Initial Findings from a Randomized, Controlled Trial of Healthy Families Massachusetts: Early Program Impacts on Young Mothers' Parenting

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Introduction

For decades now, child maltreatment has been considered a serious public health concern, associated with extensive and significant consequences for children's health, development, and well-being (Bolger & Patterson, 2003; Cicchetti & Valentino, 2006; DeBellis, 2005; Erickson & Egeland, 2002; U.S. Department of Health and Human Services [USDHHS], 2011). In 2010, an estimated 754,000 children were victims of abuse and neglect, and approximately 3.3 million children were referred to Child Protective Services (CPS) that year. More than one-third (34%) of these children were under three years of age, and the majority (78%) experienced neglect (USDHHS, 2011).

The deleterious effects of CA/N early in life—including *physical* (impaired brain development, poor physical health), *psychological* (poor mental health, social and school difficulties, cognitive deficits), and *behavioral* (behavior problems, juvenile delinquency, substance abuse, teen pregnancy) consequences—are now well-documented (Bolger & Patterson, 2003; Kim & Cichetti, 2006; Schatz & Lounds, 2007). Child neglect is the most commonly reported form of child maltreatment, claiming more victims each year than physical and sexual abuse combined (Dubowitz, Papas, Black, & Starr, 2002; DePanfilis, 2006; USDHHS, 2009). Research on child neglect has highlighted the particular vulnerability of very young children by identifying deficits, both structural and functional, in the brains of neglected infants (Hawley, 1996; Perry & Pollard, 1997). Moreover, young children's ability to form healthy attachments with caregivers may be disrupted, thereby impeding the later formation of healthy relationships that might compensate for the effects of early neglect (DePanfilis, 2006).

Children born to adolescent mothers are particularly at-risk for maltreatment (Sidebotham & Golding, 2001; Whitman, Borkowski, Keogh, & Weed, 2001). Estimates of the percentage of maltreated children living with an adolescent mother are as high as 50% (Bolton, 1990), and the association between adolescent parenting and infant neglect is particularly strong (Lounds, Borkowski, & Whitman, 2006; USDHHS, 2010). Adolescent mothers are most at-risk for neglecting their children within their children's first three years of life (Stier et al., 1993; USDHHS, 2010),

adding weight to the considerable body of research suggesting that intervention/prevention programs for young mothers should come as early as possible in young parents' lives (Schatz & Lounds, 2007).

Home visitation is one of the service strategies aimed at preventing child abuse and neglect that has been most broadly implemented in the United States (Harding, Diaz, & Oshana, 2004). Approximately 400 home visiting programs now serve approximately half a million children (Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010), with annual costs of these services estimated anywhere between $250 million and $1 billion (Stoltzfus & Lynch, 2009). Currently, at least 40 states utilize one or more models of home visitation (Johnson, 2009), serving an estimated 2% of all children under age six (Gomby, 2005). Moreover, recent federal legislation (the Patient Protection and Affordable Care Act of 2009) provides $1.5 billion for the next five years to expand evidence-based home visitation programs to at-risk pregnant women and newborns. Despite this general enthusiasm for home visiting, however, meta-analyses of rigorous evaluations of home visiting programs suggest that, while some programs have positive impacts on parenting, these effects often are modest and do not reflect significant reductions in child abuse and neglect (Azzi-Lessing, 2011; Bull, McCormick, Swann, & Mulvihill, 2004; Chaffin, 2004; Elkan et al., 2000; Howard & Brooks-Gunn, 2009; Mikton & Butchart, 2009; Sweet & Applebaum, 2004).

At this point, the scientific evidence on home visiting remains insufficient to provide appropriate guidance to policymakers on how to achieve stronger impacts with families at-risk for child maltreatment; there remain significant areas of practice for which additional, targeted research is necessary, to determine the conditions under which home visitation is most effective and for whom (Sweet & Applebaum, 2004). Few studies, for instance, have explored characteristics of parents, families, and environments that influence the effectiveness of home visitation (Ammerman et al., 2010). Similarly, research on program utilization, meant to determine how populations use which set of services in what ways and why, is remarkably thin in a field as otherwise well-studied as home visiting (Reynolds, Methieson, & Topitzes, 2009). Another notable gap is the lack of research distinguishing program outcomes for different forms of child maltreatment (e.g., neglect, physical

abuse, sexual abuse, multiple type maltreatment). A growing body of research suggests that different types of maltreatment have distinct causes and consequences (DePanfilis, 2006; Hildyard & Wolf, 2002; Kim & Cicchetti, 2006), and evaluation studies indicate that program effects have been more modest for some forms than others (i.e., neglect) (Duggan et al., 2004; Skowron & Reinemann, 2005).

To summarize, findings from evaluations on the effectiveness of home visitation indicate somewhat limited success in reducing child abuse and neglect, but also provide the basis for optimism if researchers can determine more precisely which program strategies work best for whom and under what conditions (Howard, & Brooks-Gunn, 2009). This study investigates how characteristics of young mothers, their childrearing environments, and their participation in a paraprofessional home visiting program for young parents determine the program's impact on parenting, including child maltreatment. It is intended to contribute to the general literature on home visiting effectiveness, and to shed particular light on individual and contextual characteristics that moderate program effects. Findings should also advance policymakers' and practitioners' efforts to maximize the impact of home visitation as a strategy to prevent child maltreatment.

Review of the Literature

This review of the literature provides an overview of current research in the following areas: adolescent parents and child maltreatment, with attention paid to antecedents and outcomes; differentiation among child maltreatment types; home visiting approaches and effects on maltreatment and other parenting outcomes; potential moderators of home visiting program effectiveness and home visiting program utilization.

Adolescent Parents and Child Maltreatment

Young women who give birth in their teen years are simultaneously in need of parenting and becoming parents (Lerner, Noh, & Wilson, 2001), navigating the complicated transition from adolescence to adulthood while confronting the challenges of adjusting to motherhood (Noria, Weed, & Keogh, 2007). Many encounter additional hardships along the way (e.g., family discord, social

isolation, poverty), some of which may have contributed to an early pregnancy to begin with and then placed their families at-risk for future adversity (Coley & Chase-Lansdale, 1998; Moore & Brooks-Gunn, 2002). Given the many difficulties young mothers face, it is not surprising that numerous studies demonstrate short- and long-term costs of parenting in adolescence to teenage parents, their children, and society (Borkowski, Whitman, & Farris, 2007; Leadbeater & Way, 2001; Lounds et al, 2006; Moore, Morrison, & Green, 1997; Whitman et al., 2001).

Of all forms of maltreatment, the type most strongly associated with maternal age is neglect (DePanfilis, 2006; Hildyard & Wolfe, 2002); the younger a mother is at childbirth the greater the likelihood that she will neglect her child (Goerge & Lee, 1997; Lee & Goerge, 1999; Slack, Holl, McDaniel, Yoo, & Bolger, 2004). Mounting research demonstrates that early exposure to neglect, especially when severe and prolonged, has adverse and long lasting consequences for children's cognitive, socioemotional, and physical development in ways that are distinct from other forms of maltreatment (De Bellis, 2005; Erickson & Egeland, 2002). It can also be fatal; neglect is the cause of the majority of maltreatment-related deaths, and almost half (46.2%) occur within a year of a child's birth (USDHHS, 2010).

Researchers have identified a host of risk factors that increase the probability of suboptimal parenting in adolescent parents, including the following: (1) individual factors such as cognitive immaturity, limited knowledge of child development (Tamis-Lamonda, Shannon, & Spellman, 2002), low intelligence (East & Felice, 1996; Mylod, Whitman, & Borkowski, 1997; O'Callaghan & Dukewich, 2001), and poor mental health (e.g., depression, anxiety) (O'Callaghan & Dukewich, 2001; Whitman et al., 2001), and (2) contextual factors such as stressful living conditions (Moore & Brooks-Gunn, 2002; O'Callaghan & Dukewich, 2001), single parenthood (Sedlak, et al, 2010), poverty, social isolation (Meade, Kershaw, & Ickovics, 2008; Sedlak & Broadhurst, 1996), and difficult family interactions (Lounds et al., 2006; Milan, Lewis, Ethier, Kershaw, & Ickovics, 2004).

The specific mechanisms underlying neglectful and abusive parenting are still unclear, making it difficult to determine which parents to target for prevention. As cited above, a number of

studies have produced robust findings on specific risk factors associated with maltreatment, but in reality these risks rarely occur in isolation from one another. Maltreatment is the product of many interacting forces originating from the child, parents, family, and larger environment (Belsky, 1993; Cicchetti & Lynch, 1993). Risks tend to aggregate in the lives of children and their families and, generally speaking, the more risk factors that accumulate, the more substantial the threat to a child's well-being (Sameroff, 2000; Sameroff, Seifer, & Zax, 1982). Further research is needed, however, to ascertain which constellations of risk are most likely to lead to maltreatment and which are most amenable to intervention (Ross & Vandivere, 2009).

Differentiation among Maltreatment Types

Child neglect is the most common form of child maltreatment and arguably poses the greatest threat to children's well-being, yet it has received limited public attention (Dubowitz, 2007). In 2009, CPS identified 763,000 children who were victims of abuse and neglect, jointly referred to as "child maltreatment." Over three-quarters (78.3%) of these children suffered neglect, a figure that far exceeded physical abuse (17.8%), sexual abuse (9.5%), and psychological abuse (7.6%) combined (USDHHS, 2009). Although there is a growing consensus that the causes and consequences of neglect are different from those of abuse (DePanfilis, 2006; Dubowitz, 2007; Manly, Kim, Rogosch, & Cicchetti, 2001), the majority of research to date has not delineated findings for different forms of maltreatment. Most researchers focus on child abuse, or aggregate abuse and neglect into a single construct as if they constitute a monolithic experience. The conflation of disparate forms of maltreatment is especially concerning in light of mounting evidence that the causes and consequences of neglect are distinct from abuse (Manlyet al., 2001; Pianta, Egeland, & Erickson, 1989); studies that combine the two miss opportunities to identify unique antecedents. On the other hand, the shortfall in the literature presents an important opportunity for researchers, who can advance the scientific evidence base that policymakers and practitioners need to develop successful strategies to prevent neglect.

Home Visitation as a Strategy to Prevent Child Maltreatment

Home visitation as a strategy of service delivery has been employed in the U.S. since the late 19th century, when it was used primarily as an intervention for poor urban women and children (Buhler-Wilkerson, 1985). In the early 1990s, following the development of early models such as Olds and colleagues' nurse visitation (Olds et al., 2009) and Hawaii's Healthy Start (Duggan et al., 2004), the U.S. Advisory Board on Child Abuse and Neglect implemented a universal home visitation system for parents and their newborns, paving the way for some of today's most prominent prevention programs (e.g., Healthy Families America, Healthy Start, Even Start; Astuto & Allen, 2009).

While target populations (e.g., low-income families, adolescent parents), requirements for the qualifications of home visitor (e.g., nurses, social workers, trained paraprofessionals), and training approaches vary across models, most originate from the notion that supporting parents' well-being will improve the safety and well-being of their children. At a minimum, home visitation typically offers parents regular, one-on-one visits in which home visitors provide information, resources, psychoeducational training(e.g., childrearing skills, parent-child relationship quality, home safety, maternal health, infant nutrition), referrals, and case management services related to parenting. This strategy has been lauded for focusing on the earliest months of life (e.g., pre- and postnatal services), minimizing barriers to accessing services, providing an accurate "picture" of children's home environments, and enabling service providers to tailor interventions to the specific needs of individual families (Astuto & Allen, 2009; Thompson, Kropenske, Heinicke, Gomby, & Halfon, 2001).

Effects of Home Visiting on Child Maltreatment

In their comprehensive review of 35 rigorously evaluated home visiting programs targeting early childhood, Kahn and Moore (2010) found only six (Early Start, Healthy Families New York [HFNY], Healthy Start, Home Visiting to Vulnerable Families by Nurses, Nurse-Family Partnership [NFP], and Social Learning Parent Training) that had any impact at all on child maltreatment, and

those six were characterized as having "mixed findings." For example, HFNY had some positive impact on substantiated cases of physical abuse, but no impact on cases of neglect; NFP had positive impact on cases of neglect, but no impact on the percent of children removed from the home. And in a recent review conducted by the Home Visiting Evidence of Effectiveness (HomVEE) project, an enterprise of the U.S. Department of Health and Human Services, only NFP was characterized as having a statistically significant favorable impact on state agency reports of child maltreatment, although HFNY had a significant impact on maternal self-reports of child maltreatment (Paulsell, Avellar, Martin, & Del Grosso, 2011).

Some home visitation experts caution that requiring a program to produce a significant reduction in rates of abuse and neglect is an unrealistic standard for establishing the intervention's effectiveness (Howard & Brooks-Gunn, 2009; Olds et al., 2009). In part, this may be because families receiving home visitation services (i.e., the intervention group) have regular contact with professionals or paraprofessionals who might identify instances of maltreatment and report it to child protective services, whereas families with infants and toddlers not participating in the program (i.e., the control group) are not exposed to the same level of scrutiny. In turn, elevated rates of maltreatment in the intervention group stemming from an increase in surveillance may obscure measurable effects on rates of child abuse and neglect reported by official sources (Mitchell-Herzfeld, Izzo, Green, Lee, & Lowenfels, 2005; Olds et al., 2009). While Chaffin and Bard (2006) warn against too strongly invoking the argument of surveillance to explain a lack of a program impact on child maltreatment when families are no longer enrolled in the program, they also note that surveillance effects may well obscure reductions in child abuse and neglect if measured when families are actively receiving services. Indeed, several meta-analyses of home visiting evaluations have concluded that surveillance bias is prevalent enough to be considered a real threat to the validity of those findings based solely on administrative reports of maltreatment (Barlow, Simkiss, & Stewart Brown, 2006; Bull, McCormick, Swann, & Mulvhill, 2004; Hodnett & Roberts, 2000; Mikton & Butchart, 2009)

Methodological issues also may hamper efforts to detect the effectiveness of home visitation in reducing maltreatment, with challenges associated with both administrative data and self-report measures. Using administrative data to accurately identify incidents of child maltreatment is difficult for a multitude of reasons: The threshold for what comprises child abuse or neglect varies considerably across agencies and states (Dubowitz, Pitts, Litrownik, Cox, Runyan, & Black, 2005; Howard & Brooks-Gunn, 2009); the number of cases investigated by Child Protective Services likely underrepresents the actual incidence of child maltreatment (Sedlak, et al., 2008); and reports may be subject to racial, ethnic, and socioeconomic biases (Ards, Myers, Malkis, Sugrue, & Shou, 2003; Fluke, Yuan, Hedderson, & Curtis, 2003). Other methods, such as self-report and observation, are prone to bias, as participants may answer survey questions about parenting in socially desirable, rather than truthful, ways (Miller-Perrin & Perrin, 2007). Finally, we believe a major impediment to ascertaining program effects on child maltreatment is the conflation of abuse and neglect. As described above, research increasingly shows that different forms of child maltreatment have heterogeneous etiologies and, accordingly, one-size-fits-all prevention approaches are unlikely to be equally successful among families with distinct profiles of risk (Wulczyn, 2009).

Effects of Home Visiting on Other Parenting Outcomes

Given these methodological issues, it is not surprising that Howard and Brooks-Gunn (2009), in their review of evaluations of nine evidence-based home visiting programs, observed that child abuse and neglect data might not be the best outcome measures by which to assess program effectiveness, suggesting that researchers also focus on those aspects of parenting and maternal functioning associated with child well-being. Parental sensitivity, for instance, has been closely associated with child maltreatment (Cicchetti & Valentino, 2006; Lyons-Ruth, Connell, Zoll, & Stahl, 1987), with many studies reporting relations between child maltreatment and low parental warmth (Slack, Holl, McDaniel, Yoo, & Bolger, 2004) and a limited capacity for sensitive and responsive care (Lounds et al, 2006), key components of emotional availability (EA) (Biringen, Robinson, & Emde, 1998) that may support positive parenting. Parenting stress also has been found

to negatively impact maternal and child outcomes (Borkowski et al., 2007; Polansky, Gaudin, & Kilpatrick, 1992; Whitman, Borkowski, Keogh, & Weed, 2001).

Indeed, evidence on home visiting effectiveness appears to be strongest with regard to improving these other parenting behaviors and attitudes (Sweet & Applebaum, 2004). Studies have shown, for instance, that parents who have received home visiting are less punitive and restrictive in their play with infants (Olds et al., 2002), use nonviolent discipline more frequently (DuMont et al., 2011), report fewer instances of psychological aggression against their children (Duggan, Rodriguez, Burell, Shea, & Rohde, 2005; Landsverk, Garland, & Leslie, 2002), have more positive parenting attitudes (Fergusson, Grant, Horwood, & Ridder, 2005), report less parenting stress (Administration for Children and Families, 2006b), and show increased maternal sensitivity (Doesum, Hosman, Riksen-Walraven, & Hoefnagels, 2008). Findings such as these suggest the importance of including parenting outcomes such as parenting attitudes, parenting stress, or mother-child interaction in any investigation of home visiting effectiveness, rather than relying solely on reduction on child maltreatment as the indicator of program success.

Moderators of Home Visiting Effectiveness

One of the major challenges to preventing child abuse and neglect is that its causes are unknown, although most experts agree that child maltreatment is multiply determined, and that no single parental trait or environmental factor can sufficiently explain why it occurs in some families and not others (Belsky, 1993; Cicchetti & Toth, 2005). Home visiting programs therefore confront the daunting task of ameliorating a problem of numerous and uncertain origins. In the absence of a definitive etiologic explanation for child maltreatment, evidence-based approaches to home visitation often focus on risk factors, or characteristics of children, parents, families, and their surroundings that have been found to be statistically associated with child maltreatment. Empirically established risk factors include young maternal age, a parental childhood history of maltreatment, single parenthood, intimate partner violence (IPV), maternal depression, social isolation, poor

neighborhood conditions, and poverty, among others (Ammerman et al., 2010; Daro, 2009; Ertem, Leventhal, & Dobbs, 2000; Tandon, Parillo, Jenkins, & Duggan, 2005; Slack et al., 2011).

Not surprisingly, given this multiplicity of risk factors and contexts, home visiting services are not equally effective for all families who receive them, even when they are well-designed and implemented (Daro & Cohn-Donnelly, 2002). That is, these programs may be an especially useful strategy with some subgroups of program participants, but have little impact with others (Daro & Harding, 1999; Eckenrode et al., 2000; Olds & Kitzman, 1993). Determining which services are most beneficial to which groups of individuals under which conditions is key to understanding how to prevent child maltreatment and promote healthy parenting. Studies suggest that first-time adolescent mothers, who often face considerable economic hardship, and exhibit substantial psychological vulnerability (Maynard, 1997), are especially amenable to intervention through home visitation (DuMont et al., 2008; Olds et al., 2002). On the other hand, IPV, maternal depression, a maternal history of childhood maltreatment, lack of social support, and poor neighborhood conditions, may impede the ability of programs to reduce child abuse and neglect (Duggan et al., 2004; Eckenrode et al., 2000; Hanks et al., 2011; Landsverk et al., 2002; Mitchell-Herzfeld et al., 2005).

Intimate partner violence (IPV). Approximately15 - 45% of families enrolled in home visiting programs experience IPV (Chamberlain, 2007). Children who reside with couples engaged in high-conflict, aggressive, and coercive relationships are more likely to be maltreated than are children who do not experience IPV in their homes (Lee, Kotch, & Cox, 2004; Margolin, Gordis, Medina, & Oliver, 2003; Tajima, 2000; Tolan, Gorman-Smith, & Henry, 2006; Wolfe & Garrido, 2006). The rate of child abuse among children exposed to IPV is 15 times the national average (Osofsky, 2003), and estimated co-morbidity rates of IPV and child maltreatment range from 30 - 60% (Daro, Edleson, & Pinderhughes, 2004).

The association between IPV and child maltreatment has specific relevance to home visiting intervention, as research suggests that the effectiveness of these programs in reducing child

maltreatment is attenuated for families experiencing IPV (Eckenrode et al., 2000; Sharps, Campbell, Baty, Walker, & Bair-Merritt, 2008; Tandon et al., 2005). The specific nature of the moderating effect of IPV on home visiting in preventing child maltreatment is not yet clear, and further study may help to explain the underlying mechanisms and elucidate more effective practice. Eckenrode and colleagues (2000) found a limiting effect of IPV on preventing child abuse and neglect with a program of nurse home visitation, and hypothesized that it "sets in motion a number of processes that compromise the parenting of the mother or other caretakers," by way of diminished physical or psychological health. The researchers also postulated that IPV introduces "a more chaotic or a less predictable environment for children, placing them at increased risk" (p.1390). However, such explanations have not been tested empirically within the context of home visitation with adolescent parents, and warrant further investigation.

Maternal depression. Maternal depression is one of the individual characteristics most often linked to poor parenting (Duggan et al., 2007; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Stevens, Ammerman, Putnam, & Van Ginkel, 2002) and is strongly associated with child maltreatment (Conron, Beardslee, Koenen, Buka, & Gortmaker, 2009). Compared to non-depressed mothers, depressed mothers are more negative, disengaged, and insensitive during interactions with their children, less able to modulate their affect and behaviors when parenting, spend less time talking to and playing with their children, and are more likely to maltreat their children (Administration for Children and Families, 2006a; Shay & Knutson, 2008; Pelaez, Field, Pickens, & Hart, 2008). An estimated 25% of parents investigated by CPS whose children remain in their custody report having experienced major depression within the past year (USDHHS, 2005).

An increasing number of home visitation evaluation studies show that maternal depression affects how participants use home visiting services, though the exact nature and direction of the influences are unclear. Some researchers find that depression disrupts home visitation services (Duggan, Berlin, Cassidy, Burrell, & Tandon, 2009), and others report that depressed mothers maintain more regular contact with home visitors, receive more home visits, and participate longer in

home visitation programs (Administration for Children and Families, 2002; Ammerman et al., 2010; Olds & Korfmacher, 1998; Stevens et al., 2002). Research on the associations between depression and home visiting outcomes is similarly mixed, and not yet fully understood (Olds & Korfmacher, 1998; Stevens et al., 2002). There also may be differences in program impact among subgroups of depressed and nondepressed mothers. For example, in a study of Healthy Families Alaska, Duggan and colleagues (2009) found that maternal depressive symptoms moderated program effects for six of seven parenting outcomes studied, but that program effects were greatest for two specific subsamples of mothers: nondepressed mothers with high levels of discomfort with trust and dependence, and depressed mothers with low levels of discomfort with trust and dependence.

Maternal history of childhood maltreatment. Over 30 years of research suggests that having a history of childhood abuse or neglect is more common among parents who maltreat their children than it is among nonmaltreating parents (Bert, Guner, & Lanzi, 2009; de Paúl & Domenech, 2000; Kaufman & Zigler, 1989; Pears & Capaldi, 2001; Pianta et al., 1989; Scannapieco & Connell-Carrick, 2005). Few researchers, however, have investigated these intergenerational cycles in the context of home visiting, and it remains unclear how (or even *if*) parental victimization affects the efficacy of home visitation. A parental history of child abuse and neglect may disrupt individuals' capacity to form healthy relationships (Belsky, 1993; Bowlby, 1977; Kaufman & Zigler, 1989), and therefore inhibit their ability to create a positive connection with a home visitor. Moreover, home visitors themselves may be overwhelmed by the challenges that these individuals present (LeCroy & Whitaker, 2005). Conversely, individuals with a childhood history of maltreatment may constitute a high-risk population that is especially responsive to home visiting, an association that may be mediated by maltreated parental mental health. For instance, childhood victimization has been linked to substance abuse issues, depression, and other poor mental health outcomes in adulthood, which in turn may affect the efficacy of home visitation to prevent child abuse and neglect (Appleyard, Berlin, Rosanbalm, & Dodge, 2011; Scott, Smith, & Ellis, 2010; Widom, DuMont, & Czaja, 2007; Widom, White, Czaja, & Marmorstein, 2007). As the research on home visitation is devoid of studies

exploring how a parental history of maltreatment influences a program's effectiveness in preventing child abuse and neglect, an important first step is to determine if a participant's childhood maltreatment is a significant moderator of parenting outcomes.

Social support. Research consistently demonstrates that adequate social support mitigates parental stress and depression, increases parental sensitivity, and helps to counteract risk for abusive and neglectful parenting (Gaudin, 2001; Way & Leadbeater, 1999; Whitman et al., 2001). Social support may be a particularly important protective factor for adolescent mothers, who are exposed to high levels of stress and anxiety, but may find refuge and relief in positive social connections (Dixon, Browne, & Hamilton-Giachritsis, 2009). Maltreating parents report more loneliness and dissatisfaction with members of their social support networks than do nonmaltreating parents, and there is a strong association between social isolation and child maltreatment, particularly neglect (Garbarino & Kostelny, 1992; Gaudin, Polansky, Kilpatrick, & Shilton, 1993; Scannapieco & Connell-Carrick, 2005; Slack et al., 2004).

Home visitation can provide opportunities to increase parental social support by offering services to families in a comfortable, familiar environment that may be less threatening than other social service settings (Chapman, Siegel, & Cross, 1990). Some programs also assist parents in expanding their social support networks by creating linkages with public and private community services or by providing parenting groups (American Academy of Pediatrics Council on Child and Adolescent Health, 1998). In fact, the extent to which home visitation programs are successful in improving the social support networks of the families they serve may be an important moderator of program effectiveness, yet to our knowledge, no program evaluation studies have examined the potential moderating effects of social support on home visiting effectiveness.

Community context. Some of the most widely reported ecological risk factors for child maltreatment are low socioeconomic status, unsafe and resource-poor neighborhoods, and a lack of reliable, good quality social support (for review, see Goldman & Salus, 2003). Poverty, in particular, is inextricably linked to child neglect, and the association between household income and

involvement with the child welfare system is one of the most frequently cited findings in the literature on child maltreatment (DePanfilis, 2006; Sedlak et al., 2008), as are the associations between maltreatment and living in poorer, more densely populated neighborhoods (Coulton, Korbin, Su, & Chow, 1995; Drake & Pandey, 1996; Garbarino & Sherman, 1980). In fact, living in a high-poverty neighborhood has been found to be a more significant factor in child maltreatment than is family poverty (Drake & Pandev, 1996).

That being said, our understanding of the mechanisms by which neighborhood is associated with maltreatment is still quite limited (Ernst, 2001; Gracia & Musitu, 2003). Coulton and her colleagues (1995) found that, in urban areas, the neighborhood indicators that most significantly accounted for rates of maltreatment were poverty, residential instability, and child care burden. Results from a replication of this study in suburban communities suggest that only the first two of those indicators—poverty and residential instability—appeared to be related to maltreatment (Ernst, 2001), and in rural areas, family structure appears to be more significantly associated with child abuse report and substantiation rates than are socioeconomic factors (Weissman, Jogerst, & Dawson, 2003). Some researchers have asserted that racial, ethnic, and socioeconomic reporting biases (Ards, Myers, Malkis, Sugrue, & Shou, 2003; Fluke, Yuan, Hedderson, & Curtis, 2003) have resulted in disproportionately high rates of reported maltreatment in more diverse, poorer, and more urban neighborhoods. Other studies have found that the probability of reporting maltreatment is inversely correlated with perceived neighborhood social disorder (and its associated feelings of danger and insecurity) in one's immediate environs (Gracia & Herrero, 2006), suggesting that maltreatment may be *under*-, rather than *over*-represented, in poorer communities.

Studies of the moderation effects of neighborhood on home visiting and other family support programs are similarly equivocal. Some have found that families from more impoverished homes and neighborhoods tend to benefit more from services than do their more advantaged counterparts (Olds & Kitzman, 1993). Evaluators of the Parents as Teachers home visiting program, for instance, found that the program had a stronger impact on child outcomes for very low-income participants

when compared to participants of more moderate income (Wagner, Spiker, & Linn, 2002), and a cross-study analysis of evaluations of the Nurse Family Partnership home visiting program found that home visitation moderated the adverse effects of concentrated neighborhood disadvantage on maternal and child outcomes (Hanks et al., 2011). Other studies have found opposite effects, with families from less impoverished backgrounds and neighborhoods showing greater program impacts than poor families (Pinquart & Teubert, 2010; Teti et al., 2009). Additional research in this area is necessary before we can begin to understand the complex ways in which neighborhood-level factors may contribute to home visiting program effectiveness.

Program Utilization

Understanding how different patterns of program usage enhance or impede the benefits of home visitation is essential to maximizing its impact (Reynolds, Methieson, & Topitzes, 2009), yet current research in this area remains somewhat limited, and results from these studies are largely inconclusive with regard to which constellation of services leads to which impacts (Azzi-Lessing, 2011; Duggan et al., 2000). For example, to the extent that utilization—a complex phenomenon in home visiting—has been measured, the variable has generally only reflected the number of home visits completed and the length of participation in the program; only occasionally have researchers included analyses of other critical service parameters, such as the quality and content of home visiting, and its activities related to service referral (DuMont et al., 2010; Kitzman et al., 2000; Kitzman et al., 2010; LeCroy & Milligan Associates, Inc., 2007; Mitchell-Herzfeld et al., 2005; Olds et al., 2004; Olds et al., 2007; Olds et al., 2002; Raikes, et al., 2006; Wagner, Spiker, Hernandez, Song, & Gerlach-Downie, 2001). In addition, although other components of the services delivered to participants (ie., the substantive support services provided in addition to the home visit, such as advice offered over the phone, or transportation to pediatricians' offices) have not been captured in estimations of program use, earlier work from this evaluation suggests the importance of these (Goldberg, Diez, & Jacobs, 2005) in participants' experience of the program.

The prevailing wisdom in the field is that "more is better," and indeed, in their review of the role of home visiting programs in preventing maltreatment, Howard and Brooks-Gunn (2009) observed that programs with more planned visits were more effective, and that the families that benefit the most in these programs are those that receive the highest dosage. Further, Kahn and Moore (2010), in a review of 66 home visiting evaluations, noted that program intensity—the number of visits within a particular time period—is what counts; programs that lasted for more than one year and provided an average of four or more home visits per month over that time span had more positive outcomes than did long-term programs with monthly or fewer visits. Similar conclusions were drawn by Nievar and colleagues (2010) in their meta-analysis of home visiting, suggesting that a threshold of two visits per month is necessary to produce substantive outcomes. But in reality, a considerable proportion of families in the intervention group receive few services, if any at all, and therefore these families do not reap the benefits of the program or demonstrate its positive effects (Howard & Brooks-Gunn, 2009).

Summary of the Literature

To summarize, findings from evaluations on the effectiveness of home visitation indicate only limited success in reducing child abuse and neglect, with notable gaps in the literature when it comes to pinpointing precisely which program strategies work best for whom and under what conditions (Howard, & Brooks-Gunn, 2009). There are multiple factors contributing to the inconsistency of these findings: lack of clarity about the particular constellations of risk factors that contribute to maltreatment, or the mechanisms by which these factors lead to outcomes; a failure in the research field to differentiate among types of maltreatment; methodological challenges in measuring child maltreatment; methodological challenges in assessing home visiting impacts on child maltreatment; and, finally, lack of understanding in the field about the ways in which individual and contextual characteristics may effect a home visiting program's ability to achieve its goals.

The study presented here attempts to address some of these gaps in our understanding of child maltreatment among young parents, and the effectiveness of home visitation in preventing this

phenomenon. We investigate how characteristics of young mothers, their childrearing environments, and components of program use shape the impact of the program on parenting. Our overall research approach is informed by Bronfenbrenner's (1977) ecological model, which emphasizes ongoing transactions among parents, children, and different layers of their environment over time (Belsky, 1984, 1993; Bronfenbrenner, 1977; Cicchetti & Lynch, 1993). An ecological approach to research on child maltreatment lessens the likelihood that studies will generate reductionist explanations of parent-child relationships, because they presume that focus on a single aspect of the problem is not sufficient (Belsky, 1993; Cicchetti & Lynch, 1993; Cicchetti & Valentino, 2006), and that problematic family interactions are as much a function of extrinsic circumstances as they are of parental deficits (Conger, Belsky, & Capaldi, 2009). Several researchers have derived ecological models of maltreatment derived from Bronfenbrenner's ecological systems model, applying this approach using different but analogous terms: *socio-ecological* (DePanfilis, 2006), *ecological-transactional* (Cicchetti & Lynch, 1993), and *developmental-ecological* (Belsky, 1993), but the implications are the same—many interacting forces contribute to child maltreatment.

This study assessed the impact on parenting of Healthy Families Massachusetts (HFM), a statewide child maltreatment prevention home visiting program for young, first-time mothers (age 20 and under) and their children (prenatal to age 3). Using a randomized, controlled trial design, the evaluation explored the effectiveness of the program in preventing child abuse and neglect, reducing parental stress, and improving maternal sensitivity. We also examined whether particular individual factors (i.e., maternal history of childhood maltreatment, intimate partner violence, social support, and depression) and contextual factors (i.e., neighborhood demographics, neighborhood cohesion and safety) moderated the impact of home visitation on parenting outcomes. Finally, we investigated utilization of key program components by young mothers related to HFM effectiveness in improving maternal functioning.

Study Research Questions

The study's specific research questions are as follows: (1) Is participation in HFM associated with more optimal parenting and lower rates of child maltreatment? (2) Do characteristics of individuals or their contexts moderate the relation between program and parenting? (3) For mothers enrolled in the program, is there an association between program utilization and parenting? As is reflected in the literature review above, the conflicting evidence from home visiting evaluations of impacts on child maltreatment and parenting, and the complex nature of the many potential moderators of potential impact, we present here research questions rather than specific hypotheses. Each research question is described in more detail below.

Research Question 1: Is participation in HFM associated with more optimal parenting and lower rates of child maltreatment? This first question addresses whether participation in HFM is associated with greater positive parenting and lower rates of child maltreatment. As our review of the literature indicated, there is evidence to expect an association between participation in a home visiting parenting support program and child maltreatment. The literature also shows, however, that the nature of this relation is likely to be highly complex (e.g., Chaffin & Bard, 2006; Howard & Brooks-Gunn, 2009; Kahn & Moore, 2010; Olds et al, 2009; Paulsell et al, 2011). On the one hand, several program evaluations suggest that participation in home visiting should reduce rates of maltreatment and increase positive parenting. On the other hand, the literature also strongly suggests that our focus on state agency reports of maltreatment is subject to issues of increased surveillance among program participants, leading to an expectation of higher rates of maltreatment reports in the home visiting group. In light of evidence that service recipients have higher rates of reports to child welfare services than do families who do not receive services (Barlow et al., 2006; Bull et al., 2004; Hodnett & Roberts, 2000; Mikton & Butchart, 2009), and that proxy measures "may provide greater insight into the way that parenting practices directly bear on child well-being" (Howard & Brooks-Gunn, 2009, p. 122), we also examined program effectiveness in decreasing parenting stress and promoting maternal EA (maternal sensitivity and nonhostility).

Research Question 2: Do characteristics of individuals or their contexts moderate the relation between program and parenting? Here we explore the complex nature of the relations between program participation and child maltreatment and parenting outcomes by examining possible moderators, and characteristics of program participants and their contexts, that might influence the effects of program participation. These include certain characteristics (e.g., maternal depression, history of child maltreatment, IPV, social support, neighborhood/community context), identified in the literature, that might be expected to influence child maltreatment and positive parenting. For example, based on associations that have been well-established in the literature (e.g., Bert et al., 2009; De Paúl & Domenech, 2000; Lee et al., 2004; Margolin et al., 2003; Shay & Knutson, 2008; USDHHS, 2005), we expected to find evidence of an intergenerational cycle of maltreatment, as well as evidence that in homes where IPV was present mothers would report greater parenting stress and children would have higher rates of maltreatment. The more compelling question that follows is whether these characteristics moderate the effectiveness of HFM. Here, the literature is far less conclusive. For example, there is evidence that mothers who are depressed are more likely to engage in home visiting services (Ammerman et al, 2010), but there also is evidence that program effects are negated by maternal depression (Duggan et al, 2009). The literature on maternal history of child maltreatment is similarly murky regarding whether to expect mothers with a history of maltreatment to be more/less likely to benefit from home-visiting services.

Research Question 3: For mothers enrolled in the program, is there an association between program utilization and parenting? Finally, our third research question examines the impacts of service utilization on child maltreatment *within the program group only*. Based on the literature, we expect that mothers who received more home visits and stayed in the program longer would fare better than did their less high-participating counterparts But the extent to which nonvisit activities, such as groups (parenting education, social outings, etc.) and secondary activities (phone contacts, assistance with filling out forms, rides to doctors' appointments, etc.) influence parenting outcomes has not been studied until now, and therefore remains an open research question.

Methods

Healthy Families Massachusetts

The program being evaluated is a comprehensive, voluntary, newborn home visiting program for all resident first-time parents ages 20 and under. Based on the Healthy Families America (HFA) model, this paraprofessional program provides parenting support, information, and services to young parents, beginning prenatally and continuing until the child's third birthday. The program's goals are as follows: (a) to prevent child abuse and neglect by supporting positive, effective parenting; (b) to achieve optimal health, growth, and development in infancy and early childhood; (c) to encourage educational attainment, job, and life skills among parents; (d) to prevent repeat pregnancies during the teen years; and (e) to promote parental health and well-being.

Program services include weekly or biweekly home visits, with additional contact via phone and electronic media as needed ("secondary activities"), goal-setting activities, group-based activities (e.g., parenting education, peer support groups, social gatherings), and linkages and referrals to other resources. Service levels generally proceed as follows: weekly or biweekly home visits for participants during pregnancy, followed by weekly home visits for six months after the birth of the baby. Visits then decrease in intensity, as guided by indicators of family progress, until the child is three years old.

Home visitors are paraprofessionals with a combination of qualities, including experience working with families, knowledge of child development and family relationships, and a host of other less tangible characteristics, such as the ability to establish trusting relationships and a willingness to work with culturally diverse populations. Home visiting staff complete a six-day core training at the time of their hire, and are required to complete 10 additional topical trainings within the first year of employment. All home visiting staff (home visitors, supervisors, and program coordinators) receive weekly supervision (1 - 1.5 hours) by professionally trained staff.

Sample and Design

Participants were enrolled into the randomized, controlled trial between February 2008 and October 2009. Of the 26 HFM local programs across the state, 18 were selected to be evaluation sites, each of which was assigned a recruitment start date and enrollment target, based on individual program capacity. Aiming for a sample size of at least 600 participants, and assuming an approximately 80% participation rate, the evaluation team set a total recruitment target of 860 participants. Because of a higher-than-anticipated acceptance rate into the evaluation (83%) (see below for details), the algorithm was turned off after 840 participants were recruited into the study by HFM sites.

To address the reservations held by many of HFM's sites about participating in a randomized controlled trial (and consequently denying services to some families), the evaluation team conducted a power analysis to determine the smallest possible control group that could still yield meaningful results with appropriate effect sizes. From the power analysis, we determined that 60% of participants would be assigned to the treatment group, and 40% would be assigned into the control group; this 60/40 breakdown was incorporated into the algorithm used by the program to assign participants to their study condition: treatment or control.

Recruitment was conducted in two stages: the first by HFM staff, and the second by the evaluation team. The HFM Intaker asked all eligible referrals to participate in the study. Eligibility requirements were as follows: 16 years or older, had received no HFM services in the past, fluent in either English or Spanish, and cognitively able to provide informed consent. Eligible referrals who agreed to participate were entered into the HFM management information system, the Participant Data System (PDS). An algorithm randomly assigned her to either the "Home Visiting Services Group" (HVS) (the program group), or the "Referrals and Information Only Group" (RIO) (the control group). Participants assigned to HVS received HFM services as usual. RIO participants could not receive HFM home visiting services, but, at the point of assignment, were assessed for

needs for services with a brief intake interview, and were provided referral information and/or resources based on these needs (e.g., mental health, WIC, housing, TANF, etc.). RIO participants also received monthly mailings from administrators of HFM about child development. Participants who did not meet the study eligibility requirements but were eligible for HFM were enrolled directly into the program.

Once HFM concluded this first stage of recruitment (assigning participants to HVS or RIO), the evaluation team assumed responsibility for the second stage of recruitment. Every participant was invited by the evaluators to do some combination of the following: 1) sign a release allowing Massachusetts Healthy Families Evaluation to access her administrative data from the Massachusetts departments of Elementary and Secondary Education (DESE), Transitional Assistance (DTA), Public Health (DPH), and Children and Families (DCF); 2) participate in a half hour phone interview (called the Intake Interview [II]); and 3) participate in an additional two and one-half hour research visit, during which participants were given a semistructured interview, written questionnaires, and were filmed in an observation of mother-child interactions (called the Research Interview [RI]). To be part of the evaluation, participants needed to consent to *at least one* of the first two of these activities (i.e., sign a release and/or participate in the II); participants who did this were considered to be in the Impact Study sample. Those participants who also consented to the third activity, the RI, were considered to be part of the Integrative Study sample. Everyone in the Integrative Study sample is also in the Impact Study sample, but not vice versa.

Data collection procedure. The overall design (Impact and Integrative) is a three-wave study in which data are collected from participants at three different time points (T1—T3) over a two-year period. Recruitment and T1 data collection began in February 2008 and ended in October 2009. T2 data collection was completed in December 2010. This study uses data from T1 and T2. The first research question was tested using T1 random assignment to predict T2 outcomes; the other questions were tested using T1 and T2 data.

Sample retention. Of the 840 evaluation recruits, eight signed only the administrative data release, and 687 signed the administrative release *and* completed the II. These 687 women constituted the Impact Study sample (420 HVS, 267 RIO). The sample size of the treatment and control groups reflect the 60/40 recruitment split noted above. Of the Impact Study sample, 477 participants (277 HVS, 200 RIO) also completed the RI, and were therefore also considered part of the Integrative Study sample.

By T2, a number of participants (45) had switched from the Integrative Study to the Impact Study or vice versa (37), others withdrew from the study, and two participants were withdrawn by Healthy Families Massachusetts Evaluation from the sample; one following a miscarriage and the other because of maternal death. Five hundred sixty-six participants completed the T2 II (338 HVS and 228 RIO), for an Impact Sample retention rate of 82.2% between time points. Four hundred two participants completed the T2 RI (229 HVS and 173 RIO), for an Integrative Sample retention rate of 84.3% between time points. There were no significant demographic differences between the participants who completed a T2 interview and those who did not.

For this study, the Integrative Study sample comprises any participant who either completed a T1 or T2 RI, for a final sample size of 512.[1] Final sample size for the Impact Study is 687.

Group equivalencies. Equivalence analyses were conducted on preliminary baseline data to determine the effectiveness of random assignment in the creation of the program status groups (HVS/RIO). With the exception of one variable (participants in the RIO group were more likely to report receiving mental health services at the T1 II ($\chi^2(1) = 4.83$, $p < .05$), there were no differences between HVS and RIO participants on any of the major study constructs. We conclude that there are no confounding variables that differentiate participants' program status for the Impact Study.

Impact Study sample demographics. At enrollment into the study, Impact Study participants were, on average, 18.6 years old, with an ethnic distribution of 37.3% White Non-

[1] As is described later in this section, missing data at either time point were addressed using multiple imputation.

Hispanic, 31.5% Hispanic, 19.6% Black Non-Hispanic, and 11.5% categorized as "other" (this includes anyone who identified as more than one race or ethnicity). Slightly more than half (51.7%) of the participants reported being in some kind of committed relationship, with the baby's father or with someone else. The majority (88.4%) of the participants was born in the United States, and 69.2% of the sample was born in the state of Massachusetts. English was the preferred language of 75.3% of participants.

Measures

The study uses data from the Impact and Integrative Studies datasets. Data drawn from the Impact Study include state agency child maltreatment records, demographic data from the II, and maternal reports of depressive symptoms. Data drawn from the Integrative Study include maternal reports on standardized assessments and observations of mother-child interaction. Standardized measures were selected based on psychometric integrity and prior use in studies of child abuse and neglect, and with adolescent parents, diverse samples, and mothers at risk for maltreating their children. Data sources are described below, by data analysis construct. Data collection time points (i.e., T1, T2) are in parentheses following the measure name.

Participant characteristics. Maternal and child demographic variables, to be used as controls in analyses, were generated from measures of maternal age at first birth, child age at the T2 interview, maternal race/ethnicity, parenting status at time of enrollment in study, and use of parenting services other than HFM.

Maternal age at first birth. Maternal age was collected via the II. A continuous variable for maternal age at first birth was used in data analyses.

Baby age at T2. Baby age is calculated in months and was used as a continuous variable in all analyses.

Maternal race/ethnicity. Mothers were asked to indicate their race/ethnicity in the II. They noted all choices that applied to them in both of two categories used in the U.S. Census: a) ethnicity (Hispanic/Latina, Not Hispanic/Latina); and b) race (American Indian/Native American/Alaska

Native, East Asian, South Asian, Native Hawaiian or Other Pacific Islander, Black or African American, White, or Other). In many instances, participants identified themselves using either the ethnicity categories or the racial categories, but not both. In order to preserve these self-identifications, project researchers collapsed the race and ethnicity categories. Afterward, the categories were combined to generate a reasonable number of dummy variables to include in the multiply imputed dataset. The final dummy variables used to control for race/ethnicity in analyses were Hispanic, Black, and Other, with the largest group (White) as the reference group.

Pregnant or parenting at time of enrollment. Mother's status as pregnant or parenting at the time of enrollment into the study, specifically at the T1 intake, was reflected in a binary variable.

Other parenting services. To control for mothers' participation in parenting programs other than HFM, a binary variable was created to indicate whether or not participants had been the recipients of services from another home visiting program at any time during the study period.

Parenting outcomes. We used a multimethod approach to the assessment of parenting outcomes that includes the following: (a) administrative reports of child abuse and neglect, (b) maternal self-reports of harsh parenting, (c) behavioral observations of mother-child interactions, and (d) parenting stress.

Administrative reports of child abuse and neglect (T1, T2). To determine whether the infants of participating mothers had been victims of maltreatment, cumulative records of physical abuse and neglect were obtained from the Massachusetts Department of Children and Families (DCF). The records provided data on the number of reports and substantiated reports of maltreatment, types of maltreatment (physical abuse, sexual abuse, neglect, congenital drug addiction, and emotional maltreatment), identity of the perpetrators, and the timing and dates of the reports filed. DCF records covered the period between each target child's birth and May 5, 2011 (the day the data were downloaded by DCF). Only records that covered the time period after participants enrolled in the home visiting program were used.

According to the Massachusetts definitions of child maltreatment under (state regulation 110

CMR, section 2.00), "abuse" is "the nonaccidental commission of any act by a caretaker upon a child under age 18 which causes, or creates a substantial risk of, physical or emotional injury; or constitutes a sexual offense under the laws of Massachusetts; or any sexual contact between a caretaker and a child under the care of that individual; and "neglect" is "[f]ailure by a caretaker, either deliberately or through negligence or inability to take those actions necessary to provide a child with minimally adequate food, clothing, shelter, medical care, supervision, emotional stability and growth, or other essential care; provided, however, that such inability is not due solely to inadequate economic resources or solely to the existence of a handicapping condition."

Congenital drug addiction was considered as child neglect and coded as neglect because many experts in the field of child welfare consider newborns exposed to substances prenatally to be victims of neglect (DePanfilis, 2006). No cases of emotional maltreatment were reported, thus it was excluded from the data. There were five cases in which the child experienced unsubstantiated cases of sexual abuse perpetrated by a person other than the mother. One case was sexual abuse alone, three cases were in addition to neglect, and one case was in addition to neglect and physical abuse. These cases were included in all the analyses except for the analyses that looked at substantiated or unsubstantiated reports of neglect and physical abuse against any perpetrator, as sexual abuse derives from processes that do not usually implicate adolescent mothers as perpetrators (Finkelhor, 2009). For a few cases, DCF assigned a disposition of "concern," "minimal concern," or "no concern" (instead of substantiated or unsubstantiated), based on a system of Differential Response (DR) that was instituted in August 2009. For the purposes of this study, any DR case in which services were provided to the family was counted as substantiated. When no services were required, a case was counted as unsubstantiated.

The obtained data were recoded in several ways to answer the research questions. The total number of substantiated reports was obtained by adding the number of substantiated reports for physical abuse and neglect. The total number of substantiated or unsubstantiated reports was obtained by adding the number of both substantiated and unsubstantiated reports of physical abuse

and neglect. To examine the frequency of reports that were against the mother specifically, these two variables were created for the reports against the mother. Binary variables were also created to examine whether the children of participating mothers had ever been victims of neglect only, physical abuse only, both physical abuse and neglect, or no maltreatment. A case was considered nonmaltreatment if the child did not experience any physical abuse or neglect. A case in which the child did not experience a particular type of maltreatment of interest, but did experience other maltreatment types was given the code representing "not applicable." Again, to examine the reports against the mother separately, these two variables were created for the reports against the mother as well.

Maternal self-reports of harsh parenting (T2). The Conflict Tactics Scale-Parent/Child (CTSPC) (Straus, Hamby, & Warren, 2003) includes maternal reports of her childrearing behavior, with scales for neglect, physical assault, psychological aggression, sexual abuse, and nonviolent discipline. The CTSPC is a commonly used measure of parental discipline and behavior that presents an alternative to state agency reports, providing what Straus and his colleagues claim is a "more accurate prevalence estimate for low-income and young parents" (Straus et al., 2003, p. 86). Research indicates that scores do not reflect a social desirability response set. The final set of variables for CTSPC reflected both continuous and binary scores for nonviolent discipline, physical assault only, neglect only, and the combination of physical assault and neglect, and a binary variable reflecting the presence/absence of any self-reported maltreatment.

Behavioral observations of mother-child interactions (T2). The Emotional Availability Scales (EA) (Biringen, Robinson, & Emde, 1998) are used to characterize interactions of mothers and children, filmed in their homes during ten minutes of freeplay and teaching interactions. Maternal EA is associated with children's attachment, maternal psychosocial risk, and has been used with diverse samples (Easterbrooks & Biringen, 2000). Assessments of maternal sensitivity and nonhostility in each context were used, resulting in four continuous EA variables: sensitivity free play, sensitivity teaching task, nonhostility freeplay, and nonhostility teaching task.

Parenting stress (T2). The Parenting Stress Index/Short Form (PSI/SF) (Abidin, 1995) was designed to measure stress in the parent-child system and is composed of Parental Distress, Parent-Child Dysfunction, and Difficult Child subscales. The full-length PSI, from which the short form is derived, is associated with parental maltreatment and maternal depression. It also has been used with adolescent mothers and was normed on ethnically and economically diverse samples. The total stress score, representing a sum of all the subscales, was used.

Individual characteristics. The literature suggests that a) maternal childhood history of victimization, b) intimate partner violence, and c) maternal depression are associated with risk for child abuse and neglect and may alter program effects; these factors were tested in the conceptual model for this study.

Childhood history of maltreatment (T1, T2). Participants' own histories of child maltreatment were assessed using two data sources: state DCF records of victimization of mother during her childhood; and the Conflict Tactics Scale-Parent/Child Version.

DCF maternal history of childhood maltreatment report. To determine whether the participating mothers had been victims of maltreatment while growing up, cumulative records of physical abuse, neglect, and sexual abuse reports were obtained from DCF. These records covered the period between each participant's birth and May 5, 2011 (the day the data were downloaded by DCF). The records provided data on the number of substantiated and unsubstantiated reports of maltreatment, types of maltreatment (physical abuse, sexual abuse, neglect, congenital drug addiction, and emotional maltreatment), the identity of the perpetrators, and the timing and dates of the reports filed.

Maternal history data were recoded in the following ways: Two continuous variables were created: 1) total substantiated reports (of all possible types of maltreatment) and 2) total combined substantiated and unsubstantiated reports (also a combination of all possible types of maltreatment). Additionally, data were coded into binary variables indicating whether mothers had been victims of specific types of maltreatment: neglect only, severe physical assault only, sexual abuse only, and the

combination of physical abuse and neglect. Lastly, a binary variable reflected if any type of maltreatment was experienced versus no maltreatment history.

Conflict Tactics Scale-Parent/Child Version (CTSPC "Adult Recall") (Straus, Hamby, Finkelhor, Moore & Runyan, 1998). This 27-item self-report questionnaire measures the extent to which the child experienced acts of violence, or psychological or physical aggression from their parents. Psychometric data indicate adequate test-retest reliability and discriminant and construct validity (Straus et al., 1998). The measure has been used frequently in epidemiological research on harsh parenting/child maltreatment prevalence, risk factors, and sequelae, as well as in evaluations of treatment and prevention programs (Straus et al., 1998). This measure was modified to assess whether mothers had experienced abuse or neglect (as described by each item) from their parents during their childhood. Binary variables reflecting the presence of neglect only, severe physical assault only, sexual abuse only, a combination of types, and any maltreatment, along with one continuous variable reflecting childhood chronicity of maltreatment (total number of items endorsed), were used in analyses.

Intimate partner violence (IPV) (T2). We assessed IPV in mothers' intimate relationships using the revised Conflict Tactics Scale short form (CTS2S) (Straus & Douglas, 2004), a 20-item self-report questionnaire that measures the extent to which partners in a dating, cohabiting, or marital relationship engage in physical attacks on each other, and their use of reasoning or negotiation to deal with conflicts. To reflect the level of IPV in mothers' lives since their enrollment in the study, past year chronicity for the severe physical assault, sexual coercion, and injury subscales were summed for both mother and partner, resulting in two continuous scores used in analyses: total past year chronicity for mother as perpetrator and total past year chronicity for partner as perpetrator.

Maternal depression (T1, T2). Depressive symptomatology was assessed using the Center for Epidemiological Studies (CES-D) (Radloff, 1977) questionnaire. The CES-D is a commonly used assessment of depressive symptoms and is associated with clinical indicators of depression.

Scores yield a linear score for current depressive symptoms and a dichotomous cutoff score associated with clinical levels of depressive symptoms; only the dichotomous score, reflecting clinical levels of depression, was used in analysis.

Maternal social support (T1, T2). Support networks in mothers' lives were assessed using the Personal Network Matrix (Trivette & Dunst, 1988). This self-report questionnaire measures the frequency of contact with, and dependability of, network members. Frequency of contact with network members is a continuous summary score of contacts (e.g., phone, in-person, mail) within the last month. Reliability of network assesses the extent to which contacts can be depended on; it also yields a continuous summary score.

Community-level characteristics. In response to criticisms of the methods used to designate communities or neighborhoods, and characterize them (for low income communities, primarily by their deficits), we included the following measures:

Community descriptions using Census Data. U.S. Census Bureau socioeconomic data and Geographic Information Systems software (ArcGIS) were used to categorize participants' geographic environments (at the block group level) according to the indicators of population density (measured as people per dry square mile), percent minority (as determined by specific racial/ethnic composition) and median household income. These demographic indicators were entered into cluster analysis to determine the different types of communities in which participants lived at the time of enrollment into the study.

Cluster analytic techniques detect structural patterns within a dataset, creating groups or clusters of individuals or objects that can be characterized by homogeneity within a cluster but that are separate or distinct from other clusters in some way (Everitt, Landau, Leese, & Stahl, 2011). A standard agglomerative hierarchical cluster analysis, using Ward's method (1963), was performed and a viable 4–cluster solution emerged (see Figure 1). The Ward method of cluster analysis was used specifically because it often finds similarly sized cluster groups and our goal was to have

adequately sized groups for comparative purposes. As shown in Figure 1, the clusters range in size (n = 75 – 286) and have distinct profiles.

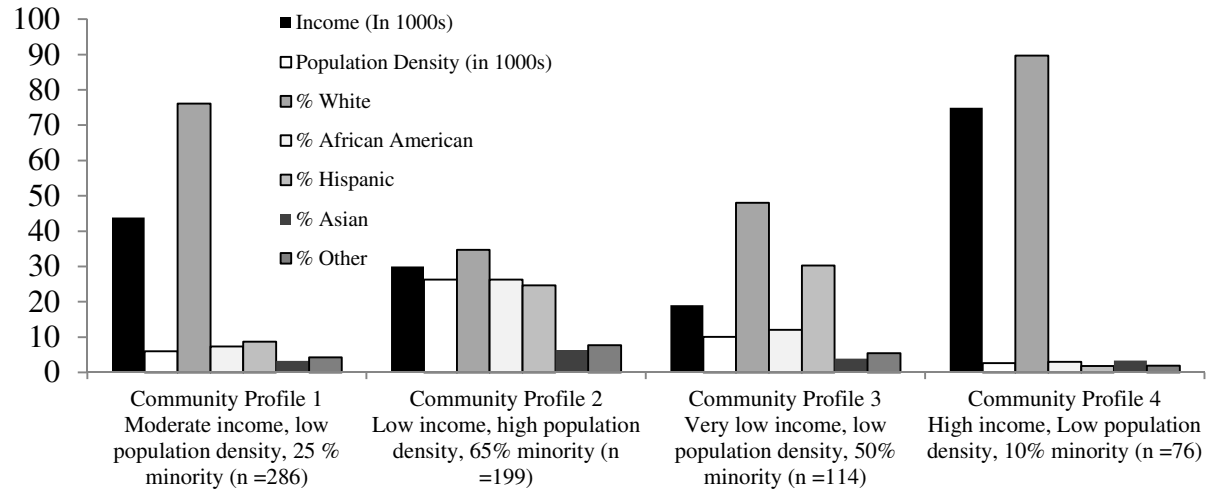

Figure 1. The four-cluster solution to depict community demographic profiles at the census block group level (n = 675).

Community descriptions using residents' perspectives (T1). The My Neighborhood Survey, constructed and piloted by the evaluation team, captures the following four constructs: safety and neighborhood risk, awareness of community resources, neighborhood connections, and perceived social capital of participants' neighborhoods. The validity of the measure was evaluated using the confirmatory factor analytic approach, which indicated that the two-factor structure of the measure fit the data well (model x^2 = 410.28, $p < .001$, RMSEA = 0.07), and resulted in one factor representing neighborhood safety and another representing neighborhood cohesion. The correlations between the items and the factors were moderately high (*Range* = .50 to .78). The measure also had excellent internal consistency: the Cronbach's alphas for each of the subscales (Safety and Cohesion) were .80 and .92, respectively. Both the neighborhood safety and neighborhood cohesion scales were used as continuous variables in analyses, with higher scores reflecting greater safety or more cohesion.

Program utilization. Data on participants' service use were drawn from the HFM management information system, the Participant Data System (PDS), in which HFM home visitors record information about all aspects of participants' service utilization. Indicators of program usage

were accessed with Cognos reports, and analyzed in Excel and SPSS. Areas of service usage examined were pregnancy status at enrollment, duration in program, and program dosage.

Three indicators were used to represent the amount of program dosage participants received: 1) total number of home visits; 2) total number of groups attended, and 3) total number of "secondary activities." The last of these, secondary activities, includes all of those nonvisit activities that occur as a part of a home visiting program, including phone calls, attempted phone calls, delivery of goods or documents (e.g., a food basket or an application for WIC), rides, mailings, emails, and text messages. As part of their documentation of services in the PDS, home visitors were required to enter every nonvisit activity that occurred, using a drop-down menu to select the type of secondary activity (e.g., phone call, ride to a doctor's appointment, etc.) and a memo field to record the details of the activity. Because program utilization variables were used largely as predictors in this study, we only included program use data that occurred between enrollment and May 5, 2011, the time span for which DCF provided child maltreatment data on participants' children. In other words, service duration was calculated, in months, for the point of enrollment through either discharge or May 5, 2011, whichever came first; visits, secondary activities, and groups, were likewise only counted until May 5, 2011.

Analysis Plan

As recommended in the field, we used an intention-to-treat analytic design (Hollis & Campbell, 1999; McKinlay, Stone, & Zucker, 1989; Ruiz-Canela, Martinez-Gonzalez, & de Irala-Estevez, 2000); that is, regardless of whether participants in the program group actually used the home visiting services, they were considered part of the program group for the duration of the study. Our analytic approach is described below, organized by research question.

Research Question 1: Is participation in HFM associated with greater positive parenting and lower rates of child maltreatment? Pearson's correlation, t-test, and binary logistic

regression[2] were used as appropriate to determine if bivariate associations existed among parenting outcome variables. Following bivariate analyses, nested linear and logistic regression models were run to determine whether program status was associated with parenting outcomes. All regression analyses were run with two models: the first model was bivariate in nature and regressed parenting outcome on program status, and the second model introduced control variables (maternal age, child age, parenting status at enrollment, race/ethnicity, and use of other home visiting services) to the regression.

Analyses involving the outcomes for EA, parenting stress, and self-reported child maltreatment (CTSPC) were run on the Integrative Study sample (n = 512). Analyses for the outcomes on state agency data of maltreatment were run on both the Integrative Study sample for model comparisons in the hierarchical regressions of Research Question 2, and also in the fullest sample of data available, the Impact Study sample (N = 687).

Research Question 2: Do characteristics of individuals or their contexts moderate the relation between program and parenting? Pearson's correlation, t-test, and binary logistic regression were used as appropriate to determine if bivariate associations existed among the individual and contextual level variables and the parenting outcomes. We then fit a series of hierarchical (nested) regression models in which we entered predictors into the equation as blocks to determine the extent to which they combined together to predict criterion variables (Meyers, Gamst, & Guarino, 2012). The blocks of independent variables were chosen through theoretical and conceptual considerations, and entered into analyses according to Bronfenbrenner's ecological model (1977, 1979), which emphasizes the importance of considering the multiple contexts in which individuals develop, from individual to environmental—proximal to distal. The order of entry was as follows: (a) one's individual characteristics (e.g., age, racial/ethnic background); (b) one's personal functioning characteristics (depressive symptoms, maternal history of maltreatment); (c)

[2] As will be discussed later in this section, all analyses were conducted with multiply imputed data; therefore, binary logistic regression was used in place of chi-square tests

characteristics of the support network, community and neighborhood in which one is situated; and (d) interaction terms for HVS vs. RIO group membership with these characteristics. Because regression models can become increasingly complex as more variables are entered into the analysis, we relied on the principle of parsimony in choosing our final models (Paulson, 2007; Vittinghoff, Glidden, Shiboski, &McCulloch, 2012). Guided by this principle, once we compiled the fullest moderation regression model, we removed, one at a time, those interaction terms and predictor variables that did not make a significant statistical contribution to the model until a model that accounted for the variance most parsimoniously was found. Using model fit statistics (R^2 change, -2LL change), we compared the nested regression models to determine the parsimonious models with the most predictive power. For space considerations, we present only the program effect model (M1), the fullest moderation model that includes all predictors and all program interaction terms (M2), and the final, parsimonious model (M3) for significant findings.

These analyses utilized many variables from the T2 RI; therefore, all analyses were based on data from the Integrative Study sample (n = 512). Maternal history of maltreatment was of particular interest to the current study, and thus was examined in a multidimensional manner in moderation analyses. For all parenting outcomes, we tested individual models for chronicity of maternal maltreatment history, existence (versus absence) of maternal maltreatment history, and substantiated cases of specific types of maltreatment history as potential moderators of program on parenting outcomes. Analyses that included chronicity and existence of maltreatment history were able to capture the full Integrative Study sample. However when analyses considered a specific type of maltreatment history (e.g., maternal history of substantiated reports of neglect only) as a potential moderator, the maternal maltreatment history variable had cases with a *0* for no maltreatment history of any type, a *1* for existence of that specific history (e.g., neglect only), and a *not applicable* for cases in which neither of the former definitions were true (e.g., existence of a maternal history of another type of maltreatment). These analyses were therefore necessarily conducted on subsamples

of the Integrative Study sample because regression analyses excluded cases that were *not applicable*. These subsamples are noted and described when relevant.

Lastly, to determine whether those significant moderation effects in the subsamples effects could be retained in the full Integrative Sample, we used the full moderation model (M2) of analyses that contained the *existence of maltreatment history* as the maltreatment history moderator (because the *existence* moderator captures the full Integrative Study sample), regardless of the statistical significance of its effects. We were then able to create, for the full Integrative Sample, a parallel, parsimonious model (M3) for the parenting outcomes with significant moderation effects in subsamples.

Research Question 3: For mothers enrolled in the program, is there an association between specific aspects of program utilization and parenting? For this research question, only state agency data were used for parenting outcomes. Pearson's correlation, t-test, and binary logistic regression were used as appropriate to determine if bivariate associations existed among the model variables. Following bivariate analyses, nested linear and logistic regression models were run to determine whether program utilization was associated with parenting outcomes. All regression analyses were run with two models: the first model was bivariate in nature and regressed parenting outcome on program utilization, and the second model introduced control variables (maternal age, child age, race/ethnicity, and use of other home visiting services) to the regression. All analyses were conducted on the Impact Study HVS sample (n = 420).

Databases. Three imputed databases were used for this study (see Appendix A for a detailed description of the statistical strategy used to impute the data):

1. *Impact Study database* (N = 687), used to assess the direct impact of HFM on DCF reports of child maltreatment;
2. *Integrative Study database* (n = 512), used to investigate the direct impact of HFM on DCF variables *plus* those parenting outcome variables available only for the Integrative data (i.e., self-reported child maltreatment, maternal sensitivity, maternal nonhostility, and parenting

stress as reported at the T2 RI). Likewise, all individual-level and contextual-level moderators of these outcomes were available only for Integrative data which includes maternal childhood history of maltreatment, IPV, depression, parenting stress, social support, neighborhood safety, neighborhood cohesion, and community configuration;

3. *Impact Study HVS Sample database* (n = 420), used to examine the relations between program utilization and DCF reports of child maltreatment within the group of evaluation participants who were assigned to HVS.

Results

Descriptive Information on Impact Study and Integrative Study Samples

Descriptive statistics for the Impact Study sample (N = 687), the Integrative Study sample (n = 512), and the comparison of parenting outcomes between HVS and RIO samples appear in Table 1, Table 2, and Table 3, respectively. Descriptive statistics for the HVS sample (n = 420) appear in Table 4.

Overall Rates of Child Maltreatment

Chronicity and types of child maltreatment rates in the DCF agency records consider two categories of report post-enrollment: (a) *reports of maltreatment*, which include all allegations of child maltreatment made to DCF, whether or not maltreatment was found to have occurred, and (b) *substantiated reports of maltreatment*, which comprise a smaller subset of these reports that DCF determined maltreatment had in fact occurred (substantiated). Here we report on the overall rates of child maltreatment in the Impact Study sample (N = 687) by identified perpetrator: first, reports and substantiated reports by any identified perpetrator, then reports and substantiated reports in which the mother was identified as the perpetrator.

Following enrollment in the evaluation study, approximately 29.2 % of children (n = 199) in the full sample had reports of physical abuse and/or neglect and 21.11% of children (n =145) in the full sample had at least one *substantiated* report of maltreatment; thus nearly 73% of the reported cases in the sample were substantiated by the agency. Of children with reports, 46.2% of children (n

= 67) had a single report of maltreatment filed, approximately half of the children (50.3%, *n* = 73) had between two and four reports of maltreatment filed, and 3.4% of children (*n* = 5) had either five or six reports of maltreatment filed.

Neglect only was the predominant type of reported maltreatment, representing 85.9% of all maltreatment reports (*n* =171) and 94.5% of all substantiated reports (*n* = 137). Thus, of the neglect-only reports, approximately 80.1% were substantiated. Reports of physical abuse combined with neglect represented 12.1% of all report cases (*n* = 24) and 5.5% of all substantiated report cases (*n* = 8). Thus, of the combination type maltreatment reports, about one-third was substantiated. Additionally, none of the four children who were reported to be victims of physical abuse alone were determined by DCF to have been maltreated. Five children were reported as victims of sexual abuse (one report of sexual abuse alone, three in combination with neglect, and one in combination with both neglect and physical abuse), but none of these reports were substantiated.

We also examined reports of child maltreatment in the Impact Study sample in which *mothers* were identified by DCF as the perpetrator, either alone or in addition to other caretakers. Following enrollment in the evaluation study, 24% of mothers (*n* = 165) in the full sample were reported for neglecting and/or physically abusing their children and approximately 16.5% of mothers (*n* = 113) in the full sample were found to have at least one *substantiated* case of maltreatment; thus 68.5% of reported cases in the sample were substantiated by the agency.

Again, reports of neglect-only were the most frequently cited type of maltreatment filed on mothers; 92.1% of all maltreatment reports (*n* = 152) and 96.5% of all substantiated maltreatment reports (*n* = 109) were filed as neglect-only type maltreatment. Thus, approximately 71.7% of neglect-only reports were substantiated for mothers as perpetrators. Ten mothers were reported to DCF for physical abuse combined with neglect and four of these cases had at least one substantiated report. However, only three instances of physical abuse-alone were filed on mothers and none of these reports was substantiated.

Chronicity and type of child maltreatment rates were also was assessed using a self-report measure, the Conflict Tactics Scale – Parent-Child version (CTSPC; Straus et al., 1998) completed in the Integrative Study sample (n = 512) at the T2 RI. Reflecting on the past year, mothers reported their abusive and neglectful behavior with their infants and toddlers. On average, mothers reported less than one maltreatment event in the past year (M = .57). Thirteen percent of mothers reported that they had engaged in abusive and/or neglectful behaviors with their children (13.3%, n = 68.1). When examining maltreatment by type, data show that approximately 8.2% of mothers (n = 42) reported having neglected their children, 6.4% of mothers (n = 32.8) reported having physically assaulted their children, and 3.4% of mothers (n = 18) combined neglect and physical assault upon their children in the past year. Mothers' responses on the CTSPC also indicated nonviolent discipline, a positive dimension of parenting; results showed that approximately 85.7% of participants (n = 439) engaged in at least one type of nonviolent behavior with their children, with an average report of using such discipline approximately 24 times throughout the past year (M = 24.29).

Associations among Study Outcome Variables

Bivariate analyses were conducted to investigate possible associations among parenting outcomes (EA, parenting stress, self-reports of maltreatment, and DCF reports of maltreatment). All associations were nonsignificant with the exception of a relation between DCF reports of child maltreatment and parenting stress, and between maternal self-reports of child maltreatment and parenting stress. On average, maltreated children had mothers who experienced higher levels of parenting stress than mothers of nonmaltreated children. Mothers who self-reported neglecting their children rated themselves higher on parenting stress (M = 78.89) than their nonmaltreating peers (M = 74.26), $t\ (501)$ = 2.10, $p < .05$; as did mothers who self-reported any type of maltreatment, $t\ (510)$ = 2.46, $p < .05$ (M = 78.89 versus M = 74.26). Similarly, mothers whose children had at least one DCF report of neglect and physical abuse jointly by any perpetrator (M = 83.3) reported higher levels of stress, t (370) = 2.02, $p < .05$, than mothers of children without a DCF report (M = 73.71). Children

of participants who reported more parenting stress were slightly more likely to have at least one report of maltreatment by any perpetrator (*OR* = 1.04, $p < .05$).

Maternal self-reports of any type of maltreatment versus nonmaltreatment (*OR* = 1.03, $p < .05$) and of neglect versus nonmaltreatment (*OR* = 1.03, $p < .05$) were also related to parenting stress. Mothers who had high levels of parenting stress were 3% more likely to report maltreating their children compared to mothers with lower levels of parenting stress.

Research Question 1: Is Participation in HFM Associated with More Optimal Parenting and Lower Rates of Child Maltreatment?

We examined associations of HFM on EA, parenting stress, self-reported child maltreatment, and state-reported child maltreatment using data as available in either the Impact Study sample (*N* = 687) or the Integrative Study sample (*n* = 512).

Program associations with parenting outcomes. No significant differences between the program and control groups emerged for EA or positive parenting in the Integrative Sample (*n* = 512), *F Range* = 2.11 – 19.88, ns. However, participation in HFM predicted lower levels of parenting stress when controlling for individual characteristics, *b* = -3.58, *t* (312) = -2.24, $p < .05$, with HVS mothers scoring, on average, 3.6 points lower on the PSI than RIO mothers.

Program associations with rate of self-reported child maltreatment. No significant differences between the program and control groups emerged for maternal self-reports of child maltreatment in the Integrative Sample (*n* = 512), *F Range* = 1.81 -2.26, ns and *Mean -2LL Range* = 137.40 – 387.98, ns.

Program associations with DCF reports of child maltreatment in the Integrative Sample. Program participation significantly predicted two binary child maltreatment variables in the Integrative Study sample (*n* = 512): substantiated reports of any type of maltreatment (versus nonmaltreatment) by mothers (*OR* = 1.72, $p < .05$), and substantiated reports of neglect (versus nonmaltreatment) by mothers (*OR* = 1.79, $p < .05$), controlling for individual characteristics.

Children in the HVS group were on average over 70% more likely to have a substantiated report of maltreatment than were children in the RIO group when holding all other variables constant.

Program associations with DCF reports of child maltreatment in the Impact Sample. Among Impact Study participants (N = 687), the results of bivariate analyses testing whether mothers enrolled in the program were less likely to abuse and neglect their children than mothers in the control group indicated no significant association between program status (HVS/RIO) and any measure of child maltreatment (i.e., by chronicity, maltreatment type, perpetrator, or substantiated-status), *F Range* = .03 – 3.87, ns and *Mean -2LL Range* = 36.93 – 757.31, ns. Multivariate regression analyses assessing HFM's impact on child maltreatment while controlling for demographic variables and maternal functioning further affirmed that program status was not significantly related to child maltreatment *F Range* = 3.01 – 5.56, ns and *Mean -2LL Range* = 28.54 – 784.37, ns, although the relation between program involvement and physical abuse could not be examined because there were too few reports (n = 4).

Research Question 2: Do Characteristics of Individuals or their Contexts Moderate the Relation between Program and Parenting?

The next set of data analyses explored whether or not certain individual and contextual characteristics moderated the relation between participation in HFM and parenting in the Integrative Sample (n = 512) and subsamples thereof that considered specific maternal histories of maltreatment.

Results of bivariate analyses. Prior to conducting these moderation analyses, we examined the bivariate associations between potential moderators (maternal depression, maternal history of maltreatment, intimate partner violence [IPV], social support, community demographic profile, and neighborhood safety and cohesion) and parenting outcomes (EA, parenting stress, self-reported maltreatment, and DCF reports of maltreatment). Results indicated significant associations between depression, t (510) = 4.77, $p < .001$, IPV partner-as-perpetrator, $r = .11$, $p < .05$, frequency of social support, $r = -.21$, $p < .05$, and a maternal history of multiple-type maltreatment, t (304) = 2.38, p < .05, and the outcome of parenting stress. Moreover, results indicated significant associations

between both IPV by self and by partner, frequency of social support, Community Profile 4, neighborhood safety and numerous measures of maternal maltreatment histories and DCF parenting outcomes. The results of these findings are summarized in Table 5 and Table 6.

Results of moderation analyses. Multiple hierarchical and logistic regression analyses of the Integrative Study subsamples revealed predictive, moderated relations between the program and various characteristics of individuals and their contexts and parenting outcomes, mainly maternal depression, community profile, and neighborhood safety. Nested regression models showing the main effect of program model, the full moderation model, and the final, parsimonious moderation model of subsample analyses are shown in Tables 7 - 11. The results of the final parsimonious models are reviewed here.

Moderation of maternal depression and HFM. Maternal depression moderated the relations between program and parenting outcomes in three analyses, and these effects are depicted in Figures 2 - 6. Maternal depression moderated the relation between program and parenting stress, $b = 8.32$, $t(269) = 2.75$, $p < .01$, in the subsample analyses that considered a mother's self-reported history of neglect ($n = 300$). As indicated in Figure 2, the relation between depression and parenting stress differed between HVS and RIO groups. On average, controlling for other model variables, at both above and below the clinical cutoff, HVS mothers indicated less parenting stress than their RIO counterparts. However, for HVS mothers, being above the clinical cutoff resulted in a significantly higher level of parenting stress than those HVS mothers who were below the clinical cutoff; whereas the status of being above or below the clinical cutoff did not result in different levels of parenting stress for RIO mothers. For mothers above the clinical cutoff, program status did not result in much difference; HVS and RIO mothers were more similar in their parenting stress. For mothers below the clinical cutoff, program status did indicate differences; HVS and RIO mothers were not as similar in their levels of parenting stress.

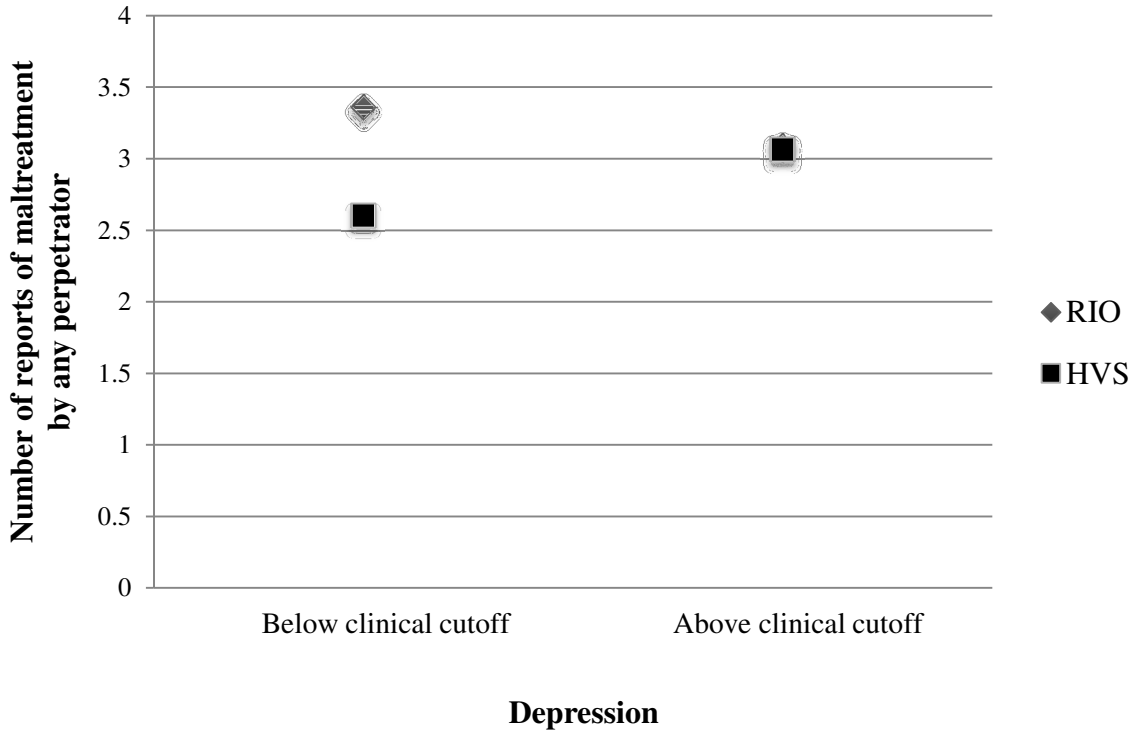

Figure 2. Prototypical plot depicting the interaction between program status and maternal depression predicting reports of any type of child maltreatment by any perpetrator (n = 228).

Maternal depression moderated the relation between program and number of reports of maltreatment by any perpetrator, $b = 0.73$, t (195) = 2.06, $p < .05$, in the subsample analyses that considered a mother's DCF history of physical abuse (n = 228). As indicated in Figure 3, when controlling for baby's age and maternal race, children of both HVS and RIO mothers who exhibited clinical levels of depressive symptoms had a similar number of reports (substantiated or unsubstantiated) on average; for children of mothers who fell below the clinical cutoff for depressive symptomatology, the program group was associated with significantly fewer reports of child maltreatment when compared to their counterparts in the control group. Additionally, the number of reports of maltreatment was lower for children of depressed RIO mothers compared to children of nondepressed RIO mothers.

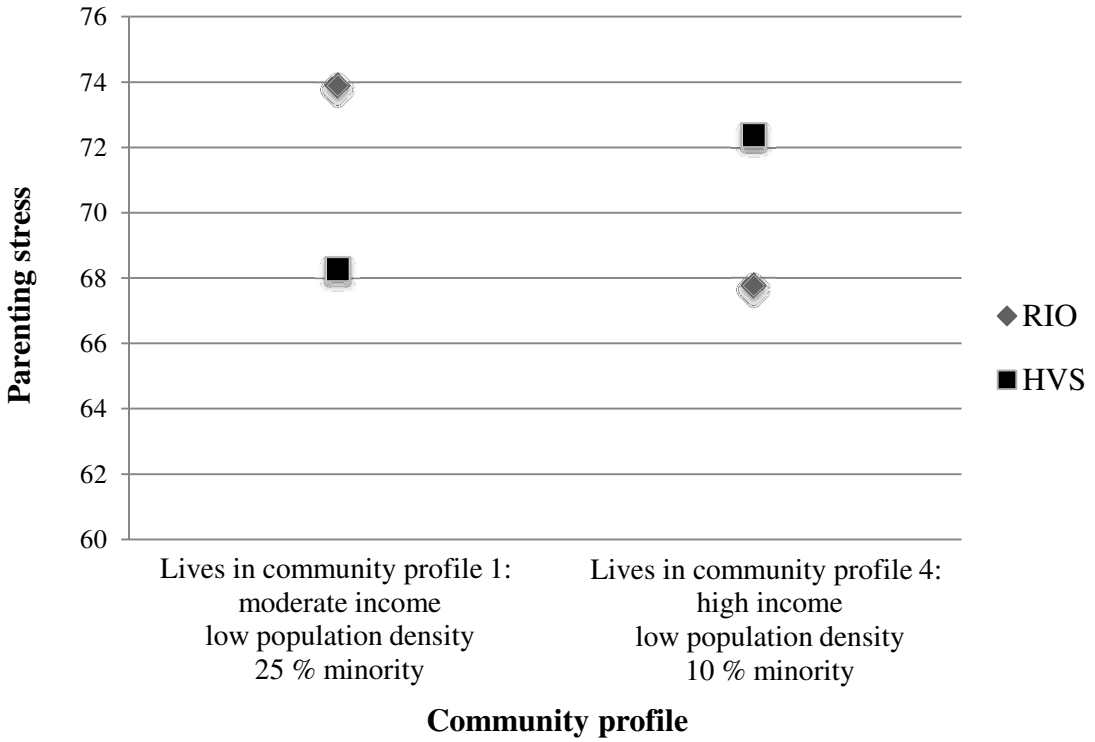

Figure 3. Prototypical plot depicting the interaction between program status and Community Profiles 1 and 4 predicting parenting stress (n = 379).

Maternal depression also moderated the relation between program and number of reports of maltreatment by mother as perpetrator, $b = 0.56$, t (196) = 2.64, $p < .01$, and this also was found in the subsample analyses that considered a mother's DCF history of physical abuse (n = 229). This relation is depicted in Figure 4. This analysis also controlled for baby's age and maternal race, and revealed on average that across HVS and RIO groups, mothers above the clinical cutoff were similar in reports in which the mother was the reported perpetrator; however for mothers below the clinical cutoff, HVS mothers had significantly fewer reports on average than RIO mothers. While reports of maltreatment were fewer in the HVS group regardless of clinical depression status, analyses revealed that RIO mothers below the clinical cutoff had the most reports of the four groups.

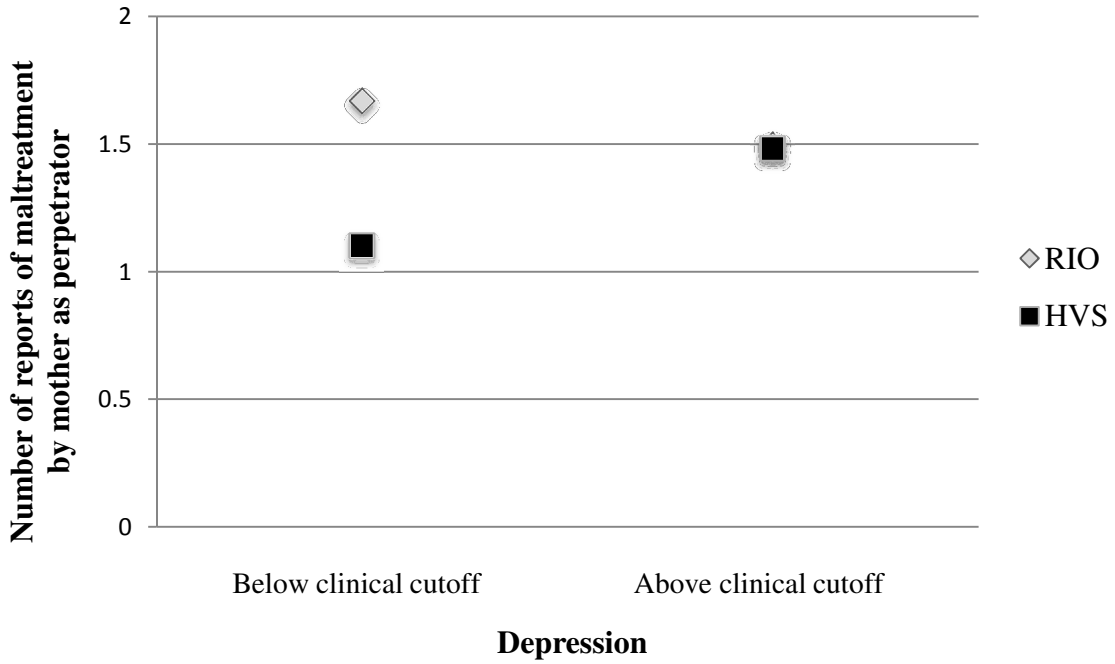

Figure 4. Prototypical plot displaying the interaction between program status and maternal depression predicting reports of any type of child maltreatment by mothers (n = 229).

Moderation of Community Profile and HFM. Community Profile also moderated the relation between program and parenting stress, $b = 10.23$, $t\ (348) = 2.37$, $p < .05$, in the subsample analyses that considered a mother's DCF history of neglect (n = 379). This relation is depicted in Figure 5 whereby, controlling for all other model variables, RIO mothers residing in Community Profile 4 (high-income, low population density, 10% percent minority communities) had lower levels of parenting stress than RIO mothers residing in Community Profile 1 (moderate-income, low population density, 25% minority communities). Conversely, HVS mothers living in Community Profile 4 reported higher levels of parenting stress than HVS mothers living in Community Profile 1. Comparing HVS and RIO mothers within community profiles, HVS mothers in Community Profile 4 reported higher levels of parenting stress than RIO mothers in the same profile, whereas HVS mothers in Community Profile 1 reported lower levels of parenting stress than RIO mothers in that same profile.

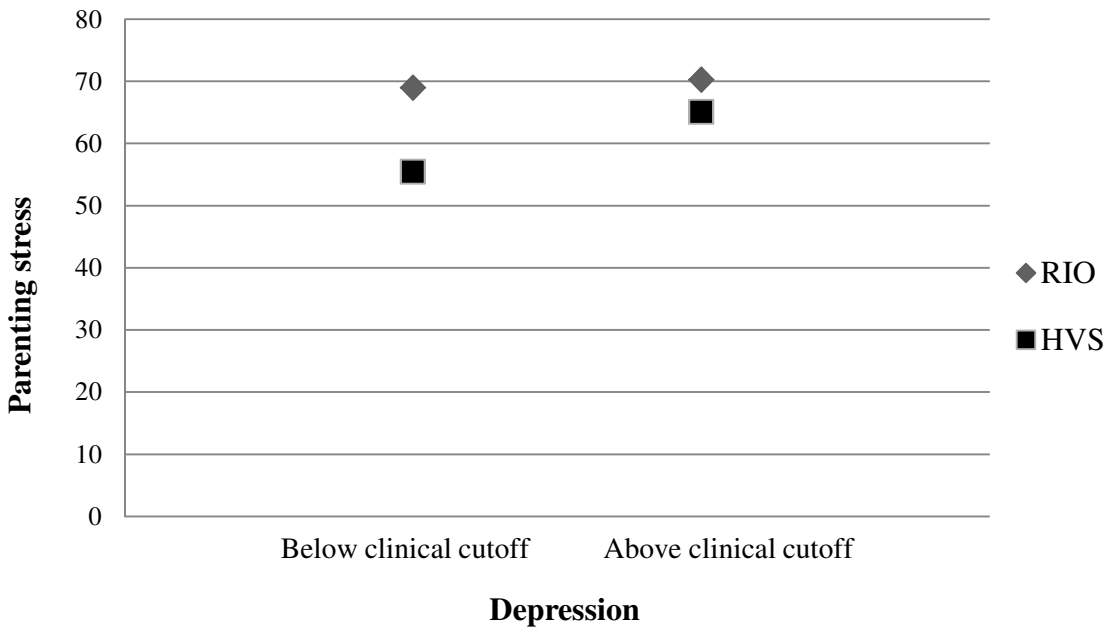

Figure 5. Prototypical plot depicting the interaction between program status and maternal depression predicting parenting stress (n = 300).

Moderation of neighborhood safety and HFM. Mothers' perceived neighborhood safety moderated the relation between program and the likelihood of having a report of neglect by any perpetrator, OR = 1.10, $p < .05$, in the subsample analyses that considered a mother's multiple-type maltreatment history (n = 308). This relation is depicted in Figure 6. Controlling for the frequency of social support, for children of HVS mothers, the odds of being reported to DCF for neglect by any perpetrator were *higher* on average given higher levels of perceived neighborhood safety and, conversely, *lower* when the levels of perceived neighborhood safety lower. The opposite relation was observed for children of RIO mothers: here the odds of the child having a report of neglect filed with DCF were *lower* if their mothers perceived their neighborhoods to be more safe and *higher* when their mothers considered their neighborhoods to be less safe.

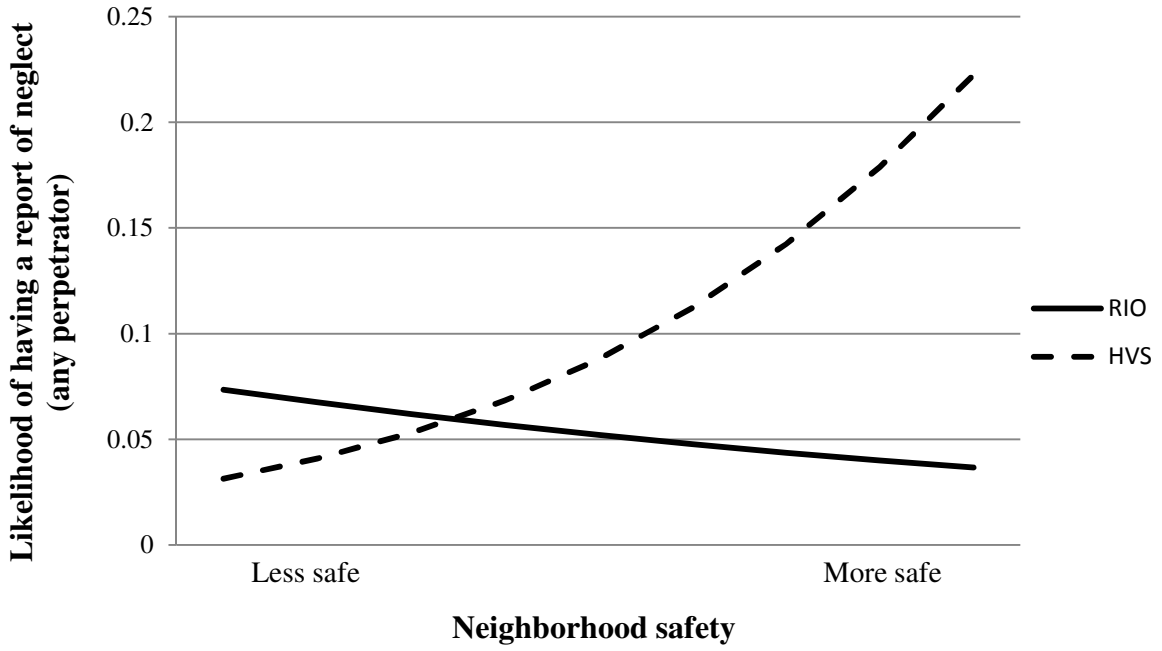

Figure 6. Prototypical plot depicting the interaction between program status and neighborhood safety in predicting reports of child neglect by any perpetrator (average n = 308).

Main effects of final moderation models. The final parsimonious models also sustained main effects of individual characteristics and their social contexts in predicting the four parenting outcomes reviewed above. For the two subsamples that considered mothers' history of neglect, more frequent and dependable social supports were prominent main effects in predicting lower parenting stress in both models. For the two subsamples that considered mothers' history of physical abuse, younger child age and being Hispanic (in reference to being White) were prominent main effects in predicting lower number of reports of maltreatment in both models. Finally, for the subsample that considered mothers' multiple-type maltreatment history, higher frequency of social support predicted lower likelihood of having a report of neglect. These results are detailed in Tables 7 - 11.

Main effects of maternal history of maltreatment for full Integrative Study sample. Final, parsimonious models of the full sample analyses are shown in Table 12. Multiple hierarchical and logistic regression analyses of the *full* Integrative Sample (n = 512) did not sustain any statistically significant moderation effects of program status on parenting outcomes, *F Range* = 7.11 – 8.18, ns and *Mean -2LL* = 5.38, ns. The final, parsimonious models on the four outcomes of

interest revealed predictive, main effects between the various characteristics of individuals and their contexts and parenting outcomes. Maternal history of any type of maltreatment did not sustain a main effect in the final models predicting parenting stress or predicting likelihood of having a neglect report. However, there was a significant main effect of maternal history of DCF maltreatment in the two models that predict reports of maltreatment: on average, when controlling for all other model variables, children of mothers who had a maternal history of DCF maltreatment (of any type) had more reports of maltreatment filed (on any perpetrator) than those of mothers who did not have any history of maltreatment, $b = .26$, $t\ (501) = 2.14$, $p < .05$. Similarly, when controlling for other model variables, a mother who had a maternal history of DCF maltreatment (of any type) on average had more reports of maltreatment filed on herself as perpetrator than a mother who did not have a history of maltreatment, $b = .18$, $t\ (505) = 2.42$, $p < .05$.

Research Question 3: For Mothers Enrolled in the Program, Is There an Association between Program Utilization and Parenting?

To investigate whether patterns of program utilization influenced young mothers' parenting, we conducted analyses examining associations between program usage variables and parenting outcome variables examining only the HVS group of the Impact Sample ($n = 420$). Program utilization was represented by number of home visits, duration in the program, groups attended in the program, and secondary activities. Parenting outcomes were represented by DCF reports of child maltreatment. We also examined personal characteristics of mothers among program usage. Results of bivariate analyses indicated significant associations between program utilization and mothers' characteristics as well as DCF reports of maltreatment.

Program utilization of the HFM sample. Table 4 presents descriptive information for program utilization variables in the full HVS sample ($n = 420$). On average, young mothers remained in the HFM program for 13.18 months (*Range* = .03 – 36.98), during which time they received a mean of 22.54 home visits (*Range* = 0 – 96) and 22.13 secondary activities (*Range* = 0 – 252). Participants attended, on average, 1.75 groups (*Range* = 0 – 21).

Associations between individual characteristics and program utilization. Individual characteristics associated with program use in the full HVS sample were child's age, maternal depression, maternal race/ethnicity, and pregnant/parenting status at enrollment. On average, mothers of younger children received more home visits (r = -.22, p < .001) and secondary activities (r = -.15, p < .01). Younger child age also was associated with longer duration in the program (r = -.19, p < .01). Mothers who were not clinically depressed (M = 14.02 months) stayed longer in the program than the depressed mothers (M = 11.42 months), t (418) = -2.33, p < .05. Mothers who were not clinically depressed (M = 24.22) also had more secondary activities than depressed mothers (M =17.73), t (418) = -2.03, p < .05. Hispanic mothers (M = 27.02) received more secondary activities than non-Hispanic mothers (M = 19.64), t (418) = 2.36, p < .05). Participants who entered the program pregnant (M = 26.26) received more home visits than the mothers who were parenting at enrollment (M = 17.41), t (418) = -3.88, p < .001). Pregnant mothers (M = 14.91 months) stayed longer in the program than parenting mothers (M = 10.93 months), t (418) = -3.97, p < .001).

Associations between program utilization and parenting outcomes. Bivariate analyses of program use and DCF reports of maltreatment showed that, for program participants, fewer reports of maltreatment with mother as perpetrator were associated with more home visits (r = -.11, p < .05), more secondary activities (r = -.10, p < .05), and a longer stay in the program (r = -.11, p < .05). Participants who attended more groups had fewer substantiated reports of maltreatment with the mother as the perpetrator than participants who attended fewer groups (r = -.10, p < .05). Also related to child maltreatment was whether the participant enrolled in the program pregnant or parenting. Participants who were pregnant at enrollment had fewer reports of child maltreatment (M = .52) than women who were parenting (M = .83; t (418) = 2.44, p < .05). However, when controlling for demographic information, use of other parenting services, and maternal depression in the subsequent analysis models, the bivariate associations between program utilization and parenting outcomes described above no longer were significant.

Discussion

While the detrimental effects of child maltreatment are well known to researchers, practitioners, and policy makers, there remains much to learn about the most effective approaches to reducing rates of child maltreatment. In this study, we posed three research questions to address these concerns: (1) Is participation in HFM associated with more optimal parenting and lower rates of child maltreatment? (2) Do characteristics of individuals or their contexts moderate the relation between program participation and parenting? (3) For mothers enrolled in the program, is there an association between program utilization and parenting?

Our study design was guided by an ecological model (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 2006) that emphasizes the ways in which individuals, programs, and communities are in mutual relationship with one another and are embedded within a particular, and evolving, policy context. Because a program such as HFM, which aims to support positive parenting and family well-being, offers services to a diverse group of young families across many community contexts in the state of Massachusetts, we sought to understand what characteristics of mothers (e.g., childhood history of maltreatment, depression) and their contexts (e.g., community profile, neighborhood safety) that might influence the attainment of its goals. These questions have importance both for programs and policies intending to support young children and their families, as well as for research in the area of home visiting services and child maltreatment prevention more broadly.

Research Question 1: Is Participation in HFM Associated with More Optimal Parenting and Lower Rates of Child Maltreatment?

Our results showed some evidence of early effects of HFM on mother's parenting and child maltreatment. Mothers enrolled in HFM reported less parenting stress than mothers not enrolled in the program.

There was an interesting pattern of findings when considering program status and child maltreatment. While program status was not related to mothers' self-reports of child maltreatment, program status was related to state agency substantiations of maltreatment, with program participants

more likely to have supported cases of child maltreatment. However, this finding was significant only in the Integrative Sample (n = 512), and not the Impact Sample (N = 687); the failure to replicate in the largest sample suggests the need for caution in interpreting this finding.

Research Question 2: Do Characteristics of Individuals or their Contexts Moderate the Relation between Program Participation and Parenting?

There was ample evidence of the benefits of assuming an ecological approach that considers characteristics of individuals and their contexts that may aid in tailoring program services to particular participants based on knowledge of who they are and the nature of their environments. As expected, both proximal and distal characteristics of mothers' ecologies were related to the incidence of maltreatment and parenting stress (in main effects models). Mothers' social relationships (social support, intimate partner violence) were associated with substantiated child maltreatment; less frequent social support and the presence of IPV were associated with more maltreatment in the full integrative sample, as well as higher likelihood of neglect reports in a select subsample. When we considered particular subsamples of mothers who had different childhood histories of maltreatment, we found that the effects of program status on parenting stress and on substantiated reports of child maltreatment were moderated by mothers' depression such that the program effects "washed out" when mothers were depressed; for mothers who were not depressed, HVS mothers had lower parenting stress than mothers who were not receiving HFM services.

As noted earlier, maternal depression moderated the effects of HFM on parenting stress and substantiated maltreatment in subsample analyses that considered the mother's childhood maltreatment history. We were particularly interested in looking separately at the type of maltreatment histories (e.g., neglect, physical abuse, sexual abuse) that mothers carried forward from their own childhoods. It is rare to find studies in the child maltreatment literature that consider the intergenerational influences of type of maltreatment, and we know of no studies of home visiting interventions that do so. When we considered mothers with histories of physical abuse and mothers with no maltreatment, the effects of the program on substantiated child maltreatment (by either

mothers or other perpetrators) were moderated by maternal depression, with program effects evident only for mothers who were not depressed.

Analyses including mothers who reported a history of neglect alone and mothers with no neglect (thus excluding mothers with other kinds of maltreatment histories) revealed that low social support (dependability) was related to higher parenting stress, and the effects of the program were evident only for mothers who were not depressed. Analyses that included mothers for whom there were state agency records of childhood histories of neglect and mothers who had not been maltreated in childhood showed that mothers who were depressed, and those with lower social support (frequency) reported greater parenting stress. In addition, among this subsample, community of residence moderated the effects of HFM on parenting stress. In this analysis, mothers not receiving HFM services who lived in communities which were low population density, high income, and low percent minority reported less parenting stress than control group mothers residing in communities with low population density, moderate income, and higher percent minority residents. The opposite pattern was true for mothers enrolled in HFM.

In subgroup analyses that considered mothers' histories of multiple types of maltreatment, perceptions of neighborhood safety moderated program effects on the likelihood of substantiated maltreatment (by any perpetrator). Mothers enrolled in the program were more likely to have children with substantiated maltreatment when they lived in neighborhoods they perceived as safer; for mothers not enrolled in the program, the odds of child neglect were higher if they lived in less safe neighborhoods.

Research Question 3: For Mothers Enrolled in the Program, Is there an Association between Program Utilization and Parenting?

In order to understand whether, and how, variations in mothers' use of the program were related to parenting, we examined several aspects of program utilization. We explored how many home visits and secondary activities each participant completed, and length of time in the program, and their potential relation to substantiations of child maltreatment and to parenting stress. Each

dimension of program utilization (more home visits, longer duration of program participation, more secondary activities) was associated with fewer substantiated reports of mother-perpetrated maltreatment. Participants who were pregnant at program enrollment were less likely to have reports of child maltreatment than participants who began the program following childbirth.

Providing the Context for Study Findings

In order to understand the meaning and scope of our study findings, we provide information about the incidence of maltreatment in our sample of adolescent mothers. Based on their mothers' young age at childbirth (average age almost 19 years), the target children (average age 12 months at our RI) are at risk for child abuse and neglect (Howard & Brooks-Gunn, 2009). The literature (e.g., Brooks-Gunn & Chase-Lansdale, 1995; Lounds et al, 2006; Sidebotham & Golding, 2001) shows strong associations between adolescent parenting and child maltreatment, though this association is not necessarily causal. Children of teenaged mothers are at high risk because of challenging circumstances that precede the early childbearing (Borkowski et al, 2007; Whitman et al, 2001).

Indeed, there is reason to be concerned about these young children and their futures: the rate of substantiated child maltreatment (by any perpetrator) in the full sample of young mothers (21%) was ten times higher than the rate of maltreated infants in the national population (20.6 per 1,000; USDHHS, 2010). The rate of substantiations in our full sample, however, was consistent with the rate of maltreatment for all children in Massachusetts in 2010 (19%), which is the third highest in the nation. The state rate would likely be considerably higher if we considered only the age group of very young children that comprised our sample. Neglect alone (in absence of other forms of maltreatment) was by far the most common form of substantiated maltreatment in our sample (80%), a figure that also is consistent with the national rate of neglect (71%; USDHHS, 2010). In our full sample, young mothers were identified as perpetrators in almost 17% of cases of substantiated maltreatment; the vast majority of these cases of maternal maltreatment (96%) were cases of neglect-only.

Interpretation of the Findings

We begin by summarizing several key findings that are particularly notable for their implications for HFM, and for home visiting services in general. Briefly, mothers in the program (HVS) group had significantly lower levels of parenting stress, as well as higher rates of child maltreatment documented by state agencies, than did mothers in the control (RIO) group. The impact of the program on parenting outcomes for particular subgroups of mothers considering their own maltreatment histories, was moderated by maternal depression, neighborhood safety, and community demographic profile.

Since parenting stress is a predictor of child maltreatment (Stith et al, 2009) the early program effects on this intermediate, or more proximal goal, are quite encouraging. At the same time, our data showed (in analyses of the Integrative Sample that controlled for potential confounds) that mothers in the home visiting group received *more* substantiations of child maltreatment than did mothers in the control group. Based on other findings from this current study, and from previous evaluations of other home visiting programs (see review by Howard and Brooks-Gunn, 2009), we speculate that these findings may, in part, be attributable to oversurveillance of families in the program group. It is notable that in the program group, mothers who used more program services, more secondary activities, and stayed longer in the program were less likely to have reports of child maltreatment than mothers who did not utilize the program in this way. We surmise that HVS mothers whose children receive DCF reports may then end their participation in HFM, or may not have fully engaged in the program from the outset.

Maternal depression, neighborhood safety, and community demographic profile were significant moderators of the relation between program participation and parenting when we conducted subsample analyses according to mothers' childhood histories of maltreatment. HVS mothers who fell below the clinical cutoff for depression had children with significantly fewer reports of child maltreatment compared to children of nondepressed mothers in the control group. Perceived neighborhood safety also moderated program effects, with those HVS participants living in

the less safe neighborhoods showing more positive outcomes than their RIO counterparts; the inverse was true in the safer neighborhoods.

The following paragraphs offer more detailed interpretations of some of our key findings.

Associations between parenting and individual and contextual characteristics. In order to understand and interpret these data, we need to know more about how other characteristics of mothers and their contexts may be related to parenting. The extant data on child abuse and neglect suggest that knowledge of several features of mothers and their lives may aid our understanding of the circumstances surrounding the maltreatment. The mothers in our study resided in communities throughout the state that were diverse in race and ethnicity, and in income. They are first-time teenage mothers who are simultaneously taking on and learning the responsibilities and behaviors of parenthood at the same time that they are making the transition to late adolescence and early adulthood. The transition to parenthood holds challenges for every parent, perhaps more so for these mothers, many of whom become parents "off-time" according to many views of American motherhood, and are under scrutiny simply because of the early childbearing.

In our study, child maltreatment was related to both childhood contexts (mothers' own childhood histories of maltreatment) and current relationships (e.g., partner relationships characterized by intimate partner violence [IPV], social support while parenting). In addition to the many associations between maternal history of maltreatment and present-day reported child maltreatment in our bivariate analyses, we find direct effects in our multivariate analyses. For example, when mothers themselves had a childhood history of maltreatment, their children on average are predicted to have higher reports of maltreatment (either by their mothers or other perpetrators). Not surprisingly, then, our study joined a host of others documenting the intergenerational cycle of maltreatment (Bert et al., 2009; De Paúl & Domenech, 2000; Egeland, et al., 1987; Kaufman & Zigler, 1987; Pears & Capaldi, 2001).

Child maltreatment perpetrated by mothers and other caregivers more often took place in homes where there was intimate partner violence. That is, when mothers reported being the victim or

the aggressor of violence in their partner relationships, their children were more likely to be maltreated. Not surprisingly, child maltreatment occurs in the context of other kinds of domestic violence in the homes of these young children. Similar to the finding of intergenerational cycles of maltreatment, this pattern of cycles of difficult/maladaptive family relationships is well documented in the literature on child abuse and neglect (Lee et al, 2004; Margolin et al, 2003; Tajima, 2000; Tolan et al, 2009; Wolfe & Garrido, 2006). While we were somewhat surprised that the documented relation in our data was not stronger, and did not show that IPV moderated program effects on child maltreatment, we expect that stronger relations between IPV and child maltreatment may emerge in later years of the evaluation study.

Although there was evidence of family relationships that challenged positive parenting, we also found that relationships could be a constructive force for young mothers and their children. Specifically, when mothers had greater frequency of contact with members of their social support networks their children were less likely to have maltreatment reports and substantiations (by mothers or other perpetrators). When mothers reported their social networks to be more dependable they reported less parenting stress. Again, this is consistent with the literature on the importance of social support networks in nurturing positive parenting and family relationships (Crockenberg, 1987; Gaudin, 2001; Way & Leadbeater, 1999; Whitman et al., 2001).

Besides relationships, two other characteristics of mothers and their contexts were related to child abuse and neglect. Not surprisingly, children who were maltreated had mothers who reported greater parenting stress. Whether this parenting stress is antecedent to or resulting from child maltreatment is a question that we may explore further in future analyses. Finally, characteristics of mothers' childrearing contexts (neighborhood safety and community context) were related to child abuse and neglect. We surmise that different thresholds for perceiving and reporting maltreatment may be operating among and between communities, making it somewhat difficult to interpret direct comparisons of reports of families who reside in communities with different assets and challenges.

Explaining the high rates of child maltreatment in this sample. As described above, the rate of substantiated reports of child maltreatment in the full sample of young mothers indicated that a substantial number of children had been maltreated (primarily neglected) one year after our study began. Currently there is no information about maltreatment rates among cohorts of young parents residing outside Massachusetts to use for comparison. In an initial evaluation of HFM (Jacobs, et al., 2005), an estimated 11.6% of children whose mothers were enrolled in the program had substantiated reports with the mother as perpetrator; thus the current sample's 16.5% substantiations with the mother as perpetrator represents an increase in child maltreatment. Several recent evaluations (of Healthy Families programs in New York, and Alaska) are useful counterpoints, though they serve a broader population than teen mothers. In the New York evaluation, roughly 5% of both the program and control groups had substantiations in Year 2 of the study. The subsample most closely approximating our young mothers (<19 years at first childbirth) had substantiations in 3.4% of the program group and 7.4% of the control group (DuMont et al., 2008). The results of our study were more similar to those reported by Duggan and colleagues (Duggan et al., 2007) for the Alaska evaluation, where rates of reports were 30% in the program group and 33% in the control group, with substantiations of 16% for the program group and 17% for the control group in the first two years of the program.

Although the rates of substantiated reports of maltreatment in the present study appear high—or at least suggest an increase from those reported in an earlier evaluation of HFM, it is difficult to interpret them confidently in that light. An estimated 76% of the current sample of mothers is enrolled in community parenting programs, providing opportunities for surveillance that may not have been available for the previous cohort, and may not be routinely available elsewhere. In addition, the accumulation and dissemination of evidence underscoring the consequences of early brain development for later functioning—particularly the harmful effects of neglect in early childhood (Hostinar & Gunnar, in press)—have likely fueled the impulse to report situations involving infants and toddlers that might not have registered even a decade ago. The fact that HVS

families in the Integrative Sample had a greater likelihood of substantiated reports of child maltreatment is consistent with another finding of our study, that children whose mothers used parenting services other than, or in addition to, HFM had even greater likelihood of substantiated reports. In the Healthy Families New York (HFNY) evaluation (DuMont et al., 2011), mothers in the home visiting group who self-disclosed maltreating their children (using the same instrument that we used, the Conflict Tactics Scale) were differentially more likely to be reported to CPS than were mothers in the control group who reported maltreating their children. This suggests that once families are engaging in parenting service programs they are more likely than other parents to have child maltreatment detected and reported. The pattern suggests that families enrolled in parenting services are under increased surveillance by service providers focused on supporting parenting (Chaffin & Bard, 2006).

Depression as a moderator of program effects on maltreatment and parenting stress. The findings noted above (main effects of program participation on maltreatment reports and on parenting stress) were moderated by characteristics of mothers and their contexts, including mothers' depressive symptoms, their perceptions about the safety of their neighborhoods, and the characteristics of the communities in which they live.

For mothers who fell below the clinical cutoff for depression, program participation was associated with fewer reports of maltreatment, compared to the control group. Among children whose mothers reported clinically significant depressive symptoms, however, reports of maltreatment were not different for the HVS and RIO groups, suggesting that the mothers' depression may compromise home visiting program effectiveness. This is a key finding since approximately one-third of mothers in the study report depressive symptoms high enough to be clinically significant and that may compromise the impact of the HFM program.

One puzzling finding was that among the mothers who were not enrolled in HFM, there were fewer reports of child maltreatment when mothers were depressed. While we do not have clarity about this finding, it may be that family members and friends may have provided greater supports

when they suspected that mothers were depressed and having a difficult time with parenting. Family members and friends might, for example, provide more help with childcare, or act to secure residential stability, or provide physical necessities that would avert reports of maltreatment. Importantly, we found that, although depressive symptoms were relatively stable across the year between the two assessments (T1 and T2), mothers reported declining levels of symptoms only in the HVS group. While this may be an artifact of the fact that the RIO group had higher symptoms than the HVS group at the first time point, in future work we will explore whether HFM has an effect on maternal depression.

Why would depression influence the program's impact? When viewed through a bioecological lens (Bronfenbrenner & Morris, 2006), it is clear that depression affects cognitions, emotions, and behavior. For example, a mother who is depressed might take longer to engage in the program, might have more home visit "no shows," and might have a more difficult time developing a close and trusting relationship with her home visitors. Another mother may have more difficulty ingesting and applying the parenting information shared by her home visitor. And another mother may withdraw from or neglect her parenting role because she is simply overwhelmed with her own psychological distress.

Neighborhood and community context as moderators of program effects. We discovered a complex relation between mothers' perceptions of their neighborhood and community contexts and the effects of program participation on DCF reports of child maltreatment. Among participants who rated their neighborhoods as less safe, HVS families were *less* likely to have a child reported as neglected than were RIO families. Interestingly, the opposite relation was observed among participants who rated their neighborhoods as more safe; among this group, children of HVS participants were *more* likely to have reports of neglect than were the children of RIO participants, suggesting, perhaps, a buffering influence of HFM in particular community contexts, and/or different reporting thresholds in different neighborhoods or communities. Specifically, the finding that in less safe neighborhoods, HVS families are less likely to maltreat can be explained as a clear program

effect: HFM acts as a buffer for enrolled families so that a percentage of reports are averted; the RIO families do not have that advantage, so reports are significantly higher. In the second instances, in those neighborhoods perceived as safer, HFM families remain engaged with a program that monitors participants and will make reports when necessary; once in a program's sight, there may also be a lower threshold for reporting in those communities than in the others. RIO families, on the other hand, may not be involved with similar kinds of programs, and the overall community assumption might be that families generally do well enough. That is, there is no comparable mechanism for surveillance and support for RIO families, which may account for the significant differences between the two groups.

Further evidence that the program may act as a buffer against economic stress may be seen in the finding that community characteristics also moderated the effects of program on parenting stress. Among mothers living in the lower income, slightly more urban and diverse community (Community Profile 1, moderate-income, low population density, 25% minority), RIO mothers reported higher levels of parenting stress than did HVS mothers. On the other hand, among participants living in the highest income community profile (Community Profile 4, high-income, low population density, 10% minority), RIO mothers reported lower amounts of parenting stress than HVS mothers. It may be that what is perceived as stressful about parenting is modified by participation in a parenting support program, and that programs operate differently in different communities. Since reduction in parenting stress is an area where HFM seems to have considerable impact, we will explore these ideas in future analyses.

Program and Policy Recommendations

These findings emerge at a particularly exciting time in the home visiting field. A recent influx of federal dollars granted through the Maternal Infant and Early Childhood Home Visiting Program (MIECHV) has allowed states—Massachusetts among them—to develop, expand and enhance existing statewide home visiting systems. Since Massachusetts is a veteran in providing home visiting services statewide, the results from this investigation may be useful as communities in

other states prepare for statewide implementation of home visitation programs. Although many possible program and policy recommendations might be derived from this study, the few most compelling are discussed here.

Focusing Program Attention on Maternal Depression

This study underscores the necessity for home visiting programs to pay serious attention to depression among their participants. Children who grow up in households with mothers who are depressed are much more likely to show deficits in brain development, cognitive functioning, self-regulation, school readiness, and social and emotional maladjustment (Murray, Woolgar, Cooper, Hipwell, Weinberg, & Hipwell, 2001; National Scientific Council on the Developing Child, 2005; Petterson & Albers, 2001). More than 30% of the study sample exhibited depression above the clinical cutoff level, and for certain subsamples of participants, depression at this level acts as a moderator of program effects. In analyses of mothers with childhood experiences of physical abuse or who had not been maltreated, program effects on maltreatment (by mothers or by other perpetrators) were evident only for mothers who were not depressed. That is, HFM appears successful at supporting positive parenting for those mothers who are *not* depressed, but its effects are essentially neutralized in the population of program participants who are depressed.

These findings regarding depression suggest the following responses at the program and community level:

- *Targeted training, consultation, and support for home visitors and program administrators* This investment might well include training sessions that help home visitors understand the manifestations and consequences of depression, as well as instruction in methods that facilitate screening for depression within the context of home visits. Home visiting programs need to become, and remain, well-acquainted with community resources that can address this problem—and nurture those community relationships as well—so that timely and appropriate referrals can be made. While the pathways responsible for the moderating effects of depression on parenting in this sample have not been established, one possible route is

through complicating the home visitor/client relationship, making it both difficult to engage these mothers and to maintain the relationship over time, perhaps particularly when a maltreatment report has been filed. Providing additional support and supervision to home visitors with clients who are depressed, and helping them develop alternative engagement and retention strategies, are promising steps to take.

- *The implementation of home visiting models with a specific "mental health" orientation.* Depending on the specifics of the population being served, and the communities in which programs are located, home visiting programs should consider augmenting their program model with therapeutic approaches specifically designed to be used in conjunction with home visitation. In this state, for instance, the MIECHV funds will be used to pilot the In-Home Cognitive Behavioral Therapy (IH-CBT) intervention (Ammerman et al., 2005) in multiple sites. This model has been demonstrated to be highly effective in reducing depression, with 66.7% of depressed mothers no longer obtaining a diagnosis of depression at the end of treatment, in contrast with a rate of 24.3% in mothers receiving home visitation alone (Ammerman et al., 2005). Programs such as these may allow home visiting programs to leverage the home visitor/client relationship to support mental health assessment, provide intensive mental health services to families who might not access services outside the home, and ultimately reduce depression in participants.

Enhancing Program Efforts at Early and Continued Engagement of Young Families

Within the HVS sample, mothers who initiated home visiting during pregnancy (as opposed to as new parents), and received a greater amount of services over a longer period of time, were less likely to have substantiated DCF reports against them than were mothers who were less fully engaged with the program. In addition, the findings in the full sample that frequency of contact with social supports reduced the probability of state agency reports of child maltreatment highlights, in the case of young mothers receiving home visiting services, the likely import of the home visitor/client

relationship, and the necessity to maintain that relationship, stably, over the period of program participation.

Ethnographic data from an earlier evaluation (Jacobs, Easterbrooks, Brady, & Mistry 2005) suggest that for some mothers, when that relationship is fractured through home visitor turnover, residential instability, or other unanticipated or undesired circumstances, it is unlikely that the participants will reinvest in a new relationship. In this sense, then, the contextual factors in the larger policy environment (in addition to the maternal health concerns noted earlier) that conspire to make maintaining this relationship challenging—inadequate supports for safe, adequate public housing for teen mothers, the relatively poor salaries for paraprofessional home visitors, etc., are worth attention by those who support and promote home visitation, and seek to reduce maltreatment within young families.

Clearly, then, home visiting programs must develop additional strategies to enroll mothers early and maintain contact with them over as extended a period of time as possible. Some potential approaches, many of which already are in HFM's repertoire, include the following:

- Developing partnerships with health clinics and private physicians to expand referral network;
- Initiating program structural modifications and innovations (e.g., evening and weekend visits, Skype contact, regular phone/texting contact, etc.) to facilitate continued participation;
- Reconsidering local program eligibility to allow for flexibility in following families who move out of the catchment area;
- Stabilizing the home visiting workforce through the development of career ladders within programs and administering agencies, and other professional inducements.

A Community Focus on Community-Based Systems of Care for Young Families

The rates of maltreatment reports among these young mothers in this study appear concerning. To what extent do these rates reflect oversurveillance of these families? Certainly the

literature poses this as one, among several, plausible explanation in circumstances where home visiting programs have not reduced the volume of CPS reports (Barlow et al., 2006; Bull et al., 2004; Hodnett & Roberts, 2000; Howard & Brooks-Gunn, 2005; Mikton & Butchart, 2009). That the Massachusetts rates of substantiated child victimization rates have been the highest, or the second highest, in the country for the three years during which this study was conducted (USDHHS, 2009; 2010; 2011) suggests a vigilant reporting culture statewide. The finding that over 75% of these mothers are in parenting programs *in addition to* HFM adds considerable opportunity for the mothers to interact with a broad range of mandated reporters, adding weight to this interpretation. And within this context, as participants in a home visiting program designed, in part, to prevent maltreatment, the HVS mothers are presumably even more closely monitored than are those in the RIO group. Our data, however, do not allow us to conclude whether, and to what extent, this oversurveillance phenomenon is in play.

These maltreatment findings do surely reflect concern, on the part of community professionals and some mothers themselves, with the quality of parenting being practiced. In this regard, the results also present broadly available opportunities for community providers to intervene with these first-time young mothers, early in their parenting careers, when they might be more amenable to guidance than they would be later on. Early identification of family stress and parenting inadequacy during a child's first months or years has the potential to support families in developing a new, more positive developmental trajectory, where children and their parents can thrive. Thus, early identification, if it is accompanied by actual supports for families, may be associated with a reorganization, skill building, and recalibration that predict resilient functioning (i.e., positive development in the context of adversity).

This situation is ripe for *system-wide* action, underscoring the need for a coordinated community-based approach, with an emphasis on prevention of maltreatment. As noted earlier, the development and implementation of a more extensive array of community mental health services for young moms—particularly preventive, for example, within schools or through prenatal visits, in post-

partum clinic visits or even for universal home visiting—is critical. In addition, a tighter, more facilitative network of community agencies that interact with these young families is another community-level goal worth embracing.

Indeed, for several decades there has been a strong push to more fully embed children and families at-risk of maltreatment, and with confirmed maltreatment reports, in their communities; evidence of this movement is found throughout the protective services system—for example, in the preference for kinship-based, geographically proximate foster care, and in systems reform efforts to develop community partnerships for families. The intention of this movement is to create an environment within communities of *shared responsibility* for these children and families, to convert the role of the state child protection agency from that of the sole arbiter for cases of possible and confirmed maltreatment to that of the central broker of necessary monitoring, support, and intervention services—that is, a relationship more collaborative in nature.

Although this impulse toward community engagement in child protection has theoretical validity, it is difficult to achieve on the ground; Daro and Dodge (2009) note the lack of knowledge of providers, resistance to change, and concern for duplication, as among the significant challenges. It also requires deep, shared knowledge of the resources, strengths, and needs of each community, and the ways in which families living within them most appreciate receiving help and support (see, for example, Jacobs, et al, 2005). Our present study, among others (see Sampson, Morenoff, & Gannon-Rowley, 2002, for a review), attests to the wide variations in community contexts, and the variable parenting outcomes that result from them. To best serve these families, then, policymakers need to identify and engage the range of service providers, to take account of the particular characteristics of individual communities, including the available network of child and family services, formal supports (e.g., schools) and nonformal mediating entities (e.g., churches)—and act collaboratively *in the context of each*.

The particular role of home visitation, as a potentially core element of this system of care for vulnerable young families, has only recently begun to receive attention. There appears to be lack of

agreement about where it belongs. For example, to the extent that HFM is a universal, strengths-based program, offering support but not interventions for families, then similar, local programs should build and maintain closer relationships with members of the "regular" early childhood system—child care providers, health care organizations, and public schools. As a child maltreatment prevention program, however, serving an at-risk population, such programs likely also need to align themselves with parenting programs and other more focused supports and intensive interventions, acting, at a minimum, as well-informed referral sources. And as to strengthening relationships with the CPS agency, Daro and Donnelly (2002) observed that prevention programs, in general, often fail to establish significant relationships of this nature. Given that initiatives such as HFM may continue to find themselves straddling this divide, more attention to cultivating these local relationships is critical in this next phase of the development of home visiting, and, indeed is a cornerstone of the newly implemented MIECHV initiative.

Study Limitations

As with any individual investigation, there are several limitations that potentially may qualify the validity or generalizability of our findings.

Analysis with Multiple Samples

Our study design nested the Integrative Sample (n = 512) within the Impact Sample (N = 687); thus the sample size differed by the particular analysis being undertaken. While most analyses conducted on both samples showed a similar pattern of findings, there were a few with significant findings only in one of the samples (e.g., the finding of greater reports of child maltreatment in the HVS group in the smaller Integrative Sample only, not also the Impact Sample). This potentially complicates what might be a clearer message had we decided to use only the Integrative Sample for whom we had both the administrative (e.g., DCF) and self-report data. However, it would have been a decision that did not take best advantage of the full sample size present in the Impact Sample.

Validity of Maltreatment Indicators

One of our interests was to explore multiple indicators of child abuse and neglect, and risk for parenting problems. The field of child maltreatment research is hampered by concerns about the validity of measures of abuse and neglect (Howard & Brooks-Gunn, 2009); while state agency substantiated reports most certainly are conservative estimates, missing many cases of maltreatment, self-reports by mothers suffer other problems (e.g., social desirability, variations in interpretations of the questionnaire items). Our strategy was to include multiple measures of both current and historical experiences of child abuse and neglect; we consider this a strength of our work. We included state agency unsubstantiated and substantiated reports, and mothers' self-reports of their own harsh parenting and parenting stress; we also conducted observations of mother-child interaction in their homes. For the history of maltreatment variable (mother as former victim of maltreatment), we used both substantiated state agency reports and mothers' self-reports of having experienced maltreatment as children.

However, our current data suggested that, at least at this time point, these indicators of parenting were not related to each other, either in the case of current maltreatment or maternal history of maltreatment. Why is it the case that mothers, service providers (and others who lodge allegations with child protective services), and trained research coders reached different conclusions about the risk for child maltreatment? Or that mothers' reports of their maltreatment histories do not reflect DCF records? One reason may be that the indicators we used access different facets of parenting, and of maltreatment risk. And there are considerations about the validity of observational judgments made by researchers (who viewed only 10 minutes of mother-child interaction before making ratings of sensitivity) and others (including home visitors) who might be making allegations of child abuse or neglect from differing vantage points (researcher vs. practitioner). Finally, while we selected assessment instruments that we believed to be most psychometrically sound, it simply is the case that many measures of parenting have not been sufficiently normed on the sample in our study (women who are young, diverse in race and ethnicity, and primarily of low income).

The Relation of Early Impacts to Later Ones

The present study examined only early program impacts. In fact, there are several models of program effects that bear consideration (Maurer, Mondloch, & Lewis, 2007; Vandell et al., 2010). Benefits incurred during the receipt of program services may (a) be observed early and sustained over time, (b) show effects immediately that diminish with time or change in circumstances/setting, or (c) show enhanced effects over time, in essence "sleeper effects" whereby an experience earlier creates the capability or potential for an effect that may emerge only at a later point in time. Indeed, several evaluations of home visiting programs have demonstrated effects on parenting that were stronger beyond the first two years of the evaluation (Rodriguez, DuMont, Mitchell-Herzfeld, Walden, & Greene, 2010; Zielinski, Eckenrode, & Olds, 2009).

The possibility for developmentally triggered "sleeper effects" to emerge that could significantly differentiate the program and control groups might be particularly salient here. Ours is a population of young mothers who themselves are likely undergoing significant developmental transitions—from adolescent to adult (as well as from adolescent to adolescent parent). It may be that the information and support offered through HFM is metabolized over time, as these young women become more mature and better able to use them. That is, greater maturity and experience might facilitate more timely and appropriate use of outside help and support, and a great ability to seek out that help; these skills might have been "learned" during active participation in the program but only implemented years later.

Limitations of an Intention-to-Treat Model

The randomized controlled trial (RCT) design implemented in this study reflects the standard for intervention research now extant across many human services domains, including home visiting (Haskins, Paxson, & Brooks-Gunn, 2009; Paulsell, Avellar, Sama Martin, & Del Grosso, 2011). This standard is sometimes reflexively applied by funders or policymakers, before the program under investigation has had the benefit of feedback from process or implementation study, or from less rigorously designed outcome evaluation, to allow necessary modifications to its program operations

or operating assumptions about program effects. The current evaluation team takes a developmental approach to evaluation (see, for example, Jacobs, 1988; Jacobs & Kapuscik, 2000; Jacobs, et al, 2005) that credits these earlier evaluation stages. Nonetheless, the team initiated an RCT in this case because HFM is mature enough, with sufficient evaluation-related resources at the state and local levels, to warrant it.

Even so, this approach imposes certain limitations that render study results potentially less useful to practitioners; the adoption of an intention-to-treat model, a related standard in the field (Hollis & Campbell, 1999; McKinlay et al., 1989; Ruiz-Canela et al., 2000), is a case in point. Approximately 14% of the HVS group never received any services, yet use of the intention-to-treat model requires that these mothers be included in the treatment group. From a research perspective that makes sense; since the intention was, indeed, for these mothers to become full program participants, their lack of participation should be factored into establishing the overall effect of the program. However, granting that programs need to focus attention and develop new strategies to engage and retain eligible potential participants, from a practical perspective, this approach constrains our understanding of the effects of home visiting programs *on the individuals who actually receive the services.* This information is critical to improve the actual service components of programs as they currently operate.

Focus on Risks and Vulnerabilities

The literature on adolescent mothers has, for many years, focused on the risks inherent in early childbearing, both for a young woman's life trajectory, and for her children (Coley & Chase-Lansdale, 1998; Leadbeater & Way, 2001; Osofsky et al, 1993). Yet this focus highlights only part of the story. For example, while we know that there is an intergenerational cycle of maltreatment in which mothers who have experienced maltreatment are more likely than those who have not been maltreated to have children who become victims of child abuse and neglect (e.g., de Paúl & Domenech, 2000; Kaufman & Zigler, 1987, 1989), most mothers with childhood histories of neglect do *not* maltreat their children. Exclusive focus on risk factors, or conditions that increase the

likelihood of negative outcomes (Masten & Powell, 2003), gives the false impression that they are deterministic and reinforces a public discourse that oversimplifies the nature of teen parenting (Flanagan, 1998; Leadbeater & Way, 2001). Although data related to maternal, family, and community strengths were collected in our evaluation, this particular report focuses on the incidence of, and risks for, child maltreatment, and only hints at a more nuanced understanding of the considerable strengths and resilient functioning among these mothers, their families, and communities.

Measurement of Community

The few statistically significant findings regarding the community's moderating role in parenting stress and substantiated DCF reports are difficult to interpret, leaving more questions than answers. The lack of a consistent story line here could well reflect limitations in the measure of community that was used. Although the data-driven approach that produced our community clusters provides a more nuanced characterization of individual participants' proximate neighborhoods (e.g., at the census block group level) than is generally included in home visiting evaluations, it also has its drawbacks.

To begin, a multitude of community-level indicators could have been selected for these analyses, and although the ones chosen (income, race, and population density) are among those basic structural neighborhood dimensions that have been strongly associated in the literature with child and family well-being (Goodnow, 2010; Leventhal & Brooks-Gunn, 2000), they may not be the most salient in understanding the particular processes through which neighborhoods contribute to young families' use of HFM and the attainment of its desired outcomes. That is, the fact that our neighborhood results are challenging to interpret may stem in part from these indicators' failure to capture what Sampson and colleagues have deemed the "more social-interactional and institutional mechanisms hypothesized to account for neighborhood-level variation in a variety of phenomena (e.g., delinquency, violence, depression, high-risk behavior), especially among adolescents"

(Sampson et al., 2002, p. 443). Furthermore, the clusters are based on one address at one point in time, and so do not reflect the residential instability experienced by many of these families.

Future Research

Viewing the findings from this study in light of other applied research studies and evaluation, and with reference to the limitations above, we note several promising directions for future researchers, including this current evaluation team, to undertake:

Disaggregating Participants by Attending to Maternal Histories of Maltreatment

One area for further exploration is the different patterns of program utilization, and program outcomes, for mothers with different childhood histories of maltreatment. These patterns underscore the heterogeneity among adolescent mothers; despite sometimes being viewed as a monolithic group in the literature, and in popular sentiment, there is evidence of the need to continue to explore the different ways in which program participants may respond to facets of the service in different ways, for example, by considering maternal childhood histories of maltreatment. We examined mothers' histories of maltreatment because of the strong evidence in the literature of an intergenerational cycle of maltreatment among young mothers (Kim, 2009; Lounds et al, 2006). In our study, among different subsamples of mothers with histories of maltreatment, depression moderated the effects of the program on parenting stress and child maltreatment. While the literature points to differential consequences of types of maltreatment (physical, sexual, neglect, etc.) for children (DePanfilis, 2006; Dubowitz, 2007; Manly et al, 2001), we need further exploration in order to understand the long-term consequences of different types of maltreatment during childhood later in life, including during parenting. Perhaps mothers with histories of physical abuse and mothers who were neglected during childhood will respond differently to the challenges of parenting as their infant becomes a two-year-old who tests boundaries, for example. Parenting is not the only concern for which maltreatment histories may manifest differentially; we may find, for example, that mothers with histories of only neglect and mothers with complex maltreatment histories of abuse and neglect may utilize program services differently as their children get older.

Understanding the Experience of Depression in Young Mothers Longitudinally

Another area of investigation concerns the high rate of depressive symptoms in this sample of young mothers. Approximately one-third of mothers reported symptoms that are comparable to a clinical diagnosis of depression; many others suffer subclinical levels of symptoms, such as irritability, social isolation, and low self-esteem. The literature documents that maternal depression has detrimental consequences for the health and development of children, particularly during the first years of life when brain development is particularly vulnerable (Goodman & Gotlib, 2002; Bureau, Easterbrooks, & Lyons-Ruth, 2009). Coupled with the finding that depression moderated program effects, it is critical to understand the developmental trajectory of depression in our study mothers, as well as the implications of depression for their young children. In light of these findings, we will use our data to follow the developmental course and chronicity of depressive symptoms in our participants, and their implications for both the moderation of program effects and their children's social, emotional, and cognitive competence.

Attending to Evidence of Resilient Parenting and General Maternal Well-being over Time

As we noted when discussing limitations of this study, our focus in the present report on risks for child maltreatment pays short shrift to a resilience perspective that stresses the role of protective factors, or characteristics and conditions that reduce the odds of poor parenting and increase the odds of positive adaptation to adversity (Easterbrooks, Chaudhuri, Bartlett, & Copeman, 2011; Horton, 2003; Luthar & Cicchetti, 2000; Masten & Powell, 2003). In line with a resilience perspective, research suggests that protective factors are key catalysts in mitigating risk for child neglect and promoting resilience among high-risk families (Borkowski et al., 2007; Children's Bureau (HHS), Child Welfare Information Gateway, FRIENDS National Resource Center for Community-Based Child Abuse Prevention, & Center for the Study of Social Policy-Strengthening Families, 2011; Horton, 2003). In future work, for example, we intend to examine how protective factors (alone, and as potential moderators of program participation) such as a stable relationship with the baby's father,

or supportive educational setting, promote positive functioning (e.g., positive childrearing attitudes, child socioemotional competence).

The potential for documentation of resilient trajectories or "sleeper effects" that may emerge later, perhaps even years after program participation, underscores the critical role for longitudinal study of program effects, even after the end of program services. In particular, for parenting services that begin (or are limited to) the infancy period (the first year of life), the developmental transitions that occur for children and their families as they move from infancy into the toddler years (ages 1 - 3) may be stabilizing and positive for some families and destabilizing for others. As children become more independently mobile, parents begin to hold them accountable for regulating their emotions and behavior (Campos, et al., 2000). Consequently, there are different kinds of demands for supervision, discipline, socialization and teaching than was the case in the "babes in arms" period. For some young mothers, the second and third years of life may be when issues of discipline and supervision become particularly salient, and perhaps particularly in need of (and amenable to) supportive guidance from home visitors. Thus, longitudinal investigation is imperative.

Considering Parenting Outcomes in the Context of the Other Program Goals

In this paper we have focused on only one of HFM's five stated goals: prevention of child maltreatment and enhancement of positive parenting. The four additional goals include: promoting optimal child health and development, supporting mothers' educational and occupational attainment, reducing rates of repeated teen birth, and enhancing maternal well-being. HFM's progress in achieving early results in its other goal areas has not yet been established, nor of course, have analyses been undertaken to reveal the distribution of effects, at any time point, across these areas, relative to one another. It may be, for example, that substantiated reports are particularly high early on, but at that same time we see significant positive differences between children of HVS mothers and RIO mothers in terms of their basic health status. Or perhaps patterns of outcomes might emerge for HVS mothers over time—as positive parenting becomes more evident, so do outcomes in maternal employment or maternal well-being. Certainly, the literature suggests that evidence of

home visiting program effectiveness can be seen in multiple areas; and among these, reductions in child maltreatment have frequently proven to be the most elusive (Howard & Brooks-Gunn, 2005; Paulsell et al., 2011) . HFM's effectiveness is best understood in the context of the full intentions of the program, not with reference to only one goal; the current evaluation intends to pursue this line of investigation as well.

Understanding More Fully the Community/Neighborhood Contexts for Programs

Although a number of the salient features of communities (e.g., poverty level) have been identified (Drake & Pandey, 1996), analyses that include clusters of characteristics—including those that are not considered to be risk factors—allow for a fuller picture of communities, and would be useful to program planning and evaluation. For example, ethnotheories of development suggest that cultural communities may differ one from another, both in how they define positive parenting practices and in the types of services members would prefer to ameliorate exigent concerns (Rogoff, 2003; Jacobs et al., 2005; Mistry, Jacobs, & Jacobs, 2009). In addition, research specifically investigating neighborhood-level indicators with regard to child maltreatment has found associations between maltreatment and, to name just a few, residential instability (Coulton et al., 1995), perceived neighborhood disorder (Gracia & Herrero, 2006), child care burden (Coulton et al., 1995), perceptions of social disorder and social control (Leventhal & Brooks-Gunn, 2000; Sampson et al., 2002), and community-held beliefs about the etiology, nature, and prevalence of child maltreatment (Elliott & Urquiza, 2006; Klein, Campbell, Soler, & Ghez, 1997; Korbin, Coulton, Lindstrom-Ufiti, & Spilsbury, 2000). Studies interested in teasing apart the role of neighborhood or community context in promoting child maltreatment prevention programs should consider inclusion of these variables in their designs. Finally, future research should consider the ways in which spatial dimensions of communities (e.g., accessibility of public transportation, the local availability of services and recreational facilities for children, etc.) also influence the utilization and perhaps, ultimately the effects, of home visiting.

Conducting a Fuller Exploration of Program Engagement and Utilization

Our data indicated that program participants who used more program services—remaining in the program longer, and completing more home visits and more secondary activities—had children with fewer substantiated reports of maltreatment than did those who were less engaged in the program. On the other hand, the data comparing the HVS and RIO groups directly indicated that the HVS group had *more* maltreatment. These provocative findings suggest that, although being enrolled in the program predicted more substantiated maltreatment reports overall, those mothers who remained engaged with the program were less likely to be among those cases. Understanding which mothers become engaged and stay involved in which constellations of service components would be of great benefit to programs.

With only a handful of exceptions (see, for example, Ammerman et al., 2006; Duggan et al., 2007; Kisker, Paulsell, Love, & Raikes, 2002), however, home visiting evaluations tend to describe service utilization solely in terms of program dosage, generally as measured by the length of enrollment in the program, number of completed home visits, duration of visits, and ratio of completed to expected number of home visits. There have been few attempts to expand this measurement of program services to include other components of home visiting programs (e.g., participation in groups or collateral activities by home visitors), and to consider the community contexts in which services are delivered.

Although this study did move past the traditional measures of program participation, in that it included nonvisit activities, achieving a fuller and more accurate characterization of program usage, further study of participant engagement and service component utilization should include the following:

- *The nature of participation (distribution of participation by program service types, considering different participant and community profiles)*. The scarcity of research in this area makes it difficult to discern which particular constellations of services, among particular

types of families, are necessary to achieve program goals. More attention needs to be paid to the distribution of different service modalities (i.e., visits, groups, secondary activities),

- *Patterns of participation (over time).* Included here are the varying distributions of service types over time, the changes in participation among family members, the circumstances surrounding missed and canceled home visits, etc.
- *The content of home visits, including the place of the home visitor/client relationship in home visiting programs.* Research is slowly accruing on both the topics addressed during home visits, and the nature, perceived value, and potentially mediating power—both in terms of continued program engagement and in the attainment of program goals—of the home visitor/client relationship (see Brookes, Summers, Thornburg, Ispa, & Lane, 2006; Korfmacher, Green, Spellmann, & Thornburg, 2007; Woolfolk, 2006; Woolfolk & Unger, 2009; Roggman, Cook, Peterson, & Raikes, 2008). Nonetheless, the data available to date do not provide much description of the relationship from the participant's perspective, in the language she chooses, nor does it provide much detail about how that relationship might relate to the content of visits.
- *The relations of program participation to parenting outcomes.* As discussed earlier, in this study, the intention-to-treat model dictates including all mothers assigned to the treatment group in all analyses, even those mothers who never received services. Subsequent analyses should compare mothers who received any service to those who received no service, and should also investigate what is anecdotally considered the threshold of home visiting engagement—a minimum of three or four visits.
- *The characteristics of the participants who enroll in home visiting programs but do not receive services.* Further analyses will explore both the characteristics of these nonusers, compared to those who received a substantial "dosage," and the outcomes attained by both groups.

Conclusion

As this report is being written, the first significant federal investment in home visiting is reaching communities and states across the country. The stakes are high for all involved—policymakers, practitioners, and families, at the local, state, and federal levels. The value of sound home visiting evaluation is not only in assessing the effectiveness of these services, but in providing feedback on program implementation that can, possibly, be used to improve operations and thus maximize the opportunities to help vulnerable families. We offer this study as a modest contribution to those efforts.

Table 1
Descriptive Statistics for the Impact Study Sample Using Imputed Data, (*N* =687).

	n	*M*	*Range*	Sample %
Control Variables				
Mother's age at birth (years)	687	18.73	15.47 - 22.70	
Baby's age (months)	687	12.41	-4.57 - 38.13	
Program participation status				
HVS (HFM group)	420			61.14%
RIO (control group)	267			38.86%
Use of other parenting services				
Yes	516			75.11%
No	171			24.89%
Mother pregnant or parenting at intake				
Pregnant	409			59.53%
Parenting	278			40.47%
Race/Ethnicity				
White	257			37.41%
Black	122			17.76%
Hispanic	212			30.86%
Other	95			13.83%
Depression				
Above clinical cut-off	222			32.31%
Below clinical cut-off	465			67.69%
Parenting Outcomes				
DCF reports of maltreatment (any perpetrator)				
Substantiated				
Total maltreatment (total substantiations)	687	.41	0.00 - 6.00	
No maltreatment	542			78.89%
Any type	145			21.11%
Neglect only	137			19.94%
Physical abuse only	0			0.00%
Neglect and physical abuse	8			1.16%
Substantiated or unsubstantiated				
Total maltreatment (total reports)	682 [a]	.66	0.00 - 8.00	
No maltreatment	483			70.82%
Any type	199 [a]			29.18%
Neglect only	171			25.07%
Physical abuse only	4			.59%
Neglect and physical abuse	24			3.52%
DCF reports of maltreatment (mother perpetrated)				
Substantiated				
Total maltreatment (total substantiations)	687	0.22	0.00 - 4.00	
No maltreatment	574			83.55%
Any type	113			16.45%
Neglect only	109			15.87%
Physical abuse only	0			0.00%
Neglect and physical abuse	4			.58%
Substantiated or unsubstantiated				
Total maltreatment (total reports)	687	0.37	0.00 - 6.00	
No maltreatment	522			75.98%
Any type	165			24.02%
Neglect only	152			22.13%
Physical abuse only	3			.44%
Neglect and physical abuse	10			1.46%

[a] Total n does not include five cases of sexual abuse, which were removed from analysis.

Table 2
Descriptive Statistics for the Integrative Study Sample Using Imputed Data, (n =512).

	n	*M*	*Range*	Sample %
Control Variables				
Mother's age at birth (years)	512	18.72	12.07 - 24.78	
Baby's age (months)	512	11.95	-18.36 - 40.01	
Program participation status				
HVS (HFM group)	301			58.79%
RIO (control group)	211			41.21%
Use of other parenting services				
Yes	377			73.63%
No	135			26.37%
Mother pregnant or parenting at intake				
Pregnant	335			65.43%
Parenting	177			26.37%
Race/Ethnicity				
White	184			35.94%
Black	97			18.95%
Hispanic	164			32.03%
Other	68			13.28%
Moderator Variables				
Depression				
Above clinical cut-off	166			32.42%
Below clinical cut-off	346			67.58%
Intimate partner violence (IPV)				
Partner-perpetrated (total events in past year)	512	2.44	-42.75 - 75.01	
Self-perpetrated (total events in past year)	512	1.90	-30.85 - 50.00	
Maternal history of maltreatment				
Self-reported maltreatment				
Total maltreatment (total events)	512	1.41	0.00 - 12.00	
No maltreatment	215			41.99%
Any type	297			58.01%
Neglect only	74			14.45%
Physical abuse only	75			14.65%
Sexual abuse only	88			17.19%
Combination of two or more types	122			23.83%
DCF maltreatment				
Substantiated				
Total maltreatment (total substantiations)	512	2.44	0.00 - 18.00	
No maltreatment	202			39.45%
Any type	310			60.55%
Neglect only	165			32.23%
Physical abuse only	44			8.59%
Sexual abuse only	32			6.25%
Neglect and physical abuse	121			23.63%
Substantiated or unsubstantiated				
Total maltreatment (total reports)	512	3.66	0.00 - 25.00	
No maltreatment	202			39.5%
Any type	310			60.5%
Neglect only	165			32.17%
Physical abuse only	44			8.65%
Sexual abuse only	32			6.19%
Neglect and physical abuse	121			23.61%
Social support				
Frequency	512	24.03	7.00 - 59.00	
Dependability	512	2.01	0.00 - 4.00	
Community Demographic Profile				
Community Profile 1	204			39.8%

	n	*M*	*Range*	Sample %
Community Profile 2	159			31.1%
Community Profile 3	101			19.7%
Community Profile 4	62			12.1%
Neighborhood				
Safety	512	27.40	13.00 - 48.00	
Cohesion	512	20.01	8.00 - 30.00	
Parenting Outcomes				
Parenting stress	512	74.41	43.00 - 11.00	
Emotional Availability				
Free play				
Sensitivity	512	4.87	-22.00 - 36.00	
Non-hostility	512	4.21	-32.00 - 30.00	
Teaching task				
Sensitivity	512	4.61	-20.00 - 26.00	
Non-hostility	512	3.98	-18.00 - 34.00	
Self-reported use of non-violent discipline				
Reported using non-violent discipline				
Yes	439			85.74%
No	73			14.26%
Use of non-violent discipline (total events in past year)	512	24.29	-313.76 - 403.61	
DCF reports of maltreatment (any perpetrator)				
Substantiated				
Total maltreatment (total substantiations)	512	.44	0.00 - 6.00	
No maltreatment	399			77.93%
Any type	113			22.07%
Neglect only	106			20.70%
Physical abuse only	0			0.00%
Neglect and physical abuse	7			1.37%
Substantiated or unsubstantiated				
Total maltreatment (total reports)	509 [a]	.69	0.00 - 8.00	
No maltreatment	357			69.73%
Any type	155			30.27%
Neglect only	134			26.17%
Physical abuse only	3			0.59%
Neglect and physical abuse	18			3.52%
DCF reports of maltreatment (mother perpetrated)				
Substantiated				
Total maltreatment (total substantiations)	512	.24	0.00 - 4.00	
No maltreatment	425			83.01%
Any type	87			16.99%
Neglect only	83			16.21%
Physical abuse only	0			0.00%
Neglect and physical abuse	4			0.78%
Substantiated or unsubstantiated				
Total maltreatment (total reports)	512	.39	0.00 - 6.00	
No maltreatment	386			75.39%
Any type	126			24.61%
Neglect only	116			22.66%
Physical abuse only	2			0.39%
Neglect and physical abuse	8			1.56%
Self-reported maltreatment				
Total maltreatment (total events in past year)	512	.57	-998.38 - 997.23	
No maltreatment	444			86.70%
Any type	68			13.30%
Severe physical assault only	33			6.41%
Neglect only	42			8.22%
Severe physical assault and neglect	18			3.44%

[a] Total n does not include three cases of sexual abuse, which were removed from analysis.

Table 3
Descriptive Data for Parenting Outcomes in the Integrative Sample by Program Status, (n = 512).

	HVS			RIO		
	n	*M*	%	*n*	*M*	%
Parenting stress	301	73.92		211	76.00	
Emotional Availability						
Free play						
Sensitivity	301	4.74		211	5.05	
Non-hostility	301	4.18		211	4.25	
Teaching task						
Sensitivity	301	4.54		211	4.71	
Non-hostility	301	3.91		211	4.08	
Self-reported use of non-violent discipline						
Reported using non-violent discipline						
Yes	256		85.05%	183		86.73%
No	45		14.95%	28		13.27%
Use of non-violent discipline (total events in past year)	301	23.11		211	25.97	
DCF reports of maltreatment (any perpetrator)						
Substantiated						
Total maltreatment (total substantiations)	301	.45		211	.41	
No maltreatment	232		77.08%	167		79.15%
Any type	69		22.92%	44		20.85%
Neglect only	64		21.26%	42		19.91%
Physical abuse only	0		0.00%	0		0.00%
Neglect and physical abuse	5		1.66%	2		0.95%
Substantiated or unsubstantiated						
Total maltreatment (total reports)	299[a]	.67		210[b]	.71	
No maltreatment	208		69.57%	147		0.70%
Any type	91		30.43%	64		30.48%
Neglect only	79		26.42%	55		26.19%
Physical abuse only	3		1.00%	0		0.00%
Neglect and physical abuse	9		3.01%	9		4.29%
DCF reports of maltreatment (mother perpetrated)						
Substantiated						
Total maltreatment (total substantiations)	301	.27		211	.19	
No maltreatment	243		80.73%	182		86.26%
Any type	58		19.27%	29		13.74%
Neglect only	56		18.60%	27		12.80%
Physical abuse only	0		0.00%	0		0.00%
Neglect and physical abuse	2		.66%	2		0.95%
Substantiated or unsubstantiated						
Total maltreatment (total reports)	301	.40		211	.37	
No maltreatment	224		74.42%	162		76.78%
Any type	77		25.58%	49		23.22%
Neglect only	72		23.92%	44		20.58%
Physical abuse only	2		0.01%	0		0.00%
Neglect and physical abuse	3		0.10%	5		2.37%
Self-reported maltreatment						
Total maltreatment (total events in past year)	301	.52		211		0.63%
No maltreatment	259		86.05%	185		87.68%
Any type	42		13.95%	26		12.32%
Severe physical assault only	21		6.98%	12		5.69%
Neglect only	26		8.64%	16		7.58%
Severe physical assault and neglect	11		3.65%	7		3.32

[a] Total n does not include three cases of sexual abuse, which were removed from analysis.
[b] Total n does not include one cases of sexual abuse, which was removed from analysis.

Table 4
Descriptive Statistics for the Impact Study HVS Sample Using Imputed Data, (n = 420).

	n	*M*	*Range*	Sample %
Control Variables				
Mother's age at birth (years)	420	18.68	14.57- 22.74	
Baby's age (months)	420	12.65	-2.20 - 34.75	
Use of other parenting services				
Yes	306			72.86%
No	114			27.14%
Mother pregnant or parenting at intake				
Pregnant	244			58.10%
Parenting	176			41.90%
Race/Ethnicity				
White	145			34.52%
Black	79			18.81%
Hispanic	141			33.57%
Other	54			12.86%
Depression				
Above clinical cut-off	136			32.38%
Below clinical cut-off	284			67.62%
Parenting Outcomes				
DCF reports of maltreatment (any perpetrator)				
Substantiated				
Total maltreatment (total substantiations)	420	.41	0.00–6.00	
No maltreatment	332			79.05%
Any type	88			20.95%
Neglect only	83			19.76%
Physical abuse only	0			0.00%
Neglect and physical abuse	5			1.19%
Substantiated or unsubstantiated				
Total maltreatment (total reports)	418 [a]	.65	0.00 – 8.00	
No maltreatment	297			70.71%
Any type	121 [a]			28.81%
Neglect only	106			25.24%
Physical abuse only	3			.71%
Neglect and physical abuse	12			2.86%
DCF reports of maltreatment (mother perpetrated)				
Substantiated				
Total maltreatment (total substantiations)	420	.24	0.00 – 4.00	
No maltreatment	345			82.14%
Any type	75			17.86%
Neglect only	73			17.38%
Physical abuse only	0			0.00%
Neglect and physical abuse	3			0.71%
Substantiated or unsubstantiated				
Total maltreatment (total reports)	420	.37	0.00 – 6.00	
No maltreatment	317			75.418%
Any type	103			25.42%
Neglect only	97			23.10%
Physical abuse only	2			0.48%
Neglect and physical abuse	4			0.95%
Program Variables				
Duration	420	13.18	.03 – 36.98	
Program services				
# of home visits	420	22.54	0.00 – 96.00	
# of secondary activities	420	22.13	0.00 – 21.00	
# of groups	420	1.75	0.00 - 252.00	

[a] Total n does not include two cases of sexual abuse, which were removed from analysis.

Table 5
Bivariate Associations between Moderators and DCF Parenting Outcomes in the Integrative Study Sample, (n = 512).

	IPV Partner-as-Perpetrator	IPV Self-as-Perpetrator	Social Support Frequency	Community Profile 4	Neighborhood Safety
Reports by any perpetrator					
Substantiated					
Total substantiations	r = .14**	r = .23***	r = -.11*	--	--
Any type	*OR* = 1.03*	*OR* = 1.06**	*OR* = 0.95**	--	--
Neglect only	*OR* = 1.03*	*OR* = 1.07**	*OR* = 0.95**	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	--	--	--	--	--
Substantiated or unsubstantiated					--
Total reports[a]	r = .16**	r = .24***	r = -.12*	--	r = .11*
Any type	--	*OR* = 1.06**	*OR* = 0.95**	--	--
Neglect only	--	*OR* = 1.06**	*OR* = 0.95**	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	--	--	--	--	--
Reports by mother-as-perpetrator					
Substantiated					
Total substantiations	r = .11*	r = .16**	--	t (510)= -2.01* (.10, .26)	--
Any type	*OR* = 1.04*	*OR* = 1.06**	*OR* = 0.95*	--	--
Neglect only	*OR* = 1.04**	*OR* = 1.06**	*OR* = 0.95**	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	--	--	--	--	--
Substantiated or unsubstantiated					--
Total reports	r = .12*	r = .18**	r = -.11*	--	r = .11*
Any type	*OR* =1.03*	*OR* = 1.05*	*OR* = 0.95**	--	--
Neglect only	*OR* = 1.03*	*OR* = 1.05*	*OR* = 0.94***	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	--	--	--	--	--

*p < .05. **p < .01. ***p < .001.*; -- = association not significant.*
[a] *n = 509.*
Note. Logistic regression was used for associations between dichotomous variables and thus odds ratios are reported here. Multiply imputed T-tests are reported by 'parameter (mean for 'yes', mean for 'no')'.

Table 6
Bivariate Associations between Maternal Histories of Maltreatment and DCF Parenting Outcomes in the Integrative Sample, (n = 512).

	1	2	3	4	5
Reports by any perpetrator					
Substantiated					
Total substantiations	r = .14**	r = .18***	t (510) = 2.46* (.53, .29)	t (370)= 1.99* (.51, .29)	t (298)= 2.35* (.57, .29)
Any type	*OR* = 1.12**	*OR* = 1.11***	*OR* = 1.68*	--	*OR* = 1.83*
Neglect only	*OR* = 1.12**	*OR* = 1.11***	--	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	--	--	--	--	--
Substantiated or unsubstantiated					
Total reports[a]	r = .20***	r = .24***	t (507) = 2.46* (.81, .50)	--	t (297)= 2.82** (.98, .51)
Any type	*OR* = 1.11**	*OR* = 1.09***	--	--	--
Neglect only	*OR* = 1.10**	*OR* = 1.09**	--	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	*OR* = 1.19**	*OR* = 1.16**	--	--	--
Reports by mother-as-perpetrator					
Substantiated					
Total substantiations	r = .13**	r = .16**	t (510) = 2.28* (.29, .26)	--	t (2298)= 2.46* (.34, .16)
Any type	*OR* = 1.09*	*OR* = 1.10**	--	--	--
Neglect only	*OR* = 1.09*	*OR* = 1.09**	--	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	--	--	--	--	--
Substantiated or unsubstantiated					
Total reports	r = .19***	r = .22***	*OR* = 1.59*	--	t (298)= 3.19** (.60, .27)
Any type	*OR* = 1.09*	*OR* = 1.08**	--	--	*OR* = 1.86*
Neglect only	*OR* = 1.08*	*OR* = 1.08**	--	--	--
Physical abuse only	--	--	--	--	--
Neglect and physical abuse	--	*OR* = 1.20**	--	--	--

Key: 1) Maternal history chronicity by number of DCF substantiated reports of any maltreatment; 2) Maternal history chronicity by number of DCF reports (substantiated and unsubstantiated) of any maltreatment; 3) Maternal history of DCF substantiated report of any maltreatment (versus no maltreatment); 4) Maternal history of DCF substantiated reports of neglect only; and 5) Maternal history of DCF substantiated reports of multi-type maltreatment only.

*p < .05. **p < .01. ***p < .001.; -- = *association not significant*.

[a] n = 509.

Note. Logistic regression was used for associations between dichotomous variables and thus odds ratios are reported here. Multiply imputed T-tests are reported by 'parameter (mean for 'yes', mean for 'no')'.

Table 7
Nested Taxonomy of Regression Models Predicting Parenting Stress by Program Status in Integrative Study Subsample that Considers Maternal History of Self-Reported Neglect, (n = 300).

	Model 1 Program Effect	Model 2 Full Moderation Model	Model 3 Final Moderation Model
Variable	*B (SE)*	*B (SE)*	*B (SE)*
Intercept	75.60 (1.19)***	81.93 (11.77)***	75.54 (1.32)***
HVS/RIO (program/control)	-2.76 (1.52)	-17.39 (5.22)**	-13.54 (4.15)**
Maternal age at birth		-0.22 (.60)	
Baby age		0.13 (.19)	
Pregnant/parenting		-1.92 (2.19)	
Race/ethnicity			
Hispanic		1.30 (1.98)	
Black		-0.94 (2.15)	
Other		-1.12 (2.49)	
Other parenting program		-1.82 (1.72)	
Depression		0.40(2.48)	1.28 (2.26)
Social support			
Frequency		-0.14 (.16)	
Dependability		-2.75 (1.27)*	-3.25 (.89)***
Self-reported history of neglect		-1.60 (2.24)	
Intimate Partner Violence (IPV)			
Partner perpetrated		0.20 (.22)	
Mother perpetrated		-0.08 (.26)	
Community profile			
Profile 1		-0.36 (3.19)	
Profile 2		-4.48 (3.09)	
Profile 3		-3.49 (4.39)	
Neighborhood			
Safety		0.33 (.19)	
Cohesion		0.23 (.29)	
HVS/RIO X Depression		8.97 (3.36)**	8.32 (3.03)**
HVS/RIO X Social support			
X Frequency		-0.04 (.21)	
X Dependability		0.22 (1.73)	
HVS/RIO X history of neglect		2.04 (2.49)	
HVS/RIO X IPV			
X Partner perpetrated		-0.18 (.38)	
X Mother perpetrated		-0.05 (.47)	
HVS/RIO X community			
X Profile 2		0.99 (3.95)	
X Profile 3		6.05 (4.09)	
X Profile 4		7.34 (5.77)	
HVS/RIO X neighborhood			
X Safety		-0.30 (.24)	
X Cohesion		-0.27 (.38)	
R^2 (average)	.011	.210	.140
df E(average)	298	269	295
ΔR^2 (average)		.198***	-.069
df Δ R^2 (average)		29	26

*p < .05. **p < .01. ***p < .001.

Table 8
Nested Taxonomy of Regression Models Predicting Parenting Stress by Program Status in Integrative Study Subsample that Considers Maternal History of DCF Substantiated Neglect, (n = 379).

	Model 1 Program Effect	Model 2 Full Moderation Model	Model 3 Final Moderation Model
Variable	*B (SE)*	*B (SE)*	*B (SE)*
Intercept	76.73 (1.03)***	85.06 (11.03)***	77.39 (1.70)***
HVS/RIO (program/control)	-3.25 (1.35)*	-10.32 (4.63)*	-5.63 (2.00)**
Maternal age at birth		-0.41 (.56)	
Baby age		0.18 (.17)	
Pregnant/parenting		-1.16 (2.04)	
Race/ethnicity			
Hispanic		-0.29 (1.83)	-.31 (1.73)
Black		-3.25 (1.98)	-3.80 (1.91)*
Other		-3.20 (2.20)	-2.62 (2.09)
Other parenting program		-1.06 (1.56)	
Depression		3.34 (2.14)	5.38 (1.45)***
Social support			
Frequency		-0.24 (.14)	-.24 (.09)*
Dependability		-1.26 (1.12)	
History of neglect (DCF)		-0.13 (2.13)	
Intimate Partner Violence (IPV)			
Partner perpetrated		0.15 (.18)	
Mother perpetrated		-0.13 (.24)	
Community profile			
Profile 2		-0.74 (2.82)	.35 (2.56)
Profile 3		-4.14 (2.98)	-3.77 (2.78)
Profile 4		-5.59 (3.24)	-6.13 (3.16)
Neighborhood			
Safety		0.21 (.16)	
Cohesion		0.16 (.24)	
HVS/RIO X Depression		3.03 (2.92)	
HVS/RIO X Social support			
X Frequency		0.12 (.17)	
X Dependability		-0.56 (1.53)	
HVSRIO x history of neglect (DCF)		1.50 (2.85)	
HVS/RIO X IPV			
X Partner perpetrated		0.09 (.29)	
X Mother perpetrated		0.18 (.41)	
HVS/RIO X community			
X Profile 2		1.68 (3.49)	1.21 (3.20)
X Profile 3		6.80 (4.08)	6.77 (3.83)
X Profile 4		9.33 (4.45)*	10.23 (4.32)*
HVS/RIO X neighborhood			
X Safety		-0.24 (.20)	
X Cohesion		-0.19 (.34)	
R^2 (average)	.015	.163	.123
df E(average)	377	348	366
ΔR^2 (average)		.147**	-.040
df Δ R^2 (average)		29	18

*p < .05. **p < .01. ***p < .001.

Table 9
Nested Taxonomy of Regression Models Predicting Number of Reports of Child Maltreatment against Any Perpetrator by Program Status in Integrative Study Subsample that Considers Maternal History of DCF Substantiated Physical Abuse, (n = 228).

	Model 1 Program Effect	Model 2 Full Moderation Model	Model 3 Final Moderation Model
Variable	*B (SE)*	*B (SE)*	*B (SE)*
Intercept	0.39(.12)***	0.84 (1.31)	0.26 (.24)
HVS/RIO (program/control)	0.15 (.15)	-0.56 (.55)	-0.76 (.50)
Maternal age at birth		-0.05 (.07)	
Baby age		0.03 (.02)	0.04 (.01)**
Pregnant/parenting		0.01 (.25)	
Race/ethnicity			
Hispanic		-0.59 (.22)**	-0.50 (.17)**
Black		-0.40 (.23)	-0.27 (.21)
Other		-0.23 (.27)	-0.15 (.25)
Other parenting services		0.28 (.18)	0.35(0.14)**
Depression		-0.36 (.29)	
Stress		0.00 (.01)	
History of physical abuse (DCF)		0.01 (.28)	
Intimate Partner Violence (IPV)			
Partner perpetrated		-0.02 (.04)	
Mother perpetrated		0.03 (.05)	
Social support			
Frequency		-0.02 (.02)	
Dependability		0.03 (.14)	
Community profile			
Profile 2		0.46 (.33)	
Profile 3		0.52 (.32)	
Profile 4		0.23 (.39)	
Neighborhood			
Safety		-0.01 (.02)	
Cohesion		-0.01 (.03)	
HVS/RIO X depression		0.82 (.38)*	0.73 (.35)*
HVS/RIO X stress		-0.01 (.01)	
HVS/RIO X history of PA/ DCF		-0.03 (.47)	
HVS/RIO X IPV			
X Partner perpetrated		0.01 (.04)	
X Mother perpetrated		-0.02 (.06)	
HVS/RIO X social support			
X Frequency		-0.01 (.03)	
X Dependability		0.02 (.20)	
HVS/RIO X community			
X Profile 2		-0.34 (.40)	
X Profile 3		-0.52 (.46)	
X Profile 4		-0.59 (.54)	
HVS/RIO X neighborhood			
X Safety		0.02 (.02)	
X Cohesion		0.03 (.04)	
R^2 (average)	.005	.219	0.114
df E(average)	226	195	220
ΔR^2 (average)		.214*	-.105
dfΔ R^2 (average)		31	25

*p < .05. **p < .01. ***p < .001.

Table 10
Nested Taxonomy of Regression Models Predicting Number of Reports of Child Maltreatment against Mother by Program Status in Integrative Study Subsample that Considers Maternal History of DCF Substantiated Physical Abuse, (n = 229).

	Model 1 Program Effect	Model 2 Full Moderation Model	Model 3 Final Moderation Model
Variable	*B (SE)*	*B (SE)*	*B (SE)*
Intercept	0.18 (.07)*	0.44 (.78)	0.11 (.14)
HVS/RIO (program/control)	0.13 (.09)	-0.52 (.33)	-0.57 (.29)
Maternal age at birth		-0.03 (.04)	
Baby age		0.02 (.01)	0.02 (.01)*
Pregnant/parenting		-0.10 (.15)	
Race/ethnicity			
Hispanic		-0.34 (.13)**	-0.24 (.10)*
Black		-0.17 (.14)	-0.09 (.12)
Other		-0.11 (.16)	-0.03 (.15)
Other parenting services		0.20 (.11)	
Depression		-0.20 (.17)	-0.17 (.15)
Stress		0.00 (.01)	
History of physical abuse (DCF)		-0.04 (.16)	
Intimate Partner Violence (IPV)			
Partner perpetrated		-0.01 (.02)	
Mother perpetrated		0.01 (.03)	
Social support			
Frequency		-0.01 (.01)	
Dependability		0.03 (.08)	
Community profile			
Profile 2		0.20 (.20)	
Profile 3		0.29 (.19)	
Profile 4		0.00 (.22)	
Neighborhood			
Safety		0.00 (.01)	
Cohesion		-0.01 (.02)	
HVS/RIO X depression		0.59 (.23)**	0.56 (.21)**
HVS/RIO X stress		0.00 (.01)	
HVS/RIO X history of PA(DCF)		0.08 (.02)	
HVS/RIO X IPV			
X Partner perpetrated		0.01 (.02)	
X Mother perpetrated		-0.03 (.03)	
HVS/RIO X social support			
X Frequency		0.00 (.02)	
X Dependability		-0.01 (.12)	
HVS/RIO X community			
X Profile 2		-0.05 (.24)	
X Profile 3		-0.21 (.28)	
X Profile 4		-0.16 (.31)	
HVS/RIO X neighborhood			
X Safety		0.01 (.01)	
X Cohesion		0.02 (.02)	
R^2 (average)	.011	.214	.114
df E(average)	227	196	221
ΔR^2 (average)		.203	-.100
df Δ R^2 (average)		31	25

*p < .05. **p < .01. ***p < .001.

Table 11

Nested Taxonomy of Logistic Regression Models Predicting Likelihood of Having a Report of Child Neglect by Program Status in Integrative Study Subsample that Considers Maternal History of DCF Substantiated Multiple Type Maltreatment, (n = 308).

	Model 1 Program Effect	Model 2 Full Moderation Model	Model 3 Final Moderation Model
Variable	*OR [95% CI]*	*OR [95% CI]*	*OR [95% CI]*
Intercept	0.35 [.23 - .53]***	0.01 [.00 – 2.34]	0.32 [.21 - .50]***
HVS/RIO (program/control)	1.17 [.68 – 2.01]	1.29 [.13 – 12.71]	1.22 [.69 – 2.14]
Maternal age at birth		1.17 [.89 – 1.54]	
Baby age		0.98 [.88 – 1.09]	
Pregnant/parenting		1.68 [.73 – 3.89]	
Race/ethnicity			
Hispanic		0.56 [.22 – 1.39]	
Black		0.57 [.23 – 1.44]	
Other		0.99 [.35 – 2.83]	
Other parenting services		1.68 [.73 – 3.89]	
Depression		0.72 [.24 – 2.12]	
Stress		0.99 [.95 – 1.03]	
History of multiple (DCF)		1.49 [.60 – 3.71]	
Intimate partner violence (IPV)			
Partner perpetrated		0.99 [.87 – 1.13]	
Mother perpetrated		1.04 [.90 – 1.20]	
Social support			
Frequency		0.94 [.87 – 1.02]	0.93 [.89 - .98]**
Dependability		1.26 [.70 – 2.25]	
Community profile			
Profile 2		2.89 [.76 – 11.03]	
Profile 3		1.68 [.42 – 6.78]	
Profile 4		2.63 [.53 – 13.04]	
Neighborhood			
Safety		0.96 [.89 – 1.04]	0.98 [.93 – 1.03]
Cohesion		0.99 [.88 – 1.11]	
HVS/RIO X depression		1.96 [.44 – 8.72]	
HVS/RIO X stress		1.00 [.95 – 1.06]	
HVS/RIO X DCF History		1.15 [.31 – 4.31]	
HVS/RIO X IPV			
X Partner perpetrated		1.00 [.85 – 1.18]	
X Mother perpetrated		1.16 [.90 – 1.51]	
HVS/RIO X social support			
X Frequency		0.99 [.86 – 1.10]	
X Dependability		0.90 [.40 – 2.03]	
HVS/RIO X community			
X Profile 2		0.16 [.03 - .83]*	
X Profile 3		0.47 [.07 – 2.98]	
X Profile 4		0.31 [.03 – 3.09]	
HVS/RIO X neighborhood			
X Safety		1.13 [1.03 – 1.25]*	1.10 [1.02 – 1.78]*
X Cohesion		1.09 [.92 – 1.30]	
Mean -2LL (Range)	340.56 (326.01-351.88)	283.94 (268.53-299.45)	320.99 (309.60–333.26)
Mean p-value (Range)	.578 (.208-.891)	.010 (.000-.082)	.001 (.000 - .011)
Δ Mean -2LL		56.62**	37.047
df	1	32	4
Δ *df*		31	-28

*p < .05. **p < .01. ***p < .001.

s for Predicting Parenting Stress, Reports of Maltreatment, and Likelihood of Having a Report of Neglect by Program
ve Study Sample that Considers Existence of Maternal History of Maltreatment, (n = 512).

	Parenting Stress	Reports of Maltreatment—Any Perpetrator	Reports of Maltreatment—Mother as Perpetrator	Likelihood of Having a Report of Neglect—Any Perpetrator
	B (SE)	*B (SE)*	*B (SE)*	*OR [95% CI]*
	75.36 (1.15)***	.14 (.21)	.06 (.13)	.47 [.32 - .70]***
	-1.73 (1.10)	.02 (.12)	.07 (.07)	1.16 [.76 – 1.77]
		.03 (.01)*	.02 (.01)*	
	-.04 (1.33)	-.40 (.14)**	-.32 (.09)***	.43 [.26 - .74]**
	-3.11 (1.55)*	-.27 (.16)	-.24 (.10)*	.66 [.37 – 1.19]
	-2.61 (1.75)	-.35 (.18)	-.29 (.11)*	.87 [.46 – 1.64]
		.33 (.14)*	.24 (.09)**	
	4.14 (1.21)**			
tment V)		.26 (.12)*	.18 (.07)*	
		.05 (.01)***	.02 (.01)**	1.06 [1.02 – 1.11]**
	-.25 (.09)**	-.02 (.01)*		.95 [.92 - .98]**
	-1.98 (.73)			
	.11 (.07)			
	.113	.131	.104	
	503	501	505	
				538.813
				(524.827-546.211)
				.000 (.000-.000)

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Appendix A: Missing Data

Missing data. We addressed missing data using Multiple Imputation (MI; Rubin, 1987), a statistical strategy endorsed by statisticians and developmental theorists as a preferred method of addressing problems of missingness (Allison, 2002; Schafer & Graham, 2002; Widaman, 2006). Using observed values, MI assigns multiple, different values for missing data. Data analysis using MI data then generates "pooled" results for the multiple datasets based on rules established by Rubin (1987) that incorporate the uncertainty introduced by estimating values. MI has certain advantages over other methods of handling missing data, such as introducing appropriate random error, allowing for unbiased estimates of all parameters, and providing good estimates of the standard errors (Allison, 2002).

Because our analyses required three different samples (the full Impact Study sample, the smaller Integrative Study sample, and the Impact HVS sample, as described above), we conducted MI using IBM SPSS 19.0 on three separate occasions to generate an imputed database for each of the sample. Missing values were then imputed for all variables with two exceptions. First, scores on videotaped observations of maternal sensitivity were not imputed if the participant or the child was deceased, the child was in the custody of CPS at the time of the observation, or the child was too young (under four months). Second, values were not imputed if participants selected or variables were derived for an answer of *not applicable* on any of the questionnaires or reports. The missing values analysis for each database is presented below.

Database 1: Impact Sample (n = 687). This dataset had 1.89% missing data that were considered missing at random (MAR). The estimation of missing values was done on IBM SPSS 19.0. Approximately 1.89% of values were missing from the variables of our interest, but the percent of missingness for each individual variable ranged from 0.00% (Child maltreatment information from DCF cumulative records) to 72.2% (baby age at T2 RI). According to Bodner (2008), one imputation for each percent of missing values in the dataset is recommended. Based on this recommendation, we needed two imputations with our percent of missing values (1.89%). However, because the minimum

of five imputations is recommended in the field, we ran our analyses on five imputed datasets.

Database 2: Integrative Sample (n = 512). This dataset had 19.3% missing data, and the data were considered missing at random (MAR). Approximately 19.3% of values were missing from the variables of our interest, but the percent of missingness for each individual variable ranged from 0.00% (child maltreatment information from DCF cumulative records) to 53.9% (teaching task EA sensitivity at T2 RI). For interactions between predictor variables and potential moderators, the highest amount of missingness was 67.4% (interaction between number of visits for DCF sample X substantiated reports of sexual abuse against participant). Based on Bodner's recommendation (2008), we needed 19 imputations with our percent of missing values (19.3%). However, preliminary multivariate analyses showed that missingness between predictors and outcomes could reach 50% missing, and to account for this, we ran our analyses on 50 imputed datasets.

Database 3: Impact HVS Sample (n = 420). This dataset had 1.87% missing data, and the data were considered missing at random (MAR). Approximately 1.87% of values were missing from the variables of our interest, but the percent of missingness for each individual variable ranged from 0.00% (child maltreatment information from DCF cumulative records) to 85.0% (baby age at T2 RI). Based on Bodner's recommendation (2008), we needed two imputations with our percent of missing values (1.87%). However, because the minimum of five imputations is recommended in the field, we ran our analyses on five imputed datasets.

High rates of missingness. Baby age at the T2 RI had high rates of missingness in both Impact Study databases. This variable was chosen because it 1) was the first time point of data collection in which all children had been born, and 2) reflected the date that key outcome data, specifically EA, parenting stress, and participants self-reports of maltreatment (CTSPC), was collected. However, only a portion of the Impact sample received the Integrative study interview in which these parenting outcomes were collected, explaining the higher percentage missing in the Impact databases. This variable was

used as a demographic control and not a predictor or outcome variable; therefore we retained the variable in spite of the high missingness.

Emotional availability (EA), one of our primary outcomes of interest for Research Question 2, also demonstrated a high degree of missingness. Approximately 62% of the Integrative Study mothers completed EA. The remaining mothers did not consent to being video-taped (22.5%), could not complete the EA task due to maternal or child illness or scheduling issues (13%), or did not have custody of their child (2.5%). When examined, missingness in EA did not relate to demographic characteristics such as maternal age, baby age, maternal ethnicity, household income, or program participation. We included the variable in the analyses because of its high relevance to the research question and particularly because it was the only variable representing behavioral and dyadic interaction. We imputed 50 datasets to account for the high level of missingness of this variable.