding of how parental monitoring is related to child delinquent behaviors over time. The findings from this study extend this literature by examining the consistency of mother-child reporting discrepancies in parental monitoring behaviors both across Child Disclosure, Parental Knowledge, and Parental Solicitation domains and over time, and whether these discrepancies longitudinally predict child delinquency in ways that the individual informants' reports do not.

There were four main findings. First, treating multiple indices of mother–child reporting discrepancies on parental monitoring assessments as “items” on a measure of reporting discrepancies, we found that mother–child discrepancies were consistent both across monitoring domains and over baseline, 1-, and 2-year follow-up assessments. Second, mother–child discrepancies in the direction of mothers consistently reporting higher levels of parental monitoring than the child across monitoring domains predicted variance in child reports of their own delinquent behaviors assessed 2 years later. Specifically, mother–child dyads within this profile of mothers reporting of higher levels of parental monitoring relative to their child’s reports were more likely to evidence high ratings of child delinquent behaviors at a 2-year follow-up assessment, relative to dyads that did not tend to evidence extreme reporting discrepancies of parental monitoring. Third, the relationship between mother–child reporting discrepancies and child delinquent behaviors at 2-year follow-up could not be accounted for by baseline levels of child delinquency, maternal depressive symptoms and life stress, and childhood depressive symptoms, and were not accounted for by child age, gender, and ethnicity/race. Fourth, the separate mother and child reports of parental monitoring used to assess mother–child discrepancies failed to demonstrate the same predictive utility that was demonstrated with the discrepancies. In sum, mother–child reporting discrepancies in parental monitoring assessments are consistent across domains and time, and usefully predict child delinquent behaviors 2 years later in ways that the individual informants’ reports do not.

Our findings have implications for research seeking to understand why informant discrepancies might longitudinally predict behavior. Indeed, parental monitoring is a construct with relevance to mother–child interactions and the development of child maladjustment. Further, mother–child discrepancies in reports of parental monitoring appear to remain consistent over multiple years. Most importantly, one can surmise that if mothers view levels of parental monitoring in a far more positive light than their children view them and if this discrepancy in perceiving monitoring holds for an extended period, such a discrepancy may be a marker for mothers not having access to vital information about their child’s whereabouts and with whom they associate. Indeed, recent observational research in the clinical child literature suggests that part of the reason why informants disagree in their reports is because they often primarily view the behaviors being assessed in different settings, and children often behave differently, depending on the setting (e.g., parents view children’s behavior at home and teachers at school; see De Los Reyes et al. 2009). Therefore, a mother’s lack of access to information on their child’s whereabouts and associations—particularly when

present over a long period—may have significant implications for the development of childhood psychopathology and for reports of other aspects of the mother–child relationship (e.g., negative parenting). Thus, our findings may provide guidance for future work seeking to understand constructs for which reporting discrepancies may predict important domains of child, parent, and family functioning. We recommend that future research conceptualize *why* informant discrepancies *would* predict domains of child, parent, and/or family functioning when selecting measures to examine the predictive utility of informant discrepancies.

Limitations

There are limitations to the present study. First, informant discrepancies were assessed using standardized difference scores. Prior work has raised concerns about the reliability of difference scores for assessing constructs such as informant discrepancies and general variation between scores (e.g., De Los Reyes and Kazdin 2004; Nunnally and Bernstein 1994; Rogosa et al. 1982; Rogosa and Willett 1983). However, prior work has noted that when differences between informants’ ratings are high, such as those observed for parental and child ratings of monitoring behaviors, difference scores demonstrate acceptable levels of reliability (Rogosa et al. 1982; Rogosa and Willett 1983). Indeed, we observed just this: Standardized difference scores demonstrated acceptable levels of internal consistency not only over time but also across very few items (three items within assessment points, and nine items across three assessment points). In any event, we encourage future research to employ other strategies besides difference scores for assessing discrepancies, including direct assessments of informants’ perceptions of discrepancies between their perspectives and those of other informants.

Second, we identified modest predictive effects of mother–child discrepancies on child delinquency (Table 1). The magnitudes of these effects were likely attributable to two factors. First, baseline child delinquency was a covariate in these tests, and these baseline scores were highly related to delinquency at 2-year follow-up. Second, we assessed the predictive utility of discrepancies over two time periods, and it remains unclear how informant discrepancies unfold or develop across periods beyond 2 years. Perhaps the consistency of discrepancies increases beyond the periods assessed in this study, and the predictive utility of discrepancies, in turn, increases in magnitude over time. Future work ought to examine the consistency of discrepancies and their utility for predicting behavior over periods longer than 2 years.

Third, sample characteristics could limit the generality of the findings. We studied a community sample of predominantly African American mothers and children. A community sample provided a useful test insofar as substantial

heterogeneity was evident in parental monitoring. Our findings may only be applicable to samples from at-risk populations that experience wide variability in psychosocial functioning. Other samples, such as clinic samples for which problems with psychosocial functioning warrant clinical intervention (e.g., children referred for oppositional, aggressive, and antisocial behavior; Kazdin 2005) may not evidence these relationships. At the same time, discrepancies are consistently present across various clinic and non-clinic samples and methods of assessing behavior. Moreover, parental monitoring may be examined as a change mechanism for therapeutic interventions or as a protective factor for preventive interventions with at-risk samples (e.g., Dishion and McMahon 1998). Additionally, we previously cited evidence suggesting that our recruitment strategy resulted in a sample for which the proportion of families agreeing to participate was higher relative to prior work, ranges of scores on measures were consistent with prior community-based studies, and demographic characteristics of the sample matched those of previous population estimates of the geographic region of study recruitment. Nevertheless, understanding reporting discrepancies in parental monitoring is crucial for both basic and applied research. It is important that future work extends our findings to other samples for which informant discrepancies are a concern.

Conceptual and Research Implications

Our findings have important theoretical and research implications and highlight interesting directions for future research. First, we observed consistency in informant discrepancies in parental monitoring reports over time and across domains, and they predicted behaviors in ways that the individual informant's reports could not. These findings suggest that informant discrepancies might be viewed as interpretable evidence that yields meaningful information about the development of psychopathology. Indeed, reporting discrepancies in assessments of behavior may extend our conceptualization of risk and protective factors in developmental psychopathology, because these discrepancies are longitudinally consistent and demonstrate predictive utility. For instance, we examined informant discrepancies in reports of a construct that is conceptualized as a protective factor against the development of poor behavioral outcomes in children (Soenens et al. 2006; Stattin and Kerr 2000). Yet, we identified an instance in which reporting discrepancies on this construct actually predict poor behavioral outcomes in children. We encourage further study on whether similar processes occur for reporting discrepancies on other constructs germane to the study of adolescent development.

Second and more broadly, our findings provide important evidence in support of the reliability and validity of measures of informant discrepancies. Further, the ability of

informant discrepancies to exhibit these properties rests on the individual informants themselves being reliable and valid reporters of the construct they rate discrepantly (Rogosca et al. 1982; Rogosca and Willett 1983). As such, like all informant discrepancies research one cannot use findings of studies comparing informants' reports to deduce whether one informant's report (e.g., child) is more accurate, reliable, or valid than the other informant's report (e.g., parent) (see Achenbach et al. 1987; De Los Reyes and Kazdin 2005; Richters 1992). When informants' reports disagree, this should not be interpreted as reflecting a need to determine which of their reports is "right" and which is "wrong," or whether they are unreliable. In fact, such a decision could lead to a loss of crucial information.

The findings from this study further bolster the importance of collecting multiple informants' reports of parental monitoring, because by doing so one is able to create new measurements, of the construct being reported. These new measurements and in particular the discrepancies between reports, can be used to gain new insights into the very construct (parental monitoring) upon which informants (mother, child) provide reports. Indeed, the construct being rated by informants may operate differently in relation to other constructs (child delinquency), depending on how informants perceive the construct and whether these perceptions differ from one another. In sum, the findings suggest that informant discrepancies in youth and family assessments should not be solely viewed as measurement error or evidence of the inaccuracy of one or more of the informant's reports. As such, we encourage future research to study discrepancies in child and family assessments of other constructs, and in particular research on the mechanisms by which discrepancies predict behavior over time.

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