MATERNAL INATTENTION AND IMPULSIVITY, AND PARENTING BEHAVIORS

by

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ABSTRACT

Recent studies on adults with ADHD have consistently shown an association between ADHD symptomatology and parenting impairments. This study extends previous research by examining whether inattention and impulsivity in a community sample of mothers are associated with different patterns of parenting deficits. Seventy mother-son dyads participated in the study, and the boys ranged between 4 and 8 years of age. Both negative and positive dimensions of parenting behaviors, as well as self-report and observational measures of parenting were included. Results showed that maternal inattention was uniquely associated with parenting overreactivity, inconsistent discipline, and lower involvement after controlling for impulsivity; however, maternal impulsivity was not uniquely related to any of the parenting constructs after controlling for inattention. Further, the associations between maternal inattention and parenting overreactivity and inconsistent discipline remained significant even after controlling for maternal hostility and depression, and child behavior problems. Possible reasons for the different patterns of associations between maternal inattention and impulsivity, and parenting are discussed.

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INTRODUCTION

The social, cognitive and emotional growth of a child is influenced by many factors and many studies have examined the impact of parenting styles and practices on child development. In their review on parenting research, Collins, Maccoby, Steinberg, Hetherington and Bornstein (2000) concluded that, although parental influence may not be as deterministic as was claimed by earlier studies on parenting, contemporary studies have shown parenting to have an indisputable influence on child development. Specifically, longitudinal studies have found later child adjustment to be affected by parenting variables even after baseline child characteristics are controlled (Ge et al., 1996; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994). In addition, in their reviews of parent training research, McMahon and Wells (1998) and Kazdin (1997) found the modification of parental behaviours to result in reductions of children's deviant behavior. Given this evidence of the influence of parenting, an understanding of the factors that promote appropriate parenting behaviors seems imperative in efforts to foster optimal child development.

Parental Characteristics as Determinants of Parenting Behaviors

According to the process model put forth by Belsky in 1984, parenting behavior is determined by three general sources of influence: 1) the parent's psychological resources, 2) the child's characteristics, and 3) contextual sources of stress and support. The three sources were conceived as exerting reciprocal influences upon one another, with parental psychological resources carrying the most weight in determining parenting competence. Although this claim has yet to be substantiated with empirical evidence, studies examining the parenting behaviors of parents with psychological dysfunctions have generally found evidence in support of an association between parental psychological well-being and parenting.

Depression and hostility in particular have emerged in the literature as two important parental characteristics to consider. In research on depression and parenting, observational

studies have found depressed parents to show increased hostility and to have higher rates of negative interactions with their children (Goodman & Brumley, 1990; Gordon et al., 1989; Lovejoy, 1991). Other studies have found depressed mothers to be less responsive to child behavior, to communicate less effectively and to show less synchrony with their infants (Cohn, Campbell, Matias, & Hopkins, 1990; Field, Healy, Goldstein, & Guthertz, 1990). In a more recent study, Albright and Tamis-LeMonda (2002) also found maternal depressive symptoms in a nonclinical population to be associated with less sensitivity, engagement, affection, and more rigidity in mothers, even with other risk factors (i.e., socioeconomic status, maternal IQ and presence or absence of a partner) controlled. The findings of this study, as well as those of a recent meta-analysis on maternal depression and parenting behavior (Lovejoy, Graczyk, O'Hare, & Neuman, 2000) suggest that the association between maternal depression and parenting impairment is not limited to the clinical range of depression.

Evidence also abounds linking parental hostility and anger with coercive parenting behaviors and physical abuse of children (Bauer & Twentyman, 1985; Kolko, 1996; Wolfe, 1987). For example, Peterson, Ewigman and Vandiver (1994) presented mothers with vignettes depicting common child-rearing challenges and asked mothers to rate the level of anger they typically experienced in each of the scenarios. Results indicated that maternal anger was associated with the selection of physical discipline in one third of the situations sampled. In other studies, mothers' hostility has been found to be related to mothers' self-report of more coercive and punitive parenting practices (Johnston, Scoular, & Ohan, 2004), as well as lower observed maternal responsiveness when mothers were instructed to have their children complete a number of structured tasks in a lab setting (Seipp & Johnston, in press). In sum, both depression and hostility have been repeatedly shown to be associated with impaired parenting, and these results illustrate convincingly the importance of examining maternal characteristics as important determinants of parenting behaviors.

Parental Inattention and Impulsivity

Given the accumulating evidence in support of associations between parental psychological symptoms and parenting behavior, an interesting question arises as to other parental characteristics that may be worth studying. In his review of the kind of parenting that promotes optimal child functioning, Belsky (1984) concluded that across childhood, a parenting style that demonstrates high levels of sensitivity towards children's capacities and needs seems to foster a variety of highly valued developmental outcomes, including emotional security, behavioral independence, social competence, and intellectual achievement. A probable hypothesis follows that parents who have difficulties with attention and self-regulation will find it challenging to provide this style of parenting, as the ability to pay close attention to one's child seems pivotal to be able to accurately understand and be appropriately sensitive towards the child. Preliminary support for this hypothesis can be found in studies of Attention-Deficit/Hyperactivity Disorder (ADHD) in adults. This is a disorder characterized by elevated levels of inattention and/or impulsivity/hyperactivity. Although limited in number, existing studies on the effects of parental ADHD on parenting do seem to point to a consistent picture of significant impairment. For example, relying on their clinical experience, Weiss, Hechtman and Weiss (2000) reported parents with ADHD to have particular difficulty in being consistent, in monitoring their child's activities, and in disengaging from escalating situations. Fathers with high ADHD symptoms also were found by Arnold, O'Leary, and Edwards (1997) to have a tendency toward being critical or negative in their response to child behavior. In the context of parent-training, Sonuga-Barke, Daley, and Thompson (2002) also found that at post-treatment, children of mothers who had scored higher on a pre-treatment measure of adult ADHD, showed little improvements in their ADHD symptoms. In contrast, children of mothers in the medium or low maternal ADHD groups made substantial gains in the reduction of their ADHD symptoms. The authors concluded that high levels of maternal ADHD symptoms impose significant

limitations on mothers' abilities to benefit from parent-training programs. Finally, in a more recent study, Murray and Johnston (in press) examined the impact of a maternal ADHD diagnosis on specific parenting behaviors including monitoring, consistency, and ability to problem-solve about child behavior problems. Mothers with ADHD scored lower than mothers without ADHD on measures of monitoring and knowledge of the child's activities and were less consistent in their parenting behaviors than mothers without ADHD. Additionally, although mothers with ADHD were able to generate as many solutions as mothers without ADHD to hypothetical child-related problem situations, the quality and planning of the solutions generated by mothers without ADHD were superior. Together, these findings suggest that the impact of parental ADHD symptoms on parenting behaviors is an important topic that warrants further attention.

ADHD Dimensions and Parenting

The studies reviewed above compared parents with ADHD with non-ADHD parents and did not distinguish among subtypes of ADHD. However, the diagnosis of ADHD is in fact comprised of two categories of symptoms in the DSM-IV (American Psychiatric Association, 1994): inattentive symptoms such as failing to pay attention to details, making careless mistakes, and not listening; and hyperactive/impulsive symptoms such as fidgeting, being out of one's seat, running or climbing excessively, talking excessively, difficulty waiting one's turn, and blurting out answers before a question has been completed. Those with at least six of the inattentive symptoms would be diagnosed as having the inattentive subtype; those with at least six of the hyperactive/impulsive symptoms would be diagnosed as having the hyperactive/impulsive subtype; and those who meet both of the above criteria would be diagnosed as having the combined subtype. The distinction between inattentive and hyperactive/impulsive symptoms has been consistently supported by an extensive body of exploratory and confirmatory factor analyses (DuPaul et al., 1997; Hudziak et al., 1998; Lahey & Willcutt, 2002; Pillow, Pelham,

Hoza, Molina, & Stultz, 1998) and each category of symptoms has been found, at least in children, to be associated with a distinct pattern of impairments (Barkley, 1998). The inattentive symptoms are more often associated with internalizing features and disorders (such as depression or anxiety), and the hyperactive-impulsive symptoms are more commonly associated with aggression and conduct problems (Paternite, Loney, & Roberts, 1996). Additionally, in a series of regression analyses which carefully controlled for family income, intelligence, ethnicity, as well as concurrent symptoms of Oppositional Defiant Disorder, Conduct Disorder, depression and anxiety, the inattentive symptoms were found to be associated with teacher ratings of shyness and withdrawal, underachievement in mathematics, and enrollment in special education. In contrast, the hyperactive/impulsive symptoms were found to be associated with teacher-reported disruptiveness, lack of self-control, and aggression (Lahey et. al, 1998). Similarly, in the domain of social functioning, Maedgen and Carlson (2000) found children with both inattentive and hyperactive/impulsive symptoms to be rated by teachers as showing more aggressive behaviors and as having more difficulties with emotional dysregulation, while those with the inattentive symptoms were rated as displaying more social passivity.

Although most of the studies that have examined the different correlates of inattentive and hyperactive-impulsive symptoms were done with children, at least two studies have looked at the factor structure of ADHD symptoms in adults and found that, in addition to the distinction made between inattentive and hyperactive/impulsive symptoms, impulsivity and hyperactivity also appear to be independent factors in adults. For example, Conners et al. (1999) developed 93 questionnaire items representing nine categories of symptoms commonly found in adult ADHD patients, and administered the questionnaire to approximately 1000 adults, including a sample of 167 who met the DSM-IV criteria for ADHD. Exploratory and confirmatory factor analyses conducted on the items revealed a four-factor structure, including Inattention, Hyperactivity/Restlessness, Impulsivity/Emotional Lability, and Problems with Self Concept.

Similarly, Span, Earleywine and Strybel (2002) used confirmatory factor analyses to compare a total of six models and found the three-factor model of inattention, hyperactivity, and impulsivity to best fit the structure of ADHD-type symptoms in adult, nonclinical samples. Finally, in a recent study, Glutting, Youngstrom and Watkins (2005) used exploratory and confirmatory factor analyses to investigate the factor structure of ADHD in a group of college students and again found the three-factor structure to best capture the students' self-reported symptoms. These authors also found the factor structure to replicate across genders.

In sum, given the findings that inattentive and hyperactive-impulsive symptoms are each associated with different patterns of impairments in children, and the emerging evidence that the inattentive, hyperactive and impulsive symptoms appear to be independent factors in adults, it seems appropriate to extend previous research by examining the independent impact of each of these symptom clusters on parenting.

In the only published study that has directly addressed this question, Harvey, Danforth, Eberhardt McKee, Ulaszek and Friedman (2003) examined the role of parental ADHD symptomatology (only inattention and impulsivity, not hyperactivity) on parenting in mothers and fathers of children with ADHD. Their results showed that before parent training, inattention was associated with more arguing with the child and more use of repetitive commands in mothers, and with lax parenting in fathers. Impulsivity, on the other hand, was found to be associated with laxness and arguing only in fathers. Although this study was the first to examine the independent impact of parental inattention and impulsivity on parenting, the picture is far from clear. For example, as participants for the study were recruited through an advertisement for parent training, it is unclear whether the results would be generalizable to parents who do not self-identify as lacking in parenting skills. Similarly, as all children in the study met criteria for ADHD and had elevated levels of either aggression or conduct problems, it is unclear whether the findings would be applicable to families with less problematic children. Furthermore, even

though the study included an observational measure of parenting behavior, the interactions were audio-taped at home by the parents themselves and thus may not have been standardized across parents. Two other studies have examined this question in a post hoc manner and have reported inconsistent findings. Johnston et al. (2004) found maternal hyperactivity/impulsivity to be related to maternal overreactivity and laxness, and maternal inattention not to be associated with either of these parenting behaviors in a group of mothers of boys with ADHD. Murray and Johnston (in press), on the other hand, compared the parenting behaviors of mothers who have been diagnosed with either the Inattentive or the Combined (with both inattentive and hyperactive/Impulsive symptoms) subtypes of ADHD and found the mothers with the Inattentive subtype to be less consistent in their parenting, worse at monitoring their children, and less positive toward their children than mothers with the Combined subtype. These contrasting patterns of results may be due to several methodological differences in the two studies including: 1) mothers who met diagnostic criteria for ADHD versus those who did not, 2) relatively small sample sizes, and 3) differences in the measures used to assess maternal ADHD symptoms.

To address some of the limitations discussed in the studies cited above and to further clarify the picture, this study examined the separate and unique influences of maternal inattentiveness, impulsivity, and hyperactivity on parenting behaviors in a community sample of mothers, using well validated measures of both maternal symptomatology and parenting behaviors. As noted above, two of the three studies in the area have examined the association between diagnostic levels of ADHD symptoms in parents and parenting behaviors (Arnold et al., 1997; Murray & Johnston, in press). These studies are useful in describing the behavior of parents who meet the diagnostic criteria for ADHD. However, both theoretical and empirical evidence would suggest that inattention and impulsivity-hyperactivity are distributed dimensionally in the population (Levy, Hay, McStephen, Wood, & Waldman, 1997). It also would be expected that linear relations between these symptoms and parenting behaviors would

occur across the range of both symptom levels and parenting behaviors. For this reason, and to increase the applicability of findings to a broader group of mothers, the decision was made to investigate the links between maternal inattentiveness, impulsivity, and hyperactivity, and parenting behaviors in a community sample of mothers of young boys in this study. In addition, this study expands on previous findings by investigating a wider range of parenting variables that cover not only the negative dimensions of parenting behaviors, but also the positive dimensions which have traditionally received less attention in the literature. As relatively little is known about the associations between maternal inattention and impulsivity, and positive versus negative parenting behaviors, the inclusion of multiple measures of positive parenting allows for an initial step towards exploring this question. In addition, both self-report and observational measures of parenting are included to allow exploration of the contribution of method variance to the associations between parental ADHD symptoms and parenting behaviors.

Parenting Variables

As mentioned above, both negative and positive dimensions of parenting behaviors were examined in this study, and a multi-method and multi-construct approach was adopted to investigate the association between maternal inattention and impulsivity, and parenting behaviors. Maternal overreactivity and inconsistent discipline were selected as constructs falling within the domain of negative parenting behaviors, while parental involvement and use of positive reinforcements were chosen as constructs within the category of positive parenting behaviors. In addition, an observational measure of maternal responsiveness was included to provide information on maternal parenting behaviors beyond self-report data. These specific parenting variables were selected because each has been shown to be linked reliably to child behavior problems and to various parental characteristics, and because each can be hypothesized to have associations with parental inattention and/or impulsivity. These parenting variables also

seem to be fundamental skills that together, enhance a parent's ability to achieve the sensitivity postulated by Belsky (1984) to foster optimal child development.

Negative Parenting Behaviors

Overreactivity

Overreactivity refers to a general cluster of parenting behaviors such as yelling, physical aggression, frequent negative commands, and criticism (O'Leary, Smith Slep, & Reid, 1999). With respect to child development, overreactivity has been found in many previous studies to have a moderate to strong association with child externalizing behaviors (Arnold, O'Leary, Wolff, & Acker, 1993; Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Michalcio & Solomon, 2002; Patterson, Reid, & Dishion, 1992). For example, taking a longitudinal approach, O'Leary et al. (1999) found not only that the overreactive disciplinary style of mothers remained stable across 2½ years, but that the association between maternal overreactivity and child externalizing problems appeared to be a unidirectional process going from parenting to child outcome. In terms of its association with paternal characteristics, overreactivity has been found to be related to maternal hostility (Johnston et al., 2004; Seipp & Johnston, in press), to hyperactive/impulsive symptoms in mothers of children with ADHD (Johnston et al., 2004) and to fathers' self-reported level of inattention (Harvey et al., 2003).

Inconsistent Discipline

Many studies find inconsistency in parental discipline (i.e., providing both positive and negative responses to child misbehavior) to be associated with more severe child behavior problems (Patterson, 1982; Wahler & Dumas, 1986). For example, in an observational study, mothers of preschoolers with conduct problems were found to respond inconsistently more frequently during conflict episodes than mothers of nonproblem preschoolers (Gardner, 1989). Similarly, Harvey, Danforth, Ulaszek, and Eberhardt (2001) found that fathers and mothers of children with aggression and conduct problems exercised less consistency in their rule

enforcement, relative to parents of children without behavior problems. Beyond correlational studies, Acker and O'Leary (1996) randomly assigned mothers to five groups, each given different instructions for responding to their toddlers' demands. Results showed that when mothers reprimanded half of their toddlers' demands and responded to the other half with positive attention (i.e., were inconsistent), the children made more demands and displayed more negative affect. In regards to its association with paternal characteristics, inconsistent discipline has been found to be positively associated with inattention in mothers (Harvey et al., 2003; Murray & Johnston, in press), and with inattention and impulsivity in fathers (Harvey et al., 2003). Higher levels of depression in both mothers and fathers also have been shown to be linked to the parents' use of harsh and less consistent disciplinary strategies (Conger et. al, 1992).

Positive Parenting Behaviors

Involvement

Mothers' positive involvement with their children has been found to be associated with lower levels of behavioral problems in children (Gardner, 1987; Pettit & Bates, 1989). For example, in a longitudinal study, Pettit, Bates and Dodge (1993) found that not only was observed maternal involvement positively associated with lower levels of child externalizing problems, but its contribution was unique and incremental to that of maternal coercive control in predicting teachers' report of child externalizing problems. In terms of associations with paternal characteristics, mothers with depression have been found to show lower positive involvement when interacting with their children compared to mothers without psychological problems (Goodman & Brumley, 1990). No published study has yet examined the relationship between parental ADHD symptoms and involvement.

Use of Positive Reinforcement

This construct refers to mothers' use of positive reinforcement, such as praise and rewards, to promote positive behaviors in their children. Information on the direct relationship

between positive reinforcement and child outcome is limited. However, a number of studies have reported improvements in child behavior problems following parental participation in parent training programs that teach parents to use positive reinforcements for appropriate child behavior (Kazdin, 1997; Marchant, & Young, 2001; McMahon & Wells, 1998). In terms of its associations with parental characteristics, mothers with depression have been found to give less positive feedback to their children (Gordon et al., 1989; Lovejoy et al., 2000). However, the only study to date that has examined the use of positive reinforcement by mothers with symptoms of ADHD found no difference between the self-reports of mothers with and without ADHD (Murray & Johnston, in press).

Responsiveness

In a meta-analysis on parenting and child behavior problems, Rothbaum and Weisz (1994) concluded that responsiveness, defined as encompassing parental approval of child, synchrony, affection and noncoercive or authoritative control, was strongly related to child externalizing behavior. In a sample of children with ADHD, Johnston, Murray, Hinshaw, Pelham, and Hoza (2002) found maternal responsiveness to be negatively related to child conduct problems, even after controlling for demographic characteristics, maternal psychopathology, and the severity of child ADHD symptoms. In regards to its association with parental characteristics, depressed mothers have been repeatedly shown to be less responsive than nondepressed mothers when interacting with their children (Albright & Tamis-LeMonda, 2002; Goldsmith & Rogoff, 1995; Rutter, 1990). However, the association between responsive parenting and parental ADHD have thus far not received much research attention. The only study that has examined this relationship is by Johnston et al. (2002), who found no significant relationship between mothers' ADHD symptoms and maternal responsiveness. However, the measure used to assess maternal ADHD in the Johnston et al. study relied on mothers' recollection of their childhood ADHD symptomatology and therefore may not accurately capture the mothers' concurrent level of

ADHD. Indirect evidence for the association between maternal ADHD and maternal responsiveness is suggested by a case study of a mother with ADHD who experienced considerable difficulties with infant feeding, due to her own inattentive and impulsive nature (Daly & Fritsch, 1995).

In sum, the constructs selected to reflect negative and positive dimensions of parenting, over-reactivity, inconsistency, involvement, use of positive reinforcement, and responsiveness, have all been consistently associated with child behavior problems. These parenting variables also have been linked to a mixture of inattentive and impulsive symptoms in parents and to other parent characteristics such as depression. This research extends this area of investigation by examining the associations of inattention and impulsivity with these parenting behaviors. It was hypothesized that mothers with high inattention scores (e.g., mothers who report frequent experiences of failing to pay close attention to details, having difficulty listening, and being easily distracted by extraneous stimuli) will be more disorganized in general and therefore have less resources to be involved in the daily activities of their children. These mothers also are expected to be less consistent in their discipline and in their use of positive reinforcement, because of their difficulties maintaining focus on the behaviors and responses of their children. On the other hand, mothers with high impulsivity scores (e.g., mothers who report frequent experiences of talking excessively, interrupting or intruding on others, and being restless) are expected to have difficulties disengaging from conflicts with their children, controlling their own emotions and therefore to be less responsive and more prone to overreact in mother-child interactions.

In addition to examining the separate associations between maternal inattention and impulsivity, and each of the parenting variables, this study also investigates whether maternal inattention and impulsivity are uniquely related to the parenting variables after controlling for each other. That is, the ability of each ADHD dimension (inattention and impulsivity) to predict

parenting is considered, controlling for the contribution of the other dimension. As well, the ability of inattention and impulsivity to predict parenting, controlling for maternal depression and hostility is examined. These analyses will address issues related to the uniqueness of the associations of these various forms of parental psychopathology and both positive and negative dimensions of parenting. Finally, as the reciprocal nature of parent-child interactions is now well established (Anderson, Lytton, & Romney, 1986; Ge, et al., 1996; Ianna, Hallahan, & Bell, 1982), the contribution of child conduct problems to parenting also is controlled in analyses examining links between inattention and impulsivity and parenting, to account for the possibility that problematic maternal parenting behaviors have developed in response to persistent child misbehaviors.

With respect to maternal hyperactivity, as no study has looked at the independent impact of hyperactivity on parenting behaviors, it was difficult to make specific predictions regarding the pattern of relationships expected. The associations between maternal hyperactivity and the parenting behaviors were therefore examined in an exploratory manner.

This study focused on the parenting behaviors of mothers and did not include fathers. This decision reflected both practical issues of the relative ease in recruiting mothers, and the findings from many studies that mothers continue to assume the majority of childrearing responsibilities in most families (Deutsch, Lussier, & Servis, 1993; Holden, 1988; Pleck, 1997; Wood & Repetti, 2004). Also, the study only included boys and not girls, because the prevalence of behavior problems has been found to be considerably higher in boys (Maughan, Rowe, Messer, Goodman, & Meltzer, 2004).

METHODS

Participants

Mothers and sons were recruited from a range of sources, including schools and community centers as well as sources dedicated more specifically to families of children with

ADHD (e.g., ADHD support groups), in order to increase the variability in levels of child and mother symptoms within the sample. To be included in the study, the mother and son must have spoken English for at least 3 years, and the child must not have been diagnosed with any physical, mental or behavioral condition which might interfere with his participation (e.g., blindness).

Seventy mothers participated in the study with their sons. The mothers' ages ranged from 23 to 48 years ($M = 36.21$ years, $SD = 5.47$). The boys ages ranged from 48 to 95.5 months ($M = 70.76$ months, $SD = 14.20$). Eight of the boys had received a diagnosis of ADHD according to maternal report. Other demographic characteristics for the participants are summarized in Table 1. In addition to asking the mothers to report on their ethnicity, mothers also were asked to rate, on a scale ranging from 0 (*not at all Canadian*) to 10 (*completely Canadian*), how much they identify themselves as being Canadian. In this sample, despite the wide range of ethnicity reported, the mean level of Canadian identity was high ($M = 8.72$, $SD = 1.87$). Mothers' socioeconomic status (SES) was measured using the Blishen socioeconomic index (Blishen, Carroll, & Moore, 1987), which provides an estimation of the respondent's SES based on the prevailing income and education levels associated with 514 census occupations in Canada. The scale ranges from 17.81 (unemployed) to 101.74 (dentists), with a mean of 42.74 (e.g., secretaries, carpenters). In the current sample, the families' mean SES score corresponds roughly to occupations such as construction electricians, supervisors, advertising sales, and occupations in law.

Measures

Maternal Inattention, Impulsivity and Hyperactivity

Maternal inattention, impulsivity, and hyperactivity were measured using two questionnaires: the Current Symptom Scale-Self Report Form (Barkley & Murphy, 1998) and the Conner's Adult ADHD Rating Scale-Short Version (Conners, 1999). The Current Symptoms

Scale-Self Report Form is an 18-item, self-report measure used to assess symptoms of ADHD as outlined in the DSM-IV. Mothers were asked to rate their behavior over the past 6 months on a four-point Likert scale (with 0 being “*never or rarely*” and 3 being “*very often*”) regarding how often they experience symptoms of inattention (nine items), hyperactivity (six items), and impulsivity (three items). Scores of the nine items assessing inattention were summed for a total score with a possible range of 0 and 27. Similarly, scores of the six items assessing hyperactivity were summed for a total score with a possible range of 0 and 18. Finally, scores of the three items assessing impulsivity were summed for a total score with a possible range of 0 and 9. The internal consistencies for the total scale, the inattention subscale, and the hyperactivity and impulsivity subscales combined have been reported as .75, .65 and .63 respectively (Aycicegi, Dinn & Harris, 2003). In terms of its validity, a similar self-report symptom checklist has been found to discriminate between adults previously diagnosed with ADHD and nonproblem controls (O'Donnell, McCann, & Pluth, 2001). In the present sample, the internal consistencies for the Inattention, Hyperactivity, and Impulsivity subscales were .86, .69, and .77 (Cronbach's α) respectively.

The Conner's Adult ADHD Rating Scale-Short Version (Conners, 1999) is a 26-item, 4-point Likert-type, self-report rating scale that comprises four factor-derived scales assessing ADHD-related symptoms and behaviors: a five-item Inattention/Memory Problems subscale, a five-item Hyperactivity/Restlessness subscale, a five-item Impulsivity/Emotional Lability subscale, and a five-item Problems with Self-Concept subscale. Raw scores of items on the Inattention/Memory Problems subscale were summed for a total Inattention score with a possible range of 0 and 15. Raw scores of items on the Impulsivity/Emotional Lability subscale were summed for a total Impulsivity score with a possible range of 0 and 15. Finally, raw scores of items on the Hyperactivity/Restlessness subscale were similarly summed for a total Hyperactivity score with a possible range of 0 and 15. All subscales have been shown to have

internal reliability of .80 or higher in women (Conners et al., 1999). In terms of its validity, the CAARS has been shown to produce an overall correct classification rate of 85% for adults with ADHD and to correlate significantly with other measures of adult ADHD (Erhardt, Epstein, & Conners, 1999). In the present sample, the internal consistencies for the Inattention/Memory Problems, the Hyperactivity/Restlessness, and the Impulsivity/Emotional Lability subscales were .74, .52, and .70 (Cronbach's α) respectively.

Maternal Depression and Hostility

The Depression and Hostility subscales from the Brief Symptom Inventory (BSI, Derogatis, 1993) were used to assess the level of depression and hostility in mothers. The Depression subscale includes six items describing the symptoms of depression and mothers were asked to use a 5-point Likert scale to rate how much they have experienced each symptom in the previous month. The six items of the Depression subscale were summed for a total score with a possible range of 0 and 24. The Depression subscale has been shown to have an internal consistency of .85 and a test-retest reliability of .84 (Derogatis, 1993). In terms of its validity, the Depression subscale has been found to correlate significantly with the Depression and the Poor Morale subscales of the Wiggins content scales (Derogatis, 1993). Good internal consistency for the Depression subscale was found in this sample (Cronbach's $\alpha = .85$).

The Hostility subscale contains five items that tap the thoughts, feelings, and actions associated with the negative affect state of anger. The scores of the items on the subscale were summed for a total score with a possible range of 0 and 20. The Hostility subscale has been shown to have an internal consistency of .78 and a test-retest reliability of .81 (Derogatis, 1993). It also has been shown to correlate with the Resentment and Aggression subscale of the Tryon Scale, and with the Manifest Hostility subscale of the Wiggins Scale (Derogatis, 1993). The internal consistency for the Hostility subscale was moderate in this sample (Cronbach's $\alpha = .69$).

Maternal Parenting Practices

The two negative (overreactivity and inconsistent discipline) and the two positive (involvement and use of positive reinforcement) parenting constructs were assessed using self-report questionnaires as completed by the mothers. Maternal responsiveness was assessed by observer coding of mother-child interactions.

Negative Parenting Behaviors

Overreactivity. The Overreactivity subscale of the Parenting Scale (PS; Arnold et al., 1993) was used to measure mothers' ability to inhibit ineffective parenting practices in disciplinary situations. The PS is a 30-item, 7-point Likert-type, self-report measure designed to assess parental disciplinary practices. The 10-item Overreactivity subscale measures the parent's tendency to display anger, meanness and irritability (e.g., "I raise my voice or yell"), and has been shown to have an internal consistency of .82 and a 2-week test-retest reliability of .82 (Arnold et al., 1993). The Overreactivity subscale has been shown to discriminate between clinic-referred and nonproblem families and to be significantly correlated ($r = .85$) with observational ratings of parental overreactivity (Arnold et al., 1993). The internal consistency of the Overreactivity subscale in the present sample was .82.

Inconsistent Discipline. The Parenting Scale (Arnold et al., 1993) and the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996) were used to assess the mothers' consistency in rule enforcement. The 11-item Laxness subscale from the PS that measures the parent's tendency to give in and to allow rules to go unenforced, was used to assess parenting consistency (e.g., "I threaten to do things that I know I won't actually do"). The Laxness subscale has been shown to have an internal consistency of .83, a 2-week test retest reliability of .83, and to reliably distinguish clinic-referred parents from non-referred parents (Arnold et al., 1993). The Laxness subscale also has been found to be significantly correlated ($r = .82$) with observational ratings of parental laxness (Arnold et al., 1993). In the present sample, the Laxness subscale had an internal consistency of .82.

The Alabama Parenting Questionnaire (Shelton et al., 1996) is a 42-item, 5-point Likert-type, self-report rating scale designed to assess parenting practices. The 6-item Inconsistent Discipline subscale was used to measure parents' inconsistency in their use of discipline (e.g., "You let your child out of a punishment early"). Scores on the six items were summed for a total score with a possible range of 0 to 24. This subscale has been shown to have a test-retest reliability of .85 and an internal consistency of .67 (Shelton et al., 1996). In terms of its validity, the subscale has been shown to discriminate between clinic-referred and nonproblem families (Shelton et al., 1996). In the present sample, the Inconsistent Discipline subscale had an internal consistency of .69.

Positive Parenting Behaviors

Involvement. The Involvement subscale of the Alabama Parenting Questionnaire (Shelton et al., 1996) was used to measure mothers' level of positive involvement with their children (e.g., "You play games or do other fun things with your child"). The raw scores of the 10 items on this subscale were summed for a total score with a possible range of 0 and 40. The Involvement subscale has been shown to have a .80 internal consistency (Shelton et al., 1996) and was found to have a .84 internal consistency in this sample. In terms of its validity, the Involvement subscale has been shown to be negatively correlated with the Conduct Problems subscale of the Strength and Difficulties Questionnaire (Dadds, Maujean, & Fraser, 2003).

Use of Positive Reinforcement. The Positive Parenting subscale, also taken from the Alabama Parenting Questionnaire (Shelton et al., 1996), was used to measure mothers' use of positive reinforcement with their children (e.g., "You praise your child for behaving well"). This subscale contains six items and has been shown to have a .80 internal consistency and .88 test-retest reliability for parents (Shelton et al., 1996). In this study, one item was eliminated from the subscale in order to achieve greater internal consistency (from .60 to .69). The remaining five items on the subscale were summed for a total score with a possible range of 0 and 20.

Finally, as an indication of its external validity, the Positive Parenting Subscale has been found to be negatively correlated with the Conduct Problems subscale of the Strength and Difficulties Questionnaire (Dadds et al., 2003).

Responsiveness. Maternal responsiveness was coded by following a modified version of the observational coding system developed by Johnston et al. (2002). Six dimensions of responsiveness were rated: authoritative control (i.e., the extent to which mothers encourage child to participate in decision-making and offer appropriate reasons or rationales for their commands), sensitivity of maternal control (i.e., the degree to which mothers exert control or direct child's behavior in a manner that is sensitive to the child's needs), maternal affective tone (i.e., mothers' emotional tone in the interaction), maternal acceptance of the child (i.e., the extent to which mothers appear to enjoy spending time with their child), maternal involvement (i.e., the extent to which mothers seem interested in the interaction and spend most of their time interacting with their child) and general responsiveness (i.e., mothers' overall ability to be sensitive to their child's needs or state and to coordinate their behavior to the behavior of the child).

The mother-son interactions used for coding responsiveness consisted of a 10-minute free-play session in which mothers simply played with their child as they would at home, and a 10-minute clean-up session in which mothers were assigned a number of tasks for the child to complete. At the time that this manuscript was being prepared, 57 of the 70 videotaped interactions have been coded. The responsiveness data included in the current study were therefore based on 57 and not 70 dyads.

Coders began each coding process by viewing the entire 20-minute interaction to gain an understanding of the child's needs and abilities. At the second viewing, coders rated the mother's behavior on each of the six dimensions using a 7-point scale, at 1-minute intervals. Two research assistants and the author were trained as coders. In the training process, all coders

were first required to become thoroughly familiar with the coding manual. All coders then met with a senior lab member with extensive experience applying the manual, to discuss the coding procedure. All four then watched and independently coded a number of sample interactions. The coding of actual interactions began only after the training process consistently demonstrated over 80% agreement (defined as ratings within 1-point of each other on the 7-point scale) among the coders and the senior lab member on all dimensions of responsiveness. All coders were blind to the mothers' scores on the measures of inattention, impulsivity and hyperactivity, and the two research assistants also were blind to the hypotheses of the study. To determine reliability, 31% of all coded videotapes were randomly selected and re-coded by a second independent coder. Both coders were unaware of which videotapes were being double-coded. Excellent inter-rater reliability was found for all six dimensions of responsiveness in this study, with interclass correlations ranging between .90 and 1.00.

Within each dimension, the scores were first averaged separately across the 10 minutes of free-play and the 10 minutes of clean-up. As the six dimensions have previously been found to load on a single "Responsiveness" component that accounts for approximately half of the variance in observations of mothers' behavior (Johnston et al., 2002; Seipp & Johnston, in press), in this study, the average scores of the six dimensions were summed to yield a total Free-Play Responsiveness score with a possible range of 0 and 42. The procedure was similarly repeated to form a total Clean-Up Responsiveness score also with a possible range of 0 and 42. In analyses, the Responsiveness scores for the free-play and the clean-up portions were kept separate, as a *t*-test revealed the two scores to be significantly different, $t(63) = -3.98, p < .001$.

Child Behavior Problems

Child behavior problems were assessed by the Child Behavior Checklist (Achenbach, 1991) as completed by the mother. The Child Behavior Checklist is a standardized parent-report measure that is widely used. It contains 118 items related to behavior problems which are scored

on a 3-point scale ranging from “*not true*” to “*often true*” of the child. Scores on the Externalizing scale, which combines the Delinquent Behavior scale and the Aggressive Behavior scale, were used for the purpose of this study. The Externalizing scale has been shown to have a 1-week test-retest reliability of .91 and .86 stability over 2 years (Achenbach, 1991). In terms of its validity, the Externalizing scale correlates significantly with the Antisocial and the Conduct problem subscales of the Conners Parent Questionnaire, as well as the Socialized Aggression and the Conduct Disorder subscales of the Quay-Peterson Revised Behavior Problem Checklist (Achenbach, 1991).

Procedure

This research was approved by the University of British Columbia’s ethical review board. When mothers first contacted the lab, a research assistant described the study in detail, and if mothers were interested in participating, a brief phone screening was conducted to determine whether the family met criteria to be included in the study. The eligible mother-son pairs were invited to the Parenting Lab in the Department of Psychology. Upon their arrival, mother and son were directed to a small laboratory room arranged to resemble a living room, with a sofa, a desk, a plant, an area rug and a number of toys. The mother was provided with a consent form that clearly outlined the procedure of the study. A simplified version of the consent form was read and explained to the boy by a research assistant. Once mother consent and child assent had been given, the mother was redirected by a research assistant to an adjacent room to complete the first set of questionnaires while the boy stayed behind with a research assistant and engaged in play and completed a number of tasks as part of another study. At the completion of this first section of the study, the mother returned to the small laboratory room and was asked to first play freely for 10 minutes with the boy as she would at home. The mother was then provided with a list of tasks and was asked to instruct the boy to complete as many tasks as he could within the next 10 minutes (e.g., putting away toy cars and animals into corresponding containers, sorting

marker lids, cleaning-up toys). The interaction was videotaped and coded for maternal responsiveness. At the end of the 20 minute interaction period, the mother was again directed to the adjacent room to complete the second set of questionnaires while the boy stayed behind with a research assistant and worked on another set of tasks as part of the other study. Also as part of the other study, the mothers observed their boys engage in a number of cognitive tasks and made predictions about their sons' performances. The order of the parent-child interaction and the cognitive tasks were counterbalanced across families. Upon completion, the family received a UBC t-shirt for the boy and \$30.00 reimbursement for their transportation expenses.

The first set of questionnaires that mothers completed included a general family information sheet, the Current Symptoms Scale, and the Child Behavior Checklist. The second set of questionnaires included the Parenting Scale, the Alabama Parenting Questionnaire, and the Conner's Adult ADHD Rating Scale. All questionnaires assessing parenting behaviors were given after the mother-son interaction to avoid priming mothers to think about their parenting style while engaging in the interaction task with their sons. Within both sets of the questionnaires, the order of administration was randomized across participants.

RESULTS

Table 2 shows the mean levels of maternal characteristics, parenting behaviors and child behavior problems. With respect to maternal characteristics, as can be seen in the table, although the scores for all maternal characteristics came close to spanning the entire ranges of possible scores, the mean scores across participants all fell at the lower end of the dimensions, indicating, on average, only mild levels of inattention, impulsivity, hyperactivity, depression and hostility in this sample. More specifically, comparisons of the mean scores in this sample with the norms of standardized measures revealed that mothers' mean scores on the CAARS subscales place them at the 63rd percentile for inattention, the 48th percentile for impulsivity, and the 39th percentile for hyperactivity, relative to the normative sample of non-clinical female adults (Conners et al.,

1999). For maternal depression and hostility, mothers' mean BDI scores correspond to *T*-scores of 58 for depression and 60 for hostility (Derogatis, 1993). Taken together, these scores suggest that this is a sample of normal mothers with slightly more problems in the areas of inattention, depression, and hostility than the average non-clinical adult population. This level of maternal problems also is consistent with the mean scores for the parenting variables and child behavior problems. For example, mothers' mean scores on both the Overreactivity and the Laxness subscales of the Parenting Scale were slightly higher than the means of the nonclinical sample, but lower than the means of the clinical sample, as reported by Arnold et al. (1993). The *T*-score of 53.5 for child behavior problems also places the boys in the current sample just slightly above average in terms of their externalizing problems.

Preliminary Analyses

Several variables were measured using two instruments. These included: maternal inattention, hyperactivity, and impulsivity, and maternal inconsistent discipline. The decision to create composite scores for these constructs was based on two criteria that were devised with the goal of obtaining the most reliable measure of each construct: 1) the two scores for the same construct must be significantly correlated, and 2) the composite score must have greater internal consistency than the independent scores. For maternal inattention, hyperactivity, and impulsivity, scores obtained from the CSS and the CAARS were significantly correlated (see Table 3), and except in the case of maternal impulsivity, the internal consistencies of the composite scales were all greater than the internal consistencies of their corresponding individual subscales (see Table 4). As the difference between the internal consistencies for the Composite Impulsivity scale and the Impulsivity subscale from the CSS is quite small, and for the purpose of maintaining consistency across measures, all subsequent analyses were conducted using the composite scores for all of maternal inattention, hyperactivity, and impulsivity. The composite scores for inattention and impulsivity were slightly positively skewed and square root

transformations were applied to correct for this skewness. The transformations were successful in bringing the distributions closer to normality.

For maternal inconsistent discipline, the Laxness subscale from the Parenting Scale and the Inconsistent Discipline from the Alabama Parenting Questionnaire were significantly correlated, $r(70) = .71, p < .01$, and achieved an increase in internal consistency when combined. All subsequent analyses were therefore conducted using the Composite Inconsistent Discipline score ($\alpha = .85$).

The correlations among the parenting variables are shown in Table 5. As expected, mothers' self-reports of negative parenting behaviors were positively correlated with each other, and negatively correlated with mothers' self-reports of positive parenting behaviors. Similarly, mothers' self-reports of positive parenting behaviors were positively correlated with each other, and negatively correlated with mothers' self-reports of negative parenting behaviors. With regard to the observational measure, although maternal responsiveness during free-play was not significantly correlated with any of the other parenting variables, the direction of correlations between maternal responsiveness during free-play and the self-report measures of parenting behaviors were all in the expected directions (i.e., negatively with the negative parenting behaviors, and positively with the positive parenting behaviors). Lastly, maternal responsiveness during clean-up was found to be negatively correlated with parenting overreactivity, and positively correlated with maternal involvement and use of positive reinforcement.

Relationships between Maternal Inattention, Hyperactivity,

Impulsivity, and Parenting Behaviors

Bivariate Correlations

Table 6 shows the bivariate correlations between the three maternal ADHD characteristics and the parenting variables. As predicted, maternal inattention was significantly correlated with maternal inconsistent discipline, involvement and use of positive reinforcement.

A significant relationship also was found between maternal inattention and overreactivity.

Contrary to predictions, maternal impulsivity was not significantly related to over-reactivity or responsiveness, but was significantly correlated with maternal inconsistent discipline and use of positive reinforcement. No significant correlations were found between maternal hyperactivity and any of the parenting variables, and interestingly, responsiveness was not correlated with any of maternal inattention, impulsivity, or hyperactivity. Because maternal hyperactivity was not found to be associated with any of the parenting variables, it was not included in subsequent analyses. Similarly, as maternal responsiveness was not found to be related to any of the maternal ADHD dimensions, it was excluded from all subsequent analyses.

Partial Correlations

Given the high correlation between the composite maternal inattention and the composite maternal impulsivity scores, $r(70) = .59, p < .001$, the next step in the analyses was to examine whether the correlations between maternal inattention and the parenting variables would remain after controlling for maternal impulsivity, and vice versa. Partial correlations were conducted to answer this question, and results are presented in Table 7. As can be seen in the table, although the effect sizes have decreased slightly, maternal inattention has retained all of its significant correlations with the parenting variables, except in the case of maternal use of positive reinforcement. Maternal impulsivity, on the other hand, was not significantly related to the parenting variables after controlling for maternal inattention. Hence it appeared that it is maternal inattention, and not maternal impulsivity, that is uniquely associated with maternal overreactivity, inconsistent discipline and lower maternal involvement. Neither maternal inattention nor maternal impulsivity appeared to be uniquely related to maternal use of positive reinforcement.

Hierarchical Regression

Next, I wanted to examine whether the associations between maternal inattention and impulsivity, and the parenting variables would remain after controlling for demographic variables, other maternal psychopathologies, and child behavior problems that might be related to parenting. To determine which variables need to be controlled for in each regression, maternal overreactivity, inconsistent discipline, involvement, and use of positive reinforcement were correlated with child age, mother age, mother's level of education, family SES, mother's level of Canadian identity, maternal depression and hostility, and child externalizing problems. Results of these correlations are presented in Table 8. Consistent with previous research, maternal depression, hostility and child behavior problems were found to be strongly related to the negative parenting behaviors, and to some of the positive parenting behaviors.

Hierarchical regression analyses were performed for each parenting variable as the outcome variable. At Step 1 of the regressions, the appropriate control variables were entered (e.g., child behavior problems, depression). The control variables in each regression consist of only the variables found to be significantly correlated with the parenting variable being predicted. At Step 2, the Inattention composite and the Impulsivity composite were entered. At each step, I tested whether the model was significant and, at Step 2, whether the incremental change in R^2 was significant. The Beta weights for the final step of each model are presented in Table 9.

Negative Parenting Behaviors

Overreactivity. For overreactivity, the full model was significant, $F(5, 63) = 7.08, p < .001$. At Step 1, both maternal hostility and child behavior problems accounted for unique variance in parenting over-reactivity. At step 2, maternal inattention and impulsivity accounted for significant incremental variance, $R^2 \text{ Change}(2, 63) = .07, p < .05$. However, examination of the beta weights in the full model indicated that only maternal inattention and not impulsivity accounted for significant unique variance in overreactivity. Hence maternal inattention significantly increased the variance accounted for in maternal overreactivity even after

controlling for maternal hostility, maternal depression, child externalizing problems, and maternal impulsivity.

Inconsistent Discipline. For inconsistent discipline, the full model was significant, $F(5, 63) = 6.05, p < .001$. At Step 1, only child behavior problems accounted for unique variance in maternal inconsistent discipline. At step 2, maternal inattention and impulsivity accounted for significant incremental variance, $R^2 \text{ Change}(2, 63) = .10, p < .05$. However, examination of the beta weights in the full model indicated that only maternal inattention and not impulsivity accounted for significant unique variance in inconsistent discipline. Hence maternal inattention still significantly increased the variance accounted for in maternal inconsistent discipline even after controlling for maternal hostility, maternal depression, child externalizing problems, and maternal impulsivity.

Positive Parenting Behaviors

Involvement. For maternal involvement, the full model was significant, $F(4, 60) = 3.84, p < .01$. At Step 1, both child behavior problems and family SES accounted for unique variance in maternal involvement. In contrast, at Step 2, maternal inattention and impulsivity failed to account for significant incremental variance, $R^2 \text{ Change}(2, 60) = .03, p > .05$. Thus for maternal involvement, after controlling for family SES and child externalizing problems, neither maternal inattention nor maternal impulsivity significantly increased the variance accounted for in maternal involvement.

Use of Positive Reinforcement. For mothers' use of positive reinforcement, the full model was significant, $F(3, 66) = 4.29, p < .01$. At Step 1, maternal hostility accounted for unique variance in maternal use of positive reinforcement. At Step 2, maternal inattention and impulsivity accounted for significant incremental variance, $R^2 \text{ Change}(2, 66) = .11, p < .01$. However, examination of the beta weights in the full model indicated that neither maternal inattention nor maternal impulsivity accounted for significant unique variance in maternal use of

positive reinforcement. Thus after controlling for maternal hostility, while maternal inattention and impulsivity still significantly increased the variance accounted for in maternal use of positive reinforcement, their contributions were not unique and independent from one another.

DISCUSSION

This study examined whether inattention, hyperactivity, and impulsivity in mothers are each associated with distinct patterns of parenting impairments in a community sample of mothers. Both negative and positive dimensions of parenting behaviors, as well as self-report and observational measures of parenting were included. Although the findings were not entirely consistent with the hypotheses, in general, maternal inattention and impulsivity were found to be associated with a wide range of parenting deficits, and maternal inattention in particular appeared to be uniquely associated with parenting overreactivity and inconsistency even after controlling for maternal impulsivity, depression, hostility, and child behavior problems.

Maternal Inattention

Consistent with previous research, maternal inattention was found to be moderately associated with both dimensions of the negative parenting behaviors (Harvey et al., 2003; Murray & Johnston, in press) at the bivariate level, accounting for 17% of the variance in parenting overreactivity and 24% of the variance in parenting inconsistency. Although controlling for maternal impulsivity reduced these values to 13% and 16% for parenting overreactivity and inconsistency respectively, the associations remained highly significant. Even more impressively, maternal inattention significantly increased the variance accounted for in both of the negative parenting behaviors above and beyond that accounted for by other predictors, suggesting maternal inattention to be truly uniquely related to both parenting overreactivity and inconsistency, and not be linked to these parenting behaviors only because of its associations with maternal depression, hostility, or child behavior problems.

Conceptually, it makes sense that mothers who are easily distracted, forgetful in daily activities, and who have difficulties finishing work, would also be more likely to not follow through on the commands and warnings that they give to their children. In addition to the mothers' failure to execute what they propose to do however, the measures of inconsistent discipline in this study also included items that assess whether mothers persist with their demands, or whether they switch to negotiation or persuasion when their children refuse to comply. It is conceivable therefore, that maternal inattention also is associated with parenting inconsistencies because mothers with attentional problems are more likely to give in to their children or to try whatever strategies that might work in the moment to elicit compliance from their children. Hence, mothers with attentional problems may find the task of parenting especially challenging against the backdrop of their own struggles of being disorganized and forgetful. When confronted with child misbehavior, these mothers might therefore opt to give in or to compromise more quickly than mothers without attentional problems, in order to avoid exacerbating their own stress level. These patterns of interactions also may be one of the mechanisms underlying the association between maternal inattention and parenting overreactivity. That is, mothers who scored high on inattention may be more likely to become angry or upset, to argue, or to raise their voices in disciplinary situations, because they are under higher levels of stress resulting from their own difficulties with attention relative to mothers without attentional problems. Alternatively, it also is possible that these mothers' tendency to overreact is a cumulative result of their use of ineffective disciplinary strategies, resulting escalation of child misbehavior, and increased parenting frustration which increases the likelihood of outbursts over time. Unfortunately, the cross-sectional nature of the data in the current study does not allow for an exploration of the potential interactive relationship between parental inconsistency and overreactivity. These explanations remain speculative therefore and will need to be examined in future studies.

In regards to the positive dimensions of parenting, at the bivariate level, as predicted, maternal inattention was moderately associated with maternal involvement, accounting for 10% of the variance in this parenting behavior. Consistent with previous research (Murray & Johnston, in press), maternal inattention also was moderately associated with mothers' use of positive reinforcement, accounting for 10% of the variance in mothers' use of positive reinforcement. After controlling for maternal impulsivity however, maternal inattention was no longer significantly related to mothers' use of positive reinforcement, although it continued to account for 7% of the variance in maternal involvement. Finally, when considered in the context of other predictors, maternal inattention did not contribute uniquely above and beyond the contributions of family SES and child behaviors in predicting maternal involvement. For mothers' use of positive reinforcement, while maternal inattention and impulsivity together added significantly to the predictive ability of maternal hostility in predicting mothers' use of positive reinforcement, this relationship was not unique to either maternal inattention or maternal impulsivity.

For maternal involvement, the results suggest that although mothers with attentional problems may be less involved and may engage in less positive tasks with their children, this association may be driven in part by the child's behavior problems that may render the parent-child interactions less positive thereby reducing mothers' attempts to initiate conversations or activities with their child. Similarly, although maternal inattention was related to mothers' use of positive parenting at the bivariate level, this relationship was not unique and independent from maternal impulsivity. As there is no existent evidence to suggest that higher levels of maternal inattention are associated with a lack of maternal warmth or affection, it is more likely the case that the less frequent use of praise and rewards in these mothers again reflects a difficulty with sustaining attention on their children's responses and following through commands with consequences, either positive or negative. Future studies with more specific measures are

needed to shed light on why mothers with higher levels of inattention engage in less positive reinforcement. It also may be interesting in the future to explore whether inattention differentially affects mothers' use of negative versus positive feedback in parent-child interactions.

It is important to note that as these data are merely correlational, caution must be taken when making interpretations about the direction of causality. That is, although it seems more likely that the direction of influence would move from maternal characteristics to mothers' parenting behaviors, one must not discount the possibility that the specific parenting behaviors and perhaps the consequences that arise from those parenting behaviors also may be affecting mothers' ability to pay attention and maintain focus. Future studies with experimental manipulation or longitudinal designs would be needed to clarify these associations.

Maternal Impulsivity

Although maternal impulsivity was found to be moderately associated with parenting inconsistent discipline and mothers' less use of positive reinforcement, accounting for 10% and 12% respectively in these two parenting behaviors, it was not found to be uniquely associated with any of the parenting variables, independently from inattention. In addition, when maternal depression and hostility, child behavior problems, and family SES were controlled, the only significant relationship that remained was between maternal impulsivity and less use of positive reinforcement.

These findings were unexpected. For example, although it does make sense that mothers who tend to intrude on others and blurt out responses are not necessarily less involved in their children's activities, it was surprising that these mothers also were not more overreactive in their parenting. One possible explanation for this pattern of results may be that impulsivity is a multifaceted construct and that the specific dimensions of impulsivity that would be associated with parental overreactivity and inconsistency are not those that are tapped by traditional measures of

ADHD. For example, Whiteside and Lynam (2001) recently conducted factor analyses with the most widely-used measures of impulsivity and found support for a four-factor model that accounted for 66% of the variance in the impulsivity instruments. These are: Urgency, or the impulses to act in order to alleviate oneself from the immediate negative emotions regardless of the long-term consequences of these behaviors; Lack of Premeditation, or the tendency to act without considerations for the consequences of one's behavior; Lack of Perseverance, or the inability to remain focused on a task that may be unpleasant; and Sensation Seeking, or the tendency to partake in exciting activities that may be risky or dangerous. More recently, Miller, Flory, Lynam and Leukefeld (2003) used zero-order correlations and multiple regression analyses to examine the relationships between these four dimensions of impulsivity and various forms of internalizing and externalizing psychopathologies, including ADHD, in a group of adults in their early twenties. Using the DSM-IV symptoms of ADHD, they found that although the hyperactive/impulsive symptoms were correlated with all four dimensions of impulsivity, the highest correlation was with the Lack of Premeditation dimension. It is possible therefore, that maternal impulsivity was not found to be associated with parenting overreactivity, because the overreactive parenting behaviors assessed in this study (e.g., argue, yell, do things not intended to, use bad language when child misbehaves) are more closely related to the category of impulsive behaviors acted out of negative emotions (in this case, anger and frustration with child misbehaviors), or behaviors that are associated with the Urgency dimension of impulsivity.

Further challenging the validity of the measure and perhaps also the construct of maternal impulsivity is the fact that whereas the CSS and the CAARS subscales of maternal inattention were more highly correlated with each other than with the subscales of other ADHD dimensions, as were the CSS and the CAARS subscales of maternal hyperactivity, as can be seen in Table 3, the correlation between the CSS and the CAARS subscales of maternal impulsivity was not higher than the correlations between the impulsivity subscales and the subscales of the other two

ADHD dimensions. Overall, it appears that more research is needed to clarify the specific aspects of impulsivity that are assessed using questionnaire measures of adult ADHD and whether the different dimensions of impulsivity are linked with different parenting impairments.

Maternal Hyperactivity

No significant relationships were found between maternal hyperactivity and any of the parenting behaviors. It is possible that hyperactivity in mothers does not hinder their abilities to practice good parenting behaviors. Alternatively, it is possible that hyperactivity is a problem that is perhaps easier to cope with or compensate for in adults. More studies on how hyperactivity may be manifested in adults are needed to further understand this lack of associations.

Maternal Responsiveness

Contrary to hypotheses, maternal responsiveness was not related to maternal inattention, impulsivity, or hyperactivity. Although these findings are surprising, they are in fact consistent with the findings of Johnston et al. (2002), who found no significant relationship between maternal ADHD symptoms and responsiveness in a group of mothers of children with ADHD. Three possible reasons might underlie these findings. First, it is possible that the level of responsiveness across mothers in this study was too uniform to detect any significant relationship with maternal inattention and impulsivity. Thus, the lab setting with minimal distractions, and mothers' awareness of being under observation might have both contributed to creating an environment that fostered optimal responsiveness from the mothers. However, the fact that the correlations between maternal responsiveness and the other parenting behaviors were all in the expected directions, and further, that maternal responsiveness during clean-up was significantly correlated with parenting overreactivity, maternal involvement and mothers' use of positive reinforcement, does lend support to the validity of the measure and argues against the hypothesis that all mothers were equally responsive due to contextual influences.

Interestingly, in contrast to previous research, maternal responsiveness was not found to be significantly associated with maternal depression or child behavior problems (Albright & Tamis-LeMonda, 2002; Goldsmith & Rogoff, 1995; Johnston et al., 2002; Rutter, 1990). However, most of these previous studies used different measures of maternal responsiveness, and the only study (Johnston et al., 2002) that employed the same observational measure as the current study included mothers of children with ADHD who might not be comparable with the current sample in their levels of psychological functioning.

A more plausible explanation is that the self-report questionnaires ask the mothers to reflect on their parenting behaviors across a longer period of time and in unspecified situations, whereas the observational measure of responsiveness only assesses mothers' behaviors in a limited 20-minute period and in a very structured environment. As the self-report measures of ADHD dimensions also query about mothers' functioning across a long period of time, it is possible that this shared quality between the self-report measures contributed in part to revealing the relationships between self-reported ADHD characteristics and parenting. Unfortunately, no well validated behavioral measures of adult ADHD dimensions exist currently. In the future, it may be interesting to explore whether behavioral or observational measures of parental ADHD would be more strongly related to behavioral than to self-report measures of parenting behaviors. Finally, it is possible that mothers' ability to be sensitive to the feelings and needs of their children is only compromised at higher levels of maternal psychopathologies. Both the study by Johnston et al. (2002) and this study examined mothers who have not been diagnosed with ADHD, and future studies with clinical samples will be needed to shed light on this hypothesis.

Conclusion and Implications

There are several limitations to this study. First, except for the measure of responsiveness, all other data relied on the mothers as the only source of information. It is possible therefore, that the significant associations found in this study reflect in part mothers'

biases in reporting their functioning, their parenting practices, and their perception of child behavior problems. Also, although efforts were made to recruit mothers from a wide range of communities, the majority of the mothers who participated in the study were well educated and had only minor levels of inattention and impulsivity. As well, because only mothers and boys were included in the study, the findings may not generalize to fathers and daughters.

Despite these limitations however, this study makes an important contribution to the literature by being the first study to have examined the unique associations between maternal inattention and parenting behaviors while controlling for maternal impulsivity, and the unique associations between maternal impulsivity and parenting behaviors while controlling for maternal inattention. In addition, this study extends on previous research on maternal ADHD and parenting, by showing that even at mild levels, maternal inattention is still uniquely associated with parenting overreactivity and inconsistency after controlling for maternal impulsivity.

The findings of this study have two major implications. First, results of the study highlight the importance of distinguishing between the different dimensions of ADHD symptomatology when investigating the correlates of ADHD in adults. Unfortunately, studies that have examined the psychosocial functioning of adults with ADHD have almost always combined participants into a single ADHD group and failed to differentiate between the inattentive and the hyperactive/impulsive dimensions (Biederman, Faraone, & Chen, 1993; Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1993; Weiss, Hechtman, Perlman, Hopkins, & Wener, 1979; Young, Toone, & Tyson, 2003). This is a major gap in the literature, and without the data on adults, researchers can only rely on the findings on childhood ADHD to speculate about differences in functioning for each ADHD dimension that may or may not generalize to adulthood. Secondly, these results present a convincing case for maternal inattention being an important variable to consider and include when conducting research on parent-training and

parent-child interactions. For example, when examining the efficacy of parent-training programs, it is important to consider how maternal characteristics such as inattention might interfere with mothers' ability to apply the parenting skills, and whether the attentional problems need to be addressed separately prior to introducing other components of the training program. Although inattention has previously been observed to interfere with parenting skills in a mother who met the diagnostic criteria for ADHD (Daly and Fritsch, 1995) and in mothers of boys with ADHD (Sonuga-Barke, Daley, & Thompson, 2002), the results of this study would suggest that even in non-clinical populations with only mild levels of inattention, maternal inattention still appears to be uniquely related to negative parenting behaviors and should therefore be taken into consideration.

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Table 1

Demographic Characteristics of the Sample

Demographic variables	
Mother's ethnicity (%)	
Caucasian	67.1
Asian	21.5
Other	8.5
Missing	2.9
Mothers' level of education (%)	
Some high school or less	5.7
High school or equivalent	10.0
Trade school	2.9
Some college	20.0
College degree	41.4
Graduate school	20.0
Mother's marital status (%)	
Married	72.9
Single/Separated/Common law	27.1
Blishen SES Score	
Mean (SD)	48.43 (14.06)

Table 2

Mean Levels of Maternal Characteristics, Parenting Behaviors and Child Behavior Problems

	<i>M</i>	<i>SD</i>	<i>Range</i>
Maternal Characteristics			
CSS Inattention (<i>n</i> = 70)	5.84	4.69	.00 – 22.00
CSS Impulsivity (<i>n</i> = 70)	1.66	1.59	.00 – 8.00
CSS Hyperactivity (<i>n</i> = 70)	3.87	2.80	.00 – 12.00
CAARS Inattention (<i>n</i> = 70)	4.01	2.58	.00 – 11.00
CAARS Impulsivity (<i>n</i> = 70)	3.73	2.04	.00 – 10.00
CAARS Hyperactivity (<i>n</i> = 70)	4.14	2.31	.00 – 10.00
BDI Depression (<i>n</i> = 70)	3.17	3.72	.00 – 15.00
BDI Hostility (<i>n</i> = 70)	3.61	2.41	.00 – 11.00
Parenting Behaviors			
Overreactivity (<i>n</i> = 70)	27.15	8.76	10.00 – 48.00
Laxness (<i>n</i> = 70)	25.49	8.68	10.00 – 48.00
Inconsistent Discipline (<i>n</i> = 70)	7.57	3.48	.00 – 19.00

Involvement ($n = 68$)	30.70	5.54	18.75 – 39.00
Use of Positive Reinforcement ($n = 70$)	19.79	2.31	13.00 – 24.00
Responsiveness Free-Play ($n = 57$)	26.95	3.15	16.27 – 31.77
Responsiveness Clean-Up ($n = 57$)	28.47	3.54	17.54 – 35.60
Child Behavior Problem			
CBCL Externalizing (T -Score) ($n = 69$)	53.49	10.23	36.00 – 76.00

Note. *ns* vary slight due to missing data.

Table 3

Correlations among the CSS and the CAARS Maternal Inattention, Hyperactivity, and Impulsivity Subscales

	CSS	CSS	CSS
	Inattention	Impulsivity	Hyperactivity
CAARS Inattention	.68**	.38**	.27*
CAARS Impulsivity	.43**	.40**	.31**
CAARS Hyperactivity	.43**	.38**	.75**

** $p < .01$

* $p < .05$

Table 4

Internal Consistencies of the Maternal Inattention, Hyperactivity, and Impulsivity Subscales

	Inattention	Hyperactivity	Impulsivity
Current Symptom Scale (CSS)	.86 (<i>n</i> = 70)	.69 (<i>n</i> = 70)	.77 (<i>n</i> = 70)
Conners Adults ADHD Scale (CAARS)	.74 (<i>n</i> = 70)	.52 (<i>n</i> = 70)	.70 (<i>n</i> = 70)
CSS and CAARS Composite	.89 (<i>n</i> = 70)	.79 (<i>n</i> = 70)	.75 (<i>n</i> = 70)

Table 5

Correlations Among Parenting Behaviors

	OR	Composite Inc Disc	Inv	Pos	Resp FP	Resp CU
Overreactivity	-					
Composite	.59**	-				
Inconsistent Discipline	(<i>n</i> = 70)					
Involvement	-.41**	-.51**	-			
	(<i>n</i> = 68)	(<i>n</i> = 68)				
Use of Positive Reinforcement	-.43**	-.46**	.65**	-		
	(<i>n</i> = 70)	(<i>n</i> = 70)	(<i>n</i> = 68)			
Responsiveness	-.12	-.19	.25	.16	-	
Free-Play	(<i>n</i> = 57)	(<i>n</i> = 57)	(<i>n</i> = 55)	(<i>n</i> = 57)		
Responsiveness	-.35**	-.22	.44**	.38**	.60**	-
Clean-Up	(<i>n</i> = 57)	(<i>n</i> = 57)	(<i>n</i> = 55)	(<i>n</i> = 55)	(<i>n</i> = 57)	

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

Note. OR = Overreactivity

Composite Inc Disc = Composite Inconsistent Discipline

Inv = Involvement

Pos = Use of Positive Reinforcement

Resp FP = Responsiveness Free-Play

Resp CU = Responsiveness Clean-Up

Table 6

Bivariate Correlations between Composite Maternal Inattention, Impulsivity, and Hyperactivity, and Parenting Measures

	Composite Inattention	Composite Impulsivity	Composite Hyperactivity
Negative Parenting Behaviors			
Overreactivity ($n = 70$)	.41**	.21	.12
Composite Inconsistent Discipline ($n = 70$)	.49**	.31**	.17
Positive Parenting Behaviors			
Involvement ($n = 68$)	-.31*	-.15	-.07
Use of Positive Reinforcement ($n = 70$)	-.31*	-.34**	-.02
Responsiveness			
Free-Play ($n = 57$)	.01	-.07	-.00
Clean-Up ($n = 57$)	-.01	-.02	-.07

** $p < .01$

* $p < .05$

Table 7

Partial Correlations between Composite Maternal Inattention and Impulsivity, and Parenting Measures

	Composite Inattention (Controlling for Composite Impulsivity)	Composite Impulsivity (Controlling for Composite Inattention)
Negative Parenting Behaviors		
Overreactivity ($n = 67$)	.36**	-.04
Composite Inconsistent Discipline ($n = 67$)	.40**	.03
Positive Parenting Behaviors		
Involvement ($n = 65$)	-.28*	.04
Use of Positive Reinforcement ($n = 67$)	-.14	-.21
Responsiveness		
Free-Play ($n = 54$)	.01	-.01
Clean-Up ($n = 54$)	.03	-.07

** $p < .01$

* $p < .05$

Table 8

Correlations between Parenting Behaviors and Demographic Variables, Maternal Depression and Hostility, and Child Behavior Problems

	Overreactivity	Composite		Use of
		Inconsistent	Involvement	Positive Reinforcement
Child Age	.13 (<i>n</i> = 70)	.08 (<i>n</i> = 70)	-.10 (<i>n</i> = 68)	-.22 (<i>n</i> = 70)
Mother Age	.02 (<i>n</i> = 66)	-.11 (<i>n</i> = 66)	.14 (<i>n</i> = 64)	.10 (<i>n</i> = 66)
Mother's Level of Education	-.06 (<i>n</i> = 70)	-.21 (<i>n</i> = 70)	.14 (<i>n</i> = 68)	.12 (<i>n</i> = 70)
Family SES	-.18 (<i>n</i> = 68)	-.03 (<i>n</i> = 68)	.32** (<i>n</i> = 66)	.17 (<i>n</i> = 68)
Mother's Level of Canadian Identity	-.16 (<i>n</i> = 69)	.02 (<i>n</i> = 69)	.16 (<i>n</i> = 67)	.05 (<i>n</i> = 69)
Maternal Depression	.26* (<i>n</i> = 70)	.32** (<i>n</i> = 70)	-.24 (<i>n</i> = 68)	-.09 (<i>n</i> = 70)
Maternal Hostility	.42** (<i>n</i> = 70)	.32** (<i>n</i> = 70)	-.21 (<i>n</i> = 68)	-.28* (<i>n</i> = 70)
Child Behavior Problems	.45** (<i>n</i> = 69)	.42** (<i>n</i> = 69)	-.27* (<i>n</i> = 67)	-.17 (<i>n</i> = 69)

** $p < .01$

* $p < .05$

Table 9

Regression Analyses Indicating Contributions of Maternal Inattention and Impulsivity to the Prediction of Parenting Behaviors

Predictors	β	p
Negative Parenting Behaviors		
Overreactivity		
Maternal Hostility	.32	.01
Maternal Depression	-.12	.38
Child Behavior Problems	.32	.01
Composite Maternal Inattention	.34	.01
Composite Maternal Impulsivity	-.13	.32
Composite Inconsistent Discipline		
Maternal Hostility	.13	.28
Maternal Depression	-.01	.95
Child Behavior Problems	.26	.03
Composite Maternal Inattention	.38	.01
Composite Maternal Impulsivity	-.03	.85

Positive Parenting Behaviors

Involvement

Family SES	.31	.01
Child Externalizing Problems	-.20	.12
Composite Maternal Inattention	-.22	.15
Composite Maternal Impulsivity	.07	.65

Use of Positive Reinforcement

Maternal Hostility	-.12	.33
Composite Maternal Inattention	-.12	.42
Composite Maternal Impulsivity	-.27	.07

Note. *B*s and significance levels are from the full regression models.