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Early Exposure to Maternal Depressive Symptoms and the Identification of Emotions in Facial Expressions by School-Aged Offspring

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Abstract

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By Rachel J. Ammirati

The primary purpose of this study was to investigate the potential association between early exposure to elevated maternal depressive symptoms and school-aged children's emotion identification skill for child facial expressions. Because school-aged children of depressed mothers have been found to exhibit poorer peer relationship functioning than children of nondepressed mothers (e.g., Goodman, Brogan, Lynch, & Fielding, 1993), it was predicted that more chronic early exposure to elevated maternal depressive symptoms would be associated with school-aged offspring exhibiting more specific or general deficits in emotion identification skill, and that these deficits would be associated with peer relationship difficulties. In addition, the potential impact of the specific timing of exposure to elevated maternal depressive symptoms within the first three years of life on school-aged children's emotion identification skill was also examined. Data on 2504 mother-child dyads from the Avon Longitudinal Study of Parents and Children (ALSPAC; Golding & the ALSPAC Study Team, 2004) were examined, and self-reports of maternal depressive symptoms were ascertained at 8 weeks, 8 months, 21 months, and 33 months post birth. Children's emotion identification skill and teacher-rated peer relationship functioning were measured when they were approximately eight years of age. Results suggested there was generally no support for a relationship between early exposure to elevated maternal depressive symptoms and school-aged children's emotion identification skill. Therefore, when considering exposure to maternal depression that occurred during the first few years of a child's life, impaired emotion identification skill may not help to explain why offspring exhibit peer relationship difficulties during middle childhood. Results are further discussed in terms of limitations of the present study and directions for future research are outlined.

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The association between maternal depression and negative child outcomes is well established. Since the late 1970s, numerous studies have provided strong evidence to show that children of depressed mothers are at increased risk for the development of a range of problems that, in turn, can predispose them to developing later psychopathology as adults (as reviewed in Beardslee, Versage, & Gladstone, 1998; Downey & Coyne, 1990; S. Goodman & Gotlib, 1999). One broad area of difficulty that has been found to emerge in many school-aged children of depressed mothers is decreased social competence, which Cavell (1990) has conceptualized as being comprised of social adjustment (i.e., whether or not an individual is reaching expected goals at particular points in development like having friends), social performance (i.e., how one actually acts in varying social contexts), and social skills (i.e., the necessary abilities that one needs to perform in social situations and be well-adjusted).

The construct of social competence is multi-faceted and has been measured in a variety of ways in the literature. In regard to adjustment and performance, when compared to controls, school-aged children of depressed mothers have been found to be rated as less popular by their teachers (S. Goodman, Brogan, Lynch, & Fielding, 1993), to be rated as less socially competent on relatively broad measures that span the nature of their social relationships, social acceptance, and involvement in social activities (Anderson & Hammen, 1993), to exhibit more difficulties getting along with peers and adults (Lipman, Boyle, Dooley, & Offord, 2002), to be less accepted by peers (Kam, 2001), and to respond more negatively to friendly approaches for play by peers (Murray, Sinclair, Cooper, Ducournau, & Turner, 1999). In regard to social skills, older school-aged children of more chronically depressed mothers have demonstrated deficits in abilities necessary to navigate interpersonal situations (Beardslee, Schultz, & Selman, 1987), and younger school-aged African American children have been rated as having fewer social skills in the realm of self-control, cooperation, assertion, and responsibility (Koblinsky, Kuvalanka, & Randolph, 2006). School-aged children of depressed mothers have also been found to exhibit more internalizing and externalizing behavior problems (Billings & Moos, 1983; Lee & Gotlib, 1989a, 1989b), which in addition to other social skills deficits, can bear on ones social adjustment. Thus, exposure to maternal depression appears to put school-aged children at risk for the development of social *incompetence*.

Although each of these aspects of social competence are important for an individual's overall well-being, Cavell (1990) considers social adjustment to be the most important aspect of social competence because it represents the products of social performance and social skills that we consider to be important to well-being across the lifespan. In particular, as was stated previously, one problematic area of school-aged children's social adjustment that has been highlighted in the maternal depression literature is problematic peer relationship functioning (i.e., whether an individual is liked by or gets along with peers, has friends, etc.). Because the nature of peer relationships in school-aged children is central to their well-being (as reviewed in Hartup & Stevens, 1997), it is a particularly important area of individual difference to investigate. Moreover, some research has indicated that the presence of positive peer relationships can decrease the risk for adolescent suicide (Rubenstein, Heeren, Housman, Rubin, & Stecher, 1989), and that early problematic peer relationships are associated with a number of later negative outcomes, including dropping out of school and criminal behavior (as reviewed in Parker & Asher, 1987).

Although children of depressed mothers have consistently shown poorer peer relationship functioning than children of typical mothers, the nature of how exposure to maternal depression translates into children's peer relationship difficulties is still in need of further investigation (S. Goodman & Gotlib, 1999). For instance, what are the important underlying social skills that might be affected by exposure to maternal depression that could impact a child's adjustment within peer relationships? And although it is likely that social skills deficits like deficits in emotion regulation (e.g., internalizing and externalizing behavior problems) or an overall poor modeling of healthy social relationships by depressed mothers (S. Goodman et al., 1993) contribute to peer relationship difficulties in children of depressed mothers, this does not address the issue of whether there are additional, more finite repercussions of exposure that also contribute to this link.

Given that parents, and especially mothers, seem to be important players in the development of emotional and interpersonal competence in children, and further that even the basic ability to accurately identify emotions in others is integral to successful interpersonal relationships (Custrini & Feldman, 1989; Duke, Nowicki, & Martin, 1996; Nowicki & Duke, 1989; 1992), one area of skill that may be influenced by exposure to maternal depression, especially if it occurs early in development, is the ability to accurately identify emotions in the facial expressions of others. Further, as well-known reviews (e.g., S. Goodman & Gotlib, 1999) that discuss the literature bearing on the general nature of maternal depression indicate, most children who are exposed to maternal depression are privy to multiple episodes often of a long-term nature. Thus, the potential relationship between more chronic early exposure to maternal depression and children's later emotion identification skill was the primary focus of this study. Specifically, it is possible that early chronic exposure to maternal depression may be associated with an overall deficit in children's later abilities to identify emotions in facial expressions (i.e., they tend to misread emotions in general), or even further, that this chronic exposure may be associated with specific patterns of overattribution of negative emotions that lead to social failure. Conversely, it is also possible that more chronic early exposure to maternal depression may only serve to enhance a child's emotion identification skill for negative emotions like sadness and anger, which would then suggest that deficits in emotion identification skill may not help to explain the link between maternal depression and school-aged children's interpersonal difficulties with peers. These possibilities were explored in the present study in conjunction with an examination of whether the specific timing of exposure to elevated levels of maternal depressive symptoms within the first few years of a child's life was related to school-aged children's deficits in emotion identification skill.

Emotion identification skill and children's interpersonal relationships

The ability to accurately identify emotions in others is a key aspect of general emotion competence and successful interpersonal relationships (Camras, Ribordy, Hill, Martino, Spaccarelli, & Stefani, 1988; Denham, Zoller, & Couchoud, 1994; as reviewed in Herba & Phillips, 2004; as reviewed in Montague & Walker-Andrews, 2001; Tremblay, Kirouac, & Dore, 1987; Walden & Field, 1982; Walker-Andrews, 1997). As Halberstadt, Denham, and Dunsmore (2001) indicate in their work on affective social competence, and Crick and Dodge (1994) highlight in their well-known social information processing model, the identification and interpretation of emotions provides us with vital information about the intentions and desires of our social partners, as well about how our own actions are received.

Facial expressions in particular are thought to be one of the principal nonverbal channels through which emotional information is communicated (Collier, 1985; Tremblay et al., 1987); therefore it is particularly important to understand how individual differences in this basic domain of nonverbal skill may develop. Numerous studies show that for school-aged children, the inability to accurately identify emotions in facial expressions is related to a number of negative social outcomes with peers including lower levels of popularity (Collins & Nowicki, 2001; Edwards, Manstead, & MacDonald, 1984; Nowicki & Duke, 1992, 1994; Vosk, Forehand, & Figueroa, 1983), lower levels of teacher-rated social competence (Custrini & Feldman, 1989), and greater social anxiety (McClure & Nowicki, 2001).

Because the amount of time spent with peers across development tends to be greatest during middle childhood and adolescence (Hartup & Stevens, 1997), and children who have friends earlier in development tend to also have friends later in development (Elicker, Egeland, & Sroufe, 1992), it seems to be especially important to understand the various mechanisms through which peer relationship difficulties can develop in middle childhood. Indeed, in Hartup and Stevens' (1997) review of research on friendships across the lifespan, it becomes quickly evident that early problematic, or lacking, peer relationships predict a number of negative outcomes across development including decreased school and job performance (Bagwell, Newcomb, & Bukowski, 1996), more instances of psychological problems (Berndt & Keefe, 1992), and lower levels of psychological well-being in general during adulthood and beyond (Brown, 1981; Gupta & Korte, 1994; Larson, 1978). Thus, if exposure to maternal depression during an important stage of life for emotional development is associated with children's deficits in basic emotion identification skill later on, children of depressed mothers may be at a basic interpersonal disadvantage when it comes time to go off to school and interact socially with peers.

The development of emotion identification skill in the first few years of life

To understand how early exposure to maternal depressive symptoms may be associated with the development of a child's emotion identification skill, it is necessary to first examine what we know about the typical development of basic emotion competence, and the kinds of socialization factors that contribute to decreased competence. Although it is accepted that neurological mechanisms and innate biological factors influence an individual's ability to understand emotions in others (Nelson & De Haan, 1997; Walker-Andrews, 1997), it is also true that learning and experience with caregivers, especially mothers, seem to be important as well (Camras & Allison, 1985; as reviewed in Camras, Sachs-Alter, & Ribordy, 1996; Denham et al., 1994; Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Denham, 1998; Fivush, Brotman, Buckner, & S. Goodman, 2000). Thus, social learning theory (Bandura, 1977) can be used as a guide to explain why children of depressed mothers may develop deficits in emotion identification skill.

S. Goodman and Gotlib (1999) have emphasized the importance of using a developmental framework to understand how maternal depression may impact offspring across the life course and highlight that children need different things from their parents at different points in their lives. For example, within the first few years of life, parents must assist their infants in developing secure attachment relationships and emotion regulation skills, in addition to assisting their slightly older children in developing skills necessary to begin to navigate social and emotional situations (S. Goodman & Gotlib, 1999). Although some evidence suggests that learning how to identify emotions in facial expressions in particular may continue well into the middle of the life course (Nowicki, 2008), it seems clear that such learning begins as early as infancy (Field, Woodson, Greenberg, & Cohen, 1982; Herba & Phillips, 2004; McClure, 2000; Meltzoff & Moore, 1983; Montague & Walker-Andrews, 2001; Nelson, 1987; Walker-Andrews, 1997). Therefore, when considering how the emotion identification skill of school-aged children of depressed mothers may be associated with their peer relationship functioning, it seems to be particularly important to begin to examine exposure in the first few years of a child's life given key developmental demands at this time.

Emotion identification skill has been reliably measured in children as young as three-years-old (Nowicki, 2008) and typically improves with age (Harrigan, 1984; De Sonneville, Verschoor, Njiokiktjien, Op het Veld, & Toorenaar, 2002; Tremblay et al., 1987; Walden & Field, 1982) with females tending to outperform males (McClure, 2000). Individual differences in the ability to identify basic emotions in facial expressions have been found to be relatively stable in children between the ages of three and six years (Brown & Dunn, 1996), with children performing more poorly than their peers at three years of age also performing more poorly than their peers at six years of age. Although it is not yet known whether these individual differences remain stable throughout middle childhood and beyond, when considering how a mother's depression may influence a child's development of emotion identification skill, it again seems to be essential to understand how this skill develops during the first few years of a child's life since there is some evidence of stability at least until the end of early childhood. Further, given that the chronicity of maternal depression has been found to be associated with the extent to which mothers interact negatively with their young infants (Campbell, Cohn, & Meyers, 1995), are emotionally available to their preschool-aged children (Frankel & Harmon, 1996), and promote insecure attachments in both their infants and preschoolers (Frankel & Harmon, 1996; Teti, Gelfand, Messinger, & Isabella, 1995), the frequency of elevated maternal depressive symptoms in the first few years of a child's life also seems to be particularly important to examine when working within a social learning framework.

What can be said at this time about the typical development of facial expression identification *per se* is somewhat limited in scope. Some data indicate that happy facial expressions tend to be learned first and more easily than other basic emotions in facial expressions (Camras & Allison, 1985; De Sonneville et al., 2002; Glitter, Mostofsky, & Quincy, 1972; Walden & Field, 1982), with sadness and anger typically learned next by the age of five years, (Herba & Phillips, 2004; Walden & Field, 1982), and fear last by the age of ten years (Herba & Phillips, 2004; Philippot & Feldman, 1990; Walden & Field, 1982). Research has also consistently shown that facial expression identification skill tends to increase with age (Boyatzis, Chazan, & Ting, 1993).

While most studies on parental socialization factors that seem to influence the development of emotion competence, and basic identification skill specifically, do look at emotion understanding in facial expressions, they also tend to assess for multiple domains of emotion knowledge which often tap children's emotion elicitation, expression, coping, labeling, and identification abilities (Camras et al., 1996). Thus, much of the literature reviewed in this study, and many others (Camras et al., 1996; Herba & Phillips, 2004; McClure, 2000), about the typical development of emotion identification skill discusses measures that not only look at facial expression identification skill, but also at a number of composite emotion competency measures that tap other realms of emotion understanding as well. Therefore, although we do not have a thorough understanding of emotion identification skill for faces in isolation of other domains of emotion understanding, the general literature on the socialization of emotion competence highlights reasons why exposure to maternal depressive behaviors may be associated with children exhibiting deficits in emotion identification skill.

Theoretical and empirical basis for children's omnibus deficits in emotion identification skill

One reason school-aged offspring of depressed mothers may exhibit peer relationship difficulties is because they are exposed to environments that promote a decrease in their overall emotion identification skill. Therefore, it is important to review research on maternal socialization patterns that both promote and discourage general emotion competence in children.

Theorists guided by social learning theory (Bandura, 1977) posit that social interaction is the chief means through which children begin to learn to identify emotions in the facial expressions of others, and that because children are socialized first by their parents, it is in the parent-child relationship where emotion understanding begins

(Camras, 1985; Denham, 1998; Meadows, 1996). Camras et al. (1996) suggest that many different strategies are used by parents to teach their children to identify emotions in others, including exposure, modeling, contingent responding, and coaching (Denham et al., 1994; Halberstadt, 1991; Lewis & Saarni, 1985).

The strategies that parents, and particularly mothers, use to teach their children to be emotionally competent are not typically discussed as occurring in a specific sequence, but rather are highlighted as important processes that usually emerge in the first few years of a child's lifetime. As McClure (2000) noted, more concrete strategies like exposure, modeling, and contingent responding tend to be used first with infants who have not yet developed verbal language, followed by the addition of the more complex strategy of coaching, which involves the use of verbal language.

Initially, caregivers tend to model emotional expressions for their infants and young children, and to expose them to patterns of typical behaviors associated with emotions (Camras et al., 1996; Denham, 1998). Studies have shown that infants as young as ten-weeks-old react to their mother's different facial expressions in varied ways (as reviewed in Tronick, 1989), and that twelve-month-old infants will modify their behaviors when dealing with a task like the visual cliff dilemma, depending upon their mother's facial expressions (Sorce, Emde, Campos, & Klinnert, 1985). For example, many infants crossed the visual cliff when presented with a happy maternal face, but not when their mother's face portrayed negative emotions of fear or anger.

In a unique study done by Striano, Brennan, and Vanman (2002) that looked at facial expression discrimination by infants of mothers with a history of depressive symptoms specifically, researchers examined whether six-month-old infants preferred to look longer at frowning or smiling facial expressions. They found that having a mother with a history of depressive symptoms since birth was positively associated with an infants’ tendency to look longer at both photographs of females smiling and their own mother’s smiles, with infants of mothers with higher levels of depressive symptoms tending to prefer the more extreme smiling faces. The authors hypothesized that this may be due in part to the particular emotional environments that depressed mothers create for their infants since their offspring are more often privy to their mother’s flatter and more negative affect, and therefore would be more likely to look at smiling female faces because they were more novel. Thus, although this study did not assess infants’ emotion identification skill *per se*, it does provide some preliminary evidence to support the idea that six-month-old infants of mothers with a history of depressive symptoms will react differently to positive and negative facial expressions when compared to infants of nondepressed mothers. Further, it also provides some evidence for the idea that exposure to a mother’s depressive symptoms in infancy may impact the kinds and frequency of facial expressions that their offspring grow up with.

In addition to exposure and modeling, mothers also use contingent responding to shape their infants’ and young children’s emotion competence (as reviewed in Camras, et al., 1996), which involves a mother responding to her child’s emotion with an emotion of her own. Some researchers theorize that negative and positive contingent responses from mothers work to either punish or reward children for the emotional expression that they display (Camras et al., 1996; Denham et al., 1994). Consistent with basic principles of social learning theory, Tronick (1989) suggests that this sort of interaction between child and mother may serve to teach the child what kinds of emotions to expect to see in others in reaction to his or her own emotional expressions. For instance, if a child were frequently met with sadness or anger regardless of the emotion he or she expressed, that child may begin to expect to see sadness and anger in others in everyday interactions even when they are not there. In line with this conceptualization, Tronick and Field (1986) have found evidence for the concurrent generalization of negative interactions between depressed mothers and their infants to those interactions involving adults they did not know.

Although no studies have examined the longitudinal relationship between the saliency of particular maternal emotions during infancy and school-aged children's later facial expression identification skill specifically, Tronick (1989) suggests that long term effects of this nature are certainly possible. In a normal preschool population, Denham et al. (1994) found that positive maternal contingent responsiveness was significantly correlated with higher concurrent scores on an aggregate measure of children's emotion understanding that included facial expression labeling, while negative maternal contingent responsiveness was marginally correlated with lower concurrent scores on the same aggregate measure. Further, Denham and colleagues (1994) also found that negative maternal responsiveness negatively predicted young boys', but not girls', aggregated emotion understanding scores.

Similar to exposure and modeling, Camras et al.'s (1996) review also highlights the importance of general family affective environment for children's emotion competence. For example, it has been found that school children raised in families with high levels of general negative affect tend to do poorly on general tests of emotion understanding, possibly because members of the families talked less about emotions

(Dunn & Brown, 1994). Further, Denham et al. (1994) have also found that the frequent presence of negative maternal emotions in mother-child interactions was negatively associated with preschool-aged offspring's overall emotion understanding scores, with the negative association between maternal anger and children's emotion understanding scores being particularly strong. Denham and colleagues (1994) have theorized that, "little emotional information may be absorbed if parents' expressiveness is quite limited or if it is so negative that it distresses the child" (p. 929). Therefore, given that depressed individuals often evoke negative feelings in others (Coyne, 1976a, 1976b), and that families with a depressed parent tend to be characterized by increased marital problems and lower cohesion (Beardslee & Wheelock, 1994), it seems likely that having a depressed mother would be associated with a predominantly negative family affective environment, especially if the mother's depression were chronic.

As children reach the age of about eighteen to twenty months and begin to develop more complex communication abilities (Denham & Auerbach, 1995), coaching strategies may then become another means through which mothers can teach emotion identification skills to their children (Camras et al., 1996; Denham, 1998; Lewis & Saarni, 1985). During this time, mothers begin to use *verbal* emotion language to assist their children in understanding others' *nonverbal* communication of emotions, and to explain the relationship between emotions and observed situations and expressions (Camras et al., 1996; McClure, 2000). Mothers may also actively direct their children to attend to important emotional cues (Denham, Mason, & Couchoud, 1995), as well as to teach them about circumstances in which certain emotions are appropriate and others are not (Denham, 1998).

Research on preschoolers and their mothers suggests that the nature of mother-child discourse is a strong predictor of children's concurrent, and immediately prospective, emotion competence. Numerous studies indicate that mothers who talk more often about emotions with their preschool-aged children have offspring who demonstrate higher levels of concomitant emotion understanding (Garner, Jones, Gaddy, & Rennie, 1997), as well as higher levels of immediately future emotion understanding (Denham et al., 1994; Dunn, Brown, & Beardsall, 1991; Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Laible & Thompson, 2000; Raikes & Thompson, 2006). In one of the few longer-range studies that looked at the influence of mother-child discourse about emotions on children's later emotion competence, Dunn, et al. (1991) found a positive significant correlation between frequency of mother-child conversations about emotions at thirty six months of age and children's emotion competence at six years of age, indicating that emotion talk early in a child's life may be particularly important for their later emotion understanding.

When considering the link between mother-child discourse about emotions and emotion competence in children, it is also worth noting that some researchers theorize that attachment security is what ultimately facilitates discourse about emotions between mothers and their children, and thus emotion competence. Secure attachment relationships have been found to be characterized by open communication and maternal sensitivity (Etzion-Carasso & Oppenheim, 2000); thus it is logical that researchers would look to the attachment relationship as a contributor to children's emotion competence.

Studies have indeed linked the presence of secure attachment relationships to higher levels of emotion competence in children (De Rosnay & Harris, 2002; Greig &

Howe, 2001; Laible & Thompson, 1998; Ontai & Thompson, 2002), and one recent study found that increased mother-child conversation about emotions mediated the link between secure attachment relationships and higher emotion understanding in preschoolers (Raikes & Thompson, 2006). While the present study did not look directly at the impact of attachment security and mother-child discourse on children's ability to identify emotions in facial expressions, it is important to note the documented relationship between attachment security and general emotion competence in light of the well-documented link between early exposure to maternal depression and insecure attachment in children (van Ijzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992).

It is also important to note that data on the relationship between attachment security, maternal depression specifically, and children's emotion competence are currently mixed, with some research showing that attachment security, but not maternal depression, is related to forty-month-old children's concurrent ability to match emotional facial expressions to stories (Greig & Howe, 2001), and other research showing that effects of maternal depression on two-year-old children's later ability to identify emotions in facial expressions at three years of age are independent of attachment security (Raikes & Thompson, 2006). Thus, although it is possible that school-aged children's overall ability to identify emotions in facial expressions may be better accounted for by influences of attachment security, rather than early exposure to maternal depression specifically, findings from Raikes and Thompson's (2006) study suggest that there may be something unique about the contribution of maternal depression, independent of attachment security, to children's emotion competence.

Depressed mothers' interactions with their young children

Given that negative affective environments, negative contingent responsiveness, and decreased discourse about emotions have been found to be associated with omnibus deficits in emotion competence in children, it seems logical that exposure to mothers' depressive symptoms early in life may be related to decreased emotion identification abilities in their offspring. Although some research indicates that maternal depression may not affect the frequency with which mothers talk about emotions with their children (Raikes & Thompson, 2006), but rather how much they talk about negative emotions (Zahn-Waxler, Ridgeway, Denham, Usher, & Cole,1993), it is certainly possible that the withdrawal and anhedonia associated with depression may decrease the frequency of this important socialization factor. Further, it is clear that other previously mentioned maternal socialization factors found to decrease emotion competence in children have been found to be associated with maternal depression.

Depressive symptoms like negative or blunted affectivity, anhedonia, social withdrawal, psychomotor disturbance, and decreased concentration could easily impair mother-child interactions. Although a minority of studies have found no differences between depressed and control mothers during interactions with their children (e.g., Frankel & Harmon, 1996; Lovejoy, 1991), most that have examined depressed mothers and their children have repeatedly shown that these mothers do indeed create environments in which their offspring are often exposed to a multitude of depressive behaviors and emotions (as reviewed in Downey & Coyne, 1990; S. Goodman & Gotlib, 1999), and that mothers' depressive behaviors tend to promote insecure attachments in their offspring, which further impairs a child's interactions with others (van Ijzendoorn, et al., 1992). Research to date supports the idea that depressed mothers tend to exhibit behaviors that are thought to be both counterproductive to the typical development of emotion competence in children, and also clearly different than those of typical mothers.

Studies comparing depressed mothers' interactions with their infants to typical mothers and their infants have repeatedly shown that depressed mothers tend to display elevated levels of sadness and irritability (Field, Healy, Goldstein, Perry, Bendell, Schamberg, Zimmerman, & Kuhn., 1988; S. Goodman, Adamson, Riniti, & Cole, 1994; Hammen, 1991; Hops, Biglan, Sherman, Arthur, Friedman, & Osteen, 1987; Radke-Yarrow & Nottelmann, 1989), are less contingently and positively responsive to their infants' emotions (Field, 1984; Field, Healy, Goldstein, & Guthertz, 1990; Fleming, Ruble, Flett, & Shaul, 1988), and exhibit more negative facial expressions (Cohn, Campbell, Matias, & Hopkins, 1990). Further, reviews (e.g., Sameroff, Seifer, Zax, & Garmezy, 1982) of the literature have also highlighted research that suggests that depressed mothers are less positive and vocal with their infants, and more distant when interacting with them than typical mothers.

Studies comparing depressed and typical mothers' interactions with their toddlers and preschool-aged offspring have also revealed similar findings. Compared to typical mothers, depressed mothers tend to spend less time engaged in activities with their toddlers and pre-school-aged children (Goldsmith & Rogoff, 1997) and to criticize them more (as cited in S. Goodman & Gotlib, 1999; Hammen, Adrian, & Hiroto, 1988). Breznitz and Sherman (1987) have also found that depressed mothers spoke less frequently and responded more slowly to their three-year-old children. Further, depressed mothers have been found to attend more to negative emotions in interactions with their children (Field, Healy, Goldstein, & Guthertz, 1990; Field, Morrow, & Adlestein, 1993), which may facilitate the learning of only a narrow range of emotional expression. Thus, given the evidence that shows the disruptive nature of negative emotional environments to children's emotion competence, and the few studies that have examined very young children's general emotion identification ability as a function of exposure to maternal depression, it seems reasonable to assume that school-aged children exposed to more chronic elevated levels of depressive symptoms early in their lives could also be less adept at identifying emotions in facial expressions in general, especially since these individual differences seem to be stable at least until the end of early childhood.

Theoretical and empirical basis for children also, or conversely, developing specific patterns of deficit in emotion identification skill

Although it is possible that an overall deficit in the accurate identification of emotions in the facial expressions of others contributes to school-aged children of depressed mothers' peer relationship difficulties, it may also be the case that these children develop specific emotion identification patterns related to depressive environments that contribute to their social difficulties with peers. As S. Goodman and Gotlib (1999) highlight, children of depressed mothers may develop certain behaviors to adapt to their early negative environments that could later generalize to maladaptive behaviors with others outside the home. For instance, while living in a home with a depressed mother, it may be particularly helpful for a child to adroitly identify her mother's negative emotions in order to react accordingly (e.g., avoid her or perhaps mobilize resources to make her feel better) so as to evade the negative consequences of her depression. Indeed, as Murray, Halligan, Adams, Patterson, and Goodyer (2006) emphasize, because research suggests that children may tend to engage in caring behaviors towards mothers who are distressed (Radke-Yarrow, Zahn-Waxler, Richardson, Susman, & Martinez, 1994), it is conceivable that a child with a depressed mother might develop increased sensitivity, or a hyper-vigilance to the identification of negative emotions that would prove to be potentially helpful in some contexts (Hay & Pawlby, 2003), like the home environment, but potentially problematic in other interpersonal contexts, especially if behaviors that promoted interpersonal success at home (e.g., identifying negative emotions easily and quickly) were employed in contexts where it might not be as helpful (e.g., when interacting with a group of typical peers). It is therefore possible that exposure to a mother's elevated depressive symptoms early in life may be associated with the way offspring later identify facial expressions in others given that their early emotional environments are often flooded with negative emotion. For instance, it is possible that with more frequent exposure to maternal depressive symptoms early in life (which may increase the necessity to develop adaptive skills in the home that are not similarly adaptive outside of the home, especially with peers), specific patterns of misidentification may emerge in offspring in which negative emotions like sadness and anger are identified in facial expressions depicting non-depressive emotions (e.g., happiness or fear). Even further, and along a similar vein, children exposed to more chronic early maternal depression may demonstrate enhanced abilities to accurately identify emotions that one would expect to be salient in their environments – sadness and anger – which might then suggest that deficits in basic emotion identification skill do not necessarily help to explain the link between maternal depression and children's peer relationship difficulties because the accurate identification of emotions would not be expected to relate to interpersonal difficulty.

Empirical data to support the idea that children exposed to more chronic maternal depressive symptoms may develop specific misidentification patterns, or enhanced identification ability in specific areas, that are associated with their unique environments lies largely in the literature on abuse and violence. Like children of depressed mothers, children who are physically abused or grow up in high-crime neighborhoods tend to be exposed to certain emotions more than others. Specifically, although research has found that children of depressed mothers (especially those mothers experiencing chronic depression) tend to be exposed to more sadness and anger than children of typical mothers, research on abused and inner-city children has found that by similar virtue of their environments, these children tend to be exposed to more anger and fear respectively. Interestingly, studies on abused and inner-city children have shown an association between the saliency of emotions in their environments and the way in which they identify emotions in facial expressions. Therefore, these findings were used to develop predictions about potential patterns of emotion misidentification in children of depressed mothers.

Pollak and Kistler (2002) have suggested that the “salience” or “relative frequency” of emotions in a child’s environment may play an important role in children’s facial expression identification abilities. For instance, many of the behaviors exhibited by abusive mothers appear to be similar to those exhibited by depressed mothers; and in fact, although it is not the case that most depressed mothers abuse their children, evidence has emerged to suggest that the presence of depression in mothers puts children at higher risk for physical abuse (Chaffin & Kelleher, 1996). Therefore, in the studies that examined abused children, there may be some overlap between the impact of physical abuse and depression on child outcomes.

Like depressed mothers, abusive mothers tend to display more negative affect with their children than non-abusive mothers (Bousha & Twentyman, 1984; Pianta, Egeland, & Erickson, 1989), and less positive affect (as reviewed in Camras et al., 1996). They also tend to discuss emotions less with their children (as reviewed in Cicchetti, 1990; Shipman, Schneider, Fitzgerald, Sims, Swisher, & Edwards, 2007; Shipman & Zeman, 2001) and often have difficulty showing empathy in response to their children's emotions (Frodi & Lamb, 1980; Shipman et al., 2007). Because anger is such a salient emotion in abusive homes (Pollack & Kistler, 2002), researchers have hypothesized that when compared to typical children, children exposed to abuse, and to abusive mothers in particular, will be less able to accurately identify some emotions in facial expressions, but at the same time, will also be particularly adept at identifying anger. In fact, Pollak and Kistler have gone so far as to theorize that the identification of anger in the faces of others may be a particularly adaptive skill for abused children to develop so that they can quickly anticipate dangerous situations in the home. However, they go on to point out that the downside of an adaptive skill like this is that abused children may tend to see anger in faces when it is not there.

Although some studies have found that physically abused preschool and school-aged children are less skilled in general than their nonabused counterparts at identifying emotions in facial expressions (Camras, Grow, & Ribordy, 1983; Camras et al., 1988; During, 1986), other researchers have found misidentification patterns associated with anger. Pollak and Kistler's (2002) study of nine-year-old physically abused children found that they tended to over-identify anger in facial expressions when compared to nonabused children of the same age. Pollak Cicchetti, Hornung, and Reed (2000) similarly found that physically abused children between the ages of three and five years showed response biases for angry facial expressions as well. Additional research by Pollak and Sinha (2002) found that physically abused children between eight and a half and ten years of age were able to identify angry facial expressions with less perceptual information than nonabused children, again supporting the notion that the accurate identification of anger is a particularly important skill for a physically abused child to have. Nonetheless, it is important to note that although the physically abused children used in the previously mentioned studies were largely recruited from centers specializing in child maltreatment, and thus were likely to have all endured long-term abuse, none of the studies actually specify when, or for how long, these children experienced physical abuse. Thus, it is unclear how much the chronicity and timing of exposure to abuse mattered.

Similarly interesting data have been reported in a study that examined emotion identification skills in African-American preschoolers growing up in disadvantaged communities where stress was frequently felt and exhibited. Specifically, Smith and Walden (1998) found that these children, compared to studies of middle-class Caucasian children of the same age, were particularly adept at identifying fear in facial expressions, which investigators theorized was an adaptive skill learned as a result of growing up in high-stress environments. They speculated that fear may be a salient emotion in disadvantaged communities where crime rates are high, and that being particularly skilled at identifying an emotion like fear may help an individual to avoid dangerous situations. However, as is typical in the literature that examines emotion identification skill in facial expressions, these authors did not investigate specific misattribution patterns (i.e., whether these children tended to see fear when it wasn’t there).

Thus, as Herba and Phillips (2004) suggest, research indicates that children growing up in predominantly negative or threatening environments may not only develop omnibus deficits in the accurate identification of emotions in others, but they may also, or conversely, learn to navigate their social environments by developing skills that assist them in avoiding harm or disappointment. Research on physically abused children in particular suggests that children growing up in environments laden with negative emotion may become almost *too* adept at identifying emotions that are salient in their everyday lives with the result that they may ultimately begin to see negative emotions when they are not really there. Therefore, given the salience of negative emotions like sadness and anger in environments inhabited by mothers with high levels of depressive symptomatology, the present study examined whether children exposed to high levels of maternal depressive symptoms over time would not only make more errors in the identification of emotions in facial expressions in general, but also whether they would show greater accuracy in identifying sadness and anger in facial expressions, as well as the tendency to see sadness and anger in faces when it was not there.

Considering child gender

Although some research suggests that male infants of depressed mothers are more likely than female infants to develop insecure attachments (Murray, 1992), and that negative maternal responsiveness has negatively predicts young boys', but not girls', concurrent overall emotion understanding scores (Denham et al., 1994), principles of social learning theory suggest that it is possible that atypical emotion identification patterns will emerge more strongly in female, rather than male, offspring of mothers with elevated depressive symptoms.

Indeed, Radke-Yarrow and colleagues (1994) have found that caring behavior towards mothers in twenty four to forty eight-month-old offspring of depressed mothers was more pronounced in female offspring, which suggests that female children of depressed mothers may be more often exposed to, or need to become even more adept at identifying their mothers' negative emotions than male children. If this is the case, female offspring may then be particularly likely to overattribute emotions like sadness and anger to other facial expressions of emotion, and to also potentially be better at identifying sadness and anger as well. Conversely, it could also be that female offspring, by virtue of their being more involved with their depressed mothers, will have more pronounced omnibus deficits in emotion identification skill.

It is also important to consider research with typical mothers when considering possible gender differences in the emotion identification abilities of offspring of depressed mothers. Given that some research has shown that in the first few years of their children's lives, typical mothers tend to focus more on socializing their sons to understand anger, and their daughters to understand sadness (Fivush, 1991), it is also possible that if misattribution patterns emerge, boys will be more likely to misattribute anger, and girls sadness. However, as S. Goodman and Gotlib (1999) point out, some unpublished data (Kochanska, 1987) indicates that this socialization pattern may be reversed for depressed mothers.

Specific timing of early exposure to maternal depression

Because maternal depression data available for the present study were collected only during the first few years of a child's life, timing of depression was a factor in all analyses involving this construct, including chronicity. However, although not a main focus of the present study, it was also possible to look at the association between timing of elevated maternal depressive symptoms and children's later emotion identification skill within the 8 week to 33 month postnatal period to see if exposure at any one time point mattered more in potentially being associated with children's later emotion identification skill and peer relationship functioning. Despite the fact that much of the research literature on child development generally indicates that earlier exposure should be associated with worse child outcomes across development (S. Goodman & Gotlib, 1999), timing data tend to be somewhat mixed, with some studies suggesting that mothers' current levels of depressive symptoms are more important for child outcomes than mothers' histories of depression (Hammen, Adrian, Gordon, Burge, & Jaenicke, 1987). Yet, even with these inconsistencies, if one considers the research that suggests that individual differences in emotion identification skill tend to persist in a linear fashion, at the very least, between the ages of 3 and 6 years (Dunn & Brown, 1996), it seems reasonable to assume that very early exposure to maternal depression within in the first few years of life would be especially important for the development of emotion identification skill.

When one considers whether exposure to maternal depression at 8 weeks, versus 8 months, versus 21 months, versus 33 months post birth is more important for shaping this skill, it becomes difficult to make specific predictions. As Sroufe (1979) outlined in his classic *American Psychologist* paper that summarized many of the basic aspects of attachment theory, although caregivers are certainly important to the infant during his/her first few months of life, it is not until the age of approximately 6 months that the attachment relationship between the infant and his/her primary caregiver begins to form. When this occurs, the infant's behaviors are increasingly directed towards, and organized by, the primary caregiver (often the mother), and as Sroufe (1979) notes, "the infant has assumed a more mutual, fully reciprocal role in interaction with the caregiver" (p. 837). Thus, given that the first few months of an infant's life are primarily characterized by interactions with caregivers that serve to regulate physiological processes (Sroufe, 1979), whereas later months of the child's life are characterized by more engaged and reciprocal interactions with a primary caregiver that serve to establish the nature of the attachment relationship (Sroufe, 1979), it is possible that exposure to elevated maternal depressive symptoms after 6 months of age could be more important for a child's development of emotion identification skill and peer relationship difficulties. Indeed, taking timing and chronicity into account, Campbell et al. (1995) have shown that maternal depression that persisted from birth to 6 months postpartum had more of an impact on infants' positive concurrent behaviors in face-to-face interactions with their mothers than depression that lasted only until 2 months postpartum. Therefore, it may be that children exposed to elevated maternal depressive symptoms post 6 months of age would experience more difficulties later on in life than those children never exposed, whereas children exposed prior to the age of 6-months might not differ significantly on dependent variables of interest from those children never exposed. However, because the attachment system continues to develop between the ages of approximately 6 and 30 months (Sroufe, 1979), it is difficult to say whether exposure at only 8 months, versus 21 months, versus 33 months of age would be more important for impacting children's later individual differences in emotion identification skill or with peer relationship functioning. Therefore, no specific predictions were ultimately made in regard to timing in the present study.

Summary and predictions

In sum, the purpose of the present study was primarily to investigate the potential association between early exposure to elevated maternal depressive symptoms (hereafter simply referred to as "maternal depression") and school-aged children's emotion identification skill during middle childhood. Although exposure to maternal depression can be conceptualized and quantified in many ways (e.g., in terms of chronicity, timing, or severity), the present study only considered exposure in terms of chronicity and timing. In addition, because data on the state of school-aged children's relationships with peers were also available, analyses that served to replicate previous research concerning children's relationship difficulties with peers in relation to maternal depression, as well as the relationship between deficits in emotion identification skill and approximately concurrent peer relationship difficulties were also conducted. Although peer relationship functioning and broader measures of social competence have been found to be related to exposure to maternal depression in terms of exposure at some point in the child's lifetime

(Goodman et al., 1993; Lee & Gotlib, 1991), current exposure (Koblinsky, Kuvalanka, & Randolph, 2006), and chronicity of exposure (Anderson & Hammen, 1993; Beardslee et al., 1987), the present author was not aware of research that examined these related constructs in terms of the timing of exposure to maternal depression. Therefore, although predictions were made in regard to peer relationship functioning and more chronic exposure to maternal depressive symptoms early in life, no specific predictions were made in regard to the timing of exposure within the 8 week to 33 month postnatal period, except that it may be the case that exposure post 6 months of age would be more important given the development of the attachment system at this time.

In an effort to begin to test the primary hypothesized models in Figure 1., portions of each model were explored separately. Although the figure depicts mediational models that posit deficits in emotion identification skill as a possible mechanism that helps to explain the peer relationship difficulties observed in school-aged offspring of depressed mothers, the fact that the data in the present study on peer relationship functioning were on average collected a few months (and in some cases nearly a year) earlier in time than data on emotion identification skill precluded the full testing of a mediational model at this time. Thus, although it is reasonable to assume that children who showed deficits in emotion identification skill when they were older also had similar deficits several months prior (Brown & Dunn, 1996), it is impossible to know this for sure. Therefore, the main analyses conducted in the present study serve to inform the potential future investigation of a mediational model.

As Baron and Kenny (1986) suggest, before one fully tests a mediational model, more basic analyses can first be conducted to assess whether relationships among variables of interest that are in line with mediation do in fact exist. For example, to begin to investigate whether deficits in emotion identification skill may mediate the relationship between early exposure to maternal depression and children's later peer relationship difficulties, it would first be necessary to demonstrate that a relationship does indeed exist between exposure to maternal depression and children's later peer relationship difficulties. Next, one would then investigate whether a relationship exists between exposure to maternal depression and deficits in emotion identification skill (the major contribution in the present study), in addition to whether deficits in emotion identification skill are related to peer relationship difficulties. In the present study, preliminary analyses in line with Baron and Kenny's recommendations were conducted. Specifically, the following predictions associated with the models in Figure 1 were tested:

- That more chronic early exposure to maternal depression would be related to more overall deficits in the ability to accurately identify emotions in facial expressions in general; or the tendency to be more adept at accurately identifying depressive emotions like sadness and anger (which would not be expected to relate to more social adjustment difficulties with peers), but to see these emotions in faces when they are not there (which would be expected to relate to social adjustment difficulties)
- That more chronic early exposure to maternal depression would be related to school-aged offspring exhibiting more difficulties in their relationships with peers

- That more deficits in emotion identification skill would be associated with more approximately concurrent peer relationship difficulties

In addition, the present study also aimed to investigate whether the specific timing of exposure to maternal depression within the first few years of life mattered when considering individual differences in children's later ability to accurately identify emotions in facial expressions, as well as their later peer relationship functioning. As was discussed previously, no specific predictions were made in regard to these analyses.

Finally, because no gender-specific predictions were made, to investigate whether child gender played a role in the previously mentioned predictions and exploratory analyses, gender of the child was entered in as an additional independent variable in all parametric analyses. When nonparametric analyses were conducted, all analyses were automatically separated by gender.

Operational definitions of variables

In the present study, deficits in emotion identification skill were defined as the number of errors (either general or specific) that children made in the identification of basic emotions in child facial expressions, with higher scores corresponding to more errors and thus more deficits. Because peer relationship difficulties were of interest, child facial stimuli, rather than adult facial stimuli, were considered to be particularly appropriate. Variables to reflect the chronicity and timing of exposure to a mother's depression were also created. The chronicity variable was created by counting the number of times a mother rated herself as having a "high" score (described in detail later) on a self-report measure of depressive symptoms which was filled out at four time-points post birth; whereas the timing variable, modeled after Hammen and Brennan's (2003), was created to identify groups of mothers who experienced "high" levels of depressive symptoms at only one specific time-point post birth. Finally, because the author only wished to capture whether or not children were experiencing social adjustment difficulties in the realm of peer relationship functioning (i.e., whether or not they had friends, were liked by peers, etc.) at approximately the same time that their emotion identification skill was assessed, the subscale of a measure dealing with general child adjustment and social skill that addressed whether or not a child was experiencing difficulties in peer relationships specifically was utilized.

Method

Participants

Mother-child dyads in the present study represent a subset of the Avon Longitudinal Study of Parents and Children (ALSPAC; Golding & the ALSPAC Study Team, 2004). ALSPAC is a large, ongoing study of environmental and genetic variables associated with the health and development of children from the Avon area of England that began in 1992 (Golding et al., 2004). Avon is located approximately 120 miles to the west of London and includes 2 major cities (Bristol and Bath), as well as a number of small villages, towns, and agricultural communities (Golding et al., 2004). The total population of Avon is approximately 1 million, and it is diverse in terms of geography, socioeconomic status, and culture (Golding et al., 2004). Early analyses conducted by the ALSPAC Study Team (Golding, Pembrey, Jones, & the ALSPAC Study Team, 2001) indicated that in terms of a number of parental and child demographic and health variables, children living in Avon were representative of children living throughout Great Britain.

To be eligible for ALSPAC, women had to be living in Avon while pregnant with an expected delivery date between April 1, 1991 and December 31, 1992 (Golding et al., 2004). Participants from the overall dataset (*N* = 14,663) were excluded from the present study if they did not have complete data for key maternal depression, teacher-rated child adjustment, and child emotion identification skill measures (described in detail later). This left a subset of 2504 mother-child dyads (*n* = 1243 male children; *n* = 1261 female children). Children in the present study ranged in age from 7.83 to 10.33 years (for males, *M* = 8.61 years, *SD* = .26 years; for females, *M* = 8.61 years, *SD* = .26 years) when emotion identification skill was assessed, and from 7.67 to 9.50 years (for males, *M* = 8.34 years, *SD* = .30 years; for females, *M* = 8.35 years, *SD* = .30 years) when teachers rated their peer relationship functioning. Thus, children tended to be rated by teachers on their social and other forms of adjustment prior to the assessment of their emotion identification skill. Data on maternal social class were also available for 1078 male children and 1097 female children, and data on paternal social class were available for 1131 male children and 1179 female children. Maternal and paternal social class at 32 weeks gestation for the entire ALSPAC sample was categorized using the 1991 Office of Population Censuses and Surveys classification system (I = professional occupations; II = intermediate occupations; III NM = skilled occupations: nonmanual; III M = skilled occupations: manual; IV = partly skilled occupations; V = unskilled occupations), which generates an ordinal measure of social standing with lower roman numerals indicating higher social class (Brewer, 1986). The social class of most mothers of both male (I =

8.5%; II = 35.6%; III NM = 41.3%; III M = 6.5%; IV = 6.9%; V = 1.1%; Armed Forces = .1%) and female (I = 6.9%; II = 36.8%; III NM = 42.0%; III M = 5.1%; IV = 7.7%; V = 1.5%) children was rated as falling into category III NM; whereas the social class of most fathers of both male (I = 14.8%; II = 40.8%; III NM = 11.1%; III M = 24.3%; IV = 7.3%; V = 1.6%; Armed Forces = .2%) and female (I = 13.7%; 38.7%; III NM = 12.0%; III M = 26.3%; IV = 7.2%; V = 2.1%) children was rated as falling into category II. Ethnic background data were also available for 1210 male children ("White" = 97.1%; "Non-White" = 2.9%) and 1235 female children ("White" = 95.7%; "Non-White" = 4.3%). Taken together, demographic data suggested that participants in the present study were predominantly Caucasian and middle class.

Measures

In this section, measures are introduced by the constructs, or aspects of constructs, that they assess.

Maternal depression. The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) was given to mothers to assess for the likelihood of current maternal depression at 8 weeks, 8 months, 21 months, and 33 months post birth. The EPDS is a widely-used self-report measure that screens for postnatal depression (Matthey, Henshaw, Elliott, & Barnett, 2006). It consists of 10 items that focus on the cognitive and affective aspects of depressive illnesses and yields a maximum score of 30, with higher scores indicating the more likely presence of depression (Evans, Heron, Francomb, Oke, Golding, & the ALSPAC study team, 2001). Although it is not diagnostic in nature, cut-off scores have been established that correlate strongly with

DSM-IV and RDC depressive diagnoses (Matthey et al., 2006). A recent review conducted by Matthey et al. (2006) suggested that a cut-off score of 13 or above should be used when seeking to identify probable major depression in English-speaking women in the postnatal period; thus, this cut-off score was used in the present study. Validation of the EPDS within the ALSPAC study population revealed that all women who were diagnosed as having major depression during an interview had scores above 12 on the EPDS (Evans et al., 2001). Further, the ALSPAC study team reported that using a cut-off score of more than 12 to indicate "all forms of depression" (see Cox et al., 1987) produced sensitivity and specificity percentages of 86% and 78% respectively (Evans et al., 2001).

Another recent review of screening measures for postpartum depression (Boyd, Le, & Somberg, 2005) highlighted the strong reliability and validity of the EPDS. For example, of the numerous studies that were reviewed (as cited in Boyd et al., 2005), measures of internal consistency ranged from .73 to .87, and measures of split-half reliability ranged from .73 to .83. Further, the authors also reviewed studies that investigated the concurrent validity of the EPDS with other similar screening measures, and reported correlations in the moderate to high range. For example, when compared to the well-known Beck Depression Inventory (BDI and BDI-II; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck, Steer, & Brown, 1996), correlations ranged from .59 to .82, and when compared to the Zung Self-Rating Depression Scale (Zung, 1965), from .57 to .71.

Children's emotion identification skill. The Diagnostic Analysis of Nonverbal Accuracy 2 (DANVA2; Nowicki & Duke, 1994) was administered to children to assess their emotion identification skill. Participants in the original ALSPAC study were administered two subtests from the DANVA2, including Child Facial Expressions and Child Paralanguage. However, only data from the Child Facial Expressions subtest were available for the present study. Thus, deficits in emotion identification skill were defined somewhat narrowly in the present study as the number of errors a child made in the identification of basic emotions in child facial expressions. However, because the author of the present study was primarily interested in the peer relationship functioning of children of depressed mothers and how this may relate to emotion identification skill, the child faces subtest of the DANVA2, as opposed to the adult faces subtest, seemed particularly appropriate.

The Child (DANVA2-CF) Facial Expression subtest of the DANVA2 consists of 12 male and 12 female photographs of child faces expressing high and low intensity happy, sad, angry and fearful emotions (Nowicki & Carton, 1993). There are 6 photographs per emotion which are split up further into 3 high and 3 low intensity expressions. When the subtest is administered, photographs are shown one by one for no more than 2 seconds. Children are then asked to choose among the 4 possible emotion choices – happy, sad, angry and fearful – to decide which emotion best fits the facial expression. Scores are then determined in terms of how many errors a child made in the identification of various emotions. Error scores reflecting the number of total errors made, the number of errors made in identifying each basic emotion, and the number of times a specific misattribution error of sadness or anger for another emotion was made were examined in the present study.

Numerous studies have used the DANVA2, and construct validity and reliability evidence has been ascertained in a variety of ways. Nowicki (1997) reported acceptable internal consistency for the DANVA2-CF with coefficient alphas ranging from .69 to .81, and scores on the DANVA2-CF have been found to correlate significantly with those from the original DANVA-CF in children 8.5 years of age (Nowicki, 2008). In terms of criterion validity, lower accuracy scores on the DANVA2-CF have been found to be significantly correlated with lower social competence in preschool children (Goonan, 1995; Nowicki & Mitchell, 1998) and elementary school-aged children (Maxim & Nowicki, 1996). Lower accuracy scores have also been found to be significantly correlated with greater external control expectancies as well (Nowicki & Halpern, 1996). Further, test-retest reliability over a short period of time for third grade children was reported by Nowicki and Carton (1993), $r = .74$. Finally, in terms of discriminant validity, DANVA2-CF scores have not been found to be related to IQ scores or tests of general cognitive ability in preschool children (Nowicki & Mitchell, 1998), elementary school-aged children (McClanahan, 1996), and adolescents (Baum, Logan, Walker, Tomlinson, & Schiffman, 1996).

Children’s peer relationship functioning. The peer problems subscale of the Strengths and Difficulties Questionnaire – Teacher Version (SDQ; R. Goodman, 1997) was used in the present study to measure children’s peer relationship functioning. Whereas the full SDQ measures social, emotional, and behavioral functioning in children, all of which could be considered to be aspects of social competence, the peer problems subscale focuses exclusively on the nature of children’s interpersonal relationships with peers, with higher scores indicating more problems. As R. Goodman (1997) has noted, one of the reasons the SDQ was created was to assess for areas of interest not being assessed for by other widely-used behavioral screening questionnaires. In particular, one area of basic, general adjustment under the umbrella of social competence that R. Goodman (1997) hoped to address was the nature of a child's peer relationships and whether or not a child had same-age friends. Items that loaded onto what is now known as the "peer problems" subscale were R. Goodman's (1997) attempt to ascertain this information.

The SDQ is an observer-rated report consisting of 25 descriptive statements about a child's behavior that are rated on a 3-point Likert scale (not true, somewhat true, and certainly true). Five of these descriptive statements comprise the peer problems subscale and include the following statements: "*rather solitary, tends to play alone; has at least one good friend; generally liked by other children; picked on or bullied by other children; gets on better with adults than with other children*." Other items on the SDQ yield scores that reflect emotional symptoms, conduct problems, hyperactivity-inattention, and prosocial behavior (R. Goodman, 2001). Taken together, a total problems score is also available.

Research generally indicates that scores on the SDQ peer problems subscale tend to correlate moderately to highly with similar measures of social, emotional, and behavioral functioning, as well as sociometric data. For example, in a sample of 4- to 8-year-old Flemish children (Van Leeuwen, Meerschaert, Bosmans, De Medts, & Braet, 2006), the teacher-rated peer problems subscale was highly correlated with the teacher-rated social problems subscale of the well-established Teacher's Report Form (Achenbach, 1991b), $r = .48$, and moderately correlated in the expected direction, $r = .38$, with a single-item peer-rated social-preference score in a sample of American first-graders. Further, although the present author was unable to obtain the published statistics, a German researcher (Helmut, 2007) who studied a sample of children that ranged in age from 9 to 14 years also reported that the teacher-rated peer problems subscale was significantly related to sociometric ratings of peer relationship functioning given to both teachers and peers. Finally, recent research (R. Goodman, 2001) also suggested that the teacher-rated peer problems subscale demonstrated good internal consistency, $\alpha = .70$, and test-retest stability over a 4 to 6 month period ($r = .72$) in a sample of 5- to 15-year-old children. Mellor (2004) has similarly reported good test-retest reliability for the teacher-rated SDQ peer problems subscale, $r = .82$, in a sample of 7- to 17-year-old children.

Procedure

ALSPAC participants were recruited in a variety of ways (Golding et al., 2004). Posters, brochures, and various television and radio ads were used to recruit pregnant women in the local Avon community and at hospitals. In some cases, ALSPAC staff and community midwives also approached women in hospitals to discuss the study. Approximately 85% of mothers interested in participating in ALSPAC were included and filled out at least one questionnaire.

Once recruited, in addition to an array of other measures not examined in the present study, ALSPAC mothers completed the EPDS about themselves at 8 weeks, 8 months, 21 months, and 33 months postpartum, and teachers rated the children's social and emotional functioning with the teacher version of the SDQ when the children were approximately 8 years of age. Children's ability to identify emotions in child facial expressions was assessed with the DANVA2 at approximately the same time that teachers filled out SDQs about the children. All self-report questionnaires were mailed to participants' homes, and teacher questionnaires were mailed to children's schools. Children were administered the DANVA2 at an ALSPAC clinic.

Statistical Analyses

An alpha level of .05 was used in all analyses except for those timing analyses where post-hoc comparisons were made; in those cases, an alpha level of .01 was used in an effort to control for the risk of Type I error. Before predictions and exploratory analyses were formally tested, analyses to assess whether any demographic variables should be treated as covariates were conducted. Those demographic variables that were found to be related to dependent variables of interest were controlled for in all analyses.

To test predictions about the relationship between the chronicity of early exposure to maternal depression and children's later emotion identification skill and peer relationship functioning, linear multiple regression analyses were first conducted with control variables, and gender, entered into the first step. When key assumptions of these tests were not met (i.e., residuals were highly skewed or heteroscedastic) and linear transformations did not improve these violations, nonparametric analyses were utilized. Specifically, for all analyses that tested for linear relationships between main variables of interest, spearman correlation coefficients were generated and automatically separated by child gender and a median split in relevant control variables.

For analyses that investigated the potential relationship between the specific timing of exposure to maternal depression and children's emotion identification skill and peer relationship functioning, analyses of covariance were employed with gender entered in as an additional factor and relevant demographic variables entered in as covariates. Here too, when key assumptions of this test were not met (i.e., there was heterogeneity of variance) and violations could not be altered with linear transformations, nonparametric analyses were utilized. Specifically, Kruskal-Wallis tests split by gender and relevant control variables were conducted. When the main effect of the timing of a mother's elevated depressive symptoms was significant, post hoc comparisons were employed for ANCOVA analyses, and Mann-Whitney U comparisons were employed for Kruskal-Wallis tests (Green & Salkind, 2003).

Results

Basic descriptive statistics

Tables 1 and 2 present basic descriptive statistics for independent and dependent variables examined in the present study. Due to the moderate- to high-skew in the raw distributions of all variables, medians are presented in addition to means and standard deviations. Table 3 presents the number of mother-child dyads that comprised each chronicity and timing group per dependent variable.

Table 1 presents data on postnatal maternal depressive symptoms measured by the EPDS. Based on the criteria that a score of 13 or greater on the EPDS would signify a high score, or probable depression, most mothers (*n* = 2024) never exceeded the cut-off at any of the four postnatal time-points, whereas 480 mothers did exceed the cut-off at least one time. In regard to the mothers whose EPDS scores exceeded the cut-off at only one time-point, most mothers experienced a high EPDS score only at 33 months postpartum (n = 99), whereas 71 mothers experienced a high score only at 8 weeks postpartum, 54 only at 8 months postpartum, and 70 only at 21 months postpartum. Mothers in each chronicity group did not differ on their own, χ^2 (24) = 27.16, $p > .05$, or their partner's social class, χ^2 (24) = 17.28, $p > .05$, nor on the identified ethnicity of their child, χ^2 (4) = 2.84, $p > .05$, or the age of their child at DANVA2 administration, χ^2 (4) = .51, $p > .05$. However, they did differ in terms of the age of their child when teachers rated the SDQ, χ^2 (4) = 10.43, $p < .05$. Maternal depression timing groups were also generally similar across demographic variables. They did not differ on their own, χ^2 (24) = 15.96, $p > .05$, or their partner's social class, χ^2 (24) = 18.06, $p > .05$, the identified ethnicity of their child, χ^2 (4) = 2.82, $p > .05$, the age of their child at DANVA2 administration, χ^2 (4) = .79, $p > .05$, or the age of the child when teachers rated the SDQ, χ^2 (4) = 5.78, $p > .05$.

Table 2 presents data on children's emotion identification skill and peer relationship functioning. As expected, children tended to make the fewest number of errors on happy facial stimuli, and female children generally tended to make fewer errors than male children. Specifically, when compared to male children, females tended to make fewer total emotion identification errors, U = 684252.00, $p < .001$, fewer errors on happy facial stimuli, U = 713144.00, $p < .001$, fewer errors on angry facial stimuli, U = 677068.00, $p < .001$, and fewer misattributions of sadness for other emotions, U = 631101.00, $p < .001$. In addition, female children also tended to be rated by their teachers as having fewer problems in their peer relationships than male children, U = 683002.50, $p < .001$.

Examination of sample bias

The sample selected for the present study was compared to the rest of the ALSPAC sample to see if participants tended to differ on key variables. Analyses indicated that the present sample, comprised of only those participants for whom complete EPDS, SDQ, and DANVA2 data were available, differed from the rest of the ALSPAC sample in a number of ways. Mothers, χ^2 (6) = 80.66, $p < .001$, and fathers, χ^2 (6) = 125.43, $p < .001$, in the present study tended to be of higher social class than other ALSPAC participants, and more children were described as being "White" rather than "Non-White" when compared to other ALSPAC participants, χ^2 (1) = 13.15, $p < .001$. In addition, a Mann-Whitney *U* test showed that children in the present study tended to be slightly younger than other ALSPAC children at DANVA2 administration, $U =$ 5556496.50, $p < .01$, and slightly older when teachers filled out the SDQ, $U =$ 4484097.50, $p < .01$.

An examination of the main independent and dependent variables of interest indicated further bias in the present sample. A series of Mann-Whitney U tests showed that mothers in the present study tended to endorse fewer depressive symptoms at 8 weeks post partum, $U = 10857334.50$, $p < .001$, 8 months post partum, $U = 10307541$, $p < .001$, 21 months postpartum, $U = 9145624$, $p < .001$, and 33 months post partum, $U =$ 8303565, $p < .001$, when compared to other mothers in the ALSPAC sample. In addition, children in the present study were rated as having fewer social adjustment difficulties as measured by the SDQ peer problems subscale, $U = 4215328.50$, $p < .001$, than other ALSPAC children. However, when emotion identification skill was compared between the two ALSPAC groups, children in the present study tended to make more errors on the

DANVA2. Specifically, children in the present study made more errors on the DANVA2 overall, $U = 5205226$, $p < .001$; more errors on fearful, $U = 7284880$, $p < .001$, sad, $U = 10317536$, $p < .001$, angry, $U = 5953004$, $p < .001$, and happy, $U = 13013334$, $p < .001$, facial stimuli; and more sad, $U = 8655208.50$, $p < .001$, and angry, $U = 12165269$, $p < .001$, misattributions for other emotions. Therefore, participants in the present study tended to exhibit less severe peer relationship difficulties and depressive problems, and tended to be less skilled at emotion identification than other ALSPAC participants. Taken together, these analyses suggested that participants in the present study may not be entirely representative of participants in the overall ALSPAC sample.

Examination of potential demographic covariates

To determine whether any demographic variables should be treated as covariates in the present study, spearman correlational analyses were conducted to examine the potential linear relationships between dependent variables and age at DANVA2 and teacher SDQ administration, as well as maternal and paternal social class. Although the DANVA2 and teacher-rated SDQ were both completed when children were approximately 8 years of age, the ages of children as they pertain to these two measures varied enough to consider age of child as a potential covariate. As was expected, age was related to a number of dependent variables in the present study. Because a few children did not have data on their age, the correlations to follow are all based on an n of 2502. Specifically, older children who completed the DANVA2 tended to make fewer errors overall, $r_s = -.08$, $p < .001$, fewer errors on happy stimuli, $r_s = -.05$, $p < .05$, fewer errors on angry stimuli $r_s = -.09$, $p < .001$, fewer errors on fearful stimuli $r_s = -.04$, $p < .05$, and fewer misattributions of sadness for other emotions, $r_s = -.07$, $p < .001$. In addition, older children were also less likely to be rated as having peer relationship problems by their teachers, $r_s = -.04$, $p < .05$. Neither maternal nor paternal social class was related to any of the dependent variables in the present study. Therefore, because child age was related to nearly all dependent variables of interest in the present study, it was treated as a covariate in all analyses.

Maternal depression and children's emotion identification skill: Chronicity analyses

Is more chronic early exposure to elevated maternal depressive symptoms related to the tendency to make more emotion identification errors in general later on?

To examine whether school-aged children of mothers who experienced more chronic elevated postnatal depressive symptoms tended to make more errors in the identification of emotions in child facial expressions in general, spearman correlation coefficients were generated separately for males and females, and attempts were made to control for age of the child at DANVA2 administration by further separating analyses by a median split in age. This allowed for the examination of relationships of interest in "younger" (7.83 to 8.58 years of age) and "older" (8.67 to 10.33 years of age) male and female children. Correlations for the total number of errors made on the DANVA2, as well as for each basic emotion were examined. Results are summarized in Table 4 and suggested that contrary to prediction, children exposed to more chronic early exposure to maternal depressive symptoms did not show evidence of more deficits in emotion identification skill overall (i.e., the tendency to make more errors on the DANVA2 in general). Rather, some evidence emerged for the opposite trend – with more chronic exposure to elevated maternal depressive symptoms, younger females at the time of the DANVA2 administration tended to make fewer errors on happy facial stimuli, $r_s = -.08$, $p < .05$. However, it should be noted that based on Cohen's categories of effect size (1988), the strength of this relationship was very small. Further, despite the fact that the magnitude of the relationship between number of happy identification errors made on the DANVA2 and the chronicity of mothers' elevated maternal depressive symptoms was the same in older male children as it was in younger female children, the smaller size of the male group likely resulted in decreased analytical power, and thus a nonsignificant relationship. Finally, because so many correlations were generated, it is also possible that the statistically significant relationship between number of happy errors made for younger female children and exposure to more chronic maternal depression emerged merely as a result of chance. Thus, results in this area should be interpreted with caution. Descriptive statistics for children's emotion identification skill as a function of chronicity group are summarized in Tables 5 through 11.

Is more chronic early exposure to elevated maternal depressive symptoms related to school-aged offspring's tendency to more often incorrectly see anger and sadness in faces when these emotions are not there, as well as the tendency to make fewer errors in the identification of sadness and anger?

To examine the more specific predictions that children of more chronically depressed mothers may tend to more often see emotions like sadness and anger when they are not there, and that they may also make fewer errors on sad and angry facial stimuli, spearman correlation coefficients separated by gender and a median split in child age at DANVA2 administration were again examined. Specifically, correlations between chronicity of mothers' depression and the number of errors made on sad and angry facial stimuli were examined, in addition to those DANVA2 error scores that reflected the number of sad and angry misattributions made as a function of chronicity of maternal depression. As results in Table 4 suggest, more chronic exposure to more elevated maternal depressive symptoms was not associated with the tendency to make more misattributions of sadness or anger for other emotions, nor was it associated with the tendency to make fewer errors on sad and angry facial stimuli.

Maternal depression and children's peer relationship functioning: Chronicity analyses

Is more chronic early exposure to elevated maternal depressive symptoms related to the presence of more peer relationship difficulties in school-aged offspring?

To test the prediction that more chronic early exposure to elevated maternal depressive symptoms would be associated with more peer relationship difficulties later on, spearman correlation coefficients were again generated for male and female children and separated by a median split in child age at teacher rating of the SDQ. This median split was an attempt to control for the influence of age on peer relationship difficulties and allowed for the examination of relationships in "younger" (7.67 to 8.33 years of age) and "older" (8.42 to 9.5 years of age) children separately. Results are summarized in Table 12 and indicate that predictions were generally supported. Specifically, more chronic early exposure to elevated maternal depressive symptoms was associated with more peer relationship problems in younger, $r_s = .09$, $p < .01$, and older, $r_s = .07$, $p < .05$ female children, as well as in older male children, $r_s = .07$, $p < .05$. However, the relationship was not signification for male children who were younger at the time of SDQ ratings. Here again, the magnitude of each of these relationships was small (Cohen, 1988).

Children's emotion identification skill and peer relationship functioning

Are more deficits in the ability to accurately identify basic emotions in facial expressions associated with more approximately concurrent peer relationship difficulties?

To assess the prediction that children who tended to make more errors on the DANVA2 would also tend to be rated as having more approximately concurrent peer relationship difficulties, spearman correlation coefficients were generated separately for male and female children and split by age of the child at teachers' ratings of the SDQ. Like before, analyses were split by median age in an effort to control for the influence of child age on teacher-rated peer relationship problems. Table 13 summarizes these results and indicates that some predictions were supported. All significant correlations were in the expected direction and indicated that more errors in the identification of emotions in child facial expressions were generally associated with more peer relationship difficulties. Further, most statistically significant correlations emerged for children who were younger at the rating of the SDQ, rather than for older children, and no relationships emerged as statistically significant for male children who were older at the rating of the

SDQ. Specifically, making more errors on the DANVA2 in general was associated with more problems in peer relationships for younger males, $r_s = .08$, $p < .05$, and younger females, $rs = .09$, $p <. 05$, whereas making more errors on angry facial stimuli was associated with more problems in peer relationships not only for younger males, $r_s = .10$, $p < .01$, and younger females, $rs = .07$, $p < .05$, but also for older females, $r_s = .07$, $p < .05$. Specific misattributions of sadness for other emotions was only related to adjustment difficulties in peer relationships for younger males, $r_s = .07$, $p < .05$, and older females, $r_s = .09$, $p < .05$, and misattributions of anger for other emotions was similarly only related to peer relationship difficulties in younger male, $r_s = .07$, $p < .05$, and older females, $r_s = .07$, $p < .05$. Here again, all effect sizes were small (Cohen, 1988).

Maternal depression and children's emotion identification skill: Timing analyses

Does the specific timing of early exposure to elevated maternal depressive symptoms within the first few years of life make a difference in children's later ability to identify basic emotions in facial expressions?

To assess whether the timing of early exposure to elevated maternal depressive symptoms was related to children's later emotion identification skill, analyses modeled after those described by Hammen and Brennan (2003) were conducted. In the present sample, 71 mothers reported a high score on the EPDS only at 8 weeks postpartum ($M = 14.83$, $SD = 2.54$), 54 only at 8 months postpartum ($M = 15.13$, $SD = 2.51$), 70 only at 21 months postpartum ($M = 14.87$, $SD = 1.60$), and 99 only at 33 months postpartum ($M = 15.19$, $SD = 3.13$). Analyses of covariance were conducted to compare groups on children’s emotion identification skill while controlling for child age at DANVA2 administration. Child gender was also entered in as an additional factor. Homogeneity of variance for each analysis was examined using the Levene’s statistic, and if transformations of dependent variables did not make it so that variance estimates among groups were homogenous, nonparametric analyses were utilized. Specifically, Kruskal-Wallis tests separated by gender and a median split in child age were conducted for the following measures of emotion identification skill: happy errors and angry misattributions. As was stated earlier, when the main effect for timing of mother’s elevated depressive symptoms was significant, post hoc analyses were examined.

Table 14 summarizes the results for all ANCOVA analyses and indicates that the main effect for timing of exposure to elevated maternal depressive symptoms was significant only for the number of errors children made on fearful facial stimuli, $F(4, 2307) = 2.60, p < .05$. The effect size for this difference was extremely small, $\omega^2 = .00$. For fearful errors, there was no main effect for child age, $F(1, 2307) = 7.25, p > .05$, or gender, $F(1, 2307) = 1.28, p > .05$, and no interaction between timing of maternal depressive symptoms and child gender, $F(4, 2307) = .74, p > .05$. Post hoc comparisons revealed that children whose mothers experienced elevated depressive symptoms at only 21 months postpartum made more errors on the DANVA2 ($M = 1.84$, $SD = 1.56$) when compared to children whose mothers experienced elevated depressive symptoms at only 33 months postpartum ($M = 1.34$, $SD = 1.43$). However, no groups differed significantly from the group of children never exposed to elevated maternal depressive symptoms, which indicated that despite the significant difference in number of fearful errors made between children exposed to elevated maternal depressive symptoms at only 21 months versus only 33 months postpartum, timing of exposure to elevated maternal depressive symptoms did not actually appear to matter for a child’s later identification of fear in facial expressions. Descriptive statistics for these analyses are provided in Table 15.

Table 16 summarizes the results for all Kruskal-Wallis tests. Among those DANVA2 error scores for which Kruskal-Wallis tests were employed, only differences in happy errors as a function of timing of exposure to elevated maternal depressive symptoms in young females was significant, χ^2 (4, N = 816) = 9.99, $p < .05$. Post hoc Mann-Whitney *U* tests indicated that children whose mothers experienced elevated depressive symptoms at only 8 months postpartum (*M* = .41, *SD* = .66) tended to make more errors on happy facial stimuli than those children whose mothers experienced elevated depressive symptoms at only 21 months postpartum (*M* = .23, *SD* = .54). Here again, no groups differed significantly from the group of children never exposed to elevated maternal depressive symptoms, which indicated that the timing of exposure to elevated maternal depressive symptoms likely did not matter for a child’s later identification of happiness in facial expressions. Descriptive statistics for these and other similar analyses are provided in Table 18.

Does the specific timing of exposure to elevated maternal depressive symptoms during the first few years of a child’s life make a difference in children’s later peer relationship functioning?

To assess whether the timing of early exposure to elevated maternal depressive symptoms was related to children’s later peer relationship difficulties, analyses modeled after those described previously for children’s emotion identification skill deficits were conducted. Because the heterogeneity of variance among groups for the SDQ peer problems subscale score analyses could not be made homogeneous by linear transformations, Kruskal-Wallis tests split by child gender and age at teacher rating of the SDQ were again performed. Table 17 summarizes the results of these analyses and indicates that the timing of exposure to elevated maternal depressive symptoms was not related to children's peer relationship functioning, regardless of age or child gender. Descriptive statistics for these analyses are provided in Table 18.

Discussion

The present study offered a unique, prospective opportunity to begin to investigate some of the more finite potential repercussions of early exposure to maternal depression in a large community sample. Specifically, because research consistently suggests that deficits in even the basic ability to accurately identify emotions in others is associated with problematic peer relationship functioning (e.g., Collins & Nowicki, 2001; Nowicki & Mitchell, 1998), the present study primarily explored how early exposure to maternal depression may be related to school-aged children's emotion identification skill. Although many researchers have examined the negative effects of maternal depression across the lifespan on children, no one to date has looked specifically at the potential relationship between very early exposure to maternal depression and both general *and* specific deficits in emotion identification skill in school-aged offspring.

Overall, there was no support for a relationship between early exposure to maternal depression during the first few years of a child's life and school-aged children's emotion identification skill in a task involving child facial expressions. Although some evidence did emerge to suggest the possibility of a small relationship between more chronic early exposure to maternal depression and the tendency to make *fewer* errors in the identification of happiness for female offspring between the ages of 7.83 and 8.58 years, it is likely that given the number of correlations generated, this relationship emerged merely as a result of chance (and, as expected, making fewer errors in the identification of happy facial expressions was not associated with more peer relationship difficulties). It is important to note that the same magnitude of correlation also emerged for older male children between the ages of 8.67 and 10.33 years, but was not statistically significant because the *n* for this group was smaller than that for younger females. The fact that this correlation was of the same magnitude as that for younger females may suggest that this relationship is not merely a result of chance. Nonetheless, despite the small effect sizes and potential for Type I error, this result is reminiscent of Striano, Brennan, and Vanman's (2002) finding that six-month-old infants of mothers with a history of depressive symptoms preferred to look longer at their own mother's, and other female's, smiling faces more than frowning faces, conceivably because smiling faces were more novel. As these authors hypothesized, it is possible that early immersion in a predominantly negative emotional environment makes it so that positive, or happy, emotional stimuli become more novel, and that the young offspring of chronically depressed mothers seek out these positive stimuli whenever the chance is given. This potential tendency to look for non-depressive emotions may then assist these children in becoming more adept at identifying positive emotion because they essentially train themselves to look for it. In addition, although these findings should be interpreted with caution, in regard to the differential patterns of association for gender and age, results suggest that for females, the tendency to make fewer errors in the identification of happiness in the facial expressions of peers may dissipate over time during middle childhood, whereas for males, this enhanced skill may emerge later in middle childhood. It is possible that these potentially differential trajectories for enhanced skill in the identification of happiness in the facial expressions of peers are related to the well-documented gender differences in depression that tend to emerge in early adolescence (Nolen-Hoeksema & Girgus, 1994).

No published study to date has examined the potential long-term association between very early exposure to maternal depression and children's emotion identification skill during middle childhood; consequently it is somewhat difficult to situate the findings of the present study within the extant literature. Although some studies suggest an association between exposure to maternal depression, or depressive behaviors, and children's omnibus deficits in emotion identification skill for concurrent exposure (Denham et al., 1994), or exposure that occurred only a year or so prior (Raikes & Thompson, 2006), the findings of the present study do not support a continued association of this nature over time. In addition, despite some recent unpublished work by Pollak and his colleagues (2008) suggesting that children (age unknown) of mothers who experienced major depressive disorder (characterized predominantly by sadness) during the first two years of their children's lives tended to misattribute sadness for other emotions, the present study found no evidence for specific misattribution patterns in school-aged children of depressed mothers, regardless of whether exposure to maternal depression was conceptualized as chronicity or timing within the first few years of life. Thus, although preliminary, the results of the present study are generally optimistic and suggest that exposure to maternal depression during the first few years of life may not be related to children's emotion identification skill at the beginning of middle childhood, and thus that this basic social skill may not be a mechanism that helps to explain the link between exposure to maternal depression and children's difficulties with peer relationship functioning.

A number of potential explanations can be offered for the previously mentioned null findings associated with early exposure to maternal depression and school-aged children's emotion identification skill. First, and perhaps foremost, a basic aspect of family systems theory, which emphasizes the importance of each family member's role in social learning processes and outcomes in children, can be used as a general guide to understand these results. Although research suggests that emotion identification skill begins to develop during the first few years of life (e.g., Sorce et al., 1985), and that mothers are very important players in the development of this skill (e.g., Denham et al., 1994), research also suggests that other figures in a child's life, like fathers (e.g., Adams, Kuebli, Boyle, & Fivush, 1995; Fivush et al., 2000), and siblings (e.g., Cutting & Dunn, 2006; Brown & Dunn, 1996), are similarly important. Despite the fact that numerous studies indicate that depressed mothers, and especially those experiencing more chronic depression, tend to create negative emotional environments for those around them (see Downey & Coyne, 1990 for review), and that early exposure to a mother's depression clearly impacts a child's development in a number of other ways (see S. Goodman & Tully, 2006 for review), it is possible that over time, children are nonetheless able to learn *basic* emotion identification skills from other important figures in their environments. Indeed, given that Grinspan, Hemphill, & Nowicki (2003) have demonstrated that school-aged children's basic emotion identification skills for facial expressions can be enhanced in a brief intervention outside of the home that addresses discrimination, understanding, expressive use, and application of nonverbal facial expressions; and that as children grow older, they spend less time with their mothers and more time with their peers for instance (as cited in Hartup & Stevens, 1997), it may be the case that children of depressed mothers, over time, still have ample opportunities to learn this basic skill from others. Because data on the nature of children's relationships with important others were not available for the present study, it was not possible to explore the potential moderating, or *protective*, role of the presence of important others (e.g., fathers, siblings, teachers, etc.) on the relationship between maternal depression and children's emotion identification skill in the present study. In addition, although it would be expected that most children spent enough time with their mothers to be exposed to, and impacted by, their depression, data were also not available to assess the actual amount of time that children tended to spend with their mothers, or whether the mother was the true primary caregiver.

The aforementioned results can also be considered in light of the fact that emotion identification skill was conceptualized narrowly in the present study. Although facial expressions are thought to be one of the principal nonverbal channels through which emotions are communicated (Collier, 1985), emotional information is also communicated nonverbally through other channels like tone of voice, body postures, etc. Given that depressed mothers have been found to model negative emotions for their children through more than just negative facial expressions (e.g., Campbell et al., 1995), it is also possible that for the school-aged offspring of more chronically depressed mothers, deficits in emotion identification skill in nonverbal channels other than facial expressions are present and implicated in their poorer social adjustment. For example, given the research that suggests that depressed mothers also speak more negatively to their young children (Hamilton, Jones, & Hammen, 1993; Fleming, Ruble, Flett, & Shaul, 1988), it may instead be that these children develop deficits in the ability to identify emotions in tones of voice that impact their peer relationship functioning, rather than deficits in the ability to identify emotions in facial expressions. In addition, although the use of child facial expressions seemed to be appropriate given the focus on the peer relationship functioning of children of depressed mothers, previous studies have shown that it is possible to have differential skill for identifying emotions in child versus adult facial expressions (e.g., McClure, Pope, Hoberman, Pine, & Leibenluft, 2003). Therefore, although the present study does not suggest that early exposure to a depressed mother is associated with school-aged children's emotion identification skill for child facial expressions, it could be that these children would struggle to identify emotions in adult facial expressions, perhaps because the figure (mother) hypothesized to impact this social skill is an adult herself. Indeed, data do exist to suggest that school-aged children of depressed mothers have difficulties functioning in relationships with their teachers as well (Lipman, Boyle, Dooley, & Offord, 2002).

Along with the relevance of the manner in which emotion identification skill was operationalized in the present study, the manner in which exposure to maternal depression was conceptualized can also be considered. Although there is ample research and internal ALSPAC data to suggest that a cut-off score of thirteen or greater is a reliable and valid way to identify those mothers who are likely experiencing diagnosable depression (Golding et al., 2004; Matthey et al., 2006), grouping mothers together based on high versus low scores on the EPDS made it so that the severity of depression was not taken into account. Because some studies have found omnibus deficits in emotion identification skill in young children to be associated with the severity of a mother's concurrent depressive behaviors (Denham et al., 1994), severity of a mother's symptoms, even over time, may play an important role in impacting a child's emotion identification skill. In the present study, the majority of mothers in high groups reported EPDS scores that hovered around the cut-off score, and thus may not have been depressed enough to really impact their children's emotion identification skill. In addition, analyses that examined potential sample bias indicated that mothers in the present study tended to have lower EPDS scores than those mothers who did not have complete EPDS data, which again may suggest that even for those mothers who reported high EPDS scores across time, the nature of the depression may not have been severe enough to have an impact. Indeed, severity of a mother's depression has also been found to be an important moderator for other child outcomes (Brennan, Hammen, Andersen, Bor, Najman, & Williams, 2000), and in some instances, more important than chronicity or timing (Hammen & Brennan, 2003). However, given that reliable cut-offs to indicate severity were not available in the literature for the EPDS, and the fact that few mothers in the present study ever had EPDS scores that might be considered severe, severity was not properly examined.

For background analyses conducted in the present study, partial support was found for the prediction that more chronic early exposure to maternal depression would be related to children demonstrating more problematic peer relationship functioning later on, and also for the prediction that children's approximately concurrent deficits in emotion identification skill would be related to the tendency to have more difficulties in peer relationships. In regard to maternal depression and peer relationship functioning, most correlations were significant and in the expected direction, regardless of child age at the rating of the SDQ or gender. However, this relationship was not significant for male children who were on the younger side of middle childhood when their peer relationship functioning was rated, which may be related to research that suggests that in general, boys tend to have larger networks of friends than girls do during early and middle childhood (Eder & Hallinan, 1978), whereas this situation seems to switch as children approach adolescence (Cairns, Lueng, Buchanan, & Cairns, 1995). Because younger boys tend to have larger friendship networks in general at this point in development, it may be more difficult for teachers to identify their problematic peer relationships, whereas for girls, because they tend to have smaller networks of friends, it is easier to see when problems arise. In addition, it is also important to note that for those significant correlations found between early chronic exposure to maternal depression and school-aged children's peer relationship functioning, all effect sizes were small. This may be due in part to the fact that peer relationship functioning was conceptualized somewhat narrowly in the present study, or also because most studies to date that have looked at the social functioning of school-aged children of depressed mothers have found associations with broader measures of social competence rather than aspects of social adjustment alone, and have tended to conceptualize maternal depression in terms of concurrent (Koblinsky et al., 2006), or exposure at some point in the child's lifetime (S. Goodman et al., 1993). Given these considerations, it may be that larger correlations would have been found between more chronic early exposure to maternal depression and broader measures of school-aged children’s social competence (e.g., also taking into account internalizing and externalizing problems), or that for social adjustment, later, or more concurrent exposure to maternal depression is more important.

Although research suggests that early exposure to maternal depression is associated with higher risk for insecure attachment (van Ijzendoorn et al., 1992), and that early attachment relationships influence the nature of relationships later in development (Hazan & Shaver, 1987), Murray and her colleagues (2006) have highlighted the fact that “higher level” attachment representations may develop over time in relation to continued mother-child interpersonal interactions that become more important than the nature of early attachments because children’s relationships become more sophisticated over time (Steele, Steele, & Johansson, 2002). Indeed, Cassidy, Kirsh, Scolton, and Parke (1996) have found that a child’s peer status was particularly dependent on his/her representation of attachment relationships at the time that peer status was measured. Thus, if mothers’ levels of depression had been measured at the same time that children’s peer relationship functioning was measured, effect sizes may have been larger.

Finally, in regard to emotion identification skill and peer relationship functioning, it is somewhat difficult to explain the differential pattern of results for each type of error and for younger and older males and females. Although it would be expected that any type of error in emotion identification would be associated with peer relationship difficulties, results of the present study suggest that errors having to do with anger (either misattributing it for another emotion or misidentifying it in general) may be particularly associated with problematic peer relations, which in some ways, follows lines of research that have focused specifically on the interpersonal repercussions of hostile misattributions (Dodge, Price, Bachorowski, & Newman, 1990). In addition, significant relationships between emotion identification errors and peer relationship difficulties tended to emerge more often for children who were on the younger end of middle childhood when teachers rated their peer relationship functioning, which runs counter to evidence that suggests that this basic social skill is important for peer relationships throughout middle childhood and beyond (as reviewed in Nowicki & Duke, 1994). Assuming that emotion identification does in fact remain stable over time, this would suggest that deficits in the basic ability to identify emotions in faces tend to be more important for the peer relationship functioning of children in the earlier stages of middle childhood, which could be related to the fact that as children grow older and the nature of their interpersonal relationships becomes more complex, social skills beyond the basic identification of emotions in facial expressions become increasingly important.

Finally, as was discussed previously, the fact that the effect sizes of all significant correlations in this area were small may be explained by the somewhat narrow way in which social adjustment was conceptualized in the present study, in addition to the possibility that after 6 years of age (Brown & Dunn, 1996), individual differences in emotion identification skill are less stable, possibly because children’s social networks tend to increase (Hartup & Stevens, 1997) and offer more opportunities for the remediation of deficits in basic emotion identification skill.

General Limitations

As was indicated earlier, some of the general limitations of the present study include a lack of data on other important potential socialization figures in children’s lives, no data on the amount of time that mothers actually spent with their children, the lack of consideration of the potential moderating role of severity of a mother's depression on emotion identification skill, and the fact that emotion identification skill was operationalized only as skill related to child facial expressions. Although the use of child-related stimuli seemed to be particularly appropriate for the present study given questions related to peer relationship functioning specifically, the fact that stimuli only involved *facial expressions* excluded the fact that emotion identification skill also spans other important nonverbal channels of communication like voices and postures. Social adjustment in the present study may have also been conceptualized too narrowly, thus causing results to indicate a lack of association for predicted relationships, or very small effect sizes. Finally, despite research suggesting that individual differences in emotion identification skill remain stable over time between the ages of 3 and 6 years (Brown & Dunn, 1996), it is not yet clear whether the same can be said after or before this time. Therefore, the fact that peer relationship data were obtained anywhere from a few months to one year prior to the collection of emotion identification skill data may have resulted in fewer significant relationships between deficits in emotion identification skill and peer relationship functioning, as well as smaller effect sizes.

Future Directions and Implications

Although the results of the present study do not suggest that deficits in emotion identification skill should be considered as a potential mechanism to help explain the difficulties in peer relationship functioning exhibited by school-aged offspring of depressed mothers, they do highlight the optimistic possibility that over time, basic emotion identification skill may be unaffected by early exposure to maternal depression.

Nonetheless, future studies may not want to abandon this line of research fully. Future longitudinal studies should expand the way that emotion identification skill is operationalized to include other measures of emotion identification skill (e.g., tones of voice or postures), and data on other important socialization figures in a child's life can be ascertained to see if individuals like fathers and siblings may moderate a potential relationship between exposure to maternal depression and children's emotion identification skill over time. More work should also be done to understand the potential impact of maternal depression that occurs during middle childhood on concurrent emotion identification skill, as well as how individual differences in this realm of skill may or may not remain stable over time.

References

Anderson, C. A. & Hammen, C. L. (1993). Psychosocial outcomes of children of unipolar depressed, bipolar, medically ill, and normal women: A longitudinal study. *Journal of Consulting and Clinical Psychology, 61(3),* 448–454.

Adams, S., Kuebli, J., Boyle, P. A., & Fivush, R. (1995). Gender differences in parent-child conversations about past emotions: A longitudinal investigation. *Sex Roles, 33,* 309-323.

Bagwell, C. L., Newcomb, A. F., & Bukowski, W. M. (1996). *Pre-adolescent friendship and peer rejection as predictors of adult adjustment.* Unpublished manuscript, University of Richmond, Department of Psychology, Richmond, VA.

Bandura, A. (1977). *Social learning theory.* Oxford, England: Prentice-Hall.

Baron, R., M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in

Social Psychological Research: Conceptual, strategic, and statistical considerations. Journal *of Personality and Social Psychology, 51,* 1173-1182.

Baum, K. M., Logan, M. C., Walker, E. F., Tomlinson, H., & Schiffman, J. (1996, September). *Emotion recognition in adolescents with schizotypal personality disorder.* Presented at the annual meeting of the Society for Research in Psychopathology, Atlanta, GA.

Beardslee, W. R., Schultz, L. H., & Selman, R. L. (1987). Level of social-cognitive development, adaptive functioning, and DSM-III diagnoses in adolescent offspring of parents with affective disorders: Implications for the development of the capacity for mutuality. *Developmental Psychology, 23,* 807-815.

Beardslee, W. R., Versage, E. M., & Gladstone, T. R. G. (1998). Children of affectively ill parents: A review of the past 10 years. *Journal of the American Academy of child and Adolescent Psychiatry, 37,* 1134-1141.

Beardslee, W. R., & Wheelock, I. (1994). Children of parents with affective disorders: Empirical findings and clinical implications. In W. M. Reynolds and H. F. Johnston (Eds.), Handbook of depression in children and adolescents (pp. 463-479). New York: Plenum.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory – Second Edition manual.* San Antonio, TX: The Psychological Corporation.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4,* 561-571.

Berndt, T. J., & Keefe, K. (1992). Friends' influence on adolescents' perceptions of themselves in school. In D. H. Schunk & J. L. Meece (Eds.), *Students'* *perceptions in the classroom* (pp. 51-73). Hillsdale, NJ: Erlbaum.

Billings, A. G., & Moos, R. H. (1983). Comparison of children of depressed and nondepressed parents: A social environmental perspective. *Journal of Abnormal Child Psychology, 11,* 483-486.

Bousha, D., & Twentyman, C. (1984). Mother-child interactional style in abuse, neglect, and control groups: Naturalistic observations in the home. *Journal of Abnormal Psychology, 93,* 106-114.

Boyatzis, C. J., Chazan, E., & Ting, C. Z. (1993). Preschool children's decoding of facial emotions. *The Journal of Genetic Psychology, 154,* 375-382.

Boyd, R. C., Le, H. N., & Somberg, R. (2005). Review of screening instruments for postpartum depression. *Archives of Women's Mental Health, 8,* 141-153.

Brennan, P. A., Hammen, C., Andersen, M. J., Bor, W., Najman, J. M., & Williams, G. M. (2000). Chronicity, severity, and timing of maternal depressive symptoms: Relationships with child outcomes at age 5. *Developmental Psychology, 36,* 759-766.

Brewer, R. I. (1986). A note on the changing status of the Registrar General's classification of occupations. *The British Journal of Sociology, 37,* 131-140.

Breznitz, Z., & Sherman, T. (1987). Speech patterning of natural discourse of well and depressed mothers and their young children. *Child Development, 58,* 395-400.

Brown, J. R., & Dunn, J. (1996). Continuities in emotion understanding from three to six years. *Child Development, 67,* 789-802.

Cairns, R. B., Leung, M., Buchanan, L., & Cairns, B. D. (1995). Friendships and social networks in childhood and adolescence: Fluidity, reliability, and interrelations.

Child Development, 66, 1330–1345.

Campbell, S. B., Cohn, J. F., & Meyers, T. (1995). Depression in first-time mothers: Mother-infant interaction and depression chronicity. *Developmental Psychology, 31,* 349-357.

Camras, L. A. (1985). Socialization of affect communication. In M. Lewis and C. Saarni (Eds.), *The socialization of emotions* (pp. 141-160). New York: Plenum Press.

Camras, L. A., & Allison, K. (1985). Children's understanding of emotional facial expressions and verbal labels. *Journal of Nonverbal Behavior, 9,* 84-94.

Camras, L., Grow, C., & Ribordy, S. (1983). Recognition of emotional expressions by abused children. *Journal of Clinical and Child Psychology, 12(3),* 325-328.

Camras, L. A., Ribordy, S., Hill, J., Martino, S., Spaccarelli, S., & Stefani, R. (1988). Recognition and posing of emotional expressions by abused children and their mothers. *Developmental Psychology, 24,* 776-781.

Camras, L. A., Sachs-Alter, E., & Ribordy, S. E. (1996). Emotion understanding in maltreated children: Recognition of facial expressions and integration with other emotion cues. In M. Lewis and M. W. Sullivan (Eds.), *Emotional development in atypical children* (pp. 203-225). Mahwah, NJ: Erlbaum.

Cassidy, J., Kirsh, S., Scolton, K. L., & Parke, R. D. (1996). Attachment and representations of peer relationships. *Developmental Psychology, 32,* 892-904.

Cavell, T. A. (1990). Social adjustment, social performance, and social skills: A tri-component model of social competence. *Journal of Clinical Child Psychology, 19,* 111-122.

Chaffin, M., & Kelleher, K. (1996). Onset of physical abuse and neglect: Psychiatric, substance abuse and social risk factors from prospective community data. *Child Abuse and Neglect, 20,* 191-203.

Cicchetti, D. (1990). The organization and coherence of socioemotional, cognitive, and representational development: Illustrations through a developmental psychopathology perspective of Down Syndrome and child maltreatment. In R. A. Thompson (Ed.), *Nebraska symposium on motivation, 1988: Socioemotional development* (pp. 259-279). Lincoln: University of Nebraska.

Cohn, J. F., Campbell, S. B., Matias, R., & Hopkins, J. (1990). Face-to-face interactions of postpartum depressed and nondepressed mother-infant pairs at 2 months. *Developmental Psychology, 26,* 15-23.

Collier, G. (1985). *Emotional Expression*. Lawrence Erlbaum Associates.

Collins, M., & Nowicki, S. Jr. (2001). African American children’s ability to identify emotion in facial expressions and tones of voice of European Americans. *Journal of Genetic Psychology, 162,* 334-346.

Cox, J., Holden, J., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10 item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry, 150,* 782-786.

Coyne, J. C. (1976a). Toward an interactional description of depression. *Psychiatry, 39,* 28-40.

Coyne, J. C. (1976b). Depression and the response of others. *Journal of Abnormal Psychology, 85,* 186-193.

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social-information processing mechanisms in children’s social adjustment. *Psychological Bulletin,* *115,* 74-101.

Custrini, R. J., & Feldman, R. S. (1989). Children's social competence and nonverbal encoding and decoding of emotion. *Journal of Clinical Child Psychology, 18,* 336-342.

Cutting, A. L., & Dunn, J. (2006). Conversations with siblings and with friends: Links between relationship quality and social understanding. *British Journal of Developmental Psychology, 24,* 73-87.

Denham, S. A. (1998). *Emotional development in young children.* New York: Guilford Press.

Denham, S. A., & Auerbach, S. (1995). Mother-child dialogue about emotions and preschoolers' emotional competence. *Genetic, Social, and General Psychology Monographs, 121,* 313-337.

Denham, S. A., Mason, T., & Couchoud, E. A. (1995). Scaffolding young children's prosocial responsiveness: Preschoolers' responses to adult sadness, anger, and pain. *International Journal of Behavioral Development, 18,* 489-504.

Denham, S. A., Mitchell-Copeland, J., Strandberg, K., Auerbach, S., & Blair, K. (1997). Parental contributions to preschoolers' emotional competence: Direct and indirect effects. *Motivation and Emotion, 21,* 65-86.

Denham, S. A., Zoller, D., & Couchoud, E. A. (1994). Socialization of preschoolers' emotion understanding. *Developmental Psychology, 30,* 928-936.

De Rosnay, M., & Harris, P. L. (2002). Individual differences in children's understanding of emotion: The roles of attachment and language. Attachment *and Human Development, 4,* 39-54.

De Sonneville, L. M. J., Verschoor, C. A., Njiokiktjien, C., Op het Veld, V., Toorenaar, N., & Vranken, M. (2002). Facial identity and facial emotions: Speed, accuracy, and processing strategies in children and adults. Journal *of Clinical and Experimental Neuropsychology, 24,* 200-213.

Dodge, K. A., Price, J. M., Bachorowski, J. A., & Newman, J. P. (1990). Hostile attributional biases in severely aggressive adolescents. *Journal of Abnormal Psychology, 99,* 385-392.

Downey, G., & Coyne, J. C. (1990). Children of depressed parents: An integrative review. *Psychological Bulletin, 108,* 50-76.

Duke, M.P., Nowicki, S., & Martin, E.A. (1996). *Teaching your child the language of social success.* Atlanta, GA: Peachtree Publishers.

Dunn, J., & Brown, J. (1994). Affect expression in the family, children's understanding of emotions, and their interactions with others. *Merrill-Palmer Quarterly, 40(1),* 120-137.

Dunn, J., Brown, J., & Beardsall, L. (1991). Family talk about feeling sates and children's later understanding of others' emotions. *Developmental Psychology, 27,* 448-455.

Dunn, J., Brown, J., Slomkowski, C., Tesla, C., & Youngblade, L. (1991). Young children's understanding of other people's feelings and beliefs: Individual differences and their antecedents. *Child Development, 62,* 1352-1366.

During, S. M. (1986). *Recognition of emotional facial expression by abusive mothers and their children*. Unpublished master's thesis, University of British Columbia, Vancouver, Canada.

Eder, D., & Hallinan, M. T. (1978). Sex differences in children's friendships. *American Sociological Review, 43,* 237–250.

Edwards, R., Manstead, A. S. R., & MacDonald, C. J. (1984). The relationship between children's sociometric states and ability to recognize facial expressions of emotion. *European Journal of Social Psychology, 14,* 235-238.

Elicker, J., Egeland, M., & Sroufe, L. A. (1992). Predicting peer competence in childhood from early parent-child relationships. In R. Parke & G. W. Ladd (Eds.), *Family and peer relationships: Modes of linkage* (pp. 77-106). Hillsdale, NJ: Erlbaum.

Etzion-Carasso, A., & Oppenheim, D. (2000). Open mother-preschooler communication: Relations with early secure attachment. *Attachment and Human Development, 2,* 347-370.

Evans, J., Heron, J., Francomb, H., Oke, S., Golding, J., & on behalf of the Avon Longitudinal Study of Parents and Children Study Team (2001). Cohort study of depressed mood during pregnancy and after childbirth. *British Medical Journal, 323,* 257-260.

Field, T. (1984). Early interactions between infants and their postpartum depressed mothers. *Infant Behavior and Development, 7,* 517-522.

Field, T., Healy, B., Goldstein, S., & Guthertz, M. (1990). Behavior state matching and synchrony in mother-infant interactions of nondepressed versus depressed dyads. *Developmental Psychology, 26,* 7-14.

Field, T., Healy, B., Goldstein, S., Perry, S., Bendell, D., Schamberg, S., Zimmerman, E., & Kuhn, G. (1988). Infants of depressed mothers show "depressed" behavior even with non-depressed adults. *Child Development, 60,* 1569-1579.

Field, T., Morrow, C., & Adelstein, D. (1993). Depressed mothers' perceptions of infant behavior. *Infant Behavior and Development, 16,* 99-108.

Field, T. M., Woodson, R., Greenberg, R., & Cohen, D. (1982). Discrimination and imitation of facial expressions by neonates. *Science*, *218*, 179–181.

Fivush, R. (1991). Gender and emotion in mother-child conversations about the past. *Journal of Narrative and Life History, 1,* 325-341.

Fivush, R., Brotman, M., Buckner, J., & Goodman, S. (2000). Gender differences in parent-child emotion narratives. *Sex Roles*, *42*, 233-253.

Fleming, A., Ruble, D., Flett, G., & Shaul, D. (1988). Postpartum adjustment in first-time mothers: Relations between mood, maternal attitudes, and mother-infant interactions. *Developmental Psychology, 24,* 71-81.

Frankel, K. A., & Harmon, R. J. (1996). Depressed mothers: They don't always look as bad as they feel. *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 289-298.

Frodi, A., & Lamb, M. (1980). Child abusers' responses to infant smiles and cries. *Child Development, 51,* 238-241.

Garner, P. W., Jones, D. C., Gaddy, G., & Rennie, K. M. (1997). Low-income mothers' conversations about emotions and their children's emotional competence. *Social Development, 6,* 37-52.

Glitter, A. G., Mostofsky, D. I., & Quincy, A. J. (1972). Race and sex differences in the child's perception of emotion. *Child Development, 42,* 2071-2075.

Golding, J., & ALSPAC Study Team (2004). The Avon Longitudinal Study of Parents and Children (ALSPAC) – Study design and collaborative opportunities. *European Journal of Endocrinology, 151,* U119-U123.

Golding, J., Pembrey, M., Jones, R., & ALSPAC Study Team (2001). ALSPAC – The Avon Longitudinal Study of Parents and Children. I. Study methodology. *Paediatric and Perinatal Epidemiology, 15,* 74-87.

Goldsmith, D. F., & Rogoff, B. (1997). Mothers' and toddlers' coordinated joint focus of attention: Variations with maternal dysphoric symptoms. *Developmental Psychology, 33,* 113-119.

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38,* 581-586.

Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 1337-1344.

Goodman, S. H., Adamson, L. B., Riniti, J., & Cole, S. (1994). Mothers' expressed attitudes: Associations with maternal depression and children's self-esteem and psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry, 33,* 1265-1274.

Goodman, S. H., Brogan, D., Lynch, M. E., & Fielding, B. (1993). Social and emotional competence in children of depressed mothers. *Child Development, 64,* 516-531.

Goodman, S. H., & Gotlib, I. H. (1999). Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review, 106,* 458-490.

Goodman, S.H. & Tully, E. (2006). Depression in women who are mothers: An integrative model of risk for the development of psychopathology in their sons and daughters. In C.L.M. Keyes and S.H. Goodman (Eds.), *Women and depression: A handbook for the social, behavioral, and biomedical sciences* (pp. 241-280). New York: Cambridge University Press.

Goonan, L. (1995). *Socio-emotional correlates of nonverbal processing ability in preschool children.* Unpublished doctoral dissertation, Emory University, Atlanta, GA.

Green, S. B., & Salkind, N. J. (2003). *Using SPSS for Windows and Macintosh: Analyzing and understanding data.* Upper Saddle River, NJ: Prentice Hall.

Greig, A., & Howe, D. (2001). Social understanding, attachment security of preschool children and maternal mental health. *British Journal of Developmental Psychology, 19,* 381-393.

Grinspan, D., Hemphill, A., & Nowicki, S. Jr. (2003). Improving the ability of elementary school-age children to identify emotion in facial expressions. *Journal of Genetic Psychology, 164,* 88-100.

Gupta, V., & Korte, C. (1994). The effects of a confidant and a peer group on the well-being of single elders. *International Journal of Aging and Human Development, 39,* 293-302.

Halberstadt, A. G. (1991). *Toward an ecology of expressiveness: Family socialization in particular and a model in general*. In R. S. Feldman and B. Rime (Eds.), Fundamentals of nonverbal behavior (pp. 106-160). New York: Cambridge University Press.

Halberstadt, A. G., Denham, S. A., & Dunsmore, J. C. (2001). Affective social competence. *Social Development, 10,* 79-119.

Hamilton, E. B., Jones, M., & Hammen, C. (1993). Maternal interaction style in affective disordered, physically ill, and normal women. *Family Processes, 32,* 329-340.

Hammen, C. (1991). *Depression runs in families: The social context of risk and resilience in children of depressed mothers.* New York: Springer-Verlag.

Hammen, C., Adrian, C., Gordon, D., Burge, D., Jaenicke, C., & Hiroto, D. (1987). Children of depressed mothers: Maternal strain and symptom predictors of dysfunction. *Journal of Abnormal Psychology, 96,* 190-198.

Hammen, C., Adrian, C., & Hiroto, D. (1988). A longitudinal test of the attributional vulnerability model in children at risk for depression. *British Journal of Clinical Psychology, 27,* 37-46.

Hammen, C., & Brennan, P. A. (2003). Severity, chronicity, and timing of maternal depression and risk for adolescent offspring diagnoses in a community sample. *Archives of General Psychiatry, 60,* 253-258.

Harrigan, J. (1984). The effects of task order on children's identification of facial expressions. *Motivation and Emotion, 8,* 157-169.

Hartup, W. W., & Stevens, N. (1997). Friendships and adaptation in the life course. *Psychological Bulletin, 121,* 355-370.

Hay, D. F., & Pawlby, S. (2003). Prosocial development in relation to children's and mothers' psychological problems. *Child Development, 74,* 1314-1327.

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52,* 511-524.

Helmut, S. (2007). Psychometric findings of the teacher version of "strengths and difficulties questionnaire" (SDQ-L): Validation by means of sociometric indices. *Zeitschrift fur Entwicklungspsychologie und Padagogische Pychologie, 39,* 25-32.

Herba, C., & Phillips, M. (2004). Annotation: Development of facial expression recognition from childhood to adolescence: behavioural and neurological perspectives. *Journal of Child Psychology and Psychiatry, 45(7),* 1185-1198.

Hops, H., Biglan, A., Sherman, L., Arthur, J., Friedman, L., & Osteen, V. (1987). Home observations of family interactions of depressed women. *Journal of Consulting and Clinical Psychology, 55,* 341-346.

Kam, C. (2001). Effects of maternal depression on children's social and emotional functioning during early school year. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 62,* 2516.

Koblinsky, S. A., Kuvalanka, K. A., & Randolph, S. M. (2006). Social skills and behavior problems of urban, African American preschoolers: Role of parenting practices, family conflict, and maternal depression. *American Journal of Orthopsychiatry, 76,* 554-563.

Kochanska, G. (1987, April). *Socialization of young children's anger by well and depressed mothers.* Paper presented at the Society for Research in Child Development, Baltimore.

Laible, D. J., & Thompson, R. A. (1998). Attachment and emotional understanding in preschool children. *Developmental Psychology, 34,* 1038-1045.

Laible, D. J., & Thompson, R. A. (2000). Mother-child discourse, attachment security, shared positive affect, and early conscience development. *Child Development, 71,* 1424-1440.

Larson, R. (1978). Thirty years of research on the subjective well-being of older Americans. *Journal of Gerontology, 33,* 109-125.

Lee, C., & Gotlib, I. (1989a). Clinical status and emotional adjustment of children of depressed mothers. *American Journal of Psychiatry, 146,* 478-483.

Lee, C., & Gotlib, I. (1989b). Maternal depression and child adjustment: A longitudinal analysis. *Journal of Abnormal Psychology, 98,* 78-85.

Lee, C., & Gotlib, I. (1991). Adjustment of children of depressed mothers: A 10-month follow-up. *Journal of Abnormal Psychology, 100,* 473-477.

Lewis, M., & Saarni, C. (1985). Culture and emotions. In M. Lewis & C. Saarni (Eds.), *The socialization of emotions* (pp. 1-17). New York: Plenum.

Lipman, E. L., Boyle, M. H., Dooley, M. D., & Offord, D. R. (2002). Child well-being in single-mother families. *Journal of the American Academy of Child and Adolescent Psychiatry, 41,* 75-82.

Lovejoy, M. C. (1991). Maternal depression: Effects on social cognition and behavior in parent-child interactions. Journal of Abnormal Child Psychology, 19, 693-706.

Matthey, S., Henshaw, C., Elliott, S., & Barnett, B. (2006). Variability in the use of cut-off scores and formats on the Edinburgh Postnatal Depression Scale – implications for clinical and research practice. *Archives of Women's Mental Health, 9,* 309-315.

Maxim, L., & Nowicki, S. Jr. (1996). *Social competence associated with nonverbal receptive processing ability for three different age groups.* Poster presented at the meetings of the Southeastern Psychological Association, Atlanta, GA.

McClanahan, P. (1996). *Social competence correlates of children who are seven and* *eight years of age*. Unpublished master's thesis, Department of Psychology, Emory University, Atlanta, GA.

McClure, E. B. (2000). A meta-analytic review of sex differences in facial expression processing and their development in infants, children, and adolescents. *Psychological Bulletin, 126,* 424-453.

McClure, E. B., & Nowicki, S., Jr. (2001). Associations between social anxiety and nonverbal processing skill in preadolescent boys and girls. *Journal of Nonverbal Behavior, 25,* 3-19.

McClure, E. B., Pope, K., Hoberman, A. J., Pine, D. S., & Leibenluft, E. (2003). Facial expression recognition in adolescents with mood and anxiety disorders. *American Journal of Psychiatry, 160,* 1172-1174.

Meadows, S. (1996). *Parenting behaviour and children's cognitive development*. Hove, England: Psychology Press.

Mellor, D. (2004). Further the use of the strengths and difficulties questionnaire: Reliability with younger children. *Psychological Assessment, 16,* 396-401.

Meltzoff, A. N., & Moore, M. K. (1983). Newborn infants imitate adult facial gestures. *Child Development, 54,* 702-709.

Montague, D., & Walker-Andrews, A. (2001). Peekaboo: A new look in infants' perception of emotion expressions. *Developmental Psychology, 73,* 1339-1352.

Murray, L. (1992). The impact of postnatal depression on infant development. *Journal of Child Psychology and Psychiatry, 33,* 543-561.

Murray, L., Sinclair, D., Cooper, P. Ducournau, P., & Turner, P. (1999). The socioemotional development of 5-year-old children of postnatally depressed mothers. *Journal of Child Psychology and Psychiatry, 40,* 1259-1271.

Murray, L., Halligan, S. L., Adams, G., Patterson, P., & Goodyer, I. M. (2006). Socioemotional development in adolescents at risk for depression: The role of maternal depression and attachment style. *Development and Psychopathology, 18,* 489-516.

Nelson, C. A. (1987). The recognition of facial expressions in the first two years of life: Mechanisms of development. *Child Development, 58,* 889-909.

Nelson, C. A., & De Haan, M. (1997). A neurobehavioral approach to the recognition of facial expression. In J. A. Russel and J. M. Fernandez-Dols (Eds.). *The psychology of facial expression.* Cambridge: Cambridge University Press.

Nolen-Hoeksema, S., & Girgus, J. S. (1994). The emergence of gender differences in depression and adolescence. *Psychological Bulletin, 115,* 424-443.

Nowicki, S. (1997). *A study of the DANVA-AF in college students.* Unpublished manuscript, Department of Psychology, Emory University, Atlanta, GA.

Nowicki, S. Jr., & Carton, J. (1993). The measurement of emotional intensity from facial expressions: The DANVA Faces 2. *Journal of Social Psychology, 133,* 749-750.

Nowicki, S. (2008). *Manual for the receptive tests of the diagnostic analysis of nonverbal accuracy.* Unpublished manuscript, Department of Psychology, Emory University, Atlanta, GA.

Nowicki Jr., S., & Duke, M. P. (1989). *Measuring nonverbal behavior*: Paper presented at the meeting of the American Psychological Society, Alexandria, VA.

Nowicki Jr., S., & Duke, M. P. (1992). The association of children's nonverbal decoding abilities with their popularity, locus of control, and academic achievement.

Journal of Genetic Psychology, 153, 385-393.

Nowicki Jr., S., & Duke, M. P. (1994). Individual differences in the nonverbal communication of affect: The Diagnostic Analysis of Nonverbal Accuracy Scale. *Journal of Nonverbal Behavior, 18,* 9-35.

Nowicki, S., & Halpern, A. (1996). *Mother's ability to recognize emotional expression and their children's recognition ability and locus of control*. Unpublished honor's thesis, Department of Psychology, Emory University, Atlanta, GA.

Nowicki Jr., S., & Mitchell, J. (1998). Accuracy in identifying affect in child and adult faces and voices and social competence in preschool children. *Genetic, Social, and General Psychological Monographs, 124,* 39-61.

Ontai, L. L., & Thompson, R. A. (2002). Patterns of attachment and maternal discourse effects on children's emotion understanding from 3 to 5 years of age. *Social Development, 11,* 433-450.

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? *Psychological Bulletin, 102,* 357-389.

Philippot, P., & Feldman, R. S. (1990). Age and social competence in preschoolers' decoding of facial expression. *British Journal of Social Psychology, 29,* 43-54.

Pianta, R., Egeland, B., & Erickson, M. F. (1989). The antecedents of maltreatment: Results of the mother-child interaction research project. In D. Cicchetti and V. Carlson (Eds.), *Child maltreatment: Theory and research on the causes and consequences of child abuse and neglect* (pp. 203-253). New York: Cambridge.

Pollak, S. D. (2008, February). *How social experience gets under the skin: Affective neuroscience, child development, and risk for psychopathology*. Data presented at

Emory University, Atlanta, GA.

Pollak, S., Cicchetti, D., Hornung, K., & Reed, A. (2000). Recognizing emotions in faces: Developmental effects of child abuse and neglect. *Developmental Psychology, 36,* 679-688.

Pollak, S. D., & Kistler, D. J. (2002). Early experience is associated with the development of categorical representations for facial expressions of emotion. *Proceedings of the National Academy of Sciences, 99,* 9072-9076.

Pollak, S. D., & Sinha, P. (2002). Effects of early experience on children's recognition of facial displays of emotion. *Developmental Psychology, 38,* 784-791.

Radke-Yarrow, M., & Nottleman, E. (1989, April). *Affective development in children of well and depressed mothers.* Paper presented at Society for Research in Child Development, Kansas City, MO.

Radke-Yarrow, M., Zahn-Waxler, C., Richardson, D. T., Susman, A., & Martinez, P. (1994). Caring behavior in children of clinically depressed and well mothers. *Child Development, 65,* 1405–1414.

Raikes, H. A., & Thompson, R. A. (2006). Family emotional climate, attachment security and young children's emotion knowledge in a high risk sample. *British Journal of Developmental Psychology, 24,* 89-104.

Rubenstein, J. L., Heeren, T., Housman, D., Rubin, C., & Stecher, G. (1989). Suicide behavior in "normal" adolescents: Risk and protective factors. *American Journal of Orthopsychiatry, 59,* 59-71.

Sameroff, A. J., Seifer, R., & Zax, M., Garmezy, N. (1982). Early development of children at risk for emotional disorder. *Monographs of the Society for Research in*

Child Development, 47, 1-82.

Shipman, K. L., Schneider, R., Fitzgerald, M. M., Sims, C., Swisher, L., & Edwards, A. (2007). Maternal emotion socialization in maltreating and non-maltreating families: Implications for children's emotion regulation. *Social Development, 16, 268-285.*

Shipman, K. L., & Zeman, J. (2001). Socialization of children's emotion regulation in mother-child dyads: A developmental psychopathology perspective. *Development and Psychopathology, 13,* 317-336.

Smith, M., & Walden, T. (1998). Developmental trends in emotion understanding among a diverse sample of African-American preschool children. *Journal of Applied Developmental Psychology, 19(2),* 177-197.

Sorce, J. F., Emde, R. N., Campos, J., & Klinnert, M. D. (1985). Maternal emotional signaling: Its effect on the visual cliff behavior of 1-year-olds. *Developmental Psychology, 21,* 195-200.

Sroufe, L. A. (1979). The coherence of individual development: Early care, attachment, and subsequent developmental issues. *American Psychologist, 34,* 834-841.

Steele, M., Steele, H., & Johansson, M. (2002). Maternal predictors of children's social cognition: An attachment perspective. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 43,* 861-872.

Striano, T., Brennan, P., & Vanman, E. J. (2002). Maternal depressive symptoms and 6-month-old infants' sensitivity to facial expressions. *Infancy, 3,* 115-126.

Teti, D. M., Gelfand, D. M., Messinger, D. S., & Isabella, R. (1995). Maternal depression and the quality of early attachment: An examination of infants, preschoolers, and their mothers. *Developmental Psychology, 31,* 364-376.

Tremblay, C., Kirouac, G., & Dore, F. Y. (1987). The recognition of adults' and children's expressions of emotions. *Journal of Psychology, 121,* 341-350.

Tronick, E. Z. (1989). Emotions and emotional communication in infants. *American Psychologist, 44,* 112-119.

Tronick, E. Z., & Field, T. (1986). *Maternal depression and infant disturbance: New directions for child development.* San Francisco: Josey-Bass.

van Ijzendoorn, M. H., Goldberg, S., Kroonenberg, P. M., & Frenkel, O. J. (1992). The relative effects of maternal and child problems on the quality of attachment: a meta-analysis of attachment in clinical samples. *Child Development, 49,* 795-801.

Van Leeuwen, K., Meerschaert, T., Bosmans, G., De Medts, L., & Braet, C. (2006). The strengths and difficulties questionnaire in a community sample of young children in Flanders. *European Journal of Psychological Assessment, 22,* 189-197.

Vosk, B. N., Forehand, R., & Figueroa, R. (1983). Perception of emotions by accepted and rejected children. *Journal of Behavioral Assessment, 5,* 151-160.

Walden, T. A., & Field, T. M. (1982). Discrimination of facial expressions by preschool children. *Child Development, 53,* 1312-1319.

Walker-Andrews, A. S. (1997). Infants' perception of expressive behaviors: Differentiation of multimodal information. *Psychological Bulletin, 121,* 437-456.

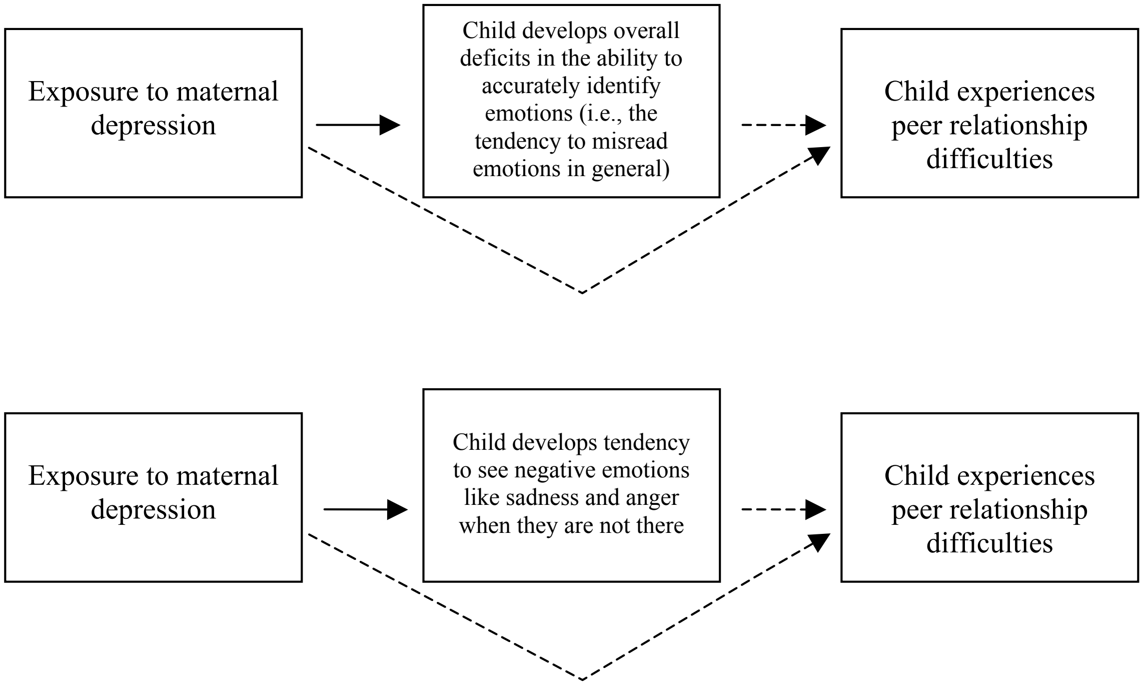
Zahn-Waxler, C., Ridgeway, D., Denham, S., Usher, B., & Cole, P. (1993). Research strategies for assessing mothers' interpretations of infants' emotions. In R. Emde and P. Butterfields (Eds.), *Parental perceptions of infant emotions* (pp. 217-236). Madison, CT: International Universities Press.

Zung, W. W. K. (1965). A self-rating depression scale. *Archives of General Psychiatry, 12,* 63-70.

Figure Captions

Figure 1. Mediational models linking deficits in basic emotion identification skill to the peer relationship difficulties experienced by school-aged offspring of depressed mothers.

Figure 1


Exposure to maternal depression
Child develops overall deficits in the ability to accurately identify emotions (i.e., the tendency to misread emotions in general)
Child experiences peer relationship difficulties
Exposure to maternal depression
Child develops tendency to see negative emotions like sadness and anger when they are not there
Child experiences peer relationship difficulties

Note. Solid arrows represent research contributions that are the primary focus of the present study; segmented arrows represent replications of previous research.

Table 1

Basic Descriptive Statistics for Maternal Depressive Symptom Data

		EPDS Scores	
	n	*Mean (SD)*	*Median*
EPDS data collected at 8 weeks postpartum	2504	5.60 (4.39)	5.00
EPDS data collected at 8 months postpartum	2504	5.04 (4.44)	4.00
EPDS data collected at 21 months postpartum	2504	5.29 (4.46)	4.00
EPDS data collected at 33 months postpartum	2504	5.78 (4.67)	5.00
Mothers high 0 times	2024	--	--
Mothers high 1 time	294	--	--
Mothers high 2 times	100	--	--
Mothers high 3 times	53	--	--
Mothers high 4 times	33	--	--
Mothers high at 8 weeks postpartum only	71	14.83 (2.54)	14.00
Mothers high at 8 months postpartum only	54	15.13 (2.51)	14.00
Mothers high at 21 months postpartum only	70	14.87 (1.60)	14.00
Mothers high at 33 months postpartum only	99	15.19 (3.13)	14.00

Note. EPDS refers to the Edinburgh Postnatal Depression Scale. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 2

Basic Descriptive Statistics for Children's Emotion Identification Skill and Peer Relationship Functioning

	Male Children (*n* = 1243)		Female Children (*n* = 1261)	
DANVA2 Emotion Identification Error Scores	*Mean (SD)*	*Median*	*Mean (SD)*	*Median*
Total Errors	4.95 (2.92)	4.00	4.32 (2.63)	4.00
Sad Errors	.77 (.98)	0.00	.69 (.89)	0.00
Angry Errors	2.24 (1.42)	2.00	1.91 (1.30)	2.00
Fear Errors	1.59 (1.45)	1.00	1.50 (1.36)	1.00
Happy Errors	.35 (.65)	0.00	.23 (.56)	0.00
Sad Misattributions	1.46 (1.38)	1.00	1.02 (1.18)	1.00
Angry Misattributions	.51 (.93)	0.00	.45 (.85)	0.00
Teacher-rated SDQ Subscale				
Peer Problems	1.23 (1.82)	0.00	.82 (1.44)	0.00

Note. DANVA2 refers to the Diagnostic Analysis of Nonverbal Accuracy – Second Edition; SDQ refers to the teacher-rated Goodman Strengths and Difficulties Questionnaire.

Table 3

Number of Child Participants per Maternal Depression Chronicity and Timing Group by Gender and Age for Analyses with Emotion Identification Skill and Peer Relationship Functioning

Dependent Variable & Chronicity Group	Y. Males *n*	Y. Females *n*	O. Males *n*	O. Females *n*
Emotion Identification				
Never High	709	711	296	308
1 Time High	99	105	49	41
2 Times High	36	36	15	13
3 Times High	18	15	8	12
4 Times High	10	12	3	8
Peer Relationship Functioning				
Never High	524	530	480	487
1 Time High	89	78	59	68
2 Times High	17	22	34	27
3 Times High	11	11	15	15
4 Times High	7	7	6	13

Dependent Variable & Timing Group	Y. Males *n*	Y. Females *n*	O. Males *n*	O. Females *n*
Emotion Identification				
Never High	709	711	296	308
8 Weeks Only	27	22	11	11
8 Months Only	18	21	8	7
21 Months Only	20	30	12	8
33 Months Only	34	32	18	15
Peer Relationship Functioning				
Never High	524	530	480	487
8 Weeks Only	25	19	13	14
8 Months Only	14	14	12	14
21 Months Only	21	22	11	16
33 Months Only	29	52	23	24

Note. “Y.” refers to “Younger” and “O.” refers to “Older.”

Table 4

Spearman Correlation Coefficients of Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms with Children's Later Emotion Identification Skill

DANVA2 Error Score	Y. Males	Y. Females	O. Males	O. Females
	r_s (*n*=872)	r_s (*n*=879)	r_s (*n*=371)	r_s (*n*=382)
Total Errors	-.02	-.00	-.05	-.07
Sad Errors	-.03	-.01	-.07	-.04
Angry Errors	-.01	.03	.01	-.07
Fear Errors	.00	-.02	-.03	-.07
Happy Errors	-.03	-.08*	-.08	.02
Sad Misattributions	.00	.00	-.01	-.06
Angry Misattributions	.01	-.03	-.03	-.05

Note. "Y." refers to "Younger" and "O." refers to "Older." "Younger" and "Older" signify a median-split in age of child at administration of the Diagnostic Analysis of Nonverbal Accuracy – Second Edition (DANVA2). "Younger" children range in age from 7.83 to 8.58 years and "Older" children range in age from 8.67 to 10.33 years.

* $p < .05$.

Table 5

Total Emotion Identification Errors on the Diagnostic Analysis of Nonverbal Accuracy – Second Edition as a function of the Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms, Gender, and Age

Chronicity Group	Y. Males	Y. Females	O. Males	O. Females
	M (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*
High 0 Times	4.95 (2.80); 5	4.50 (2.71); 4	4.98 (2.99); 5	4.08 (2.53); 4
High 1 Time	4.76 (3.15); 4	4.42 (2.30); 4	4.88 (2.75); 5	3.71 (2.26); 3
High 2 Times	5.25 (3.74); 4	4.19 (2.95); 4	4.20 (2.21); 4	3.85 (1.95); 4
High 3 Times	6.33 (3.80); 5	4.47 (3.20); 3	4.00 (2.67); 4.5	3.42 (2.23); 2.5
High 4 Times	4.70 (3.59); 4.5	4.50 (2.65); 4	5.00 (5.29); 3	3.13 (2.23); 3

Note. “Y.” refers to “Younger” and “O.” refers to “Older.” “Younger” and “Older” signify a median-split in age of child at DANVA2 administration. “Younger” children range in age from 7.83 to 8.58 years and “Older” children range in age from 8.67 to 10.33 years. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 6

Sad Errors on the Diagnostic Analysis of Nonverbal Accuracy – Second Edition as a Function of the Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms, Gender, and Age

Chronicity Group	Y. Males	Y. Females	O. Males	O. Females
	M (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*
High 0 Times	.78 (.96); 0	.71 (.93); 0	.80 (1.00); 0	.67 (.86); 0
High 1 Time	.66 (.92); 0	.73 (.87); 0	.67 (.99); 0	.63 (.62); 1
High 2 Times	.83 (1.11); 1	.64 (.90); 0	.40 (.63); 0	.38 (.65); 0
High 3 Times	1.22 (1.44); 1	.67 (.82); 0	.75 (.89); .5	.58 (.90); 0
High 4 Times	.40 (.84); 0	.42 (.90); 0	.67 (1.15); 0	.25 (.46); 0

Note. “Y.” refers to “Younger” and “O.” refers to “Older.” “Younger” and “Older” signify a median-split in age of child at DANVA2 administration. “Younger” children range in age from 7.83 to 8.58 years and “Older” children range in age from 8.67 to 10.33 years. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 7

Angry Errors on the Diagnostic Analysis of Nonverbal Accuracy – Second Edition as a Function of the Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms, Gender, and Age

Chronicity Group	Y. Males	Y. Females	O. Males	O. Females
	M (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*
High 0 Times	2.26 (1.39); 2	1.97 (1.33); 2	2.19 (1.48); 2	1.80 (1.29); 2
High 1 Time	2.19 (1.40); 2	1.98 (1.07); 2	2.24 (1.53); 2	1.78 (1.24); 1
High 2 Times	2.08 (1.42); 2	2.08 (1.54); 2	2.40 (1.35); 3	1.69 (1.32); 2
High 3 Times	2.78 (1.56); 2.5	1.73 (1.28); 1	1.75 (1.04); 2	1.25 (.87); 1
High 4 Times	2.60 (1.65); 2.5	2.17 (1.34); 2	2.67 (2.08); 2	1.13 (1.36); 1

Note. “Y.” refers to “Younger” and “O.” refers to “Older.” “Younger” and “Older” signify a median-split in age of child at DANVA2 administration. “Younger” children range in age from 7.83 to 8.58 years and “Older” children range in age from 8.67 to 10.33 years. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 8

Fearful Errors on the Diagnostic Analysis of Nonverbal Accuracy – Second Edition as a Function of the Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms, Gender, and Age

Chronicity Group	Y. Males	Y. Females	O. Males	O. Females
	M (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*
High 0 Times	1.57 (1.39); 1	1.54 (1.33); 1	1.60 (1.46); 1	1.44 (1.33); 1
High 1 Time	1.61 (1.66); 1	1.52 (1.38); 1	1.71 (1.53); 1	1.15 (1.46); 1
High 2 Times	1.97 (1.78); 1.5	1.36 (1.36); 1	1.07 (.88); 1	1.46 (1.66); 2
High 3 Times	1.78 (1.70); 2	1.87 (2.23); 1	1.25 (1.28); 1	1.42 (1.38); 1
High 4 Times	1.50 (1.58); 1	1.75 (1.29); 2	1.67 (2.08); 1	1.63 (1.60); 1.5

Note. “Y.” refers to “Younger” and “O.” refers to “Older.” “Younger” and “Older” signify a median-split in age of child at DANVA2 administration. “Younger” children range in age from 7.83 to 8.58 years and “Older” children range in age from 8.67 to 10.33 years. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 9

Happy Errors on the Diagnostic Analysis of Nonverbal Accuracy – Second Edition as a Function of the Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms, Gender, and Age

Chronicity Group	Y. Males *M* (*SD*); *Mdn*	Y. Females *M* (*SD*); *Mdn*	O. Males *M* (*SD*); *Mdn*	O. Females *M* (*SD*); *Mdn*
High 0 Times	.34 (.61); 0	.27 (.62); 0	.39 (.76); 0	.18 (.46); 0
High 1 Time	.30 (.54); 0	.18 (.48); 0	.24 (.60); 0	.15 (.36); 0
High 2 Times	.36 (.83); 0	.11 (.40); 0	.33 (.62); 0	.31 (.63); 0
High 3 Times	.56 (1.04); 0	.20 (.41); 0	.25 (.46); 0	.17 (.39); 0
High 4 Times	.20 (.63); 0	.17 (.58); 0	0 (0); 0	.13 (.35); 0

Note. “Y.” refers to “Younger” and “O.” refers to “Older.” “Younger” and “Older” signify a median-split in age of child at DANVA2 administration. “Younger” children range in age from 7.83 to 8.58 years and “Older” children range in age from 8.67 to 10.33 years. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 10

Sad Misattribution Errors on the Diagnostic Analysis of Nonverbal Accuracy as a Function of the Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms, Gender, and Age

Chronicity Group	Y. Males	Y. Females	O. Males	O. Females
	M (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*
High 0 Times	1.45 (1.31); 1	1.05 (1.19); 1	1.44 (1.38); 1	.97 (1.17); 1
High 1 Time	1.40 (1.38); 1	1.01 (1.09); 1	1.63 (1.64); 1	.95 (1.20); 1
High 2 Times	1.42 (1.38); 1	1.28 (1.39); 1	1.07 (1.33); 0	1.15 (1.07); 1
High 3 Times	2.22 (2.10); 1.5	.60 (.83); 0	1.13 (.83); 1	.42 (.90); 0
High 4 Times	1.90 (2.02); 1	1.25 (1.48); 1	2.67 (2.89); 1	.50 (1.07); 0

Note. “Y.” refers to “Younger” and “O.” refers to “Older.” “Younger” and “Older” signify a median-split in age of child at DANVA2 administration. “Younger” children range in age from 7.83 to 8.58 years and “Older” children range in age from 8.67 to 10.33 years. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 11

Angry Misattribution Errors on the Diagnostic Analysis of Nonverbal Accuracy – Second Edition as a Function of the Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms, Gender, and Age

Chronicity Group	Y. Males	Y. Females	O. Males	O. Females
	M (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*	*M* (*SD*); *Mdn*
High 0 Times	.51 (.92); 0	.49 (.93); 0	.52 (.99); 0	.43 (.79); 0
High 1 Time	.48 (.90); 0	.45 (.71); 0	.41 (.79); 0	.29 (.64); 0
High 2 Times	.61 (1.20); 0	.33 (.63); 0	.27 (.59); 0	.38 (.77); 0
High 3 Times	.72 (.89); .5	.20 (.56); 0	.75 (1.04); .5	.58 (1.00); 0
High 4 Times	.50 (1.08); 0	.17 (.39); 0	.33 (.58); 0	.13 (.35); 0

Note. “Y.” refers to “Younger” and “O.” refers to “Older.” “Younger” and “Older” signify a median-split in age of child at DANVA2 administration. “Younger” children range in age from 7.83 to 8.58 years and “Older” children range in age from 8.67 to 10.33 years. “High” refers to an EPDS score that indicates probable maternal depression (i.e., a score of 13 or greater).

Table 12

Spearman Correlation Coefficients and Descriptive Statistics of Chronicity of Early Exposure to Elevated Maternal Depressive Symptoms with Children's Later Peer Relationship Functioning

	Male Children r_s (n)	Female Children r_s (n)
Younger	.05 (648)	.09** (648)
Older	.07* (594)	.07* (610)

	Y. Males	Y. Females	O. Males	O. Females
Maternal Depression Chronicity Group	*M*(*SD*); *Mdn*	*M*(*SD*); *Mdn*	*M*(*SD*); *Mdn*	*M*(*SD*); *Mdn*
0 Times High	1.34(1.86); 0	.72(1.38); 0	1.04(1.72); 0	.80(1.36); 0
1 Time High	1.29(1.84); 1	1.03(1.60); 0	1.07(1.23); 1	.96(1.65); 0
2 Times High	2.00(2.24); 2	1.41(2.26); 0	1.26(2.38); 0	.93(1.62); 0
3 Times High	2.00(2.53); 2	.55(1.51); 0	1.60(1.64); 2	1.27(1.58); 1
4 Times High	2.57(2.76); 2	1.57(1.62); 1	1.50(1.52); 1.5	1.38(1.26); 1

Note. "Y." refers to "Younger" and "O." refers to "Older." "Younger" and "Older" signify a median-split in age of child at teacher SDQ rating. "Younger" children range in age from 7.67 to 8.33 years and "Older" children range in age from 8.42 to 9.5 years. SDQ refers to the Goodman Strengths and Difficulties Questionnaire. Four children were not included in these analyses because data were not available on their age at teacher SDQ rating.

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

Table 13

Spearman Correlation Coefficients of Children's Peer Relationship Functioning with Their Approximately Concurrent Emotion Identification Skill

DANVA2 Error Score	Y. Males r_s (n=648)	Y. Females r_s (n=648)	O. Males r_s (n=594)	O. Females r_s (n=610)
Total Errors	.08*	.09*	.05	.05
Sad Errors	.02	.06	.01	.04
Angry Errors	.10**	.07*	.02	.07*
Fear Errors	.05	.04	.05	.02
Happy Errors	-.02	.06	.01	-.02
Sad Misattributions	.07*	.06	.03	.09*
Angry Misattributions	.07*	-.01	.03	.07*

Note. "Y." refers to "Younger" and "O." refers to "Older." "Younger" and "Older" signify a median-split in age of child when teachers rated them on the Goodman Strengths and Difficulties Questionnaire (SDQ). "Younger" children range in age from 7.67 to 8.33 years and "Older" children range in age from 8.42 to 9.5 years. DANVA2 refers to the Diagnostic Analysis of Nonverbal Accuracy – Second Edition.

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

Table 14

Analysis of Covariance of Children's Emotion Identification Skill as a Function of the Timing of Exposure to Elevated Maternal Depressive Symptoms, With Gender and Child Age at Administration of the Diagnostic Analysis of Nonverbal Accuracy – Second Edition

DANVA2 Error Score	Independent Var.	df	SS	MS	F	ω^2
Total Errors						
	Child Age (C)	1	5.60	5.60	12.76***	.01
	Timing of Dep.	4	.80	.20	.46	.00
	Child Gender	1	1.71	1.71	3.90*	.00
	TOD x CG	4	.28	.07	.16	.00
Sad Errors						
	Child Age (C)	1	.35	.35	.40	.00
	Timing of Dep.	4	1.81	.45	.52	.00
	Child Gender	1	.00[†]	.00[†]	.00	.00
	TOD x CG	4	2.21	.55	.63	.00
Angry Errors						
	Child Age (C)	1	5.04	5.04	15.79***	.01
	Timing of Dep.	4	1.09	.27	.85	.00
	Child Gender	1	.71	.71	2.21	.00
	TOD x CG	4	.80	.20	.63	.00
Fearful Errors						
	Child Age (C)	1	2.03	2.03	7.25	.01
	Timing of Dep.	4	2.90	.73	2.60*	.00
	Child Gender	1	.36	.36	1.28	.00
	TOD x CG	4	.83	.21	.74	.00
Sad Misattributions						
	Child Age (C)	1	2.67	2.67	8.97**	.00
	Timing of Dep.	4	.08	.02	.07	.00
	Child Gender	1	4.52	4.52	15.19***	.00
	TOD x CG	4	.68	.17	.57	.00

Note. (C) indicates that a variable was entered as a covariate; To achieve homogeneity of variance among groups, square-root transformations were applied to DANVA2 Total and Angry Error Scores, whereas a Natural Logarithm + 1 transformation was applied to Fearful and Sad Misattribution Error Scores. TOD refers to timing of depression and CG refers to child gender.

[†] Actual number generated by SPSS 15.0 was 3.19E-005

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 15

Descriptive Statistics for Parametric Analyses Looking at Children's Emotion Identification Skill as a Function of the Timing of Exposure to Elevated Maternal Depressive Symptoms, With Gender and Child Age at Diagnostic Analysis of Nonverbal Accuracy – Second Edition Administration

	Never High	8 Wks Only	8 Mos Only	21 Mos Only	33 Mos Only
DANVA2 Error Score	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Male Tot. Errors	4.96 (2.85)	4.53 (2.89)	4.92 (3.65)	5.34 (3.13)	4.60 (2.71)
Female Tot. Errors	4.37 (2.67)	3.97 (2.26)	4.29 (2.24)	4.29 (2.24)	4.30 (2.53)
Male Sad Errors	.79 (.97)	.50 (.80)	.77 (.91)	.75 (.98)	.67 (1.02)
Female Sad Errors	.70 (.91)	.67 (.74)	.64 (.78)	.66 (.94)	.81 (.77)
Male Ang. Errors	2.24 (1.42)	2.34 (1.26)	1.92 (1.52)	2.19 (1.60)	2.27 (1.42)
Female Ang. Error	1.92 (1.32)	1.70 (.85)	1.93 (1.18)	1.84 (1.17)	2.15 (1.18)
Male Fear Errors	1.58 (1.41)	1.42 (1.64)	1.81 (1.90)	2.03 (1.69)	1.48 (1.38)
Female Fear Errors	1.51 (1.33)	1.52 (1.60)	1.32 (.90)	1.68 (1.44)	1.19 (1.48)
Male Sad Misatt.	1.45 (1.33)	1.42 (1.48)	1.42 (1.42)	1.72 (1.55)	1.40 (1.47)
Female Sad Misatt.	1.03 (1.18)	.97 (1.13)	.96 (1.04)	.87 (1.04)	1.13 (1.23)

Note. "Tot." refers to "Total" and "Ang." refers to "Angry." For comparison purposes, raw variable means are presented for each measure of emotion identification skill. "Misatt" refers to misattributions.

Table 16

Kruskal-Wallis Tests of Children's Emotion Identification Skill as a Function of the Timing of Exposure to Elevated Maternal Depressive Symptoms, Split by Child Gender and Age at Administration of the Diagnostic Analysis of Nonverbal Accuracy – Second Edition

DANVA2 Error Score	Y. Males $\chi^2(df, n)$	Y. Females $\chi^2(df, n)$	O. Males $\chi^2(df, n)$	O. Females $\chi^2(df, n)$
Happy Errors	2.82 (4, 808)	9.99 (4, 816)*	9.27 (4, 345)	2.78 (4, 349)
Angry Misattributions	9.10 (4, 808)	3.26 (4, 816)	5.93 (4, 345)	3.66 (4, 349)

Note. "Y." refers to "Younger" and "O." refers to "Older." "Younger" and "Older" signify a median-split in age of child at DANVA2 administration. "Younger" children range in age from 7.83 to 8.58 years and "Older" children range in age from 8.67 to 10.33 years.

* $p < .05$

Table 17

Kruskal-Wallis Tests of Children's Peer Relationship Functioning as a Function of the Timing of Exposure to Elevated Maternal Depressive Symptoms, Split by Child Gender and Age at Administration of the Goodman Strengths and Difficulties Questionnaire

Teacher-rated SDQ Subscale	Y. Males χ^2 (*df*, *n*)	Y. Females χ^2 (*df*, *n*)	O. Males χ^2 (*df*, *n*)	O. Females χ^2 (*df*, *n*)
Peer Problems	5.06 (4, 613)	3.53 (4, 608)	4.21 (4, 539)	4.00 (4, 555)

Note. "Y." refers to "Younger" and "O." refers to "Older." "Younger" and "Older" signify a median-split in age of child at teacher SDQ rating. "Younger" children range in age from 7.67 to 8.33 years and "Older" children range in age from 8.42 to 9.5 years.

* $p < .05$

Table 18

Descriptive Statistics for Nonparametric Analyses of Children's Emotion Identification Skill and Peer Relationship Functioning as a Function of the Timing of Exposure to Elevated Maternal Depressive Symptoms

DANVA2 Error Score And Timing Group	Y. Males *M* (*SD*); *Mdn*	Y. Females *M* (*SD*); *Mdn*	O. Males *M* (*SD*); *Mdn*	O. Females *M* (*SD*); *Mdn*
Happy Errors				
Never High	.34 (.61); 0	.27 (.62); 0	.39 (.76); 0	.18 (.46); 0
8 Weeks Only	.37 (.63); 0	.14 (.35); 0	0 (0); 0	0 (0); 0
8 Months Only	.28 (.46); 0	.48 (.75); 0	.75 (.89); .5	.14 (.38); 0
21 Months Only	.45 (.69); 0	.07 (.37); 0	.25 (.62); 0	.25 (.46); 0
33 Months Only	.18 (.39); 0	.13 (.34); 0	.17 (.51); 0	.20 (.41); 0
Angry Misattributions				
Never High	.51 (.92); 0	.49 (.93); 0	.52 (.99); 0	.43 (.79); 0
8 Weeks Only	.41 (.84); 0	.32 (.65); 0	.09 (.30); 0	.18 (.40); 0
8 Months Only	1.00 (1.14); .5	.38 (.67); 0	.50 (1.07); 0	0 (0); 0
21 Months Only	.20 (.70); 0	.40 (.67); 0	.83 (1.03); .5	.63 (1.19); 0
33 Months Only	.44 (.82); 0	.63 (.79); 0	.28 (.57); 0	.33 (.49); 0

SDQ Peer Problems Timing Group	Y. Males *M* (*SD*); *Mdn*	Y. Females *M* (*SD*); *Mdn*	O. Males *M* (*SD*); *Mdn*	O. Females *M* (*SD*); *Mdn*
Never High	1.34 (1.86); 0	.72 (1.38); 0	1.04 (1.72); 0	.80 (1.6); 0
8 Weeks Only	1.20 (1.50); 1	.84 (1.39); 0	1.15 (1.28); 1	1.29 (1.94); 0
8 Months Only	1.14 (1.23); 1	1.21 (1.72); 0	.75 (1.22); 0	.36 (1.08); 0
21 Months Only	2.19 (2.66); 1	1.05 (1.81); 0	1.18 (1.08); 1	.81 (1.38); 0
33 Months Only	.79 (1.42); 0	1.04 (1.58); 0	1.13 (1.33); 1	1.21 (1.89); 0

Note. DANVA2 refers to the Diagnostic Analysis of Nonverbal Accuracy – Second Edition; SDQ refers to the teacher-rated Goodman Strengths and Difficulties Questionnaire. "Y." refers to "Younger" and "O." refers to "Older." For the DANVA2, "Younger" and "Older" signify a median-split in age of child at DANVA2 administration. "Younger" children range in age from 7.83 to 8.58 years and "Older" children range in age from 8.67 to 10.33 years. For the SDQ, "Younger" and "Older" signify a median-split in age of child at teacher SDQ rating. "Younger" children range in age from 7.67 to 8.33 years and "Older" children range in age from 8.42 to 9.5 years.