

ENHANCING PARENTING DURING INFANCY: AN INTERVENTION PROJECT
FOR AT-RISK MOTHERS

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Abstract

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The purpose of this study was to evaluate the effectiveness of a preventative, intensive, and comprehensive intervention project designed to improve early parenting. Forty-eight at-risk mothers were randomly assigned to either a treatment condition consisting of joint-attention treatment training, developmental knowledge training, and loving touch training or a minimal support control condition. Following the intervention, treatment mothers were less rigid, less intrusive and more flexible than control mothers, indicating reduced tendencies to exert control over infants. Treatment mothers also had better understanding of infants' cognitive needs, indicated by higher quality verbalizations, more demonstrative teaching, and less role reversal. Participants did not differ in emotional expression towards their infants. Overall, results showed meaningful changes in knowledge and skills of at-risk mothers.

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INTRODUCTION

Mothers play a fundamental role in child development during infancy. During the first 12 months following birth, infants require about seven hours each day of hands-on caregiving such as physical caretaking, holding, playing and interacting, or going on outings (Baildam et al., 2000). These tasks are regularly performed by mothers. Baildam et al.'s (2000) analysis of infant care at 6, 13, 26, and 52 weeks postpartum established that mothers are the caregivers who spend the largest portion of time caring for infants. In fact, mothers spend far more time in child caregiving than fathers or all other caregivers combined (Baildam et al., 2000). Unfortunately, mothers cannot cater to infants' needs in a single time block; instead, babies require individual minutes of care interspersed throughout every day, making parenthood an extremely demanding job. Mothers' established commitments to infant caretaking, therefore, offer credence to studies examining the quality of early maternal parenting.

In particular, maternal parenting is central to impacting infant development. Belsky's model of parenting (1984) showed that parent-child processes are bidirectional, with both parent characteristics and child characteristics influencing the dynamic interactional relationship of the dyad. In fact, investigators seeking to improve children's home environments now commonly accept that multiple influences are present in all parent-child relationships (e.g. Deater-Deckard, Petrill, & Wilkerson, 2001). While acknowledging that children contribute to parent-child relationship outcomes, Maccoby

(2002) has argued that since parental abilities and environmental control are so much greater than those of their infants, parents exert most of the impact on children's development during infancy. For that reason, she concluded that parenting knowledge and skills should be heavily weighted when considering causality in child development research (Maccoby, 2002).

Parenting attitudes and actions are so consequential that, in some cases, they even counteract negative biological trends. For instance, the Colorado Adoption Study showed that once genetic effects were partialled out, genetic risk was activated by environmental risk in situations of poor parenting and poor child outcomes (Maccoby, 2002). In the same way, behavior genetic studies of siblings in nonshared environments have provided evidence for the impact of parenting beyond genetic transmission (e.g. Plomin & Asbury, 2001). A large sample from the National Longitudinal Survey of Children and Youth ($n = 8605$) also illustrated the magnitude of parenting influence. In this study, better parenting (e.g. decreased parental hostility or increased positive parent-child interaction) during early childhood began to compensate for deficits in children's motor and social development that were linked with disadvantageous birth factors like low birth weight or small-for-gestational-age status (Pevalin, Wade, & Brannigan, 2003). Maccoby (2000) has explained that the field's analytical advances have increased the proportion of variance to as high as 50% for child outcomes that are accounted for by parenting. Accordingly, the parenting environment plays a crucial role in infant development, and improving maternal parenting behaviors is a logical goal for many interventions attempting to optimize children's developmental outcomes.

The current study evaluated a preventative, intensive, and comprehensive intervention designed to enhance the positive parenting beliefs and behaviors of at-risk teen and adult mothers. The intervention aimed to improve parenting in three domains in which single mothers with low incomes and low educational attainments have typically experienced problems: (1) maternal control orientation, (2) maternal cognitive understanding, and (3) maternal emotional expression. The treatment was intended to foster high-quality parenting actions as well as to prevent problematic parenting patterns using a curriculum consisting of joint-attention treatment training, developmental knowledge training, and infant loving touch training. The following sections will discuss the rationale behind the inclusion of these intervention components in addition to the program's goals in more depth.

Demographic Risk for Non-Optimal Parenting Knowledge and Skills

Optimal parenting is threatened when mothers have certain demographic risk characteristics. Poor mothers, mothers with low educational attainment, unmarried mothers, and adolescent mothers often have trouble learning about and effectively using the best possible parenting knowledge and skills (Whitman, Borkowski, Keogh, & Weed, 2001). Unfortunately, deficits in skill acquisition and long-term utilization may lead to problematic parenting practices and subsequently poor child developmental trajectories. Thus, parenting risk must be understood to sufficiently aid maternal parenting. These risk characteristics certainly do not comprise an exhaustive list, but the repeated mention of these predictive factors in the literature merits attention when establishing which mothers might require greater parenting intervention efforts.

Low income. The literature has clearly documented the effects of diminished income on parenting behavior (e.g. Bornstein & Bradley, 2003; Duncan & Brooks-Gunn, 1997). For instance, Baumeister, Kupstas, and Klindworth (1992) described poverty as “the new morbidity,” working as a cumulative risk process to produce many troubling outcomes for children. In this conceptualization of poverty, reduced income interacts with a host of other factors, such as physical health problems or unemployment, to impact maternal functioning and parenting behaviors (Baumeister, Kupstas, & Klindworth, 1992). While low income often operates hand-in-hand with other potentially hazardous characteristics, low income itself has also been associated with problematic parenting. For example, mothers who remained poor after transitioning off of AFDC were less likely to use authoritative parenting than mothers who were no longer poor after transitioning off of AFDC (Smith, Brooks-Gunn, Kohen, & McCarton, 2001). In the same vein, parents with annual incomes under \$15,000 used severe corporal punishment 150% more often than parents with higher incomes in a nationally representative sample (Dietz, 2000). According to a parental investment perspective, additional income allows parents to have resources, such as material goods or access to services, which facilitate more optimal parenting behavior (Linver, Brooks-Gunn, & Kohen, 2002). In this manner, low levels of maternal income can instigate risk for parenting difficulties.

Low educational attainment. Research has found that low educational attainment exacerbates risk for poor parenting. The parenting literature has claimed that low maternal educational attainment affects family earnings and sometimes results in financial strain, hindering optimal parenting abilities (Jackson, Brooks-Gunn, Huang, & Glassman, 2000; Smith et al., 2001). The relationship of low educational attainment to

diminished income may result from lower-paying jobs, perhaps because of delays in skill acquisition (Simons, Beaman, Conger, & Chao, 1993). Mothers' diminished psychological well-being, such as experiencing depressive symptoms, has been additionally put forward as a mechanism through which low maternal educational attainment influences potentially harmful parenting behaviors (Jackson et al., 2000; Lipman, Boyle, Dooley, & Offord, 2002; Simons et al., 1993). Even outside of indirect influences, low maternal educational attainment has been shown to negatively affect parenting. For instance, Dietz (2000) illustrated that educational attainment predicted harsh parenting behavior. Parents with less than a high school degree used severe corporal punishment with their children more often than parents with higher educational attainment (Dietz, 2000). Another study echoed the relationship between educational attainment and parenting; results showed that parental educational attainment explained some of the variance in negative parenting beliefs (Turner & Johnson, 2003). Consequently, maternal parenting quality may be jeopardized by low educational attainment.

Single parenting. Family investigators have found that unmarried mothers are at-risk for trouble with parenting their children. Researchers have noted that both single-parent families and two-parent families possessed the characteristics that increased their chances of non-optimal parenting; however, unmarried families often had higher rates of those characteristics than married families (Lipman et al., 2002). For example, Aronson and Huston (2004) found differences between married mothers and single or cohabiting mothers on measures of maternal behavior and home environment. Married mothers displayed more positive parenting than either of the two unmarried groups; single

mothers and cohabiting mothers did not differ significantly from each other (Aronson & Huston, 2004). Another study showed that single mothers had more trouble than married mothers providing adequate supervision or monitoring for their infants since fewer adults were available to perform day-to-day tasks (Vandell, McCartney, Owen, & Booth, 2000). As a result, unmarried mothers may be more susceptible to deficiencies in parenting beliefs and behaviors.

Adolescent parenting. Detrimental patterns of parenting have frequently been linked to young maternal age at childbirth. For example, when comparing teenage mothers (under 19) to adult mothers (19 and over) on a range of parenting behaviors, adolescent mothers were judged as less supportive, more detached, more intrusive, and more negative or hostile towards their children (Berlin, Brady-Smith, & Brooks-Gunn, 2002). Whitman et al. (2001) have proposed a model of adolescent parenting where teenaged mothers' poor socioemotional adjustment in combination with a lack of social supports leads to decreased cognitive readiness to parent. In this model, maternal immaturity is a key contributor to parenting shortfalls (Whitman et al., 2001). Problematic parenting beliefs and practices in adolescents are a particular concern for practitioners because studies have found that adolescent mothers are more likely than adult mothers to have closely-spaced repeat births (Klerman, 2004). Hence, risk for poor maternal parenting was amplified once multiple children joined the family (Klerman, 2004). Adolescent parenting, therefore presents the possibility of enumerated parenting difficulties.

Minority race. Although some studies have identified race as a risk factor for non-optimal parenting (e.g. Johnson, Jaeger, Randolph, Cauce & Ward, 2003), other

researchers have maintained that effects in previous studies due to race were often confounded by socioeconomic status (Hill, Bush, & Roosa, 2003). For instance, a comparison study of lower income African-American mothers and lower income European-American mothers found that both groups reported similarly high stress levels (Middlemiss, 2003). Both groups of mothers were most likely to employ a communicative or directive parenting style, one that was neither authoritative nor authoritarian; mothers in both groups reported similar patterns of responses about their parenting behaviors (Middlemiss, 2003). Hill et al. (2003) similarly demonstrated that lower income Mexican-American mothers showed more similarities than differences to lower income European-American mothers on parenting behaviors such as consistency or control. In the same way, a study of parenting in Anglo-American, African-American and Latino-American families demonstrated that mothers with lower incomes in all ethnic groups rank-ordered parenting strategies like praise, reasoning, ignoring, or spanking in the same fashion (Medora, Wilson, & Larson, 2001). The participants in all three ethnic groups also scored similarly on a measure of child abuse potential and reported the same amount of parental satisfaction. Correspondingly, minority race did not appear to shape parenting as much as income or other risk factors (Medora et al., 2001).

Accumulating risk. Often, the aforementioned risk factors occurred in combination. For instance, Turley (2003) showed that adolescent mothers had lower average incomes, lower average educational attainment, and lower likelihood of married status than adult mothers. An additional study asserted that single mothers were more likely than married mothers to have educational attainments below high school completion, more likely to be poor, and more likely to be young (Cairney, Boyle, Offord,

& Racine, 2003). Meyers and Battistoni (2003) emphasized that parenting risk factors rarely appear in isolation; in their study of adolescent mothers, maternal risk characteristics accumulated to form problematic behavior patterns that were reflected in their parenting knowledge and skills. The most frequently mentioned risk factors for non-optimal parenting almost always appeared alongside at least one other risk factor; interventions for mothers, therefore, must address collective risk.

Domains of Parenting that are Problematic for At-Risk Mothers

Maternal control orientation. Mothers are in charge of creating the immediate environments of their infants; they determine the tone of interaction for the parent-child dyad. Increased risk can add to the likelihood of destructive parenting strategies such as using controlling parenting techniques. Mothers who are interested in their infants' well-being are involved and attentive; however, excessive concern or worry can lead to intrusive behaviors that interfere with or inhibit children's independent development (Pomerantz & Eaton, 2001). Intrusiveness, a form of psychological control, occurs when mothers manage children's behavior in a destructive fashion that prevents children from engaging in activities that could be beneficial to their development (Rubin, Burgess, & Hastings, 2002). Sometimes, maternal control is exhibited by restricting infant behaviors in ways such as frequently using "No!" or removing safe items from babies mouths (Kelley, Brownell, & Campbell, 2000). Ideologies that endorse control appear when parents are inflexible or rigid regarding their children's ordinary age-related actions. Even greater levels of control transpire when parents use physical punishment to direct their children's behaviors. For instance, mothers reported using corporal punishment when positive guidance techniques were unsuccessful in altering children's behaviors in

desired ways (Ispe & Halgunseth, 2004). In the most extreme instances, mothers became abusive towards babies in order to maintain control over children's behaviors, such as crying they perceived as excessive (Reijneveld, van der Wal, Brugman, Sing, & Verloove-Vanhorick, 2004). Controlling orientations depend upon parenting attitudes and knowledge that can be severely affected by maternal risk.

Maternal control orientation may increase in response to demographic risk factors. Because parental controlling impulses or behaviors result can stem from various sources, such as reactions to more dangerous environments, views of children as self-reflections, or frustrations with unsuccessful parenting strategies (Grolnick, Gurland, DeCoursey, & Jacob, 2002), demographic risks such as diminished income, low educational attainment, single parenting, or adolescent parenthood escalate potential for increased rigidity and inflexible maternal behaviors. Indeed, one study revealed that parents with more risk indicated higher levels of harsh parental discipline and more negative parental feelings than parents with lower risk (Asbury, Dunn, Pike & Plomin, 2003). Specifically, researchers have found that more negative parenting beliefs, greater stress, and harsher discipline were predicted by lower socioeconomic status. The model tested revealed that risk, represented in this instance as low income, negatively impacts parental perceptions of the child, leading to severe parenting approaches (Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000). In a similar manner, parents without a high school diploma reported using corporal punishment 1.5 times more often than those who had completed high school (Dietz, 2000). Accordingly, risk intensified maternal control orientation.

Maternal cognitive understanding. Mothers play a primary role in promoting the cognitive development of their children. Nevertheless, amplified risk can compromise maternal understanding of infants' cognitive needs. Exemplary cognitive understanding involves the consistent provision of developmentally appropriate learning opportunities (Bradley & Corwin, 2005) as well as the learning context to maximize those opportunities. Creating an immediate environment of frequent and rich language is one case of cognitive understanding. Another example of maternal cognitive understanding includes actively teaching and practicing skills with infants. Parents best increase their children's levels of cognitive development by using scaffolding behaviors in language and motor development to advance their infants' current abilities (Landry, Garner, Swank, & Baldwin, 1996). Scaffolding occurs when adults guide children in ways that promotes greater abilities than their current skill levels permit (Vygotsky, 1978). Optimal levels of cognitive understanding also involve displaying care for children's learning through empathic behaviors (Kiang, Moreno, & Robinson, 2004). Maternal empathic awareness for children's needs helps infants to increase their independence by validating their thoughts and ideas. Likewise, attitudes that parents are responsible for meeting infants' needs and not vice versa provides evidence of maternal cognitive understanding (Meyers & Battistoni, 2003). Thus, maternal understanding of infants' cognitive needs is imperative to facilitating learning.

Parental risk characteristics can impede the maternal promotion of children's cognitive development. For example, parents with low incomes may not be able to provide learning materials like developmentally-appropriate toys or books to support emerging language or motor abilities (Evans, 2004). Similarly, mothers with low incomes

spend less time than mothers with higher income levels using learning services like the library, and they spend more time with their children in non-interactive behaviors like watching television (Evans, 2004). In addition, parents with lower socioeconomic levels speak to their infants less often and for shorter durations than parents with higher socioeconomic levels (Evans, 2004), and mothers with lower incomes and more stresses read less to their children (Karrass, VanDeventer, & Braungart-Rieker, 2003). Analogous difficulties stimulating children's cognitive development occur for adolescent parents or parents with low educational attainment. For instance, young mothers who have not completed school or have immature cognitive development themselves may engage in fewer behaviors like reading to their infants or purposefully teaching infants age-appropriate skills (Whitman et al., 2001). As a matter of fact, adolescent mothers have been shown to vocalize less often and in a less sophisticated fashion, and mentor and rehearse new skills less often than adult mothers (Pomerleau, Scuccimarrì, & Malcuit, 2003; Ramey & Ramey, 1999). Adolescent mothers' own cognitive insufficiency may prohibit them from having appropriate developmental expectations of their children (Whitman et al., 2001), leading to less empathetic awareness of their children's demands and more inappropriate role reversal expectations. Actually, a study of at-risk maltreated children found that role reversal accommodation by the child was related to empathy for parental shortcomings (Macfie et al., 1999). Hence, risk factors acted as barriers for mothers' optimal understanding of their children's cognitive requirements and hindered favorable parenting.

Maternal emotional expression. Expressing positive emotion towards children is an important parenting responsibility of mothers. Maternal expression of emotion

encompasses both positive and negative dimensions; both forms of expressivity have been associated with child outcomes, such as self-regulation or emotional reactivity (Cumberland, Eisenberg, Champion, Gershoff, & Fabes, 2003; Eisenberg et al., 2003; Hertenstein & Campos, 2004; Liew et al., 2003). Added risk, however, can diminish the likelihood of consistently expressing maternal emotion in a favorable way. Emotional expression signifies the mother's feelings to the child. Displays of maternal positive affect, such as smiling or laughing, might indicate happiness or denote approval to babies. For instance, literature has shown that warm and sensitive interaction conveys concern and affection for infants (Bornstein & Tamis-Lemonda, 1997; Steelman, Assel, Swank, Smith, & Landry, 2002). Conversely, negativity, like critical comments, can imply displeasure to children. For instance, infants smiled more and bigger (cheek-raising smiles) when mothers were smiling than when they were not smiling, suggesting some reciprocal affect in the parent-child dyad (Messinger, Fogel, & Dickson, 2001). In addition, infants altered their smiling behavior with the changing nature of maternal vocalizations, signaling their understanding of mothers' emotional expressions (Messinger et al., 2001). Furthermore, even maternal states of general unhappiness can be interpreted by babies. Emotionality initiates the archetypes of subsequent mother-child interactions and provides a context for ensuing dyadic communication (Van Egeren, Barratt, & Roach, 2001). In other words, emotional expression affirms mothers' connections to their babies and signals maternal understanding and willingness to meet infant needs.

Mothers with high-risk status may struggle when it comes to engaging in positive forms of emotional expression. It is possible that mothers with low incomes, mothers

with low educational attainment, or mothers who are teenaged or single, may have high levels of stress and sometimes feel unhappiness or depression that shapes their parenting attitudes or behaviors (e.g. Aronson & Huston, 2004; Jackson et al., 2000; Simons et al., 1993). Correspondingly, mothers who do not feel good about themselves are less likely to demonstrate high levels of positive expressivity and low levels of negative expressivity on a consistent basis. For example, depressed mothers of young children expressed more criticism than non-depressed mothers (Rogosch, Cicchetti, & Toth, 2004). Risk characteristics may worsen the condition of maternal emotional expression. For instance, an interesting study of differential parental treatment among children in the same family revealed that socioeconomic status influenced parental positivity (Jenkins, Rabash, & O'Connor, 2003). Eisenberg et al. (2003) also found a positive correlation between socioeconomic status and positive expressivity; mothers with lower socioeconomic levels exhibited fewer instances of upbeat emotional expression than those with higher socioeconomic levels. Similar research has found that single parenthood increased displays of parental negativity (Jenkins et al., 2003). Because concerns and emotional states predict maternal expressions of positive emotion as well as expressions of negative emotion (Cumberland et al., 2003; Dix, Gershoff, Meunier, & Miller, 2004), the impact of maternal risk factors were particularly salient for mothers' overall emotional expression towards their children.

The Ideal Intervention: A Preventative, Intensive, and Comprehensive Program

The risk characteristics that endanger mothers' control orientation, cognitive understanding, and emotional expression require intervention; still, designing parenting programs for at-risk mothers necessitates careful planning. Previous research has shown

that parents with more risk are not likely to seek help with parenting (Keller & McDade, 2000). When help is available, however, high-risk parents often reap the greatest benefits from parenting intervention. For example, researchers found that all mothers in an early parent training program showed higher levels of supportive parenting, lower levels of harsh or negative parenting, and lower levels of inconsistent parenting than a comparison group. Remarkably, mothers with the most risk were the most engaged in the program and, in many cases, showed the greatest gains from the intervention (Baydar, Reid, & Webster-Stratton, 2003). Consequently, intervention programs must be outlined with at-risk mothers in mind. A good strategy for acknowledging risk characteristics is to create intervention curricula that is preventative, intensive, and comprehensive.

A preventative program. To maximize parental improvements, developmental psychologists have emphasized the value of timing interventions appropriately (Nation et al., 2003). For preventative interventions, appropriate means early in infants' lives, before mothers experience difficulty in the parenting domains of control orientation, cognitive understanding, and emotional expression. In other words, prevention efforts must strive to counteract risk before maladaptive patterns emerge. Illustrating the necessity of early intervention, Pridham, Schroeder, and Brown (1999) examined changes in mothers' internal working models of caregiving. They found that maternal adaptiveness was most affected by risk factors when infants were 8 months old. Interestingly, adaptiveness was highest at 4 months old and lowest at 8 months old, indicating that maternal parenting was malleable during this early time. Indeed, maternal responsiveness towards infants immediately after birth predicted mother-child relationship quality over the entire first year, implying that interventions must start early to prevent at-risk mothers from

developing unsatisfactory parenting patterns (Britton, Gronwaldt, & Britton, 2001). For that reason, the infant's first year of life may be a critical time to improve maternal parenting behaviors.

An intensive program. An ideal parenting intervention helps at-risk mothers improve both their parenting knowledge and their parenting skills by consciously concentrating attention on target domains. An intensive program, therefore, requires thorough and focused attention. In particular, intensive intervening efforts work hard to counteract potential parenting difficulties. Smokowski (1998) has emphasized that nurturing resilience in individuals with multiple risk factors works best when intervention strategies encourage positive change and promote patterns of adaptive functioning. Thus, an intensive program would vigorously direct its efforts toward reducing maternal control orientation, advancing maternal cognitive understanding, and enhancing maternal emotional expression.

A comprehensive program. Comprehensiveness is another critical feature of an effective intervention program. In the past, a combination of intervention tactics designed to address targeted problems made for better programs (Nation et al., 2003). In fact, the most successful early intervention programs, like the Perry Preschool Project or the Abecedarian Project, have incorporated numerous strategies into their curriculum in order to meet multifaceted goals (e.g. Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). Similar intervention effectiveness has been shown in more recent interventions that adopted a thorough, multicomponent nature (Peterson, Tremblay, Ewigman, & Saldana, 2003). The curriculum content, specifically, is what has been closely related to parenting outcomes (Mann, Pearl, & Behle, 2004). Guralnick (1998) explained that at-

risk families with young children need supports in many areas to counteract the impact that stressors are having on the family system. Therefore, comprehensive intervention curricula must consist of multiple intervention components intended to develop optimal parenting while thwarting risk.

Components of an Ideal Intervention

The specific components included in an intervention are the keys to making a program successful. The composite of components in the present study is a grouping of joint-attention treatment training, developmental knowledge training, and loving touch training. Joint attention training unites direct teaching of target skills, frequent practice of newly-learned skills, and video feedback to help mothers learn to interact appropriately and responsively with their infants. Mothers learn in joint-attention training how to focus their energy on their babies' needs while simultaneously developing infants' attention. At the same time, developmental knowledge training educates mothers about appropriate expectations and developmental milestones using relevant literature and interactive discussion. During infa, mothers become skilled at interrelating with their children in a warm and loving manner. The loving touch training relies on direct teaching and repeated practice to help mothers acquire developmentally appropriate techniques to bond with and comfort their infants through infant massage. The inclusion of all three types of training represents an example of an intervention that is preventative, intensive, and comprehensive. In this rigorous curriculum, multifaceted approaches enhance maternal knowledge and skills in numerous areas of parenting before any deficits in parenting materialize.

Joint-attention treatment training. An especially effective intervention program, PALS I (Playing and Learning Strategies I) joint-attention treatment training, has been shown to enhance the maternal parenting skills that have subsequently translated into better infant development (Landry, Smith, & Swank, in press). A recent investigation found that when infants were 12 months old, mothers in the PALS I condition displayed more responsive behaviors than those in a comparison condition. In addition, the intervention condition had greater increases in rates of positive change than the comparison condition (Landry et al., in press). Upon closer examination of patterns of maternal responsiveness, Guttentag, Pedrosa-Josie, Landry, Smith, and Swank (2004) also found that the PALS I program changed profiles of parenting skills. In relation to pre-intervention profile classifications, mothers in the treatment condition usually shifted to a higher-skill profile group or remained in the same high-skill profile group post-intervention. Mothers in the comparison condition, on the other hand, generally shifted to a lower-skill profile group or remained in a low-skill profile group post-intervention (Guttentag et al., 2004). Mothers who received joint-attention treatment training further showed consistent gains over time in their positive parenting behaviors regardless of their levels of internal or external resources (Smith, Landry, & Swank, in press). In contrast, mothers in the control condition who had fewer internal or external resources displayed lower levels of verbal scaffolding, infant attention maintenance, and contingent responsiveness as well as higher levels of physical intrusiveness when infants were 12 months old than the control mothers with more internal or external resources. As a result, not only was joint-attention treatment training effective, but it also buffered some potentially negative effects due to low maternal resources (Smith et al., in press).

Developmental knowledge training. Teaching parents about their children's development has also been a successful way to increase parental knowledge and to improve child development. Along this line, Hess, Teti, and Hussey-Gardner (2004) showed that knowledge of infant development interacted with maternal self-efficacy to predict parenting competence. Most importantly, mothers with low knowledge but high self-efficacy demonstrated the least optimal parenting behaviors (Hess et al., 2004). Maternal understanding of and expectations about children's developmental trajectories compose a large part of intentional and unintentional decision-making; however, mothers with risk characteristics may have limited knowledge or unrealistic developmental expectations for their infants. Especially when mothers are confident about their possibly faulty knowledge, undesired parenting actions can occur (Hess et al., 2004). Surveyed parents identified other parents, parenting books, and their own experiences as the sources of information they used most frequently to gain developmental knowledge. Participants in the study indicated that age-appropriate disciplinary responses and expected child development and behaviors were the most important topics that parents should be educated about; they identified literature as the best way for them to receive parenting information (Ateah, 2003). Consequently, distributing and discussing literature about child development may positively impact parenting behaviors, especially when risk characteristics have compromised the information coming from other sources.

Loving touch training. Although joint-attention treatment training has impacted maternal skills, and developmental knowledge training has improved maternal knowledge, loving touch training has affected both skills and knowledge for mothers. Tiffany Field has been instrumental in providing the field with empirical evidence of the

benefits of touch for infants, such as stimulation, relaxation, better digestion, and increased weight gain; results of her studies with high-risk participants have shown that infant massage also improved parent-child interactions (Field, 2000). Loving touch training requires parents to acquire skills that help them to massage their baby appropriately. Acceptable infant touch procedures necessitate mothers' knowledge of and suitable responses to their babies' signals. Mothers engaging in infant massage learn how to behave warmly and express positive emotion towards their infants through touch (Onozawa, Glover, Adams, Modi, Kumar, 2001). Accordingly, uniting loving touch training with joint-treatment training and developmental knowledge training creates an intervention package of already-tested components specifically intended to improve the knowledge and skills of at-risk mothers.

The Present Study

The present study aimed to improve the parenting behaviors of at-risk mothers using a preventative intervention that was also both intensive and comprehensive. An appropriate curriculum was designed for mothers with a combination of risk characteristics, such as low income, low educational attainment, and single or adolescent parenthood, using multiple intervention components including joint-attention treatment training, developmental knowledge training, and loving touch training. Mothers in the treatment condition received an intensive intervention program with all three components in their homes, while a control condition received only minimal supports. The intervention attempted to improve parenting during the first year of children's lives by modifying maternal control orientations, facilitating an understanding of infants' cognitive needs, and enriching emotional expression towards infants. In short, the project

examined the short-term impact of an early, broad, and thorough program on changing the parenting knowledge and skills of high-risk mothers.

METHOD

Participants

A sample of 63 mother-infant dyads was enrolled at one of three sites: Houston, Texas; Kansas City, Kansas; or South Bend, Indiana. The participants were recruited from local clinics, hospitals, and social service agencies. Criteria for dyad participation were low maternal education (no high school diploma at the time of enrollment) or low family income (WIC or TANF eligible at the time of enrollment). Dyads began the study when infants were between 3.5 and 5.5 months old ($M = 4.4$ months) and participated for about four months. Full-term infants and pre-term infants who were born less than eight weeks early and weighed more than 1500 grams at birth were eligible for study participation, although full-term or pre-term infants with severe medical problems were excluded.

Although 63 participants completed a pre-intervention assessment, only 48 mothers remained in the final sample due to the deletion of individual cases with no available post-assessment data. More attrition occurred at the Kansas site ($n = 7$) than at the Notre Dame ($n = 4$) or Houston sites ($n = 4$). The participants who did not complete a post-intervention interview ($n = 15$) differed slightly from participants who did complete a post-intervention interview ($n = 48$). For example, anxiety related to involvement in the project may have contributed to attrition rates; dropout participants had higher symptom levels of anxiety, $F(13, 49) = 2.27, p = .019$, and phobic anxiety, $F(15, 47) = 2.14, p =$

.024, than participants who remained in the study. Attrition also may have been due to time conflicts; participants who dropped out were more likely to be currently enrolled in school (46.7%) or working (33.3%) than participants who completed the post-assessment and remained in the final sample (27.1% and 27.1%, respectively). Mothers who could not be found for the post-intervention assessment were likely to be teenagers (53% of dropouts were 15-18 years old). All dropout participants were single or lived with their partner, while about one-third of the participants who remained in the study were married (25.0%) or divorced (10.4%). Mothers who failed to complete the post-intervention interview were no more likely to drink or use drugs than mothers who remained in the final analyses. Furthermore, no families who dropped out of the study were involved with child protective agencies or received early childhood intervention. Additionally, there were no apparent differences between groups for number of children or the target child's place in birth order.

In the final sample ($N = 48$), mothers between 15 and 38 years old were stratified by age at the pre-assessment interview with participants between 15 and 18 years classified as teens and those between 19 and 38 years classified as adults. Teen mothers ($n = 5$) were on average 16.0 years old ($SD = .71$), and adult mothers ($n = 43$) were on average 23.6 years old ($SD = 5.3$). Infants' biological fathers were, on average, about three and a half years older than mothers with average ages of 18.2 ($SD = 2.6$) and 27.2 ($SD = 6.9$) for each group; however, mothers were generally not married to fathers (only 25.0% of mothers were married to anyone). The racial make-up of mothers was 39.6% African-American, 33.3% European-American, 25.0% Latina, and 2.1% Other (multi-racial). The racial composition of all fathers was similar to the composition of mothers,

although mothers and fathers of the same baby were sometimes different races. Most mothers (72.9 %) were not working at the time of the pre-assessment interview; however, mothers reported that over half of biological fathers (58.3%) were working. Most working fathers (82.1%) had full time employment of more than 30 hours a week. About one third of all mothers (27.1%) were currently attending school.

Design

Treatment and control dyads completed the same battery of measures in their homes. Participants in both groups completed a pre-intervention assessment battery, including self-report and observational measures of mothers and infants. About two weeks after the pre-assessment, the treatment condition began 12-14 weeks of direct intervention, while the control condition received only enabling supports for 12-14 weeks. Subsequently, both treatment and control participants completed a post-intervention assessment battery, also in their homes. Participants were assessed during the pre-intervention and post-intervention assessments with measures exploring three different domains of maternal parenting toward the target child: (1) *maternal control orientation*, (2) *maternal cognitive understanding*, and (3) *maternal emotional expression*. Subscales from the self-report and observational measures of participants were included in each domain of maternal parenting and can be seen in Table 1.

Procedure

Mother-infant dyads were randomly assigned to either a direct intervention treatment group ($n = 23$) or a minimal intervention control group ($n = 25$) using a

TABLE 1

DOMAINS OF MATERNAL PARENTING BEHAVIORS AND RELATED
VARIABLES

Maternal Control Orientation

Rigidity subscale - Child Abuse Potential Inventory

Belief in the Value of Corporal Punishment subscale – Adult-Adolescent Parenting Inventory

Flexibility and Responsiveness subscale – Mother-Infant Observation

Restrictions subscale – Mother-Infant Observation

Physical Intrusiveness subscale – Mother-Infant Observation

Maternal Cognitive Understanding

Verbal Quality subscale – Mother-Infant Observation

Demonstrating and Physical Teaching subscale – Mother-Infant Observation

Parent-Child Role Reversal subscale – Adult-Adolescent Parenting Inventory

Empathetic Awareness subscale – Adult-Adolescent Parenting Inventory

Maternal Emotional Expression

Warmth subscale – Mother-Infant Observation

Positive Affect subscale – Mother-Infant Observation

Negativity subscale – Mother-Infant Observation

Unhappiness subscale - Child Abuse Potential Inventory

matched blocking procedure (Matthews, 2000). In this procedure, pairs of participant dyads were first matched on maternal age classification (teen or adult). Next, one member of the pair was randomly assigned to either the treatment condition or the control condition. The remaining member of the pair was subsequently assigned to the other condition. In cases where an enrolled dyad did not complete the pre-assessment, the next participant dyad who matched the maternal age classification was used as a replacement. Thus, mothers were assigned to conditions in very small waves for this quasi-experimental design.

Control condition. Mothers in minimal intervention control dyads received “enabling supports” that included parenting literature and community referrals. First, interviewers gave mothers assigned to the control condition a *Take Time for Kids* [TTFK] booklet set, including one booklet for each month of the child’s first year of life. This set of 12 booklets was designed by the state of Texas to promote healthy parenting practices and to increase parental knowledge about child development (Texas Department of Health, 2000). Second, control group participants received referrals to local assistance programs (such as affordable child care, GED training programs, or treatment facilities) based on wished-for services identified during the pre-assessment and post-assessment interviews.

Treatment condition. Mothers in the direct intervention treatment condition received approximately 12 weeks of parent training in addition to the two types of enabling supports presented to mothers in the control condition. Together with parenting literature and community referrals, participants in the treatment condition were administered a comprehensive intervention that attempted to enhance parenting skills

using joint-attention treatment training, developmental knowledge training, and loving touch training.

Trained parent facilitators instructed mothers in Playing And Learning Strategies I [PALS I] joint-attention treatment training for infants (Landry, Smith, Glenn, & Vellet, 2002). The PALS I curriculum consisted of 10 home visits with mother-infant dyads, including 2 visits that invited an alternate child caregiver, chosen by mothers, to participate. In addition to the 10 PALS I sessions, the treatment group received 2 supplementary sessions based on two of the *TTFK* booklets (the 6-month booklet and the 8-month booklet). The additional visits were designed to increase maternal knowledge about infant development and promote positive parenting practices. Loving touch training was also added to 2 of the existing sessions (Sessions 5 and 6) for treatment participants. The touch extension was an adaptation of infant massage with simple strokes, and it encouraged mothers to interact and communicate with their infants in a close and caring way without becoming too intrusive.

Each home visit lasted about an hour and a half with parent facilitators following the same session protocol to train each dyad. The protocol included a complete script to ensure analogous treatment administration across sites and interviewers. The protocol remained consistent and was repeated for each intervention session: (1) The parent facilitator initially asked the mother whether she had practiced the previous week's concepts. The mother then demonstrated mastery of the previous session's skills through practice and discussion of earlier topics. (2) Following the review, the facilitator focused on the current session's topic. At this time, the facilitator and the mother watched an interactive video illustrating the topic, and the mother became involved in a guided

discussion about video clips demonstrating target skills. (3) After watching the videotape, the mother attempted the target skills with her baby. During this practice time, the facilitator videotaped the dyad while simultaneously coaching the mother by offering encouragement and helpful suggestions. (4) Immediately afterward, the facilitator and the mother watched the videotape together; the mother critiqued herself on the target skills by identifying her own strengths and weaknesses while the facilitator continued coaching by providing feedback and suggestions. (5) At the end of the session, the facilitator selected a few skills for the dyad to practice over the next week, and the mother identified specific times that she would work on these skills with her infant. The entire protocol was repeated for each intervention session. The knowledge and skills addressed in the 12 direct intervention treatment sessions are as follows:

Session 1: The Introductory session (a) acquainted families with PALS I concepts and procedures, (b) established facilitator rapport with participants, and (c) individualized future sessions to incorporate mothers' goals. During this visit, mothers completed semi-structured interviews about families' everyday routines, mothers' general beliefs on childrearing including current discipline practices, mothers' interpretations of children's behaviors, and mothers' goals for their infants' futures.

Session 2: The Positive and Negative Signals session (a) helped mothers identify target infants' social and distress cues, (b) assisted mothers in correctly interpreting babies' cues as positive or negative, and (c) encouraged mothers to acknowledge infant cues as a form of communication.

Session 3: The Linking and Sensitivity Behaviors session (a) connected mothers' responses to correctly recognized infant cues, (b) taught mothers to act quickly and

appropriately when responding to infant signals, and (c) demonstrated ways for mothers to incorporate sensitivity behaviors such as positioning or pacing into their parenting practices.

Session 4: The first *Review* session (a) reinforced mothers' assimilation of previously taught topics, (b) increased mothers' confidence in new parenting skills by placing mothers in an expert role, (c) enlarged mothers' support network for new parenting practices in their natural environments, and (d) created an opportunity for facilitators to evaluate mothers' understanding of preceding topics. During this visit, mothers led the session by teaching an alternate caregiver the concepts she learned in Sessions 1-3 using the same protocol as the prior visits. While mothers explained the previously-discussed ideas to alternate caregivers, the parent facilitators assessed the mothers' understanding of the concepts and offered complementary feedback. If mothers were unable to demonstrate baseline mastery on any of the topics from the previous three sessions, an extra session repeating the earlier topic was inserted into the curriculum after Session 4 and before Session 5.

Session 5: The *6-month TTFK and Loving Touch* session (a) educated mothers about infants' developmental milestones, (b) developed mothers' age-appropriate parenting behaviors in the areas of eating, sleeping and safety, and (c) introduced loving touch training to dyads in order to demonstrate appropriate ways for mothers to touch babies.

Session 6: The *Maintaining and Redirecting* session (a) showed mothers strategies to maintain infants' interests on a single object or activity, (b) promoted child-centered learning by discouraging mothers' redirection of babies' behaviors, and (c) monitored and extended mothers' progress in loving touch training.

Session 7: The Introducing Something New session (a) clarified favorable times for mothers to introduce a new toy or activity to infants, (b) reminded mothers to use their sensitivity behaviors, such as tone of voice or hand-over-hand instruction, to introduce something new in an optimal way, and (c) instructed mothers on ways to maintain babies' attention on newly introduced objects or activities.

Session 8: The Words and Actions session (a) advanced mothers' use of language to introduce activities and maintain babies' attention and (b) strengthened mothers' use of corresponding actions to infants' signals while introducing and maintaining.

Session 9: The 8-month TTFK session (a) developed mothers' recognition of children's changing developmental milestones, (b) helped mothers cope with baby stranger anxiety, (c) encouraged mothers to read to infants, and (d) offered mothers developmentally-appropriate play time ideas.

Session 10: The second Review session echoed the objectives presented in Session 4, but mothers revisited Sessions 5-9 rather than Sessions 1-3. Again, an extra session was added after Session 10 and before Session 11 if mothers did not meet a baseline level of concept mastery.

Session 11: The Generalization session (a) integrated mothers' newly acquired parenting behaviors into everyday activities such as feeding, bathing, and dressing, (b) reviewed topics covered in previous sessions, and (c) reinforced mothers' positive habits by incorporating new parenting skills into families' daily schedules.

Session 12: The Final Review session (a) reiterated all of the key parenting skills discussed in Sessions 1-11 and (b) gave mothers a final opportunity to demonstrate and practice those skills.

Compensation. Participants in both the treatment condition and the control condition were compensated for their time. All mothers received a \$30 Walmart gift certificate upon completion of the pre-intervention interview and a \$50 gift certificate upon completion of the post-intervention interview; treatment condition participants received an additional \$40 gift certificate following Session 5 due to the intensive nature of the direct intervention. Treatment group infants were also given two small toys (a stuffed animal and a rattle) at the first home visit in order to make age-appropriate toys readily available in the home for practices. Additionally, facilitators presented mothers in the treatment condition with handouts and magnets reminding them of session goals following each direct intervention home visit.

Measures

Measures of maternal characteristics. To determine maternal intelligence levels, participants completed the *vocabulary* subtest of the Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999), a modified brief version of the Wechsler Adult Intelligence Scale – Third Edition (Wechsler, 1991) and the Wechsler Intelligence Scale for Children – Third Edition (Wechsler, 1991). The *vocabulary* subtest was intended to gauge crystallized and general intelligence in addition to other cognitive abilities (Wechsler, 1999). The newer abbreviated measure was selected for its reasonably short administration time and its pertinence to both adults and adolescents, offering measurement consistency across groups. Reliability coefficients for the *vocabulary* subtest varied between .90 and .98 for adults and ranged between .86 and .93 for children. Likewise, test-retest stability was also reasonably high with coefficients between .79 and .90 for adults and between .77 and .86 for children. The *vocabulary* subtest was

correlated with the more comprehensive Wechsler Adult Intelligence Scale – Third Edition and the Wechsler Intelligence Scale for Children – Third Edition ($r = .88$ and $r = .72$, respectively), indicating some validity beyond that of the full-scale IQ scores from the complete battery (Wechsler, 1999).

Mothers also revealed their levels of psychological distress using the Symptom Checklist – 90 - Revised (Derogatis, 1994) at the pre-assessment interview. The self-report checklist identified symptoms of personality disturbance on nine dimensions: *somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism*. Participants indicated the extent to which each of 90 problems had bothered them in the preceding week by rating each item on a 0-4 scale ranging from “Not at all” to “Extremely.” An example symptom on the *anxiety* dimension was “Spells of terror or panic,” and an example problem on the *depression* dimension was “Crying Easily.” Internal reliability coefficients for the nine dimensions ranged from .77 to .90. Test-retest coefficients were also generally high, although some discrepancies existed across studies of different samples. Factorial invariance for the nine dimensions was shown, and convergent-discrimination validity studies also found reasonable correlations between each dimension and related individual measures (Derogatis, 1994). Subscales from the Symptom Checklist – 90 – Revised were included in the study to statistically account for any extreme levels of psychological symptomatology.

Measures of maternal control orientation. Maternal tendency to exert control over target infants was appraised using five indicators: *rigidity, belief in the value of corporal punishment, flexibility and responsiveness, restrictions, and physical intrusiveness*. First,

mothers marked “agree” or “disagree” to a series of statements like “Children should never cause trouble” or “Everything in a home should always be in its place” on the *rigidity* subscale of the Child Abuse Potential Inventory– Second Edition (Milner, 1980). Higher scores on the *rigidity* subscale signified strict attitudes towards the appropriateness of children’s appearance and behavior reflected in mothers’ parenting styles. Elevated rigidity scores (over 30) denoted a strong, authoritarian parenting style that utilized direct efforts to place children in predefined molds (Milner, 1990). Mothers additionally expressed their parental attitudes, expectations, and behaviors towards children on the Adult-Adolescent Parenting Inventory – Second Edition (Bavolek & Keene, 2001). This questionnaire presented items on a 5-point scale ranging from “strongly agree” to “strongly disagree.” On the *belief in the value of corporal punishment* subscale, participants depicted their attitudes about punitive practices by rating items like “Spanking teaches children right from wrong” (Bavolek & Keene, 2001). Mothers with higher scores endorsed the use of disciplinary tactics that were non-violent and generally supported spanking alternatives. Additional appraisals of maternal control orientation came from an adaptation of a naturalistic in-home observational measure called the Mother-Infant Observation (Landry, Smith, Miller-Loncar, & Swank, 1998). On each subscale, parenting behavior was scored from 1 to 5, with a score of 1 indicating problematic parenting behavior and 5 indicating near-optimal parenting behavior. To assess maternal control orientation, the *flexibility and responsiveness* subscale evaluated behaviors such as responses to infant initiation, patience, and mother versus child agenda. The *restrictions* subscale further recorded the number of times that mothers verbally or physically limited their infants by using behaviors like saying “no” or removing toys.

Finally, the *physical intrusiveness* subscale illustrated maternal control orientation by noting behaviors such as abrupt repositioning, redirecting, or other disruptive interference with babies (Steelman et al., 2002).

Measures of maternal cognitive understanding. Four indicators were used to assess maternal understanding of target infants' cognitive needs: *verbal quality*, *demonstrating and physical teaching*, *parent-child role reversal*, and *empathetic awareness*. The *verbal quality* subscale of the aforementioned Mother-Infant Observation used a frequency count of mothers' verbalizations that were considered to scaffold children's language development. Scaffolding verbalizations encompassed 16 categories of maternal language use that have been shown to increase children's zones of proximal development by improving joint attention and shared engagement (Landry et al., in press). Maternal cognitive understanding was also evaluated with the *demonstrating and physical teaching* subscale of the Mother-Infant Observation. The scale scored parenting behaviors that facilitated child learning, such as interactive demonstration or hand-over-hand guidance. Beyond the Mother-Infant Observation, mothers rated items like "Children who feel secure often grow up expecting too much" on the *empathetic awareness* subscale of the Adult-Adolescent Parenting Inventory, which revealed parental awareness and prioritization of children's needs. Higher scores on this subscale signified that mothers valued children's age-appropriate demands and used age-appropriate strategies to attend to those demands. Participants also completed the *parent-child role reversal* subscale on the Adult-Adolescent Parenting Inventory to demonstrate cognitive understanding; the subscale revealed mothers' tendencies to formulate expectations of target infants as responsible for parental happiness with items such as

“Parents should be able to confide in their children.” In this case, higher scores suggested that mothers realized that their responsibility was to nurture the needs of the child and not vice versa. Accordingly, mothers who scored higher were more likely to place children’s needs above their own.

Measures of maternal emotional expression. Maternal Emotional Expression directed toward target infants was also measured with four indicators: *warmth*, *positive affect*, *negativity*, and *unhappiness*. Specifically, assessors rated maternal behaviors on the *warmth* subscale of the Mother-Infant Observation. This subscale gauged indications of optimal emotional expression, such as engagement, encouragement, or acceptance of target children. Similarly, maternal behaviors such as full-faced smiles or laughs directed at target children on the *positive affect* subscale showed desirable emotional expression, while behaviors like indicators of impatience, taunting, or angry tone directed at target children on the *negativity* subscale depicted unpleasant emotional expression. Emotional expression was also measured with the *unhappiness* subscale of the Child Abuse Potential Inventory; mothers revealed their agreement or disagreement with items such as “Things have usually gone against me in life.” Higher scores on the *unhappiness* subscale reflected general life dissatisfaction and interpersonal difficulties. Elevated scores (scores over 23) suggested an overall negative attitude and troubles with interpersonal relationships that could translate into problematic parenting expression of emotions (Milner, 1990).

RESULTS

Descriptive Analyses

To determine broad levels of maternal functioning, mothers' intellectual functioning (measured by vocabulary), psychological distress, and substance abuse were explored. Table 2 depicts the means and standard deviations for the vocabulary and symptom distress subscales. The sample was first analyzed in terms of their vocabulary scores from the pre-intervention interview. Overall, participants had very low vocabulary scores, with a mean score approximately one and a half standard deviations below the standardized norm of 50 (Wechsler, 1999). The low educational levels of participants likely contributed to poor vocabulary performance. About three fifths of participants (60.4%) had vocabulary scores at least one standard deviation below their age-related norm; no participants had scores at least one standard deviation above the norm (range = 20 - 59). Mean vocabulary scores and percentages of low scores were roughly the same for treatment and control conditions, and mirrored those of the overall sample closely. Due to consistently low vocabulary performance, vocabulary was not included as a covariate in subsequent analyses.

Next, levels of psychological distress were investigated along nine dimensions of symptomatology. In general, mothers reported low levels of problems; means for both conditions and the total sample (seen in Table 2) fell within the normal ranges for both adult and adolescent nonpatients on all nine dimensions (Derogatis, 1994). About one

TABLE 2

MEANS AND STANDARD DEVIATIONS FOR WASI AND SCL-90-R SUBSCALES

	Treatment Condition (<i>n</i> = 23)		Control Condition (<i>n</i> = 25)		Total (<i>N</i> = 48)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Vocabulary	37.65	11.54	34.96	10.03	36.25	10.75
Somatization	.67	.68	.55	.44	.61	.57
Obsessive-Compulsive	.82	.79	.71	.66	.76	.72
Interpersonal Sensitivity	.49	.45	.47	.50	.48	.48
Depression	.59	.51	.51	.46	.55	.48
Anxiety	.31	.50	.22	.30	.26	.41
Hostility	.36	.40	.64	.77	.50	.63
Phobic Anxiety	.26	.48	.14	.28	.20	.39
Paranoid Ideation	.65	.69	.75	.68	.70	.68
Psychoticism	.31	.58	.25	.41	.28	.50

fifth of participants had high scores more than one standard deviation above their age-related standardized norm for the obsessive-compulsive dimension (22.9%) and the paranoid ideation dimension (20.8%). Some participants also had high scores on the psychoticism dimension (16.7%), the interpersonal sensitivity dimension (14.6%), the hostility dimension (14.6%), the somatization dimension (12.5%), and the depression dimension (12.5%). Only a few participants had high scores on the anxiety dimension (6.3%) or the phobic anxiety dimension (6.3%), perhaps due to self-selection previously discussed. Most participants had no scales with high scores (66.7%), the remaining third of mothers accounted for high scores on between one and nine dimensions. Only one mother attained elevated scores on all dimensions; the participant did not produce significant outliers on any subsequent dependent variables. There were no significant differences between treatment and control conditions for scores on any single dimension. Accordingly, no subscales were included as covariates for the following analyses.

For the most part, mothers in the study also had low levels of substance use. Less than half (43.8%) had drunk an alcoholic beverage in the preceding six months, and of these participants, 84.2% had fewer than two drinks. Alcohol drinkers were most likely to be European-American (47.6%). Smaller numbers of mothers who drank alcohol were in the treatment condition ($n = 8$) than in the control condition ($n = 13$). Even fewer participants (14.6%) had used drugs in the preceding six months. Of these mothers, 71.4% used drugs less than once per month. All of the participants who used drugs were adults (over 18 years old), and 71.4% were European-American. Of drug using mothers, there was one less participant in the treatment condition ($n = 3$) than in the control condition ($n = 4$). In addition, about one fourth of the sample (25.0%) reported that they

currently smoked cigarettes. Most participants (81.8%) smoked a half pack (10 cigarettes) or less a day. Again, there were half as many mothers in the treatment condition ($n = 4$) than in the control condition ($n = 8$). Smokers were equally as likely to be European-American as African-American (41.7% and 41.7%, respectively), but they were less likely to be Latina (16.7%). Treatment condition was not significantly correlated with alcohol use, drug use, or cigarette use, and therefore, these items were not included as covariates in subsequent analyses.

Main Analyses

A series of multivariate analyses of covariance [MANCOVAs] were performed to illustrate differences between mothers in the control condition and mothers in the treatment condition on the three domains of maternal parenting behaviors related to target infants: *control orientation*, *cognitive understanding*, and *emotional expression*. Missing data for the final sample of 48 participants was handled in two ways, by using averages and mean substitution. For dependent variables where subscale variables were composed of item-level averages, the available items were averaged; if no items scores were available, mean substitution was used at the subscale level. Mean substitution at the subscale level was also used for all remaining variables in no more than 5 instances for any single variable.

Maternal control orientation. A between-subjects MANCOVA was performed on a linear combination of five dependent variables to investigate the impact of the intervention on maternal orientation towards controlling target children. Dependent variables included post-intervention measurements of maternal rigidity, maternal belief in the value of corporal punishment, maternal flexibility and responsiveness with the target

child, maternal restrictions of the target child's behavior, and maternal physical intrusiveness level. The corresponding pre-intervention assessment scores were included as covariates to reduce error variance. Results, using Wilks' criterion, showed that condition was significantly associated with the linear combination of dependent variables, $F(5, 37) = 3.64, p = .009$. In this case, mothers who received the intensive, preventative, and comprehensive intervention in the treatment condition used less controlling behaviors toward their infants than mothers in the minimal intervention control condition.

Further examination of maternal control orientation entailed running univariate analyses of covariance [ANCOVAs] for each dependent variable in the domain, and three effects were found. Means and standard deviations are presented in Table 3. A main effect of condition on rigidity, $F(1, 41) = 11.49, p = .002$, showed that mothers in the treatment condition were less strict about preset ideas of children's behavior and appearance following the intervention than mothers in the control condition. The proportion of variance effect sizes (η^2) and corresponding recommendations based on Cohen's guidelines were calculated (Olejnik & Algina, 2000). Dunlap, Cortina, Vaslow, and Burke (1996) have emphasized the importance of correcting for correlated variables (such as a pretest and a posttest); thus, both adjusted and unadjusted confidence intervals for the mean differences as well as effect sizes are presented in Table 4. The effect on rigidity, accounting for covariates, was small-medium, accounting for roughly one quarter of the variance. There was also a main effect of condition on maternal flexibility and responsiveness, $F(1, 41) = 6.90, p = .012$. In this case, mothers in the treatment condition were judged as more adaptable and accommodating toward their infants than

TABLE 3

MEANS AND STANDARD DEVIATIONS FOR DEPENDENT VARIABLES IN
 MATERNAL CONTROL ORIENTATION, MATERNAL COGNITIVE
 UNDERSTANDING, AND MATERNAL EMOTIONAL EXPRESSION

	Treatment Condition (<i>n</i> = 23)		Control Condition (<i>n</i> = 25)		Total (<i>N</i> = 48)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Rigidity**	11.65	12.55	21.80	16.42	16.94	15.41
Corp. Punish.	5.83	2.08	4.84	1.99	5.31	2.08
Flexibility*	3.16	1.16	2.62	1.02	2.88	1.11
Restrictions	2.85	2.40	2.34	1.64	2.59	2.04
Intrusiveness*	3.97	.96	3.33	1.24	3.64	1.15
Verbal Quality*	2.44	1.75	1.65	2.04	2.03	1.93
Demonstrating*	2.65	1.04	2.16	1.03	2.40	1.05
Role Reversal*	5.60	1.99	4.48	2.31	5.02	2.22
Empathetic Aware.	5.60	2.25	4.72	2.48	5.15	2.39
Warmth	3.44	1.33	2.93	1.20	3.17	1.28
Positive Affect	3.45	1.29	3.22	1.28	3.33	1.28
Negativity	4.36	.90	4.37	.85	4.37	.86
Unhappiness	14.87	11.14	12.96	12.88	13.88	11.99

Note: **p* < .05; ** *p* < .01

TABLE 4

CONFIDENCE INTERVALS FOR MEAN DIFFERENCES AND EFFECT SIZES FOR
 UNIVARIATE ANALYSES IN MATERNAL CONTROL ORIENTATION,
 MATERNAL COGNITIVE UNDERSTANDING, AND MATERNAL EMOTIONAL
 EXPRESSION

	Adjusted for Covariates				Unadjusted for Covariates			
	95% CI lower	95% CI upper	η^2	effect size	95% CI lower	95% CI upper	η^2	effect size
Rigidity	-14.53	-3.68	.27	large	-18.76	-1.60	.11	med.-large
Corp. Punish.	-.36	1.52	.04	small-med.	.20	1.17	.06	medium
Flexibility	.13	1.01	.14	large	-.09	1.17	.06	medium
Restrictions	-.47	1.87	.03	small-med.	-.68	1.70	.02	small
Intrusiveness	.00	1.22	.09	med.-large	-.01	1.29	.08	medium
Verbal Qual.	.07	2.20	.10	med.-large	-.32	1.90	.04	small-med.
Demonstrating	.18	1.33	.14	large	-.11	1.09	.06	medium
Role Reversal	.27	2.12	.14	large	-.13	2.39	.07	medium
Emp. Aware.	-.22	2.30	.02	medium	-.49	2.27	.04	small-med.
Warmth	-.36	.77	.01	small	-.23	1.24	.04	small-med.
Pos. Affect	-.56	.69	.00	none	-.52	.97	.01	small
Negativity	-.56	.41	.00	none	-.52	.50	.00	none
Unhappiness	-6.10	7.69	.00	none	-5.12	8.94	.01	very small

mothers in the control condition, with a large treatment effect. Treatment mothers were also evaluated as less invasive and disruptive than control mothers, demonstrating a significant main effect of condition on physical intrusiveness, $F(1, 41) = 4.08, p = .050$, with a medium-large treatment effect. No main effects of condition on maternal belief in the value of corporal punishment or maternal restrictions were found, although effect sizes of both were in the small-medium range, indicating trends in the expected directions.

Maternal cognitive understanding. Differences between treatment conditions were additionally found when a between-subjects MANCOVA was performed on a linear combination of four dependent variables representing maternal understanding of target infants' cognitive needs: maternal verbal quality directed toward the target child, maternal demonstration and physical teaching behaviors directed toward the target child, maternal levels of parent-child role reversal, and maternal empathic awareness of the target child's needs. Again, corresponding pre-intervention variables served as covariates. With the use of Wilks' criterion, treatment condition was significantly associated with the linear combination of dependent variables, $F(4, 39) = 2.89, p = .035$. Hence, mothers in the treatment condition showed greater understanding of their infants' cognitive needs following the direct intervention than mothers in the control condition.

Follow-up ANCOVAs were then performed on each dependent variable in the cognitive understanding domain. Three significant effects emerged. First, the analyses revealed a significant main effect of condition on verbal quality, $F(1, 42) = 4.60, p = .038$, showing that mothers in the treatment condition used verbalizations to scaffold infant language more often than mothers in the control condition. There was also a main effect of

condition on demonstrating and physical teaching, $F(1, 42) = 7.13, p = .011$, such that mothers who received the direct intervention in the treatment condition used demonstrative actions and physical teaching behaviors more than mothers in the control condition during the observation period. Moreover, mothers in the treatment condition indicated more appropriate understanding of the distinction between parent roles and child roles than mothers in the control condition, representing a significant main effect of condition on parent-child role reversal, $F(1, 42) = 6.73, p = .013$. Using Cohen's conventions, the treatment condition had medium-large effect on verbal quality and large effects on demonstrating and physical teaching as well as parent-child role reversal. There was no main effect of condition for maternal empathetic awareness; however, condition had a medium effect, indicating a trend in the expected direction.

Maternal emotional expression. To investigate the impact of receiving an intensive, preventative and comprehensive intervention on mothers' emotional expression towards their infants, a between-subjects MANCOVA was performed on a linear combination of four dependent variables: maternal warmth toward the target child, maternal positive affect directed toward the target child, maternal negativity toward the target child, and maternal feelings of unhappiness. Using Wilks' criterion, the main effect of condition was not significant, $F(4, 39) = .39, p = .82$. Thus, mothers in the treatment condition did not exhibit more desirable emotional expression towards their infants following the intervention than mothers in the control condition.

DISCUSSION

The present study is unique in that it is the first to analyze the synthesis of three already successful parenting intervention strategies designed to address the needs of at-risk mothers: joint-attention treatment training, developmental knowledge training, and loving touch training (Landry et al., in press; Hess et al., 2004; Field, 2000).

Characteristics such as low educational attainments or low income levels that were party of the eligibility criteria, as well as the unmarried mothers and adolescent mothers who were included in the sample, illustrated the high levels of risk for inappropriate or inadequate parenting that were present. The low vocabulary scores of most participants placed mothers at an even greater risk for poor parenting beliefs and behaviors (Whitman et al., 2001). The packaged intervention was successful in improving maternal parenting in the domains of control orientation and cognitive understanding; unfortunately, the intervention did not impact maternal emotional expression.

Maternal Control Orientation

Mothers in the study who received the direct intervention exhibited fewer controlling behaviors than mothers who only received minimal supports. In particular, following the intervention, those who participated in joint-attention treatment training, developmental knowledge training, and loving touch training were less rigid and intrusive as well as more flexible in dealing with their infants. These reductions in negative parenting are noteworthy because high risk mothers with more controlling orientations

may be responding to dangers present in their lives. For instance, literature has shown that the immediate environments of at-risk families had more hazards and toxins, increased crime and violence exposure, and decreased access to basic necessities like healthy food or heat (Evans, 2004). Likewise, at-risk mothers may have enacted control orientations because of inadequate knowledge about infant care such as appropriate feeding practices or realistic expectations of caregiving demands (Dukewich, Borkowski, & Whitman, 1999). Parenting knowledge and skills acquired during the intervention appeared to have assisted mothers in changing their control orientations, even in the face of barriers to optimal parenting that resulted from risk.

Improvements in maternal control orientation might be attributed to increases in knowledge about infants introduced to mothers in the intervention curriculum. Developmental knowledge training concentrated on educating mothers about specific, age-appropriate ways to support their infants' development. Knowledge was then applied through specific skills taught in joint-attention treatment training. Family researchers have suggested that parental knowledge about child development is reflected in maternal beliefs and cognitions (Miller-Loncar, Landry, Smith, & Swank, 2000). Their position maintains that mothers with more developmental knowledge accept children as individuals with needs of their own. Additionally, knowledgeable mothers attribute their children's behavior to many causes and act flexibly when generating solutions to problems. In contrast, mothers who have less knowledge have a harder time processing information and problem solving in stressful life situations (Miller-Loncar et al., 2000). As a result of this additional adaptability, mothers in the direct intervention condition may have been less likely to respond to their infants in an intrusive or rigid manner.

Decreases in maternal control related to the intervention typically extend beyond the development of high-quality parenting patterns into better child outcomes. For example, Ispa et al. (2004) showed that for European-American, African-American, and Mexican-American groups, maternal intrusiveness during infancy related to child negativity during toddlerhood. Another study demonstrated that maternal control strategies intensified child noncompliance (Blair, Peters, & Lawrence, 2003). Accordingly, the complex intervention likely contributed to preventing a cycle of negative interactions in the mother-child dyad. Sato, Uehara, Narita, Sakado, and Fujii (2000) found that maternal care was predictive of lifetime depression for children and that low frustration tolerance and rigidity were important to lifetime depression acquisition. Consequently, maternal involvement in a preventative, intensive, and comprehensive intervention may have fostered children's well-being through reductions in maternal control orientation.

Maternal Cognitive Understanding

Helping mothers to have less controlling orientations was not the only advantage of the intervention. Mothers in the direct intervention treatment condition also demonstrated more cognitive understanding of their children's needs than mothers in the minimal intervention control condition, an understanding that is essential for effective parenting (Whitman et al., 2001). Specifically, mothers in the treatment condition were more likely than mothers in the control condition to use rich, scaffolding language with their infants, to directly teach and demonstrate skills to their infants, and to adopt responsibility for the parental role as guide and nurturer to the infant. While treatment groups in this study were not significantly different on maternal empathic awareness, the

medium effect size suggested a trend towards a greater maternal empathic ability following delivery of the intervention.

Enriching verbal quality and improving demonstrative behaviors were direct objectives of the packaged intervention; avoiding role reversal and encouraging empathy were indirect aims. In contradiction to the common notion that parenting abilities come naturally, maternal knowledge and skills are gradually acquired (Arendell, 1997). Thus, the development of cognitive understanding, observed through advanced maternal parenting, was likely attributable to the modeling, repetition, and guided practice provided by the intervention's joint-attention treatment training.

The intervention benefits in maternal cognitive understanding may not only have translated into patterns of positive parenting, but also fostered long-term child development. Evidence for the continuity of core cognitive structures has established that development during infancy can predict subsequent development (Rose, Feldman, & Jankowski, 2005). For instance, gains from enhanced maternal verbal quality were observed by Landry, Miller-Loncar, Smith, and Swank (2002), when they found that maternal scaffolding behaviors positively shaped children's problem solving skills and provided a solid basis of language development into children's school years. Parental instructional behaviors, such as demonstrating and practicing skills, can similarly create the groundwork for future child learning. In addition to directly instructing infants, mothers are responsible for creating a context that facilitates learning, one where a child feels valued and nurtured. For instance, accepting parental responsibility for meeting infants' needs, as opposed to relying on children for parental happiness, communicates to children that they will be taken care of and are free to learn. Role reversal, for example,

was frequently seen in studies of physically abused children who believed it was their responsibility to please their parents (Macfie et al., 1999). Bradley and his colleagues have maintained that children's proximal environments determine the support and stimulation they received (e.g. Bradley, Burchinal, & Casey, 2001). Therefore, treatment differences in maternal cognitive understanding highlighted the advantages of an intensive, preventative, and comprehensive intervention for both at-risk mothers and their children.

Maternal Emotional Expression

Surprisingly, ratings of maternal emotional expression were not different for participants in the two study conditions. Contrary to expectations, mothers in the treatment condition did not exhibit more warmth or positive affect and less negativity or unhappiness than mothers in the control condition. The curriculum was designed to take into account high levels of stress and depression (e.g. Olson, Ceballo, & Park, 2002; Unger, Jones, Park, & Tressell, 2001); however, most mothers in this study indicated low levels of distress and depression symptoms. The loving touch training component of the intervention was principally focused on increasing warm and positive behaviors, although it did not specifically address using more displays of positive affect and fewer displays of negative behavior. Furthermore, no part of the packaged intervention was applied to decreasing general unhappiness of mothers. Previous findings have linked expressed emotionality to mothers' emotional states (e.g. Dix et al., 2004), and at-risk mothers may perceive caregiving demands as stressful, depleting their emotional resources (Morris & Coley, 2004).

Mothers' low vocabulary scores presented an additional point of interest to this study. Gohm (2003) has illustrated that the ability to alter emotion when it is necessary is a complex process. She asserts that people who have a high level of emotional intensity (stimulation or reaction to positive or negative emotions) but a low level of emotional clarity (understanding of positive or negative emotions) responded differently to needs to attenuate their moods than other participants (Gohm, 2003). The mothers with low estimated intelligence levels in this study may have fit Gohm's criteria, and therefore, may have experienced trouble in altering their emotional expression in optimal ways for children. The finding that most mothers had low vocabulary scores and no mothers had high vocabulary scores suggests that perhaps low verbal intelligence should be considered as a principal risk characteristic for poor parenting in future studies. Improvements in control orientation and cognitive understanding, however, suggest that even when half of mothers have estimated verbal intelligence levels in the extremely low range (less than 70) they still benefit from a preventative, intensive, and comprehensive intervention designed for at-risk mothers.

Study Limitations

As in many studies with high-risk participants, missing data presented an interpretive problem. Nearly one quarter of the mothers who completed the pretest could not be located approximately four months later. A possible reason for this rate of attrition is the high degree of instability in the lives of participants with risk characteristics. This attrition problem is amplified for teenagers who typically experience high levels of both geographical and familial instability (Letourneau, Stewart, & Barnflower, 2005). In fact, teenagers in this study made up over half of the dropout group. A review of intervention

research indicated that adolescent mothers are often less responsive to intervention efforts than adult mothers (Letourneau et al., 2005).

An interesting contribution of this study was the unexpected finding that anxiety levels may have affected dropout rates. It is possible that participants with higher levels of anxiety or phobic anxiety found home visitations too intrusive, and became apprehensive about being evaluated. Berstein, Layne, Egan, and Nelson (2005) have asserted that the avoidance aspect of anxiety (phobic anxiety in particular) can prevent mothers from seeking help for themselves or for their children. Retaining mothers with high anxiety may be a unique problem in studies of parenting since anxiety has been linked with many domains of child functioning from infancy through adolescence (Van den Bergh, Mulder, Mennes, & Glover, 2005). This is important to keep in mind when creating recruitment and retention strategies for high-risk families.

Conclusion

Despite the challenges faced by mothers with risk characteristics, mothers regularly expressed to interviewers that they want the best for their children. The results of this study demonstrate the willingness of at-risk mothers to embrace new knowledge and skills in order to improve their parenting practices. It is logical that the benefits from the program seen after only a brief intervention would only increase over time as positive patterns of parent-child interaction develop. Consequently, intervention curricula designed for at-risk mothers can enhance maternal parenting.

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