MINDING THE BABY: ENHANCING REFLECTIVENESS TO IMPROVE EARLY HEALTH AND RELATIONSHIP OUTCOMES IN AN INTERDISCIPLINARY HOME-VISITING PROGRAM

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ABSTRACT: In this article, we focus on the first wave of outcomes in a pilot-phase randomized control trial of a home-based intervention for infants and their families: Minding the Baby, an interdisciplinary, mentalization-based intervention in which home-visiting services are provided by a team which includes a nurse practitioner and a clinical social worker. Families are recruited during mother's pregnancy and continue through the child's second birthday. Analyses revealed that intervention families were more likely to be on track with immunization schedules at 12 months, had lower rates of rapid subsequent childbearing, and were less likely to be referred to child protective services. In addition, mother–infant interactions were less lilkely to be disrupted at 4 months when mothers were teenagers, and all intervention infants were more likely to be securely attached and less likely to be disorganized in relation to attachment at 1 year of age. Finally, mothers' capacity to to reflect on their own and their child's experience improved over the course of the intervention in the most high-risk mothers.

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The effects of chronic poverty, social and educational disadvantage, and family disruption (separation, abandonment, trauma, community and domestic violence) on infant, parent, and family development are devastating and far-reaching, with the impact reflected across a range of health as well as emotional, relational, social, and cognitive outcomes (Shonkoff & Phillips, 2000). This impact is felt most powerfully by young parents; in the United States, teenagers continue to bear children in large numbers, especially in neighborhoods populated by poor and minority families (Hamilton & Ventura, 2012). Because complex family, health, and mental health issues often make it very difficult for young parents to use community or school-based supportive parenting programs, one of the most common approaches to supporting high-risk families is home visiting (Howard & Brooks-Gunn, 2009). This kind of direct and sustained service is thought to be key for promoting healthy parent and child functioning, especially in first-time

parents and in the most disenfranchised, disengaged, and traumatized families (Olds, Sadler, & Kitzman, 2007). And yet, as a number of recent reviews have made clear, promoting and maintaining long-term changes in both health and socioemotional outcomes in parents and children are quite difficult, even for the most established programs (Eckenrode et al., 2010; Howard & Brooks-Gunn, 2009; Kitzman et al., 2010). This sobering reality makes clear how important it is to continue to develop and refine treatment models to meet and address these challenges.

In this article, we will focus on the first wave of outcomes in a pilot phase randomized control trial of a home-based, interdisciplinary intervention for infants and their families, *Minding the Baby* (MTB). Then, we describe the underlying conceptual framework of the MTB model, our service-delivery model and the results from our first tests of the program's efficacy.

CONCEPTUAL FOUNDATIONS

The intervention was first implemented in 2002 (Sadler, Slade & Mayes, 2006; Slade, Sadler, de Dios-Kenn, et al., 2005; Slade, Sadler, & Mayes, 2005). It is an amalgam and elaboration of two prominent, evidence-based early intervention models: (a) nurse home visiting, and particularly the Nurse–Family Partnership (NFP; Olds et al., 2007) and (b) infant–parent psychotherapy (IPP; Lieberman, Silverman, & Pawl, 1999). Taking these two approaches as our foundation, we felt from the beginning as if we were "standing on the shoulders of giants."

Pioneered by David Olds and Harriet Kitzman, the NFP is the most widely implemented and tested home-visiting model in the United States. Three randomized clinical trials in Elmira, New York, Memphis, Tennessee, and Denver, Colorado as well as a number of long-term follow-up studies have consistently produced a range of positive health, public health, parenting, developmental, and life-course outcomes (Kitzman et al., 2010; Olds et al., 2010; Olds et al., 2007). This model is typically delivered by experienced public health nurses with extensive training in the NFP program and its procedures, who conduct weekly home visits beginning in pregnancy until the child's first birthday, and then visit biweekly until the child is 2 years old.

Infant–parent psychotherapy was pioneered by Selma Fraiberg (1980) over 30 years ago while working with young mothers whose infants were in peril as the result of profound disruptions in the mother–child relationship. Over the past 3 decades, the work of Fraiberg and colleagues has sparked the development of a number of infant mental health home-visiting programs around the country (Slade, Mayes, & Epperson, 2002). But, unlike NFP, which has been widely researched and fully manualized, only two IPP home-visiting programs have been tested empirically; these are the programs pioneered by Lieberman et al. (1999), Lieberman, Weston, and Pawl (1991), Heinicke et al. (1999), and Heinicke et al. (2000). Both research groups linked IPP to increased rates of attachment security and to the development of a healthy and resilient mother–child relationship. This model is typically delivered by social workers or psychologists who visit dyads weekly in the home; unlike NFP, however, treatment length is not specified.

Both the NFP and IPP models and their various permutations have much to offer high-risk families, and indeed, overlap in many ways, particularly in their emphasis on sensitive parenting and the development of a healthy parent–child relationship. Both also are profoundly "relationship-based" in the sense that the parent–clinician relationship is seen as the primary catalyst for change and integration. When considered separately, however, both models have yet to address key needs and vulnerabilities of these same families. On one hand, nurse home visitors bring a set of skills and information related to infant and maternal health that are much appreciated by young, stressed families; as such, nurses typically have much easier access to mothers than do social workers, who are likely to be associated with child welfare authorities or with the stigma of mental health treatment. At the same time, the NFP model has yet to consistently change parenting or attachment outcomes in poor young mothers and their babies, or to meet normative and substantial mental health needs of the population of young parents living in underresourced communities (Howard & Brooks-Gunn, 2009). The extensive trauma seen in many families living in poverty often manifests as a constellation recently referred to as "complex trauma" (Courtois, 2008, p. 86), which—among other things—powerfully influences both early and cyclical patterns of parenting (Olds et al., 2007); complex trauma and its sequelae also frequently derail a family's capacity to engage in treatment and disrupt the capacity to parent.

There have been a number of efforts to address the mental health needs of infants and mothers within the NFP model by offering nurses additional training in emotional regulation (Robinson, Emde, & Korfmacher, 1997), adding mental health consultants to treatment teams, (Boris et al., 2006), and by incorporating short term in-home cognitive behavioral treatment for depressed mothers (Ammerman, Putnam, Bosse, Teeters, & Van Ginkel, 2010; Ammerman et al., 2011). The latter approach has met with the most success, with levels of depression significantly reduced in those mothers receiving 15 sessions of in-home cognitive behavior therapy in an open trial. These findings lend a great deal of support to the need for mental health treatment within the framework of home visits.

The IPP model clearly focuses quite specifically on trauma-related psychopathology, as it manifests in the mother and in the dyad. While these programs typically do not measure mental health outcomes, attachment and parenting outcomes have improved in those programs that have been empirically tested. At the same time, IPP programs do not focus on either health or public health concerns, many of which contribute significantly to a range of poor outcomes in this population. In addition, for the reasons described earlier, psychotherapists do not have the same access to families enjoyed by nurses.

MTB grew out of the conviction that *both* approaches are crucial to providing the level of comprehensive and diverse care needed by the families we serve, and that a truly *interdisciplinary* model combining the strengths and unique approaches of both the

nursing and infant mental health approaches would be most likely to both meet our families' multiple layers of need. As Howard and Brooks-Gunn (2009) noted, "debate continues about whether health professionals or social professionals are more effective in bringing about positive changes for families. The answer to this question may depend in large part on the overall goals of the families" (p. 136). Thus, if the goal of a program is (as is the case with NFP) to promote positive pregnancy outcomes and child health, the "choice of public health nurses is ideal" (p. 136). If, however, the goal is to address the sequelae of long-term trauma and foster attachment security, then master's-level mental health clinicians are more suitable. It is for precisely this reason that MTB was developed using an integrated nursing/infant mental health model.

Given the high levels of need in our families and the particular challenges of working with high-risk, traumatized families, we also felt that it was crucial for both the nurses and the social workers delivering MTB to have master's-level training in their disciplines. While clinicians administering IPP often have had advanced training, most of the nurses in the NFP studies have been public health nurses. Following the work of Brooten, Youngblut, Deatrick, Naylor, and York (2003) demonstrating that patient outcomes are improved when care is provided by advanced practice (APNs) rather than bachelor-level nurses, we decided that nurses as well as mental health clinicians should have postgraduate training. Thus, MTB is not only an *amalgam* of the NFP/IPP approach but also an *elaboration* of both, in that it emphasizes the importance of advanced training and experience.

A second crucial component of the MTB model is a focus on the development and enhancement of maternal reflective functioning (RF) or mentalization. This is defined as an intra- and interpersonal capacity that allows a mother to envision the baby's (as well as her own) internal experience, specifically his or her emotions, thoughts, and intentions (Slade, 2005). Our emphasis on the enhancement of maternal reflective capacities grew out of a body of literature that has linked maternal RF to the intergenerational transmission of attachment, and particularly to the development of secure infant–parent attachment (Fonagy et al., 1995; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005). Equally important, maternal RF has been negatively correlated with both disorganized infant attachment and disrupted dyadic affective communication in the dyad (Grienenberger, Kelly, & Slade, 2005). The link between low maternal RF and infant disorganization underscores the relationship between a mother's inability to attune to or imagine her baby's experience and her capacity to frighten or be frightened by her baby (Lyons-Ruth, Bronfman, & Attwood, 1999; Main & Hesse, 1990). Thus, we felt that an approach that would encourage mothers to take note of the baby's experience in a range of ways would diminish the likelihood of her responding in a frightening or frightened way and potentially maltreating her child. We also were strongly influenced by the emerging literature on mentalization-based treatment programs (see Allen & Fonagy, 2006), several of which have been focused specifically on young children and their families (Grienenberger, Denham, & Reynolds,

in press; Pajulo, Suchman, Kalland, & Mayes, 2006; Suchman et al., 2010).

In line with this mentalization focus, special emphasis was placed on the enhancement of maternal RF at every level of service delivery. In our experience, mothers vary greatly: from those who have difficulty naming even the most basic of their babies' or their own mental states to those who have a sophisticated capacity to make sense of their children's minds. Once clinicians become adept at evaluating the degree to which a mother can or cannot reflect and to describing the situations that interfere with such capacities, they are encouraged to engage the mother who is wondering about the baby's experience in a number of ways. A range of diverse strategies can be used to do this (Sadler, Slade, & Mayes, 2006). The work is often painstaking and slow because environmental impingements can be relentless and because regressions to a nonreflective, concrete stance are common. In addition, for mothers who have been traumatized, contemplating their own mind or the mind of another can be very challenging and threatening, and can, as noted earlier, lead them in many instances to be either frightening to or frightened by their babies (Lyons-Ruth, Bronfman, & Attwood, 1999).

While the constructs of RF and mentalization are relatively new to the field of infant mental health, a focus on mothers' attunement to their own and their babies' subjective experiences is not. Indeed, this focus was at the heart of Fraiberg's (1980) model, and was certainly inherent in the thinking of Ainsworth, Blehar, Waters, and Wall (1978) about the links between maternal sensitivity and attachment security. In fact, many contemporary attachment-based interventions revolve around helping mothers become more aware of their babies' experiences and of the links between their own thoughts and feelings and those of their children, such as the Circle of Security intervention (Hoffman, Marvin, Cooper, & Powell, 2006). While most of these programs likely indirectly influence the development of reflective capacities, these outcomes have not typically been measured.

MINDING THE BABY

Service Delivery Model

Families are recruited from prenatal groups offered at their primary healthcare "home," the clinic at which they receive all of their medical care. In this way, our clinicians are viewed by families as an extension of a familiar and trusted resource. They are then visited weekly beginning in the mother's third trimester of pregnancy up through the child's first birthday, at which point visits take place biweekly up through the child's second birthday. Visits are carried out on an alternating basis by a team made up of a nurse practitioner (NP) and social worker; thus, the nurse sees a family one week, the social worker the next, and so on. Home visits last approximately 1 hr, although this can vary tremendously based on a family's particular needs. At times of crisis or when families require extra supplies or time, home visits can be extended or increased in frequency. The MTB approach has been manualized

around a well-developed set of principles, protocols, and guidelines contained within a treatment manual (Slade et al., 2010). At the same time, the administration of MTB is highly individualized and shaped by the circumstances of each home visit. The clinicians confer regularly about each of their shared families; they also maintain close contact with health providers at the community health clinics from which families are recruited. In addition, they receive both discipline-focused (i.e., nursing or social work) and joint supervision on a weekly basis. Both also attend a weekly meeting of all the intervention teams, supervisors, and select administrative staff.

The roles of the clinicians are both distinct and overlapping. The NP's roles include reinforcing prenatal care and health education (e.g., informing mothers about nutrition and fetal brain development, premature labor prevention, developing a labor plan, anticipating newborn ways of communicating, breast-feeding education/support), supporting the child's health and development (e.g., assessing the child's development, diagnosing and treating illness, providing education regarding environmental safety and injury prevention, offering anticipatory guidance, and attending to the mother's health) in collaboration with Fair Haven Community Health Center (CHC). As a means of delaying subsequent childbearing, the NP works hard to counsel and ensure that MTB mothers are able to select and effectively use a method of contraception after the birth of their child.

The CSW's roles include ongoing assessment of both mother and child, diagnosing perinatal depression, anxiety, and other forms of psychological distress and psychiatric illness, providing a range of treatments as appropriate (infant–parent psychotherapy; dyadic play and developmental guidance; individual, couples, and family counseling; crisis intervention; case management; and other supportive approaches). Finally, the social worker is available to help mothers negotiate issues involving the legal and court systems. Both clinicians support reflective parenting, promote the mother–infant attachment relationship, and model and foster a range of parenting skills. The MTB treatment manual guides clinicians as they use various approaches to encourage parents' developing reflective capacity. This process is individualized, as clinicians tailor specific clinical strategies to each parent, drawing information from initial interviews, conversations, and observations during home visits.

Clinicians begin their work with mothers by building a therapeutic relationship which involves providing support, empathy, reassurance, and praise for strengths and competencies.

Mentalization arises out of the relationship. . . . The mothers experience themselves as *meaningful* in the eyes of the home visitors; the experience of being held in mind as a coherent, intentional person who is trying to do her best allows mothers to start experiencing themselves and the baby in the same way. (Sadler, Slade, & Mayes, 2006, p. 378)

Both the nurse and the social worker model a reflective stance during their home visits. This involves being curious with the mother about the child's and parent's thoughts and feelings. Clinicians often use "wondering" statements and questions (e.g., "I wonder what it feels like to you when your child cries every time you leave her sight?" "What do you imagine your child is feeling when he hears the family argue?") to allow mothers to explore their inner life as well as the child's feelings, wants, and needs. Clinicians also may describe or interpret behavior in terms of the child's and parent's beliefs, feelings, and intentions. They also can use their own reactions, feelings, and experiences in their interactions with mothers and infants.

Other approaches home visitors use to foster the development of RF with new parents include facilitating opportunities for hands-on play and observation of the parent–infant dyad, making and watching digital videos of play and care routines between mother and infant, and offering mothers activities such as journaling and scrapbooking, with suggested statements to draw out the mother's RF. These activities create moments for mothers to enjoy their babies and enable the clinicians to narrate the activity as well as some of the feelings experienced by the mother and the baby. The goal is to provide gentle opportunities for the mother to name her feelings and experiences, and develop curiosity about her baby's developing inner emotional life.

RESEARCH AIMS

The aim of this pilot study was to evaluate the differences between a cohort of families receiving the MTB intensive home visiting program and another receiving usual care at an urban community health center. Two broad domains were examined. The first was health and public health outcomes; families were compared in the degree to which they maintained a schedule of regular pediatric visits and immunizations, the timing of subsequent childbearing, and the frequency of referrals to child protective services for abuse or neglect. The second domain examined was attachment and the parent–child relationship; in these analyses, we examined whether—relative to controls—the intervention influenced the quality of affective communication in the dyad at 4 months, whether infants in the intervention group were more likely to be securely attached to their mothers at 12 months, and whether mothers in the intervention group showed greater change in level of RF when their children were 2 years of age.

METHODS

Design

This study utilized a (nested) two-group experimental design with random assignment of prenatal care groups (sealed-envelope method) to test the effects of the MTB program with young families. The CHC conducts six prenatal care groups per year, with 15 to 25 women in each group. Of these, about 50 to 75% of the women are primiparous. Because all routine prenatal care is delivered in a group format (vs. with individual patients meeting with individual clinicians) designed to develop close and supportive relationships among the women in the groups, we used a nested randomization, or cluster randomization, approach (Hauck, Gilliss,

TABLE 1. *Minding the Baby: Schedule of Administering Research Interviews and Instruments*

Participant	Variables	Pregnancy	4 Months	12 Months	24 Months
Mother and Child	Demographic Characteristics	Demographic Characteristics			Demographic Changes and Life-Course Outcomes
	Relationship Quality/ Interaction		AMBIANCE Taped mother–infant interaction		
Mother	Mental Health	CES-D, BSI, PBI		CES-D, BSI	CES-D, BSI
Mother	Reflective Functioning	Pregnancy Interview			Parent Development Interview
Child	Attachment Quality			Strange Situation Procedure	
Child	Abuse and Neglect			Child Protective Referral	Child Protective Referral
Child	Health Outcomes			Health Record Review	Health Record Review

AMBIANCE = Atypical Maternal Behavior Instrument for Assessment and Classification; CES-D = Center for Epidemiological Studies Depression Scale; BSI = Brief Symptom Inventory-Short Form.

Donner, & Gortner, 1991); therefore, group status (intervention or control) was randomly assigned to each prenatal care group before the women were invited to join the study.

Sample

Primiparous women attending nurse–midwifery group prenatal care sessions at the CHC were approached to assess their interest in participating in the study. All participants who met inclusion criteria were invited into the study and assigned either to the treatment or control condition based on the research condition to which their prenatal group had been randomly assigned. Inclusion criteria included (a) able to speak and understand English; (b) 14 to 25 years of age; (c) having a first child; (d) no active heroin or cocaine use (prescreened by the CHC as criteria for entry into group prenatal care); (e) no *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV*; American Psychiatric Association, 1994) psychotic disorder; and (f) no major or terminal chronic condition in the mother (AIDS, cancer, etc.; prescreened by the CHC). In this article, we present data on 60 families in the intervention group and 45 in the comparison group; some measures were unavailable for individual families due to issues of families' mobility, time constraints, and missed appointments. Some parents declined videotaped procedures.

To ensure continued enrollment and retention of intervention participants, home visits were set up at the mother's convenience around school and work schedules, and telephone contacts were made to reschedule missed or canceled visits; this process applied to research visits as well. To ensure continued enrollment and retention in the project of control group members, a staff member maintained telephone and mail contact on a regular basis. All participants were reimbursed for completion of research sessions.

Setting

The CHC from which participants were recruited serves a medically underserved population of families, most of whom live at or below the poverty level and have diverse cultural and ethnic heritages, including African American, Caribbean American, Puerto Rican, Mexican, and Honduran. Home visits took place in participants' homes, and most research instruments were administered during the course of separate home-visit research sessions conducted by a research assistant for the sole purpose of data collection. Research sessions also were conducted for control group mothers in participants' homes. For both intervention and control group mothers, the mother–child assessments and infant developmental testing took place in a laboratory space located within a 5- to 10-min car ride from most families' homes (Study variables and measures are presented in Table 1.)

Procedures

Recruitment. The study was approved by Yale University's and and the CHC's research review committees. All participants had the choice of whether they wished to participate in the study. Recruitment began in midpregnancy when, according to guidelines of the Health Insurance Portability and Accountability Act of 1996 (United States Congress, 1996), the CHC midwives contacted potential research participants about their interest in the study. Those who expressed interest were then approached by MTB staff who explained the project. Those who volunteered and met inclusion criteria, gave informed consent (or if younger than age 18 years, a parent provided written consent and the participant provided assent) were enrolled into the study. Both groups were followed for 27 months.

One hundred thirty-nine families met criteria and were invited to join the study. Of this group, 67 were randomized into the control group, and 72 were randomized into the intervention group. Of those from the control group, 21 families declined the invitation to join the study. Of those from the intervention group, 9 families declined the invitation. Sixty-three families were consented into the intervention, and subsequently, 1 family could not be contacted, and 2 families declined to continue the intervention after the first several months due to time constraints, leaving 60 families in the intervention group who received the intervention and participated in data collection. Of the control group, 1 family declined to continue in the study shortly after consenting, leaving 45 families who participated in data collection. Despite repeated attempts

and follow-up by the research team, not all data-collection sessions were completed by all families due to scheduling difficulties, frequent moves in and out of the state, and conflicting demands and time constraints reported by the families (Sample sizes for each component of the data analysis are presented in Tables 3 and 4.)

Data collection. Baseline data collection included a demographic interview, the written research instruments, and a clinical interview regarding the young women's experience of pregnancy and expectations about the baby. At 12 and 24 months, the health records were reviewed. Mothers and infants were invited to the lab at Yale Child Study Center where mothers and infants were videotaped and observed at 4 months in a face-to-face interaction, and at 12 to 14 months for the Strange Situation Procedure (Ainsworth et al., 1978). At 12 and 24 months, there were additional written questionnaires, and at 24 months, mothers were administered the Parent Development Interview-Revised (PDI; Slade, Aber, Bresgi, Berger, & Kaplan, 2004). Participants were paid $25 for their time for each of the data-collection visits. When travel to the lab was required, they were paid an additional $15 for transportation costs. Data were collected by experienced female RAs very familiar with high-risk populations and the special issues they raise for data collection. Attempts were made to keep RAs blind to the group status of participants, although this information was commonly disclosed inadvertently by participants.

Implementation of home-visitation clinical program (intervention participants only). As previously described, the team of home visitors began weekly home visits in the late second or early third trimester of pregnancy. These continued until the child's first birthday, at which point there was a celebratory "transition" visit acknowledging the growth and progress of the first year and setting goals for visits in the second year. The home visits then occurred every other week until the child was 24 months old, at which point there was a joint visit by both home visitors for the family's graduation from the program. For this sample, the mean number of home visits per month was 3.4 ($SD = 1.5$), which lasted between 45 and 90 min. During visits, content areas were recorded by home visitors, and use of time was documented as: child health and development (19%), maternal mental health (18%), parenting (15%), social support (12%), maternal life course (12%), maternal health (10%), infant mental health (10%), environment and safety (4%). During the intervention, families continued to receive their routine prenatal, primary care, and pediatric care from the CHC clinicians.

Control group participants received routine pre- and postnatal well-woman health visits, and well-baby healthcare visits as dictated by clinical guidelines and infant/child immunization schedules in place at the CHC. Control group families were sent monthly information sheets from Healthy Steps (Kaplan-Sarnoff & Zuckerman, 2007) materials about child rearing and health, and were sent birthday and holiday cards. We maintained telephone contact with control group families to schedule research sessions at baseline, 4, 12, and 20 to 24 months.

Measures

Selected research measures are presented in this article even though additional research instruments were utilized during the larger study (Sadler, Slade, & Mayes, 2006). Research measures and timing of data collection are presented in Table 1.

Mothers' demographic information regarding age, family background, educational background, and medical history was collected at baseline (20–24 weeks of pregnancy) by interview and health record reviews. Child protection cases that were active were noted (All open cases at enrollment were aimed at the parents of the mothers in the study.) Subsequent health record reviews were completed at 12 and 24 months after the infants' birth.

Maternal–child health outcomes. The main maternal health outcome was childbearing patterns; these were determined by interview and health center record review at 24 months. Rapid subsequent childbearing was defined as the birth of a second child within 24 months of the index birth.

Infant health outcomes were collected through a record review of the infant's pediatric CHC health record and maternal interviews at 12 and 24 months. Variables included birth outcomes and immunization records (to ascertain whether an infant was up-to-date or delayed in accord with Centers for Disease Control Immunization Guidelines); together, these were used to assess compliance levels with pediatric well-child visits. A key child health outcome was the frequency of open child protective services cases, indicating the presence of child maltreatment or neglect.

Maternal Mental Health Measures

Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D consists of 20 items selected from other depression scales; the six major symptom areas assessed include depressed mood, guilt/worthlessness, helplessness/hopelessness, psychomotor retardation, loss of appetite, and sleep disturbance. The reliability of the CES-D has been documented with high internal consistency reliability, acceptable test-retest stability, and construct validity in both clinical and community samples, and has been used successfully with urban adolescents and adolescent mothers. In this sample, the Cronbach's α coefficient is equal to .89.

Brief Symptom Inventory-Short Form (BSI; Derogatis, 1993). The BSI is a widely used, self–report measure of psychopathology. This 18-item measure yields a Global Severity Index (GSI), an indicator of current overall symptomatology across multiple domains experienced during the preceding 2 weeks. In addition, the measure yields three other subscales indicating somatization and depressive and anxiety symptoms. The BSI has been shown to be a reliable and valid measure of current global psychological distress. In this sample, the coefficient α for the GSI was .90.

Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979). This 25-item questionnaire is used to assess mothers' recollections of the care and protection that they received from their

own mothers; each item is rated on a 4-point scale ranging from 0 = *very unlike* to 3 = *very like* my mother. The PBI has demonstrated satisfactory reliability and validity in other samples similar to the current sample; in this sample, the coefficient α was equal to .78 for the Overprotection subscale and .90 for the Care subscale.

Infant measures

Mother–infant interaction. Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE) Scale (Bronfman, Parsons, & Lyons-Ruth, 1999).

This scale is used to assess the quality of affective communication between mother and infant. Videotaped face-to-face interactions, collected when babies are 4 months old, were coded on a 7-point scale, with a scale point of 1 denoting *High normal* and a scale point of 7 denoting *Disrupted communication with few* or *no ameliorating behaviors*. This measure has been validated against the Strange Situation and with maternal and infant behavior observed in the home (Lyons-Ruth, Bronfman, & Attwood, 1999). We used a version of the AMBIANCE scale developed for 4-month-old infants and their mothers (Kelly, Slade, & Lyons-Ruth, 2003). The trained and certified coder was naïve to the group status of infant–mother dyads.

Infant attachment. The Strange Situation Procedure (Ainsworth et al., 1978) is a 30-min laboratory separation procedure aimed at assessing the quality of the child's attachment to his or her caregiver. The procedure yields one of four primary attachment classifications: secure, avoidant, resistant, and disorganized. This well-validated and reliable procedure has been used in studies of attachment for 30 years. This has been used successfully with low-income mothers and mothers from various cultural backgrounds (Carlson & Sroufe, 1995). This procedure is conducted and videotaped by a trained team at the Yale Child Study Center. Coding was performed by certified coders who were naïve to the group status of the participants.

Maternal RF

Pregnancy Interview (PI; Slade, 2003). This 22-item clinical interview was designed to assess a woman's emotional experience of pregnancy and the nature of her developing relationship with her baby. The PI has been used in a number of samples and predicts to adult attachment classification (Slade, Director, Grunebaum, Huganir, & Reeves, 1991). Audiotaped responses were transcribed verbatim, and the transcript was scored by coders who were blind to group status, using the RF scoring system described later.

PDI (Slade et al., 2004). This 20-question interview assesses parents' representations of their relationships with their child. The interview takes approximately 45 min to administer, and parents are asked to describe their experience of the child, their relationship with the child, their own internal experience of parenting, and the child's reactions to normal separations, routine upsets, and parental unavailability. Transcribed interviews were scored for RF.

Initial studies testing the validity of this measure have linked it to adult attachment, child attachment, and parental behavior both in normal and drug-using samples (Levy, Truman, & Mayes, 2001; Slade, Belsky, Aber, & Phelps, 1999; Slade, Grienenberger, et al., 2005). RF is scored on a scale of 1 to 9, with higher scores reflecting higher levels of RF (Slade, Bernbach, Grienenberger, Levy, & Locker, 2005). Average scores on nonstressed samples of mothers are 6, and average scores in poverty samples are 4 (Grienenberger et al., 2005; Levy et al., 2001). Coders, who were blind to the group status of all interview transcripts, were trained to reliability on a subset of sample transcripts; the criterion for reliability was 80% agreement on individual variable and overall scores.

Analysis

Sample size was determined on three outcomes—maternal RF, secure attachment rates in the children, and incidence of rapid subsequent childbearing—using a two-group, univariate repeated measures analysis of variance power analysis with compound symmetry. Estimates of change over time were based on pilot data in which we saw effect sizes of .78, .82, and .93, respectively, for the aforementioned measures. Analyses indicated that a sample of 25 to 27 per group would provide 80% power to detect Group × Time differences with the three outcomes. We purposely oversampled since we knew that it would be difficult to retain all participants within our community sample for all data-collection points. In fact, despite persistent efforts and our use of many strategies developed to retain community samples (Sullivan, Rumptz, Campbell, Eby, & Davdison, 1996), a number of our families failed to keep all of their research appointments.

Descriptive statistics and comparisons were calculated between intervention and control groups with respect to demographic characteristics and baseline measures to determine the equivalency of the two groups. Using *t* tests, chi-square, and Fisher's exact tests, bivariate analyses were computed to detect differences between the groups with respect to the research measures and health outcomes. Because this was a pilot study, effect sizes also were computed for key outcome variables. Multivariate analysis included generalized estimation equations (GEE) using robust standard errors to account for nonnormally distributed RF findings as well as logistic regression to examine particularly high risk subgroups within the sample. GEE are a form of semiparametric regression techniques; an extension of generalized linear models, they can accommodate correlated data (Liang & Zeger, 1986), They do not require specification of the form of the distribution and are less sensitive to covariance specification, thereby allowing for more flexibility in modeling nonnormal data.

RESULTS

The sample included 60 families in the intervention group and 45 families in the control group. Even though families did not drop out of the study, they would intermittently miss multiple rescheduled research appointments beyond the time frame when

TABLE 2. *Study Attrition Rate Over Time by Intervention Group Assignment*

	Baseline (Pregnancy)	12 Months	24 Months
Intervention	60 (100%)	44 (73%)	44 (73%)
Control	45 (100%)	34 (76%)	31 (69%)
Total	105 (100%)	78 (74%)	75 (71%)

Chi-square test for trend: $\chi^2 = .03$, $p = .85$.

TABLE 3. *Comparison of Demographic Measures Among Those Completing 24-Month Research Measures and Those Who Did Not*

Variable	Did Not Complete 24-Month Interview ($n = 30$)	Completed 24-Month Interview ($n = 75$)	Significant
Maternal Age (years) at Intake M (SD)	19.7 (2.9)	19.5 (2.7)	.82
Highest Grade (years) M (SD)	11.2 (1.8)	11.5 (2.0)	.46
Race/Ethnicity			.03
Black	14%	33%	
Latina	83%	55%	
Other	3%	12%	
Marital Status			.86*
Never Married/Single	96%	86%	
Married	4%	10%	
Divorced		3%	
Engaged		1%	
Infant Gender			.99
Male	52%	52%	
Female	48%	48%	
Infant Birth Weight (g) M (SD)	3,079.3 (650.9)	3,212.2 (554.4)	.32
Gestational Age (weeks) M (SD)	38.4 (3.1)	39.2 (2.1)	.18
Caesarean Section	10%	28%	.05
Child Protection Case Open at Enrollment Into Study	2 (7)%	4 (5)%	1.0*
Group Assignment			.62
Intervention	16 (27%)	44 (73%)	
Control	14 (31%)	31 (69%)	

Chi-square tests used for categorical variables unless indicated by an *, which indicates Fisher's exact test. *T* test and Wilcoxon Mann–Whitney *U* tests performed for continuous variables. *P* values are for *t* tests.

TABLE 4. *Demographic and Birth Outcome Characteristics of Sample*

Variable	Total Sample ($n = 105$)	Intervention Group ($n = 60$)	Control Group ($n = 45$)
Maternal Age (years) at Intake M (SD)	19.6 (2.9)	19.5 (2.6)	19.7 (2.8)
Highest Grade (years) M (SD)	11.4 (2.8)	11.3 (2.0)	11.6 (1.9)
Race/Ethnicity			
Black	28%	22%	35%
Latina	62%	67%	58%
Other	10%	11.7%	6.7%
Marital Status			
Never Married/Single	83.8%	80.3%	88.6%
Married	7.6%	8.2%	6.8%
Divorced	1.9%	3.3%	
Engaged	6.7%	8.2%	4.5%
Infant Gender			
Male	52%	51%	52%
Female	48%	49%	48%
Infant Birth Weight (g) M (SD)	3,178.5 (577.5)	3,138.72 (602.3)	3,235 (542.1)
Gestational Age (weeks) M (SD)	39 (2.4)	39 (2.6)	39 (2.0)
Caesarean Section	24%	20%	30%
Child Protection Case Open at Enrollment Into Study	6%	7%	4%

those who did not. There was no significant difference between those who completed the study and those who did not (including treatment-group assignment), with the exception of race/ethnicity and caesarean section.

The mean age of the mothers in our sample was 19.6 ($SD = 2.5$) years, with 60% of the mothers under the age of 20. Participants described their marital status (see Table 4) at the beginning of the study, although the nature of the couple relationships was quite fluid over the course of the study period. The highest grade level attained was a mean of 11.4 ($SD = 2.0$) years of education. The sample was predominantly Latina (62%) while 28% of the sample was African American or of Caribbean descent, and 10% described themselves as having mixed ethnic and racial backgrounds. All participants were enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (proxy measure for income). At the time of enrollment into the study, 7% of the intervention families and 4% of the control group families had active child protective services cases. In all situations, these cases involved charges of abuse or neglect against the *parents* of the participant mothers in this study.

In comparing the baseline demographic characteristics and participants' scores on baseline research measures, there were no significant differences between the intervention and control groups, except for their scores on the PBI (Overprotective subscale; intervention mothers reported higher levels of Overprotection when they were growing up) and the BSI [Intervention mothers reported higher levels of psychological distress on the Global Severity Index

the data could be collected. This pattern resulted in sample sizes that were smaller than planned for, and an attrition rate that was relatively high (see Table 2). Thirty of those in the study did not complete the 24-month research measures, 16 (27%) from the intervention group and 14 (31%) from the control group. There was no significant differential attrition between treatment groups ($p = .85$). To explore further, we conducted an attrition analysis. Table 3 presents a comparison of selected demographic and related factors among those who completed a 24-month interview compared to

TABLE 5. *Variables Measured at Baseline, 12 Months, and 24 Months*

Variable	Intervention Group			Control Group		
	Baseline (pregnancy) $(n = 60)$	12 months $(n = 44)$	24 months $(n = 44)$	Baseline (pregnancy) $(n = 45)$	12 months $(n = 34)$	24 months $(n = 31)$
Maternal Depression (CES-D)	13.5 (8.2)	13.4 (10.9)	12.8 (10.4)	13.9 (8.3)	11.3 (7.8)	10.8 (8.9)
Brief Symptom Inventory-GSI	50.8 (9.6)*	48.4 (11.4)	48.1 (10.5)	54.2 (9.4)*	47.3 (10.9)	46.9 (9.7)
Brief Symptom Inventory-SOM	55.9 (10.3)†	50.6 (10.9)	51.1 (9.8)	60.4 (9.8)†	52.9 (11.4)	51.0 (10.2)
Brief Symptom Inventory-DEP	48.6 (8.4)	48.5 (9.1)	48.6 (9.9)	50.9 (8.4)	46.7 (8.9)	46.5 (7.9)
Brief Symptom Inventory-ANX	47.4 (8.5)	48.1 (10.4)	47.1 (8.0)	49.0 (9.6)	45.8 (9.6)	45.4 (9.0)
Parental Bonding Index-CARE	29.4 (7.9)			27.7 (7.8)		
Parental Bonding Index-Overprotection	16.1 (6.9)††			13.7 (6.9)††		

Note. CES-D = Center for Epidemiological Studies Depression Scale; GSI = Global Severity Index; SOM = Somatization Symptom scale; DEP = Depression Symptom scale; ANX = Anxiety Symptom scale.
Baseline-only comparisons: *$t = -1.8$, $df = 101$, $p = .07$. †$t = -2.2$, $df = 101$, $p = .03$. ††$t = 2.3$, $df = 100$, $p = .03$. These variables were included in models as covariates.

(GSI) and lower levels of somatic complaints on the Somatization Symptom scale (SOM)], which are displayed in Table 5. These three baseline subscale scores were therefore used as covariates in subsequent analyses of maternal–infant relationship outcomes. Finally, we then conducted a subset analysis of only those who completed the 24-month measures, examining any differences between the intervention and control groups on baseline outcome measures. The purpose was to ensure that randomization was effective in this subset as well as with all participants in the study. There were no differences between the treatment groups at baseline on measures on depression (CES-D), the BSI (SOM, Depression Symptom scale, Anxiety Symptom scale, GSI), or the PI ratings for RF. Using a Wilcoxon Mann–Whitney U test, there were significant differences between treatment groups with respect to the PBI Care, $p = .05$, and Overprotection, $p = .007$, subscales, with the intervention group having higher scores. PBI Overprotection was found to be significantly higher in the intervention group in the full sample and was used as a covariate in the main analyses along with GSI and SOM.

Maternal–Child Health Outcomes

With respect to birth outcomes, all enrolled women were classified as medically low risk at the time that they were enrolled into the study. Both groups had mean infant birth weights that were in the healthy range, and although the MTB mothers had a lower caesarean section rate, this difference was not statistically significant (see Table 4).

Immunizations and pediatric checkups were reviewed in the infants' health records at 12 and 24 months, and immunization patterns were compared with the Center for Disease Prevention and Control immunization schedule. The MTB group was significantly more likely than was the control group to be up-to-date at 12 months; however, by 24 months, both groups were up to date with the immunization schedule. In examining patterns of rapid subsequent child-bearing (i.e., within 24 months), the intervention group mothers had fewer instances of rapid subsequent childbearing ($n = 1$, 1.6%) versus control group mothers who had a 15% rate ($n = 7$),

and this difference was statistically significant, Fisher's exact test, $p = .019$. With respect to patterns of child abuse/maltreatment, the MTB group had no open cases with child protective services while the control group had 5% ($n = 2$) open cases; the difference was not significant but reflects a trend, Fisher's exact test, $p = 0.1$.

Maternal Mental Health

There were no significant Group × Time findings with respect to the measures of maternal depression (CES-D) or psychological distress (BSI). The descriptive statistics for these measures are presented in Table 5.

Maternal–Child Relationship Outcomes

Mother–child face-to-face interaction at 4 months. For the measure of early mother–infant affective communication (AMBIANCE), the scores were grouped into the following two categories for analysis: 1–4 = healthy communication, and 5–7 = disrupted communication. There was less disrupted communication among MTB families; in the intervention group ($n = 45$), there were 60.5% of the dyads versus 73% of the dyads in the control group ($n = 31$) who scored in the disrupted range. However, when controlling for the three covariates (SOM, GSI, PBI-Overprotection), the difference was not significant, Wald $\chi^2 = 1.6$, $p = .20$, OR $= 0.48$, 95% CI $= 0.16–1.5$. When these analyses were repeated for the teen mothers only (<20 years old), 66.6% of the intervention group dyads ($n = 27$) versus 93.8% of the control group dyads ($n = 15$) had scores in the disrupted range. This difference bordered on significance, Wald $\chi^2 = 3.80$, $p = .05$, OR $= 0.084$, 95% CI $= 0.01–1.01$. Therefore, intervention group teen mothers were 11.9 times more likely to have healthy communication patterns than were the control group dyads (see Table 6).

Infant attachment quality at 12 months. There was a significantly higher percentage of secure infants in the MTB group ($n = 41$,

TABLE 6. *Program Impact on Mother–Child Communication at 4 Months and Infant Attachment at 12 to 14 Months*

Measure	Group Classification	Difference in Scores Intervention vs. Control		
		Wald $\chi^2{}^*$, p	OR	95% CI
Strange Situation Procedure-Secure Attachment Classification	Intervention ($n = 41$) 64.4% secure Control ($n = 30$) 48.4% secure	4.83, .28	0.29	0.10–0.88
Strange Situation Procedure-Disorganized Attachment Classification	Intervention ($n = 41$) 27% disorganized attachment Control ($n = 30$) 43% disorganized attachment	3.86, .49	3.10	1.00–9.53
AMBIANCE Total Sample	Intervention ($n = 45$) 60.5% disrupted communication Control ($n = 31$) 73.3% disrupted communication	1.58, n.s.	0.48	0.16–1.5
Teen Mothers Only	Intervention ($n = 27$) 66.6% disrupted communication Control ($n = 15$) 93.8% disrupted communication	3.8, .05	0.08	0.01–1.01

OR = odds ratio; CI = confidence interval; AMBIANCE = Atypical Maternal Behavior Instrument for Assessment and Classification; n.s. = not significant.
*Logistic regression controlling for Somatic Symptom scale, Global Severity Index, and Parental Bonding Instrument-Overprotection scale

64.4%) than in the control group dyads ($n = 30$, 48.4%), controlling for the three covariates (Wald $\chi^2 = 4.83$, $p = .028$, OR $= 0.29$, 95% CI $= 0.10$–0.88). The intervention group was 3.4 times as likely as was the control group to have infants who had secure attachments. When only the teen mother dyads were examined, the analyses revealed nonsignificance ($p = .10$, OR $= 0.26$, 95% CI $= 0.06$–1.27). However, the direction of the differences seen are consistent with what one would expect with a successful intervention, with 72% of the Intervention group children ($n = 25$) rated as securely attached and 52.9% of the control group children ($n = 16$) rated as securely attached.

There also was a significantly lower percentage of children (27%) who were classified as being disorganized in relation to attachment in the intervention group dyads. Compared with the control group dyads (43%), when controlling for the three covariates in the logistic regression (Wald $\chi^2 = 3.86$, $p = .049$, OR $= 3.10$, 95% CI $= 1.00$–9.53), the control group children were 3.1 times more likely to have a disorganized attachment classification as were the intervention group children. Among teen mother dyads, 25% of intervention group dyads ($n = 25$) versus 40% of control group dyads ($n = 16$) had a child classified with disorganized at-

TABLE 7. *Program Impact on Parental Reflective Functioning (RF): Difference in RF Level from Pregnancy Interview (PI) to Parent Development Interview-Revised (PDI)*

Sample	Group	PI Score	PDI Score	GEE p**
All Mothers	Intervention			.38
	$n = 60$ at pregnancy	3.1 (0.6)		
	$n = 45$ at 24 months		3.6 (0.8)	
	Control			
	$n = 45$ at pregnancy	3.0 (0.6)		
	$n = 30$ at 24 months		3.7 (1.5)	
Only Mothers with <12th-grade education	Intervention			.09
	$n = 20$	2.9 (.51)	3.4 (.78)	
	Control			
	$n = 9$	2.9 (.89)	2.9 (.95)	
Only Mothers with low RF levels in pregnancy (PI <3)	Intervention			.0007
	$n = 7$	2 (.0)	3.6 (.89)	
	Control			
	$n = 7$	2.1 (.20)	2.3 (.52)	

Generalized estimation equations (GEE) controlling for Global Severity Index, Somatic Symptom scale, and Parental Bonding Instrument-Overprotection scale.
**p of Group × Time interaction term.

tachment; however, the differences were not significant ($p = .12$, OR $= 3.62$, 95% CI $= 0.69$–19.04) (see Table 6).

Parental RF. RF scores in both intervention and control groups improved significantly over the course of the intervention. However, there were no Group × Time effects, as noted in Table 7, indicating that intervention mothers' RF scores did not improve relative to those of control mothers over the course of the intervention. When certain aspects of maternal risk were accounted for in an exploratory analysis, however, there was a greater improvement in RF at 24 months for intervention than there was for control group mothers. With mothers who had less than a 12th-grade education, bivariate analysis demonstrated a significant improvement in the intervention group ($n = 20$). RF mean scores in the intervention group changed from 3.0 in pregnancy to 3.8 at 24 months ($t = -2.1$, $df = 19$, $p = .05$). By contrast, there was no significant improvement in the RF scores (mean scores of 2.9 at both time points) in the Control group ($n = 9$). In GEE analysis, controlling for BSI, SOM, and PBI, these effects were not seen, although there was a trend, $p = .09$. Among mothers whose PI transcripts revealed no efforts at mentalization at intake [i.e., very low (<3) RF scores], bivariate analysis showed a significant improvement in the intervention group ($n = 7$), with mean scores changing from 2.0 in pregnancy to 3.6 at 24 months ($t = -4.0$, $df = 6$, $p = .016$). There was, however, no significant improvement in the control group ($n = 7$), with the mean scores changing only slightly between pregnancy (2.1) and 24 months (2.3). GEE analysis, controlling for the three covariates, provided results consistent with bivariate analyses, with a significant Group × Time interaction ($p = .0007$).

DISCUSSION

Our results provide preliminary evidence in a pilot sample that the MTB intervention—an interdisciplinary, mentalization-based, home-visiting program—is having a positive effect on both health and attachment/parenting outcomes. The trajectory of our results, with a move toward less disrupted interactions at 4 months, higher rates of secure attachment and lower rates of disorganized attachment at 12 months, and a strong trend toward lower rates of child protective service referrals at 24 months, suggests that MTB mothers, despite the many challenges facing them on a daily basis, are parenting in more sensitive and presumably less frightening ways. That they also are attending to their children's pediatric health visits and delaying subsequent childbearing likewise suggests that they are managing to approach both childrearing and their own lives in a more organized and planful way, which we expect will positively impact both mothers and children in the long-term.

Our first research aim was to document the impact of the intervention on health and public health outcomes. Infants in the MTB group were significantly more likely to be up-to-date on pediatric immunizations and well-baby visits at 12 months, but not at 2 years. The convergence of the two groups at this second data point was likely because the CHC had implemented a funded statewide outreach program aimed at immunizing all children by age 2 years. The impact on immunization rates at 1 year was significant, however, and suggests that intervention mothers are attending to their child's health needs in a timely way—no small feat for a stressed population. In the only trial by Kitzman and colleagues (1997) to evaluate immunization rates, no program benefits were found in this area. Mothers in the intervention group also were less likely to bear a second child within 24 months from the birth of their first baby. MTB intervention mothers in this pilot study had a 1.6% rate of having a second child within 24 months of the birth of their first child, which compares favorably with the rates reported in the Memphis trial of the Nurse–Family Partnership findings with the Memphis study (Kitzman et al., 1997). In the Memphis trial, within the overall intervention group, 22% of mothers had a second child by 24 months, and in a subanalysis of intervention mothers with higher levels of psychological resources, 14% of the women experienced a second childbirth by 24 months. The delay of subsequent childrearing until the first child is at least 2 years old repeatedly has been found to predict a range of positive health and socioemotional outcomes in mothers and children (Klerman, 2004). These outcomes reflect the major thrust of the nurses' efforts: to improve the quality of the child's healthcare and to attend to the mothers' own reproductive health and healthcare.

The comparison between intervention and control families with respect to child protective service referrals just missed significance. Given that intervention mothers were slightly more likely to enter the program with active child protective service cases (against their own caregivers), the fact that none of our mothers had active child protective cases is striking, although only continued assessment with more participants will confirm our success in this area. In the two open cases in the control group, both families had children removed from their custody due to neglect. As noted by Howard and Brooks-Gunn (2009), most studies have not found differences between intervention and control participamts in rates of child abuse referrals, as the reporting and documenting of abuse is complex and as the base rate in both intervention and control samples is low (as was the case in our sample). Thus, the trends observed in this area are most encouraging.

Our second research aim was to demonstrate the impact of the intervention on a range of parenting and attachment outcomes, including mother–infant communication, infant attachment, and maternal RF. Mothers in the MTB group demonstrated the impact of the intervention on both the nature of their evolving relationship with the child as well as their own capacity to make meaning of their own and the infant's subjective experiences. When differences in patterns of mother–infant affective communication were measured at 4 months, the MTB intervention was associated with significantly lower rates of disrupted interactions in teen mothers and their babies; differences between the intervention and control mothers was in a positive direction, but not significant, when the whole group was considered. That the intervention and control groups began to distinguish themselves with respect to this kind of negative parenting as early as 4 months suggests that the intervention was beginning to have an effect within a fairly short time window, particularly for teen mothers.

With respect to attachment quality, intervention infants were more likely to be securely attached and less likely to be disorganized in relation to attachment than were control infants. The results with respect to security of attachment are consistent with results reported by Lieberman et al. (1991) and Heinicke et al. (1999). As has been well-documented for the past 3 decades (Carlson & Sroufe, 1995; Weinfield, Sroufe, Egeland, & Carlson, 2008), security of attachment is associated with a range of positive social and emotional outcomes throughout childhood. The intervention results that specifically point to lower rates of disorganized attachment are unique to this study. As has been described repeatedly in the attachment literature (Carlson, 1998; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), disorganized attachment is prevalent in high-risk samples and, of all the insecure attachment classifications, is the most pernicious with respect to long-term outcomes. The antecedents for these lower rates of disorganized attachment may well be the tendency toward less disrupted communication at 4 months, which—as noted—was significant in teen mothers (Grienenberger et al., 2005; Lyons-Ruth, Bronfman, & Parsons, 1999).

Finally, RF scores for all mothers—control or intervention—increased significantly over the course of the 24-month time period. RF on the PI was assessed on the basis of a mother's ability to envision her own mental states in relation to pregnancy, the mental states of those closest to her (her own parents, the father of the baby), and that the baby, after she or he is born, has thoughts and feelings. That is, a reflective pregnant woman represents herself, her partner, her family, and the baby as having an internal, psychological life. RF on the PDI when the child was 2 years old was assessed on the basis of a mother's ability to envision her own

and the baby's mental states; does she, for instance, see the baby's behavior in light of thoughts and feelings? (e.g., "he is clinging to me because he doesn't want me to go to work"). It is likely that the increase across both groups was, to some degree, a function normal development; RF is thought to continue developing throughout adolescence, in conjunction with the development of other executive capacities (Kriss, Steele, & Steele, 2012). It also is likely that the presence of an actual baby accounted for the increase in RF across both groups. In a study of the development of RF on the PDI in a low-risk, nonintervention sample, Poznansky (2010) found similar increases in RF between 10 and 28 months, as the baby became increasingly known to the mother.

Thus, there are likely a number of factors at work in our failure to discern intervention effects on maternal RF, except in a small subgroup of parents whose RF was particularly low in pregnancy. As noted earlier, maternal RF appears to develop as the parent becomes more experienced with the baby. This alone would make it difficult to detect changes in RF in the intervention group over and above those in the control group. Another complicating factor in assessing outcomes using RF on the PDI is the fact that as can be seen from an examination of Table 5, the ranges on both RF measures were extremely restricted in both intervention and control groups. Thus, mothers' responses typically fell between 2.5 and 4.5 on a 9-point scale. This restriction of range obviously had an impact on our capacity to detect differences between the two groups using this measure, and in fact, it was when a wider spread of scores was studied in the mothers whose RF was very low at enrollment that the effect of the intervention was apparent.

These complications clearly raise the possibility that measuring change in RF on the PDI may not be the best way to assess outcomes in this study. It also is clear that much work needs to be done to better understand developmental and clinical aspects of improvements in maternal RF in the child's first 2 years of life, with or without intervention. We believe that one of the primary limitations of using the PDI with this population is that RF scoring is so dependent on language. Young mothers who have had limited education and who struggle with trauma and environmental adversity may use language more instrumentally and less as a means of communicating and describing more complex emotional and cognitive experiences. In addition, many of our mothers were bilingual and may not have felt as comfortable or facile with the expression of their feelings and ideas in English. These issues might well have to do with the restriction of range observed across the whole sample. Finally, the lower end of the RF scale may not adequately distinguish levels of prementalizing, such that clinically meaningful distinctions in the capacity to make sense of mental states are lost. Thus, it might be more appropriate to use a nonverbal measure of mentalization such as that developed by Shai and Belsky (2011) or a more behaviorally based measure such as Meins, Fernyhough, Fradley, and Tuckey's (2001) measure of mind-mindedness. In any event, these complexities of measuring change in RF must be addressed in further research.

Clearly, it could be argued that—even with these complexities in mind—the intervention did not alter mothers' fundamental appreciation of their babies' subjective experience. However, we do think there is evidence to suggest that it did. The interactions of intervention group mothers and babies were less disrupted at 4 months, and intervention infants were less likely to be insecure and/or disorganized in relation to attachment. Both findings suggest that mothers in the intervention group were more responsive to and sensitive to their babies' needs. Maternal RF and infant attachment have consistently been correlated in low-risk samples (Fonagy et al., 1995; Slade, Grienenberger et al., 2005). That mothers were more reflective also was repeatedly borne out by clinical observation.

MTB had no discernible effects on the measures of depression or other psychiatric symptomatology. This is a complex issue. For one, the mean depression and BSI scores for both intervention and control mothers did not at any data point meet criteria for clinical depression or general psychiatric distress, although intervention mothers had higher scores on the GSI than did controls. The finding that our sample's level of depression and psychiatric symptomatology was not in the clinically significant range is inconsistent with both the levels of psychological distress in general and depression in particular reported in the literature on home visiting (Ammerman et al., 2011). In addition, this finding did not reflect our clinical experience with families. It was clear to the home visitors, often within weeks of enrolling mothers, that many were very distressed psychologically; this manifested not only as depression and anxiety but in a range of other symptoms and difficulties. In line with the studies by Ammerman et al. (2010, 2011) as well as our own observations, it seems possible that our primary measure of depression (the CES-D) did not capture the level of depression in our sample. Alternatively, we have begun to consider the possibility that the symptoms we see consistently in so many of our mothers are characteristic of what Courtois (2008) described as "complex trauma:" Complex trauma is the "result of cumulative and repeated trauma, usually within a period of time and within specific relationships and contexts" (p. 86). Individuals suffering from complex trauma (which stems, among other things, from repeated child abuse, domestic violence, and/or community violence) show signs of many psychiatric disorders, but rather than being *comorbid* disorders, these are linked in complex trauma to the "underlying posttraumatic adaptation" (p. 87). That is, depression and anxiety are symptoms of a more pervasive disorder, which Courtois described as leading to a range of alterations: "alterations in a range of affective impulses, alterations in attention and consciousness, alterations in self-perception, alterations in perceptions of the perpetrator, alterations in relationships to others, somatic and/or medical problems, alterations in systems of meanings" (p. 88). These descriptions are very consistent with our experience of the intervention mothers in our study, some of whom improved and some of whom continued to struggle throughout the study, with continued personal, interpersonal, and familial crises and upheavals.

As Courtois (2008) noted, complex trauma is difficult to assess because—as we discovered time and again—traumatized individuals do not necessarily reveal their trauma histories at intake and,

in fact, often may not disclose highly traumatic events until they are certain of the clinician's trustworthiness. In our experience, this often can take place toward the end of treatment. Thus, the typical measures used to evaluate psychiatric symptoms may be unsuited to assessing the kinds of symptoms and states of mind associated with complex trauma; rather, it is only over the course of a treatment relationship that complex trauma can be assessed (Courtois, 2008). This suggests that going forward, both in our as well as in others' studies, the presence of complex trauma ideally must be assessed and treated as a covariate in outcome analyses. However, given the current difficulty of assessing and measuring complex trauma, work is needed to determine possible new ways of measuring trauma that are amenable to "brief research encounters."

Note that while our program is not geared specifically toward the alleviation of mental health symptoms, we do regularly provide individual and dyadic therapy as part of home visits, and it certainly had been our hope that treatment would have secondary impacts on the range of psychological distress that our mothers experienced. What we observed—as has been the case with other programs— is that mothers make gains in parenting sensitivity, even if their depression does not remit (Howard & Brooks-Gunn, 2009; Mayers, Hager-Budny, & Buckner, 2008). Nevertheless, the complex issues involved in alleviating the symptoms of psychological distress that characterize samples such as ours require further study. We have consistently maintained that these are best addressed by familiar and trusted social work clinicians within the framework of the home visit; yet, it must be acknowledged that this poses quite a challenge in working with some families whose needs are so deep and wide.

Limitations of the study include incomplete data on the longitudinal measures. As noted in our attrition analysis, women who self-identified as being Black were more likely to complete a 24-month interview compared to Latinas. It is unclear what is influencing this, and if it is specifically related to this study. A greater proportion of those who completed a 24-month interview delivered their infants by caesarean compared to those who did not. One possible explanation is that those who delivered by caesarean may have been more engaged in the study or may have felt more vulnerable as they recovered from their births and appreciated the support from the intervention so that they were more willing to complete the 24-month research measures.

While attrition was high in this pilot study, there were few differences between those who completed and did not complete the study. Future studies should examine the possible role of differential race and ethnicity attrition in the evaluation of the program. Baseline measures among the subset of those who completed were different compared to the full sample in that PBI Care also was significantly different, and GSI and SOM at baseline were not. These differences may be due to the small sample size inherent in pilot studies.

As expected in any analysis of pilot data, our preliminary investigations have yielded as many questions as answers. Clearly, many of the patterns we are beginning to see must be confirmed in a larger sample, and the questions we have raised here about the differences between teens and more mature mothers, about the process whereby the intervention "takes hold" (i.e., does it take more time for different mothers, can we discern nonverbal mentalizing processes, etc.), and about the nature and impact of trauma upon all outcomes must be examined. In addition, the mechanisms of change (i.e., intervention dose, quality of relationship to home visitors, etc.) must be assessed. In view of the issue of complex trauma, there remain a number of questions on how to best implement treatment for these issues within the framework of a home visit.

Overall, we see our early outcomes as quite encouraging, and indicative of the fact that an intensive, interdisciplinary program that encourages mothers to attend to their own and their babies' physical health and internal experience can affect both health and attachment/parenting outcomes. To return to the point made by Howard and Brooks-Gunn (2009), complex goals require complex, interdisciplinary work. As our aim was to affect both health and attachment/parenting outcomes, bringing together nursing and mental health practitioners was crucial. Using an interdisciplinary team, we have preliminary evidence that—at least in some areas— we are beginning to succeed.

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