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Depressed Mothers as Informants on Child Behavior: Methodological Issues

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Abstract

Mothers with depressive symptoms more frequently report behavioral problems among their children than non-depressed mothers leading to a debate regarding the accuracy of depressed mothers as informants of children's behavior. The purpose of this integrative review was to identify methodological challenges in research related to the debate. Data were extracted from 43 papers (6 theoretical, 36 research reports, and 1 instrument scoring manual). The analysis focused on the methodologies considered when using depressed mothers as informants. Nine key themes were identified and I concluded that researchers should incorporate multiple informants, identify the characteristics of maternal depression, and incorporate advanced statistical methodology. The use of a conceptual framework to understand informant discrepancies within child behavior evaluations is suggested for future research.

Keywords

Depressed mothers; child behavior; informants; methodological issues

Children of depressed mothers are more frequently reported to have behavioral problems (Langrock, Compas, Keller, Merchant, & Copeland, 2002; Leckman-Westin, Cohen, & Stueve, 2009). In reports of studies in which hierarchical regression analysis with multiple maternal variables was used, self-reported maternal depressive symptoms have been found to explain the most variance in children's behaviors (Gartstein & Fagot, 2003; NICHD Early Childcare Research Network, 2003). Depression in mothers has been associated with negative maternal cognitions, behaviors, and affect that limit maternal functioning (Goodman & Gotlib, 1999) and may therefore increase children's behavior problems (Koblinsky, Kuvalanka, & Randolph, 2006). Children of depressed mothers are reportedly often left with unmet needs that affect their development because their mothers are unable to meet their social and emotional needs (Goodman & Gotlib, 1999).

Although understanding the effects of maternal depression on child behavior has been the impetus behind much behavioral research (Bolton et al., 2003; Herwig, Wirtz, & Bengel, 2004; Spieker, Larson, Lewis, Keller, & Gilchrist, 1999), the mechanisms by which maternal depression influences child behavior have not been thoroughly examined and are the subject of current debate (Bolton et al., 2003; Boyle & Pickles, 1997; Cornah, Sonuga-Barke, Stevenson, & Thompson, 2003). In a frequently cited article, Richters (1992) proposed two opposing models regarding the influence of maternal depression on informant reliability. In the distortion model, depressed mothers are said to over-report child behavior

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problems; in the accuracy model, depressed mothers are said to report child behaviors more accurately than non-depressed mothers.

Using a series of structural equation models to evaluate the relationship between maternal reports of elevated depressive symptoms and maternal reporting statistical errors - defined as the amount by which the mother's response differs from the expected response (Tabachnick & Fidell, 2007) – Fergusson, Lynskey, and Horwood (1993) found that maternal depression explained approximately 7% (ranging from 1.7% to 16%) of the error variance in maternal reports. These researchers interpreted their findings as suggesting a linear relationship between increased maternal depression and increased maternal reporting error. They proposed three explanations for the discrepancies found between mother's reports and reports obtained from their child's teachers:

1. Maternal depression distorts maternal reporting of behaviors leading to over-reporting of problem behaviors (distortion model).
2. Unknown, unmeasured variables influence maternal depression and maternal reporting patterns leading to higher correlations between maternal depression and maternal reporting patterns (distortion model).
3. A situational effect occurs whereby the children of depressed mothers demonstrate higher rates of problem behaviors at home as opposed to at school thus leading to more accurate reports by mothers as opposed to teachers (accuracy model).

The purpose of the integrative review reported here was to summarize how recent researchers have addressed the methodological challenges of using depressed mothers as informants of children's behavior problems. In a seminal article, Richters' (1992) completed a systematic review of 22 articles to evaluate the commonly held notion that depressed mothers distorted reports of their children's behavior. Richters found that there was not enough evidence in the literature to conclude that the increased rate of reported child behaviors among depressed mothers was due to the distortion model. Furthermore, he posited that until further examination of the methodological challenges was thoroughly completed, "maternal depression-perception associations should be viewed as an occasion for questions, not conclusions, about the accuracy of depressed mothers' reports" (Richters, p. 497). In this integrative review I examined the literature published since the 1992 article by Richters to identify the methodological challenges involved in the debate over the accuracy of depressed mothers as informants of their children's behavior and how researchers have addressed this debate in their methodology.

Methods

I used the integrative review method by Whittemore and Knafl (2005) to identify methodological considerations among papers discussing depressed mothers as informants of child behavior. This method incorporates various forms of literature – descriptive, empirical, and theoretical – and involves five stages: (a) problem identification, (b) literature search, (c) data evaluation, (d) data analysis, and (e) presentation.

Search Strategy

I conducted a literature search through Scopus (the largest abstract and citation database of peer-reviewed literature and web sources) and identified 250 articles published between 1996 (when completed coverage in Scopus began for all titles) to 2010 in which authors cited the Richters (1992) paper and addressed the methodological challenges he presented. From these 250 articles, I selected articles that were focused on younger children from pre-school to age 8 years without chronic medical conditions. Eight additional articles were

selected based on their frequent citation in the reviewed articles. I targeted children in this age range for the following three reasons:

1. Externalizing and internalizing behaviors in younger children are the types of behaviors most reported to be discrepant between depressed mothers and other informants.
2. The literature on the influences on children's externalizing and internalizing behavior problems is most often focused on children over 3 years old (preschool age).
3. Early exposure to maternal depression has been regularly cited as having the greatest negative impact on younger children with the risk of these negative affects carrying over through later stages of child development (Dawson et al., 2003; Elgar, Curtis, McGrath, Waschbusch, & Stewart, 2003; Goodman & Gotlib, 1999).

This search strategy yielded 43 papers (6 theoretical, 36 research reports, and 1 instrument scoring manual), in addition to Richters' (1992) paper.

Data Analysis

According to Whittemore and Knafl (2005, p. 550), the goal of data analysis in an integrative review is a "thorough and innovative interpretation of primary sources." I reviewed each paper and summarized descriptive information, methodological approaches, and reported outcomes. Theoretical papers were reviewed to examine suggestions for future research intended to address the debate over the accuracy of depressed mothers as informants on children's behavior. Descriptive data collected included the authors' names, date of publication, how depression was measured, the setting of the reported behaviors (retrospective report or a laboratory setting), and whether additional informants (other caregivers, teachers, etc) were used to provide information on the children's behaviors. Information on the methodological considerations was noted for patterns and further scrutinized making it possible to identify key challenges in the research methods used in research involving depressed mothers as informants. This analysis resulted in identification of nine key themes as summarized in Table 1.

Findings

The following sections present the key themes identified in the selected papers. The last section specifically addresses the need for a conceptual framework to guide researchers on how to conceptualize the potential discrepancies among different informants' report on children's behavior.

How to Quantify Perception

A fundamental challenge in developing strong behavior rating scales and self-report measures evident in the reviewed articles is how to quantify raters' inherently subjective perceptions (Smith, 2007). In research on reported child behavior, the relationship between the rater (mother, caregiver, or teacher) and the child is complex and influenced by the interplay of the individual characteristics of both child and rater. The quality and usefulness of the rater's report of child behavior requires an understanding of how child characteristics such as age, setting, and type of behavioral problem are associated with the rater's beliefs about specific behaviors and the rater's psychological state (Smith, 2007). These factors influence perception. The equivocal nature of a rater's reporting on child behavior complicates child behavior research. One group of researchers addressing the reliability and validity of maternal reporting on child behavior in the presence of self-reported maternal

depressive symptoms suggested that the study results be carefully reviewed for these potential psychosocial influences on outcomes (Mulvaney, Mebert, & Flint, 2007).

Prior to Richters' (1992) article identifying the specific challenge of maternal depression influencing the reports of child behavior, Achenbach, McConaughy, and Howell (1987) reviewed 119 reports of studies concerning children's behavioral and emotional problems to assess consistency between informants. The 119 studies involved 269 raters. The mean Pearson correlation statistic was .60, $df = 6{,}400$ ($p < .001$) between similar informants such as pairs of parents or sets of teachers and .28, $df = 15{,}326$ between different types of raters (e.g., parent/teacher/mental health worker). The authors encouraged the use of multiple informants as well as recognizing the different perceptions of the informants in clinical assessment. However, the review did not include data on psychological influences, such as maternal depression. It is possible that the lower correlation between different types of raters may have been related to psychological variables that were not measured. The omission of psychological characteristics, such as maternal depressive symptoms, raises important methodological issues of reliability and validity that must be considered in reporting child behavior problems.

Depressed Mothers as Informants

The goal of understanding the influence of maternal depression on reports of their children's behavior is derived from the need to understand the relationship between maternal depression and child behavior. There are three possible explanations for the consistent correlation between negative maternal characteristics, like depression, and increased maternal reports of child behavioral problems. The first explanation, supported by the distortion model, is that depressed parents have a more negative outlook that leads to a lower tolerance for their child's behavior, resulting in inflated reporting of their children's difficult behavior (Hennigan, O'Keefe, Noether, Rinehart, & Russell, 2006; Najman et al., 2001; Richters, 1992). By contrast, the accuracy model posits that there may be an interactional effect of the child's difficult behavior contributing to the parent's depression (Gartstein & Sheeber, 2004). The third explanation is that the depressed parent may in fact contribute to or sustain the child's difficult behavior because of ineffective parenting techniques that result from the parent's depressed mood (Mulvaney et al., 2007).

Much research on the effects of maternal depression on the mother's self-reporting of her child's behavior involves the use of instruments eliciting mothers' self-reports of depressive symptoms regardless of whether the mothers have been *diagnosed* with depression (Josefsson & Sydsjö, 2007). Findings derived solely from a mother on her own affect and her child's behavior may show strong correlations between her affect and her child's behavior (Mulvaney et al., 2007) as well as risk a response set type of error possible with Likert-type rating scales. The potential for response-set error occurs when the informant tends to demonstrate a pattern of response that is independent of the behaviors being observed or reported (Spector, Zapf, Chen, & Frese, 2000).

As Hennigan et al. (2006) observed, self report of maternal depression must include present depression as well as previous history of depressive symptoms, because women with a history of mental health problems but without present mental health problems tend to report higher levels of behavioral problems with their children. This suggests that self-reported history of maternal mental illness continues to influence reporting of child behavior over time. In a prospective study of 75 mothers and their first-born children, a history of maternal depressive episodes occurring in the first postnatal year was significantly related to increased internalizing and externalizing behavior problems when their children were 6–8 years old (Fihrer, McMahon, & Taylor, 2009).

Chronicity of maternal depression is also a factor in reporting child behaviors. Luoma, Kaukonen, and colleagues (2004, p. 48) reported that the "persistence of negativity from prenatal to postnatal stage predicted child[ren]'s high problem level at the age of 8–9 years, suggesting that an early negative trajectory of perceptions has continuity over the following years." Najman, Bor, Andersen, O'Callaghan, and Williams (2000) who studied 5,277 women from prior to birth until their children were 14 years old, also found a significant relationship between the chronicity of maternal depressive symptomatology and increased reporting of children's internalizing, externalizing, and total behaviors as measured by the Child Behavior Checklist. Both timing and chronicity of maternal depressive symptoms should be factored into designs of research on child behavior.

Case for Circular Cause and Consequence

Another methodological issue in analysis of informant discrepancy involves the familiar argument of circular cause and consequence, or the question of "what came first, the chicken or the egg?" Some researchers have shown that depression and child behavior mutually influence each other (Elgar et al., 2003; Elgar, Waschbusch, McGrath, Stewart, & Curtis, 2004; Najman, Bor, et al., 2000), whereas most researchers have assumed a uni-directional pathway. At least three potential pathways are evident in the accuracy model: (a) the child behavior contributes to the maternal depression, (b) maternal depression contributes to child behavioral, and (c) maternal depression and child behavior exist simultaneously with the association the result of another set of confounders.

For example, in a study of over 20,000 mothers, Elgar et al. (2003) investigated antecedent/consequence conditions in maternal depressive symptoms and child behaviors and found that maternal depressive symptoms preceded child hyperactivity and aggression (externalizing conditions) and followed child emotional problems (internalizing conditions). In their study of 69 mothers, Gartstein and Sheeber (2004) explained the relationship between maternal symptoms of depression and child behavior by the negative impact of the child's behavior on family functioning and the perceived parental competence of the mother, which then led to an increase in maternal self-reported depressive symptoms over a 12-month period. This directional model was supported by a smaller study (N=30) in which Elgar, Waschbusch, et al. (2004) found that mothers became more frustrated, fatigued, and anxious as their children's behavior became increasingly disruptive.

Criterion Raters

Criterion raters are persons familiar with the child and add another measure to identify whether the reported behaviors are viewed similarly by both parent and outsider, or are a function of clouded parental perceptions leading to bias or distortion in maternal reporting. Studies that incorporate only maternal reports of child behavior have limited validity due to the potential for cognitive bias resulting from maternal depression (Najman et al., 2001). Researchers have found that self-reported maternal depressive symptoms explain much of the difference between mothers and criterion raters (Bolton et al., 2003; Gartstein & Fagot, 2003; Van Dusen Randazzo, Landsverk, & Ganger, 2003).

There are potential problems and limitations regarding the use of criterion raters. Richters (1992) described two of the evidentiary issues in using independent criterion raters. The first problem is the lack of a "gold standard" (like those that exist to measure physical growth and maturity in children) when it comes to measuring childhood behaviors in social and behavioral sciences. Secondly, researchers must acknowledge the potential for the criterion rater informant to "use different thresholds and have different motivations, abilities, priorities, observational skills, and judgment biases" (Richters, p. 490) that may also lead to some level of inaccuracy. Lastly, a halo effect may occur because many criterion raters may

not be truly observing the child in a naturalistic setting (Kendziora & O'Leary, 1998). A halo effect refers to the potential of the rater to rate a behavior or trait as positive or negative based on one or more other behaviors or traits (Polit & Beck, 2008). For example, a teacher who is asked to be a criterion rater may rate a child's behavior as more positive because the child is viewed as compliant in a classroom full of children with more difficult behavior problems.

Components of Informant Observation

The potential for a halo effect as well as the different thresholds, motivations, abilities, and biases of informants suggest a need for understanding the components of informant observation. Four components of informant observation include saliency and recall (Karver, 2006), as well as monitoring and behavioral appraisal. Salient behaviors are behaviors that capture the attention of an observer. Therefore, discrepancies may exist between informants (parents and criterion raters such as other caregivers and teachers) as a product of the informants' own self-schema that may stimulate them to notice particular behaviors in line with their own emotional state (Hennigan et al., 2006). A good example occurs when two parents have different parenting styles. Authoritarian parents (Baumrind, 1966) who exert control on children and try to make children obey, may find certain behaviors more salient to them than to permissive parents who characteristically relinquish control to their children. Post-hoc recall of certain child behaviors may be influenced by the level of relative importance attached to the behavior or other psychological influences, such as anxiety, affecting the parent at the time of the behavior (Karver, 2006). Karver (2006) reported findings that suggest behaviors that are more salient to an informant increase the informant's recall. Bias or distortion may be the result of how salient a behavior is to the informant.

Kendziora and O'Leary (1998) posited that a difference exists between asking parents about whether they have seen a behavior and asking them to evaluate a behavior that has been seen by the parent. When parents are asked to report on their children's behavior, they are asked to report on their perception of behavior that involves awareness and/or interpretation of the behavior. This distinction must be made clear to parents when measuring their perception of their children's behavior. For example, if a researcher is interested in knowing whether a parent is aware of a behavior (i.e. do they see the behavior), then the concept the researcher would measure is monitoring. In contrast, behavioral appraisal is the concept measured when parents are asked about their classification and evaluation of the intensity of the behaviors (Kendziora & O'Leary, 1998).

Qualities of Child Behavior

Different aspects of childhood behavior may also influence how behaviors are monitored and perceived by parents and observers. Some types of behavior may be more appropriately evaluated by specific informants. Child behavior is commonly studied in terms of internalizing and externalizing behaviors (Gartstein, Bridgett, Dishion, & Kaufman, 2009; Rescorla, 2005). Externalizing behaviors, such as delinquent and aggressive behaviors, are generally outwardly visible. Internalizing behaviors, such as withdrawal, anxious/depressed mood, and somatic complaints may not be noticed as easily. The relationship between maternal depression and the two types of behavior problems differs among studies. Some researchers have found that mothers with higher levels of depressive symptomatology are more likely to report a higher incidence of internalizing than externalizing behaviors in their children (Koblinsky et al., 2006; Kroes, Veerman, & De Bruyn, 2003); another group of researchers have suggested that maternal depression leads to increased reports of externalizing behaviors (Luoma, Koivisto, & Tamminen, 2004). When comparing reports made by mothers and criterion raters such as teachers, there is generally more collective agreement on the presence of children's externalizing behaviors than on internalizing

behaviors (Cai, Kaiser, & Hancock, 2004). This difference in agreement between mothers and teachers has been related to behaviors (e.g. hits others, speech problem) that were more easily observed and had the potential to impede children's normal functioning (Cai et al., 2004). Another explanation for the variability in reporting internalizing behaviors may be the amount of time spent with the child, such that the more time a mother spends with her child, the more internalizing behaviors she may become aware of and report (Treutler & Epkins, 2003).

Statistical Issues

The varied statistical methods used in research on informant discrepancies constitute another methodological challenge. After noting that there are distinct mathematical properties among the three most common methods of measuring informant discrepancies, De Los Reyes and Kazdin (2004) studied the differences among a group of children referred to a child psychiatry center. The authors found that the three methods of measuring differences between child behavior raters (i.e., raw difference, standardized difference, and residual difference scores) were not interchangeable. They recommended the use of standardized difference as a preferred method of analysis of informant discrepancies. This is because the mathematical properties of standardized difference scores place the informants' ratings on the same metric or scale of variability.

Statistically it is also important to distinguish between informant correspondence and informant discrepancy where *correspondence* refers to inter-rater correlations and *discrepancies* refers to the mean differences in reports (Treutler & Epkins, 2003). These two distinct indices are important in analyzing research on informant agreement. The inter-rater correlation may be a mirror image of the difference scores if the two informants arrive at the same overall score but identify different concerns (Youngstrom, Loeber, & Stouthamer-Loeber, 2000). Concerns may be identified at the item-level as opposed to the overall score (Najman, Williams, et al., 2000). For example, results from a behavior rating scale on child behavior may indicate that two informants rated a child as having a similar level of increased externalizing behavior problems, but the items they identified may be quite different. For instance, within the Child Behavior Checklist, a child's externalizing behavior problem score is based on two subscales, attention problems and aggressive behavior. One informant may report the child to have more attention problems, but another reports the child to have more aggressive problems, however, both reports result in a higher score for externalizing behaviors. The potential risk of this statistical anomaly is that it would appear that two informants agree on a child's behavior when in fact they are monitoring and appraising different specific behaviors leading to a high level of overall correspondence in rating scores but with many internal discrepancies. Structural equation modeling (SEM) takes into account such interactions, measurement error, and correlated error terms (Tabachnick & Fidell, 2007) and may therefore may offer a more robust analytic technique to model how informants rate children's behavior.

The advancement of statistical methods, such as SEM and path analysis, has led to more sophisticated analytical techniques to test the accuracy-distortion hypothesis (Gartstein et al., 2009; Herwig et al., 2004; Langrock et al., 2002). Using SEM techniques allows researchers to statistically examine the path from a latent variable (e.g. maternal depressive symptoms) to the error terms related to the outcome variable (e.g., maternal reporting of child behavior). In addition, SEM can accommodate multiple raters using the same instrument. As an example, using SEM, Gartstein et al. (2009) identified an association between maternal depressed mood and the error component of maternal reporting, suggesting that the amount of reporting error was higher when levels of depressed mood increased. These findings provide support of the distortion model.

Cross-Situational Differences

The potential for increased discrepancy among mothers and criterion raters may also be the result of cross-situational differences wherein children display behaviors particular to their setting (Achenbach et al., 1987; Kroes, Veerman, & De Bruyn, 2005; Richters, 1992). Researchers have suggested that children may display different behaviors in the classroom than at home, which could increase the variability between informants (Cai et al., 2004; De Los Reyes, Henry, Tolan, & Wakschlag, 2009; Smith, 2007). When comparing the 82 common items on the Child Behavior Checklist/1½ -5 and the Caregiver-Teacher Report Form/1½ -5 (Achenbach & Rescorla, 2000), Cai et al. (2004) found that although up to 36% of the children (*N*=505) were identified by parents and teachers as having behavioral problems, the rate of co-identified items rated as problematic was as low as 15%. For example, when looking at the rate at which the behavior labeled “uncooperative” was reported for all children, the parents and teachers each identified over 35% of the children as uncooperative, but only 15.6% of the children were co-identified as uncooperative by both parent and teacher, suggesting a possible situational effect.

Call for Conceptual Framework

Until recently, much of the debate on the effects of maternal depression on reports of child behavior has been descriptive and atheoretical. After a critical review of the state of the science of informant discrepancies, De Los Reyes and Kazdin (2005) presented a conceptual framework to guide clinical research involving informants reporting on children’s behavior. They proposed that the combination of inconsistent measurement of informant agreement with inconsistent findings reported in correlational studies of informant discrepancies highlighted the descriptive and atheoretical nature of prior work. Their theoretical framework is the Attribution Bias Context Model (ABC) derived from their review of the literature on the actor-observer phenomenon, the influence of perspective taking on memory recall, and source monitoring from the social and cognitive literatures. The actor-observer phenomenon is based on the premise that the observer (informant) attributes the behavior of the actor (the child) to the disposition or personal temperament (e.g. aggressive) of the actor/child without considering the context of the behavior. Yet, when people (observers/informants) are asked about their own behaviors, they are more likely to ignore the influence of their own disposition or emotional state and attribute the cause of their actions or behaviors to the context in which they displayed the behavior (Karver, 2006). For example, parents may attribute their children’s behavior to their children’s general sullen mood whereas children may report their behavior is a result of their environment (i.e., low mood level related to parent’s recent divorce).

The literature on perspective taking, memory recall, and source monitoring provided background for the ABC model. Perspective taking and memory recall refer to the potential for people to recall from memory specific events that support their perspective or viewpoint. De Los Reyes and Kazdin (2005, p. 498) suggested that:

> Discrepancies between pairs of observer informants (parent–teacher, mother–father) can be expected not so much because their attributions of the child’s behavior differ but because each informant in the pair may recall information of the child’s problems from memory that is consistent with their discrepant perspectives with regard to which of the child’s problems warrant treatment.

Source monitoring refers to the mechanisms that people use to activate and make attributions of a memory to a particular source (i.e., time, person, or place). Research on source monitoring suggests that informants use heuristic (i.e., automatic and lacking in analytical methods) and/or systematic (i.e., analytical and effortful) processes to retrieve memories of behaviors they are asked to report. Memory retrieval is more reliable when

both processes are used (Johnson, Hashtroudi, & Lindsay, 1993). In sum, these three sources of research and theory resulted in the conceptualization of the constructs that make up the ABC Model. The ABC model conceptualizes four components (informant attributions, informant perspectives, the goal of the clinical assessment process, and the interaction of all three of these components) of informant discrepancies and offers propositions associated with each component. The model uses these components and propositions to provide a framework to further conceptualize the discrepancies between different pairs of informants and between informant discrepancies and informant characteristics (De Los Reyes & Kazdin, 2005)

The ABC Model was used to examine patterns of preschool behaviors in various social contexts and the relationship to informant discrepancies (De Los Reyes et al., 2009). The researchers presented these situations in a laboratory setting and found that parent-teacher rating discrepancies were related to both the cross-contextual variability of children's behavior and to the perspectives of the informants. De Los Reyes et al. (2009) used the ABC Model to conceptualize the discrepancies and to:

> encourage future research to examine the relations between observed behavior and informant discrepancies using observational paradigms that systematically vary the relationship between the child being rated and the adults with whom they interact (p. 650)

Discussion

In this paper, I have reviewed the most common methodological challenges involved in research on maternal reporting of child behavior. The challenges were highlighted by the substantive literature that shows a correlation between maternal depressive symptoms and increased reporting of child behavior problems. This correlation has created a debate involving two different hypotheses – accuracy versus distortion. Both the accuracy and distortion hypotheses predict that depressed mothers report more child behaviors than non-depressed mothers, and this suggests the need for researchers to include criterion raters. Because of the significant error variance in maternal reports of children's behavior, there is risk in using maternal reports of children's behavior without using additional informants such as criterion raters or considering the error variance in maternal reports when interpreting the results (Boyle & Pickles, 1997; Fergusson et al., 1993). The use of multiple informants was considered important in the majority of the selected reports. When using additional raters as criterion raters, the context, length, and quality of the criterion rater's relationship with the child should be recorded.

Timing of the reporting in relation to when the first episode of maternal depressive symptoms occurred as well as the chronicity of the depression has also been found to have an impact on the reporting of child behaviors (Leckman-Westin et al., 2009; Luoma, Kaukonen, et al., 2004; Najman, Williams, et al., 2000). Understanding the characteristics of the mother's depression may also explain possible reporting discrepancies of children's behavior between the mother and criterion rater. A longitudinal repeated measures study design would provide an opportunity to examine the stability and changes in maternal depressive symptoms and the reporting of child behavioral problems by parents, compared with their child's teachers at different grade levels (Cai et al., 2004). Longitudinal studies may also provide information on whether children's behavior problems occurred before or after the occurrence of maternal depressive symptoms and how this relationship differs along the child's developmental trajectory (Elgar, McGrath, Waschbusch, Stewart, & Curtis, 2004). The circular cause and consequence argument regarding what came first, maternal depression or child behavior problems, may also be addressed with the use of additional informants (e.g. criterion raters) knowledgeable about the child's behavior.

In addition to the timing of maternal depression, the measurement of maternal depression should be made clear in research reports. Much of the research reviewed used self-reported measures of maternal depressive symptoms. Researchers should clearly distinguish between diagnosed depression and self-reported depressive symptoms and whenever possible use multiple informants to account for the influence of maternal depression/depressive symptoms.

Researchers should consider modifying methods of behavioral assessment by encouraging informants who commonly rely on heuristic (automatic and lacking analytic methods) processes to use systematic (analytical and effortful) processes as well. Incorporating contextual information into the assessments would result in more detailed information for researchers to examine (De Los Reyes & Kazdin, 2005). Additionally, the influence of perspective taking must be considered. The attributions and perspective of the informant should be assessed and examined keeping in mind the goal of the child behavior assessment. Many behavior rating scales are useful for assessing informant monitoring of the occurrence of specific behaviors, but may not take into account the informant's expectations of certain child behaviors that would allow for the possibility of behavior appraisal. Perhaps future scale development may include information regarding parent and teacher expectations of certain behaviors and the setting where the behavior is reported (Cai et al., 2004).

The Child Behavior Checklist is a well-used and validated instrument but because there is no "gold standard" in behavioral rating scales, future instrument development should include constructing rating scales in ways that maximize rater agreement (Rowe & Kandel, 1997) and that allow researcher to discern whether the bases for agreement are the same. Special attention should be paid to the discrepancies between items and not just between the larger total-item scales. The use of multiple raters may "provide a set of litmus tests to discern which aspects of agreement (overall level or item profile) were subject to influence" (Youngstrom et al., 2000, p. 1042). More advanced statistical methods, such as SEM, are required for research that relies on multiple informants to assess children's behavior. Because it is not enough to simply report correlations between maternal depression and increased child behaviors as seen in some reports, methods such as SEM provide more detailed information about the influence of maternal depression and the discrepancies between the depressed mother's reports of child behavior and the reports from additional informants.

Researchers should evaluate the discrepancies among informants in a more substantive way rather than just a measure of error. Distortion of child behavior by depressed mothers may be a result of the situational context of the behavior and not necessarily measurement error, which suggests that there are implications for multi-site evaluation research protocols involving the reporting of child behaviors. Future work must include development of experimental methods for examining the influence of maternal depression.

Finally, it is not enough to examine the methodological inconsistencies in measuring informant discrepancies or in how to reconcile the differences; rather, conceptual work must begin to answer the question of why such inconsistencies occur (De Los Reyes & Kazdin, 2005). Informant discrepancies may be evaluated using the ABC Model. Specifically, the model suggests different ways to conceptualize the cause and level of possible discrepancies across sets of informants such as parent-teacher, mother-father, or teacher-child.

In conclusion, researchers studying maternal reports of child behavior in the context of maternal depression should use a conceptual guide for understanding of informant discrepancies, incorporate the use of criterion raters in their studies, identify characteristics of the maternal depression including timing and chronicity of the depressive symptoms, and

use advanced statistical methodology, such as structural equation modeling, to analyze informant discrepancies.

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Table 1

Themes from data analysis

Theme	Author	Focus of Paper
How to quantify perception	Achenbach, McConaughy, & Powell (1987)	Theoretical
	Mulvaney, Mebert, & Flint (2007)	Research report
	Smith (2007)	Theoretical
Depressed mothers as informants	Dawson, Ashman, Panagiotides, Hessl, Self, Yamada, & Embry (2003)	Research report
	Fihrer, McMahon, & Taylor (2009)	Research report
	Gartstein & Fagot (2003)	Research report
	Gartstein & Sheeber (2004)	Research report
	Goodman & Gotlib (1999)	Theoretical
	Hennigan, O'Keefe, Noether, Rinehart, & Russell (2006)	Research report
	Joseffson & Sydsjö (2007)	Research report
	Koblinsky, Kuvalanka, & Randolph (2006)	Research report
	Leckman-Westin, Cohen, & Stueve (2009)	Research report
	Luoma, Kaukonen,, Mäntymaa, Puura, Tamminen, & Salmelin (2004)	Research report
	Mulvaney, Mebert, & Flint (2007)	Research report
	Najman, Bor, Andersen, O'Callaghan, & Williams (2000)	Research report
	Najman, Williams, Nickles, Spence, Bor, O'Callaghan, … Shuttlewood (2001)	Research report
	NICHD Early Childcare Research Network (2003)	Research report
Case for circular cause and consequence	Cornah, Sonuga-Burke, Stevenson & Thompson (2003)	Research report
	Elgar, Curtis, McGrath, Waschbusch, & Stewart (2003)	Research report
	Elgar, Waschbusch, McGrath, Stewart, & Curtis (2004)	Research report
	Elgar, McGrath, Waschbusch, Stewart, & Curtis, (2004)	Theoretical
	Gartstein & Sheeber (2004)	Research report
	Najman, Bor, Andersen, O'Callaghan, & Williams (2000)	Research report
	Spieker, Larson, Lewis, Keller, & Gilchrist (1999)	Research report
Criterion raters	Achenbach & Rescorla (2000)	Manual
	Bolton, Calam, Barrowclough, Peters, Roberts, Wearden, & Morris (2003)	Research report
	Najman, Williams, Nikles, Spence, Bor, O'Callaghan, … Shuttlewood (2001)	Research report
	Van Dusen Randazzo, Landsverk, & Ganger (2003)	Research report
Components of informant observation	Hennigan, O'Keefe, Noether, Rinehart, Russell (2006)	Research report
	Johnson, Hashtroudi, & Lindsay (1993)	Theoretical
	Karver (2006)	Research report
	Kendziora & O'Leary (1998)	Research report
Qualities of child behavior	Achenbach & Rescorla (2000)	Manual
	Cai, Kaiser, & Hancock (2004)	Research report
	Gartstein, Bridgett, Dishion, & Kaufman (2009)	Research report
	Koblinsky, Kuvalanka, & Randolph (2006)	Research report
	Kroes, Veerman, & De Bruyn (2003)	Research report
	Luoma, Koivisto, & Tamminen (2004)	Research report
	Treulter & Epkins (2004)	Research report

Theme	Author	Focus of Paper
	Rescorla (2005)	Theoretical
Statistical issues	Boyle & Pickles (1997)	Research report
	De Los Reyes & Kazdin (2004)	Research report
	Fergusson, Lynskey, & Horwood (1993)	Research report
	Gartstein, Bridgett, Dishion, & Kaufman (2009)	Research report
	Herwig, Wirtz, Bengel (2004)	Research report
	Langrock, Compas, Merchant, & Copeland (2002)	Research report
	Najman, Williams, Nikles, Spence, Bor, O'Callaghan, … Andersen (2000)	Research report
	Rowe & Kandel (1997)	Research report
	Treulter & Epkins (2003)	Research report
	Youngstrom, Loeber, & Stouthamer-Loeber (2000)	Research report
Cross-situational differences	Achenbach, McConaughy, & Howell (1987)	Theoretical
	Cai, Kaiser, & Hancock (2004)	Research report
	De Los Reyes, Henry, Tolan, & Wakschlag (2009)	Research report
	Kroes, Veerman, & De Bruyn (2005)	Research report
Call for conceptual framework	De Los Reyes & Kazdin (2005)	Theoretical
	De Los Reyes, Henry, Tolan, & Wakschlag (2009)	Research report