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EMILY H. GASKIN

Technology Adaptations to the SafeCare Parent-Infant Interaction Module for Parents with Intellectual Disabilities.

(Under the direction of John R. Lutzker, PhD.)

Parents with intellectual disabilities (ID) are disproportionately represented in child maltreatment (CM) statistics due to a confluence of factors. Prevention efforts should address this population by developing curricula that support various modes of learning. Technology offers a potentially effective tool because it is visual, free from extraneous factors, engaging, and self-instructional. SafeCare is an evidence-based parenting program with flexibility to adapt curricula while maintaining fidelity. The study aimed to determine the effectiveness of an adaptation to the SafeCare parent-infant (PII) module for parents with ID by using digital picture frames with pictures of their own PII to effect performance. A multiple-probe design across behaviors was used with one mother with ID and her infant. Results showed a significant increase in PII behaviors through two month follow-up. These data suggest the digital picture frame enhancement to the SafeCare PII module is a promising instructional tool for parents with ID.

INDEX WORDS: child maltreatment; child neglect; parents with intellectual disability; parent-infant interactions; technology; SafeCare

TECHNOLOGY ADAPTATIONS TO THE SAFECARE PARENT-INFANT INTERACTIONS
MODULE FOR PARENTS WITH INTELLECTUAL DISABILITIES

by

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M.A., GEORGIA STATE UNIVERSITY

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in Partial Fulfillment of the Requirements for the Degree

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2011

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Approved:

Committee Chair

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Date

DEDICATION

This manuscript is dedicated to my mother, Amy Gaskin and to the memory of my grandmother, Mary Hilyer. Both of whom are wonderful mothers and teachers. Thank you for supporting and believing in me.

“Authentic help means that all who are involved help each other mutually, growing together in the common effort to understand the reality which they seek to transform.”

Paulo Freire

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Special thanks to Juliet for allowing me into her home. Her spirit and openness were a blessing.

Thanks to Bryan, Obi, Millie, and my family. This is the last one for a while, I promise.

AUTHOR'S STATEMENT

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 - Took observational notes and transcribed for the focus group portion of the research.
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 - Compiled a literature review and briefed the faculty on my findings.

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INTRODUCTION

Child maltreatment (CM) is a persistent and pervasive public health concern in the U.S. It can result in an abundance of negative health outcomes and maladaptive behaviors that have effects not just on the individual, but families, communities, and the larger society. The 2009 National Data Archive on Child Abuse and Neglect (NCANDS) statistics reported Child Protective Services (CPS) received more than 3.6 million referrals of alleged maltreatment from which 19.5% were substantiated. These surveillance data show 763,000 children who experienced substantiated maltreatment in 2009 (U.S. Department of Health and Human Services, 2010). A National Incidence Study completed by the U.S. Department of Health and Human Services as the last installment of a four-part series (NIS-4) collected data from 2005-2006 and compiled a report as mandated in the Child Abuse Prevention and Treatment Act that would report incidence rates and distribution, as well as, track change over time (Sedlack et al., 2010). The NIS data reflect an incidence rate of 17.1 children per 1,000 compared to 10.1 in the 2009 study. While the incidence rate appears to be decreasing, this interpretation can be problematic. This number may simply amount to a surface approximation considering estimates only include children who have experienced “demonstrable harm as a result of maltreatment” instead of less apparent manifestations of abuse such as ongoing neglect (Sedlak et al., 2010). NIS data often report higher numbers because data are collected based on sentinel reporting. The analysis is based on a survey given to service professionals which offers a more accurate picture of maltreatment as opposed to including only those cases which were able to become substantiated. Recent literature has suggested that because current CPS interventions often occur following an instance of alleged maltreatment, there are a large number of preventable cases that

go unnoticed. Additionally, because states develop their own definitions for what constitutes maltreatment based on a minimum federal standard, it is often difficult to interpret data for the basis of comparisons across time or geographic area. (Dubowitz et al., 2005; Whitaker, Lutzker, & Shelley, 2005). Surveillance data more often reflect ex-post-facto incidence rates which do not necessarily provide a realistic picture of prevalence.

While data suggest a decrease in overall cases of CM, neglect continues to be the most common form of child maltreatment with no decline reflected in NCANDS data (Finkelhor, Jones, & Shattuck, 2009). A comparison of NIS 2-4 data reveal incident rates of neglect remain within 6 points of each other and except for NIS-2 (1986) are consistently higher than abuse rates (Sedlack et al., 2010). The more recent data reveal four-fifths (78.3%) were substantiated cases of neglect (U.S. DHHS, 2010). Neglect, however, suffers from a lack of any systematic operational definition because of a variation among states. Debates about the scope and potential for harm related to neglect, can result in discrepancies in reporting so that instances reported as physical abuse are often rooted in ongoing neglect (Dubowitz et al., 2005).

Children ages 0-2 are more at risk for maltreatment than any other age group. While CM rates in all categories appeared to be much higher for older age groups, the NIS-4 found that while all other age groups experienced a decrease in incidence rates over time, the 0-2 age group actually increased by 28% (Sedlack et al., 2010). For children below 1 year of age, the incidence rate is almost double that of rates for 1, 2, and 3 year olds. NCANDS data shows one third of children under age 4 are victims of maltreatment; with infants less than 1 year at a rate of 11.9 per 1,000. In 80% of cases children are abused by a parent rather than another relative or adult (U.S. DHHS, 2010). This increase in CM among infants and toddlers parallels the rise in

substantiated cases of neglect suggesting great potential for neglect among the very young. This suggests that early intervention with parents of infants would be prudent.

Parents with intellectual disability (ID) are also disproportionately represented in cases of neglect. Research suggests that parents with ID exhibit some cognitive differences which make them more susceptible to neglect. Feldman described limitations such as difficulty in problem-solving, issues in providing stimulating environments, and absence of nurturing positive interactions with their infants (1994). Other research has described differences as they relate to perception of parenting roles. For example, Azar, Robinson, and Proctor (2001) noted that parents with ID exhibit differences related to their outlook of their role as parents and their difficulty in identifying emotional states of their children. These cognitive limitations combined with broad socioeconomic links, such as income and environment; contribute to high incidence of neglect among parents with ID.

Neglect represents the only form of maltreatment expressly defined by the absence of action. It can be defined as considerable lack of attention to the basic needs of a child which results in actual or potential harm. The four main categories of neglect are: physical, educational, emotional, and medical. Within each of these categories, negligent parenting can pose moderate to severe effects on a child's development or even result in fatality (Dubowitz et al., 2005). This absence of care means a lost opportunity to create a bond through positive interactions. Theories of early childhood development stress the importance of the parent-child bond beginning at birth and argue that disruption of this attachment could result in poor development or fatality (Kotch et al., 2008; Pomerleau, Scuccimarri, & Malcuit, 2003). Emerging discoveries in the area of neuroscience show that maltreatment has been shown to affect the ways in which the brain develops and can result in limitations in brain anatomy and functioning manifesting lifelong

consequences (Twardosz & Lutzker, 2010). Theoretically, a lack of parental involvement could manifest as feelings of anxiety or sadness in a child which could lead to maladaptive behaviors such as anger conversion or depression in later childhood (Wulczyn, 2009). A study focusing on a cohort of 1318 at-risk children found that the only significant predictor of childhood aggression in children who had experienced maltreatment was early neglect (Kotch et al., 2008). This highlights the crucial period in the first two years of life in which a child is developing rapidly and is especially socially and cognitively malleable. A study of 101 adolescents between the ages of 13 and 18 found that a history of parental maltreatment was associated with a lower perception of social support. Using the support deterioration model of depression, the study notes that stress (related to maltreatment) results in a decreased perception of (the effectiveness of) social supports, which results in depression (Seeds, Harkness, & Quilty, 2010). Similarly, a study focusing wholly on categories and subcategories of neglect found significant associations between neglect and internalizing and externalizing behaviors in a cohort of 3-year-olds (Dubowitz et al., 2005). Many of these behaviors translate into risk factors for other negative health behaviors or conditions. These risk factors, taken in combination with an individual's social ecological environment, can result in sequelae such as substance abuse, early pregnancy, physical health problems, and relationship impairment (Seeds et al., 2010).

Some potential limitations of the research cited here are the difficulties in establishing causality of long-term effects related to early maltreatment. As a child grows older, many external factors such as income, peer groups, and built environment contribute to health behavior. While broad links to these factors contribute to an etiological framework for risk of neglect, fleshing out direct relationships to CM poses some difficulty. Despite these barriers, some studies have attempted to focus exclusively on long-term sequelae. Anda and colleagues

found that adverse childhood events (ACE) such as abuse, witnessing domestic violence, and substance abuse by a parent contributed to rates of prescriptions for psychotropic substances through adulthood. Using a standardized ACE score, researchers found that as the ACE score for an adult increased, so did the rates of prescriptive medication for mental illness (Anda et al., 2007).

While the personal cost of child maltreatment is most certainly heaviest for those who have experienced it in some form, the economic costs to communities and society are also great. A review of cost analyses related to CM showed medical costs can reach up to \$48,000 per case, up to \$51,873 for lifetime loss of productivity, and non-medical costs up to \$78,000 (Corso & Lutzker, 2006). A lack of prevention efforts for CM translates to a crisis-driven approach that is ineffective at addressing the issue. As children, increased CPS referrals and hospital visits result in an overburdened system that becomes more fiscally expensive for society (Tymchuk, 1999). As adults, lingering marks of past abuse in combination with socio-demographic factors contribute to delinquency, overuse of healthcare, and potential increased involvement with the penal system. This results in a revolving door that perpetuates CM as a pervasive public health issue (Kotch et al., 2008).

Prevention Efforts.

While instances of maltreatment occur at the interpersonal level, they do not exist in a vacuum. Internal and external factors act as potential predictors of maltreatment. Public health surveillance data have established broad links to certain contextual factors which contribute to higher risk of maltreatment such as income, age, sex, family organization and mental illness. Maltreatment has most generally been linked with poverty and its associated barriers. For

example, NIS-4 data showed higher unemployment rates, lower socioeconomic status, and single parent households had higher incidences of maltreatment (Sedlack et al., 2010) which contributes to social isolation and residential segregation (Wulczyn, 2009). The survey data also reveal that parents who have substance abuse problems or mental illness are at higher risk for abuse than other parents (Sedlack et al., 2010). Often, families or parents in need of additional social services become disproportionately represented within CPS (Tymchuk, 1999).

In an effort to better develop interventions that help to prevent forms of maltreatment, many researchers have advocated for a social-ecological approach which operates under the assumption that the etiological framework of child maltreatment is multidimensional and should be addressed at each level (Gershater-Molko, Lutzker, & Wesh, 2003; Lutzker et al., 2001). According to this model, variables such as prenatal experience, health, daily functioning ability, stress, and social support have an effect on parent-child outcomes (Feldman, Varghese, Ramsay, & Rajska, 2002). This approach is based in social-ecological theory which argues that many social and contextual factors influence a child's quality of life and parenting capacity is influenced by this complex interplay (Belsky, 1980). By identifying populations who experience these high-risk social factors, public health interventions can target their services towards prevention among these parents rather than taken a crisis-driven a priori approach. After properly assessing the needs of high-risk populations, public health practitioners are able to develop effective interventions by tailoring each approach to particular at-risk groups so that the format, delivery, and language is appropriate and sensitive (Whitaker et al., 2005).

Technology Adaptations for the SafeCare PII Module for Parents with ID.

The current intervention seeks to use a technological enhancement to adapt the parent-infant interaction (PII) module of the SafeCare parenting program for parents with ID. SafeCare

is an evidence-based parenting program for prevention of CM through a multi-tiered social-ecological perspective which addresses multiple risk factors related to CM. It is organized into three modules of which the order can be interchanged depending upon assessment of greatest need: parent-child or parent infant interaction, home safety, and health. Grounded in social learning theory and applied behavior analysis, SafeCare adopts the four-step process of training explanation, modeling, practice, and feedback and contains counseling and problem-solving elements.

An impressive evidence base for the efficacy of the SafeCare program exists, particularly in the area of home safety (Barone, Greene, & Lutzker 1986; Metchikian, Mink, Bigelow, Lutzker, & Doctor, 1999; Tertinger, Greene & Lutzker 1984; Watson-Perczel, Lutzker, Greene, & McGimpsey, 1988). Currently, only one SafeCare study has expressly focused on the PII module (Lutzker, Lutzker, Braunling-McMorrow, & Eddleman, 1987) which is the area of intervention of the current study. The PII module aims to foster positive parent-infant interactions through the use of seven behaviors which can be applied in day-to-day interactions with an infant. These behaviors are: touching, looking, smiling, holding, gentle movement, positive vocalizations, and imitating. Four of these behaviors: touching, looking, smiling, and positive vocalizations can be used in every interaction with an infant and the other three can be used intermittently where appropriate. By learning to appropriately use each of the seven PII behaviors, parents can theoretically create a bond with their infant that helps them foster positive cognitive, social, physical, and language development and reduce CM.

SafeCare emphasizes the prevention of neglect through facilitating safer home environments, addressing health needs of children, and encouraging the parent-child bond. PII was developed to address statistics that show the need for intervention during the crucial early

years of an infant's development through strengthening the parent-infant bond thereby preventing neglect. Additionally, the structure of SafeCare allows for modifications to be made in the format and delivery while still maintaining fidelity to the original model. SafeCare is positioned to adapt its PII module to target the unique learning needs and considerations of parents with ID, a high-risk parenting population.

Parents with ID.

In 2008, 1,400,000 parents with ID were living in the U.S., although lack of a common definition of ID suggests that there most likely is a larger population under the radar whose size is difficult to accurately estimate (O'Keefe & O'Hara, 2008). For parents who find themselves counted within the system, child removal rates among parents with ID are dramatically high. In a review of 437 relevant care applications to family courts, Booth, Booth, and McConnell found that 15.1% had at least one parent with ID. Of these cases, 10.2% children were returned home, 74.8% were placed outside the home with a non-family member, and 41.7% of those children were freed for adoption (2005). An earlier retrospective review of hospital records found that out of 226 children born to 79 families with one parent with ID, 45.6% had their children removed (Accardo & Whitman, 1990). While numerous studies have shown that IQ is not an adequate predictor of parental capability, ID in combination with other social-ecological factors and social stigma has resulted in a 40-60 % rate of permanent child removal internationally (McConnell & Llewellyn, 2002), or 2 in every 5 children (O'Keefe & O'Hara, 2008). Reducing incidence of child maltreatment cases in this population through prevention strategies should be considered a priority.

Efforts to prevent removal and maltreatment of children whose parents have ID have led to over 50 years of research addressing the predominance in this population. The literature on

parents with ID can be divided into two main categories: studies concerned with describing the experiences and needs of parents with ID and literature concerned with developing resources that address their needs and ability to parent effectively. Early literature in the first category focused on debate regarding the ability of persons with ID to be good parents. Many of these studies relied on social perception and stigma rather than fact, and neglected to address contextual factors that might be associated with the ability to parent. Consistent with general literature on child maltreatment, later studies focused in large part on identifying these contextual factors and taking a social-ecological approach in addressing each one. The second category contained somewhat more rigorous and quantitative research methods on efficacy of the instruction, materials, and delivery of parenting programs geared towards persons with ID (Feldman, 1994; Llewellyn, McConnell, Russo, Mayes, & Honey, 2002). Among these, technology emerged as a method of instruction with potential in addressing the needs of parents with ID (Feldman & Case, 1999).

Experiences and Needs of Parents with ID.

Historically, persons with ID have been the recipient of rigid forms of control. In the 1950s, mandatory sterilization and institutionalization was the norm (O, Keefe & O'Hara, 2008). More recently, new policies such as the Americans with Disabilities Act (ADA, 1990) recognized the right of persons with disabilities to make independent lifestyle choices and live within their communities rather than inside state institutions (Llewellyn, Mayes, & McConnell, 2008). As a result, increasing numbers of persons with ID are experiencing the opportunity to become parents. While this choice is historically unprecedented, parents with ID still encounter a multitude of barriers.

One barrier relates to the social perception about whether or not persons with ID should be allowed to be parents at all. The implied prejudice in this debate is indicative of the still persistent social stigma faced by persons with ID related to their capability as parents. This minority group has received both overt and subtle discrimination in terms of their parenting skills, and there is often a tendency to focus more on their inadequacy as parents than on their competence (McConnell & Llewellyn, 2002). One study looking at the experiences of three Australian women with ID found that their announcement of pregnancy was met with opposition from family, friends, and health care providers. Women were encouraged to have an abortion and even after they had given birth, disapproval continued (Mayes, Llewellyn, & McConnell, 2006). In some cases, parents were prohibited from leaving the hospital with their infant while others worried about threat of child removal by CPS (International Association for the Scientific Study of Intellectual Disability, 2008).

All too often, removal becomes reality and in many cases, a diagnosis of ID is sufficient evidence for removal. A summary of research involving detailed review of court cases in the U.S. that resulted in child removal found that in many cases removal occurred without any substantiation of child maltreatment whatsoever (McConnell & Llewellyn, 2002). Still other cases revealed that no support services were offered prior to removing the child, and children were sometimes removed even when parents were exhibiting progress. A review of court proceedings in Leeds and Sheffield in the UK showed that little evidence in court transcripts suggests that supports and services were initially provided. For families who received services, language in the courts records implied an assumption it would be ineffective. The researchers concluded that often the attitude of the person delivering supports affected the effectiveness rather than the parent (Booth et al., 2005). Many scholars have suggested that these

outcomes are related to outmoded and discriminatory stereotypes about people with intellectual disability that are rarely founded in any scientific evidence (O, Keefe & O'Hara, 2008; Reinders, 2008). Another analysis of grounds for termination of parental rights broken down by state found that almost half included disability as sufficient for termination. Additionally, many of the states used outdated definitions and terminology, and focused more on disability rather than acts commission or omission (Lightfoot, Hill, & LaLiberte, 2010).

Parents with ID are the only population asked to prove their competency from the outset. Even though empirical evidence conventionally suggests that there is no significant relationship between parenting and IQ, parents encounter societal perceptions of their parental ability from family, friends, health care providers, social service workers, and in the form of legal statutes. These perceptions often result in higher cases of child removal and harsher outcomes than is seen in the rest of the population. Researchers have found that while ID is a factor in child maltreatment, it generally occurs in combination with other variables that put parents at risk. There is general agreement within the literature that no direct correlation exists between cognitive ability and being a good parent (Tymchuk & Andron, 1990), but related social influences may make coping strategies more difficult.

Although parents with ID represent only 1-2% of the parenting population (Clayton, Chester, Mildon, & Matthews, 2008), they are disproportionately affected by risk factors related to child maltreatment (Tymchuk, 1999) which leads to overrepresentation in CM statistics. Even when parents are allowed to keep their children, they encounter significant barriers. Poverty is one such barrier to effective parenting. A 1996 report on disability statistics by the National Institute on Disability and Rehabilitation Research notes that family income is substantially lower if one household member has a disability. In families in which one partner has a disability

the poverty rate increases from 7.8 to 9.5 percent, and when both partners have a disability the rate increases to 14.2 percent (LaPlante, Carlson, Kaye, Bradsher, 1996). Consistent with general demographic research on CM, income is a substantial indicator for parents with ID. One study of parents with ID who do and do not have custody of their children in Canada, found that mothers who had an annual income below 10,000 CDN were more likely to lose custody of their children than mothers who received more (Aunos, Goupil, & Feldman, 2003). Another study from the U.S. comparing mothers with ID who did and did not abuse or neglect their children, found that parents with an income below \$10,000 had a 60 percent rate of history of abuse compared to 40 percent in mothers with an income above \$10,000 (Tymchuk & Andron, 1990). While poverty serves as an indication of risk for maltreatment, it is seen as a low risk-factor compared to others. A study by McGaw and colleagues focused on identifying high- risk versus low-risk variables for maltreatment among this population found that IQ, age, and access to benefits were not as significant as variables related to health, life history, and support (2007).

Good health provides a vital resource for parenting. Parents with ID often present higher prevalence of poor mental health than their peers which has been linked to an influence on the quality of care given to children (Aunos et al., 2003; McGaw, Shaw, & Beckley, 2007). In a study examining the self-reported mental health status of 50 mothers with ID, Llewellyn and colleagues found much higher instances than typically developing parents within the same socio-economic group (2003). McGaw and colleagues found that prevalence of psychopathology among 49 parents with ID was 45 percent, about two to three times higher than that of typically developing parents. The findings also suggest that the poor mental health of the parent was significantly associated with mental and cognitive deficits in their children (2007). A U.S. study found that the presence of maternal parenting stress had a significant correlation with child

problem behaviors, but that a more positive parenting style can mitigate this relationship (Aunos, Feldman, & Goupil, 2008). Factors which may contribute to poorer mental health are stigma, poverty, childhood trauma, and social support (IASSID, 2008; Tymchuk & Andron, 1990). Acknowledging these variables are important in reducing stress and thereby preventing negative parenting styles which may lead to CM.

An often cited factor that underlies parenting stress and CM is exposure to opportunities for learning and social support. A study of the relationship between social support, stress, and parent-child interactions among 30 mothers with ID showed a strong correlation between social isolation and stress. The Telleen Parent Social Support Index and the Interpersonal Support Evaluation List (ISEL) revealed parents perceived needs for support were 1.8 (scores closer to 1 represent a greater need) and within their support systems they had only a moderate amount of satisfaction (Feldman et al., 2002). For most parents, pregnancy and child-rearing is a collective effort with new parents relying on the experience and advice of family and friends. Parents with ID, especially those who have been previously institutionalized, do not always have access to positive parenting role models. Typically developing parents are able to locate multiple sources of information on parenting from books, magazines, and the web. For parents with ID, this exercise may be difficult and frustrating. The comprehension and application of this knowledge can be an unrewarding experience particularly if the parents have no one to turn to for reassurance and feedback. Parents with ID often have smaller support networks than typically developing parents (Llewellyn & McConnell, 2002; Tarleton & Ward, 2007).

While parents with ID often experience a higher level of social isolation than their typically developing peers, they do not live in a social vacuum. Interviews conducted with mothers with ID revealed that once they learned of their pregnancy, they exhibited self-efficacy

in negotiating social support for the purpose of practical assistance once the baby was born thereby increasing their social capital (Mayes, Llewellyn, & McConnell, 2008). They are not able to cast a very wide net, however, because they are often not as active in their communities as other parents (Aunos et al., 2003). Another study derived from interviews conducted with 70 mothers with ID show that they most often identify family members in their support networks, followed by social service providers, and friends and neighbors the least often (Llewellyn & McConnell, 2002). The absence of friends and neighbors with which they can share their parenting experiences puts a great deal of pressure on other sources of support such as social service providers.

For parents with ID, accessing professional support services can be a frustrating experience. Often, services for parents with ID appear disjointed, inconsistent, and crisis driven (Barkby et al., 2009; Tymchuk, 1999). They encounter a system in which service providers lack sufficient knowledge and skills to work effectively with them and are sometimes excluded from parent training programs because they cannot accommodate their learning needs. Due to inadequate funding, high caseload, and lack of knowledge related to the special needs of this population, parents who may be neglecting their children are often not identified until a report has been filed (Azar & Read, 2009; Clayton et al., 2008). A survey of 58 practitioners who often worked with parents with ID showed they reported high levels of stress when working with this population. Additionally, they identified 15 of 15 skill areas they required further training in order to competently support parents with ID (Clayton et al., 2008). In offering professional support for parents with ID, it becomes important to consider their needs in order to develop ways to help them effectively parent (Tarleton & Ward, 2007).

While early research focused almost exclusively on ID as prima facie for parental ability, much of the research of the past 20 years concerned itself with identifying needs of parents so that maltreatment and removal can be prevented. A social-ecological approach describing the experiences of these parents reveals that their life circumstances are diverse which makes generalizations about parenting abilities difficult. For this reason, professionals might incorporate a client-centered approach to working with each parent and attempt to consider whether the support being offered makes sense contextually. For example, the inclusion of a “goodness of fit” tool in a parenting intervention allowed practitioners to adjust their strategy if a parent indicated that the intervention did not fit with the family’s lifestyles and goals. Parents reported more satisfaction and confidence as a result of these individual adaptations (Mildon, Wade, & Matthews, 2008). Listening to what a parent might be looking for in a supportive relationship and providing them choices as to how they can progress puts them at the center of their support network rather than as a passive dependent. In several personal interviews, parents with ID affirmed this and said they noticed and appreciated when practitioners were not condescending or judgmental of their parenting skills (Tarleton & Ward, 2007). Researchers assert that professionals who acknowledge a parent’s central place in their child’s life offer the type of support that is most effective and long-lasting (Mayes et al., 2008).

Parenting Programs for Typically Developing Parents.

Parenting programs that teach skills related to positive child-rearing and interactions have emerged as viable opportunities for prevention of CM in typically developing populations. Essentially, parent training is made up of four basic components: collecting baseline assessment data, teaching relevant skills through explanation and modeling, having parents practice skills, and offering positive and corrective feedback (Barth et al., 2005). An impressive evidence base

has been amassed supporting these family-focused interventions and has resulted in relatively wide dissemination in real world settings. An analysis of recidivism rates for families in CPS revealed that parent education in both neglect and sexual abuse cases reduced reoccurrence of CM in 434 families (DePanifilis & Zuravin, 2002). Much of the literature related to evaluation of parenting programs supports the contention that they can effect behavior change which can be adopted and maintained over time (Barth et al., 2005). Results of these studies also suggest that newly learned skills are generalizable to other parenting activities in which parents were not trained as part of the intervention (Boyle & Lutzker, 2011).

Scholars engaged in research pertaining to the viable application of these programs in a real world setting generally agree on several effective components. Successful parenting interventions commonly contain behavioral teaching methods such as cognitive behavior therapy (Thomlison, 2003). According to Bandura and Walters, this therapy modifies behavior through repeated modeling and practice by the individual (1963). As a result, the individual increases their self-efficacy and motivation to learn because they begin to self-regulate (Bandura, 1991, 1993). This method learning in which a person observes and then imitates behavior has become established as a broadly effective teaching strategy that accounts for acquisition of skills (Shipley-Benamou, Lutzker, & Taubman, 2002). It is particularly advantageous for teaching parenting skills that have a broad application across various activities.

Programs that are in-home and in-situ fare better because skills can be practiced during real life activities and settings. A synthesis of research on the effectiveness of seven different CM prevention interventions found that home visiting, along with parent education and sexual abuse prevention is beneficial in reducing CM and its related risk factors (Mikton & Butchart, 2009). Another study expressly focusing on the effects of home-visiting found that while there

was not particularly strong evidence in direct prevention of CM, home-visiting programs improve maternal response and interaction with their children and increase effective parenting skills (Howard & Brooks-Gunn, 2009; Silovsky et al., 2011). These methods generally adopt a social-ecological approach that accounts for various social factors which may act as barriers to intervention success. For example, programs that offer problem-solving instruction geared towards the individual parent are generally more effective at increasing positive behaviors because they are relevant in the parents' lives (DePanifilis & Zuravin, 2002; Wulczyn, 2009). An additional example of a contextually-based program would be one that considered duration of instruction when designing an intervention. A study of "best practices" in nine parenting programs found that using time-limited formats in intervention delivery was more convenient for families and made monitoring newly learned behaviors easier (Thomlison, 2003).

Usefulness of Parenting Programs with Parents with ID.

A strength of evidence-based parenting programs is that they create a systematic approach to training that is client-centered and validated through scientifically sound research. This makes them widely applicable over various demographics and environments. The parenting population is not a homogenous one, however, and interventions carried out in a research setting do not always readily translate into sound practice (Boyle & Lutzker, 2011). While there is agreement on common inhibiting factors such as socioeconomic status, CM permeates a range of demographics (Wulczyn, 2009). An additional strength of parenting programs is flexibility within the structure of the intervention to modify the training approach to make them applicable for various populations. As mentioned earlier, tailoring the approach to individual needs through diverse teaching formats creates engagement and saturation of new information (Thomlison, 2003). Recent research has begun to address the paucity of literature related revising these

interventions to make them culturally relevant or target higher risk populations such as parents with ID (Mikton & Butchart, 2009).

Successful Interventions for Parents with ID.

Consistent with research with typically developing parents, recommendations for training parents with ID focus on behaviorally-based interactive instruction using direct observational assessment, modeling, practice, and positive and corrective feedback. 45 parents with ID who had participated in a home-based parenting program responded that interactive instruction during training was more engaging and elicited generally positive feedback (Llewellyn et al., 2002). Home-visiting is also supported in the literature. An inaugural review of parenting programs with parents with ID revealed that an in-home setting generally supported positive parenting behavior and child development (Feldman 1994). A more recent review of seven effective parent-training interventions for parents with ID published after 1994 revealed that all studies were implemented in the home. This supports the research before 1994 that recommends interventions be carried out in-home in an individualized setting and implies adoption of a “best practices” approach (Wade, Llewellyn, & Matthews, 2008).

Programs that offer long-term support that varies in intensity and is adapted as a child ages are also more accommodating for parents with ID (Aunos et al., 2003; Wade et al., 2008). A focus group of practitioners who work with parents with ID, confirms this assertion and notes long-term and consistent interventions as the primary focus in delivering parenting support for parents with ID (Barkby et al., 2009). From a practitioner standpoint, longer duration of intervention enabled them with more opportunity to monitor progress and influence maintenance. A 2002 study contained a training element whereby the parent and practitioner developed a home safety plan to identify hazards showed that parents who were able to complete the plan during

the intervention were able to track their progress with the practitioner during subsequent home visits. Parents who did not complete the plan before the end of the intervention lost the opportunity for feedback (Llewellyn, McConnell, Honey, Mayes, & Russo, 2003).

As with typically developing parents, parents with ID respond positively to parent training programs if they offer flexibility in their delivery. For example, a randomized trial evaluating a parenting intervention in Australia comprised of 40 families with one parent with ID, found that parents' knowledge improved through three months after study completion. Flexibility and individualization characterized program development. Specifically, all "best practice" approaches to training were included, and literature was revised to reflect an Australian context and teaching style was augmented when needed for better results (Llewellyn et al., 2003). Parents engage more often when the support is the result of the parent's expressed needs (Heinz & Grant, 2003). Increasingly, studies have employed a qualitative element including parents in the discussion of what is needed and works best. An emerging theme from one-on-one interviews with parents with ID in the UK was that parents generally have an idea of what their challenges are and respond enthusiastically when their needs are addressed during intervention (Tarleton & Ward, 2007).

Attention has been given to identifying the barriers and indicators for CM among parents with ID, however, an inclusion of these considerations in the development of interventions is lacking. For example, parenting programs should have goals that are achievable for parents to ensure that they do not become overwhelmed during training. Parents whose home environments were extremely unsatisfactory had difficulty during home safety evaluations because the lists were so long they lacked the resources to address everything (Llewellyn et al., 2002). As such, responses to perceived needs of parents with ID from a focus group of practitioners working

closely with this population recommended an individualized approach as a top priority (Barkby et al., 2009).

Diverse and cognitively appropriate teaching methods remain the most consistent finding in adapting parenting programs for parents with ID. In addition to behavioral techniques, development of various teaching materials has shown promise in working with parents with ID (Llewellyn et al, 2002). Information which is presented in several formats is an attempt to create a more interactive and engaging training atmosphere. As mentioned previously, ID alone does not suggest a person cannot absorb information. All people learn in varying formats, thus the focus should be on exploring methods which are appropriate and varied.

Studies of interventions with parents with ID most often adopt a more pictorial mode of transmitting ideas with fairly successful results. Color coded food cards and a menu planning chart for the purposes of training a mother with ID were used to plan meals and shop for groceries. Visual stimuli combined with verbal instruction and modeling resulted in an over 90% increase in menu planning and a 25-70% increase in grocery shopping maintained for up to 12 weeks (Sarber, Halasz, Messmer, Bickett, & Lutzker, 1983). Materials such as the food cards and charts represent self-instructional materials that help to increase self-efficacy in parents and serve as prompts during times when training is not occurring. One of the gaps in research related to parents with ID is the lack of focus on generalization of newly acquired skills (Feldman, 1994). Self-instructional materials provide a permanent prompt that is at once easy to understand and helps with skill maintenance. A large parenting manual containing mostly pictorial information on issues related to newborn care, health, and parent-child interaction to 13 parents with ID showed the manual resulted in the adoption of 22 of 26 skills and those skills were maintained up to 15 months (Feldman & Case, 1997). Similar results showed maintenance through 6.5 months

suggesting self-instructional materials are a viable, low-cost, and less intrusive option for parent-training with parents who have ID (Feldman, 1999).

Technology.

The use of technology also represents a self-instructional method that is relatively low-cost, unobtrusive, flexible, and casts a wider net in addressing prevention efforts. Researchers have called for wider use in the typically developing parenting populations to assist in identifying CM and its risk factors, augment current prevention efforts, and increase dissemination of parent education interventions (Self-Brown & Whitaker, 2008). Self-instructional technology such as video-tapes and web-based education impart information succinctly and provide the parent with more control over rate of delivery. A study of foster parents who watched a brief educational DVD on types and causes of anger issues in foster children concluded that the technology was effective in increasing confidence and awareness of anger related issues by the parents (Pacifci, Delaney, White, Cummings, & Nelson, 2005). Technology provides an alternative approach to the transmission of ideas through face-to-face instruction.

With respect to increasing the efficacy of parenting programs, technology is useful in creating a contact between practitioner and parent that establishes a constant form of monitoring which tracks progress and is less intrusive to parents. A study using cell phone prompts for parents participating in an intervention related to parent-child interaction showed parents viewed the use of cell phones favorably and maintained skills with an average increase of 26% from baseline (Bigelow, Carta, & Lefever, 2008). A home safety study that used previously recorded video-tapes of rooms in a parent's home provided an interactive method of instruction which the researchers concluded was significant in identifying and reducing hazards in the home (Mandel,

Bigelow, & Lutzker, 1998). A more recent study used iPhones as both a data collection and a monitoring tool for reducing the amount of hazards in participants' homes. These results also showed promise and underscored the multi-functionality of technological interventions (Jabaley, 2009). The reduction of face-to-face time potentially reduces stress and anxiety resulting from feeling the need to "perform" for a practitioner. When skills are being utilized outside of a trainer/trainee environment, they become more naturalized based on the lack of a formal training setting. Parents have wider options in how they choose to participate because technology makes it easier for parents to fit an intervention into the context of their lives. Additionally, practitioners waste less time rescheduling cancelled or missed appointments (Feil et al., 2008; Self-Brown & Whitaker, 2008).

Technology brings the added advantage of casting a wider net to reach parents who might not yet be in the system, but still represent a risk for CM. Parents who live in rural areas without access to the plethora of social services available to urban populations, and especially parents who are not yet perpetrators are able to gain access to valuable information that may aid in prevention of CM. A recent study which adapted the Playing and Learning Strategies (PALS) parenting program to a website called Infant Net concluded that the potential to reach a larger populace through web-based instruction could be both beneficial for parents and more cost-effective for providers (Feil et al., 2008). Very often, the CPS system has taken a crisis driven approach to CM, and creating opportunities for parents to seek advice without fear of repercussions presents a beneficial alternative in service delivery. Similarly, utilizing technological media through which parents (and the larger society) are becoming increasingly familiar means that cost can be cut based on the fact that these instructional tools are already in place. For example, a reality TV show called "Driving Mum and Dad Mad" in Australia made

use of technology that was already widely embedded within the population. A study of its effectiveness in altering parenting practices showed a significant improvement. In fact, this improvement was directly proportionate to the amount of episodes each parent watched (Sanders, Calam, Durand, Liversidge, & Carmont, 2008). While some barriers exist with the use of technology, such as ease of use and individual cost, the benefits offer a promising direction for prevention of CM.

Technology has also been widely used in the ID population as a method for teaching independent life skills and increasing confidence in carrying out these tasks. It can be particularly useful for persons with ID because it addresses many of their unique learning needs directly. First, information is largely visual. The use of video (Shiple-Benamou et al., 2002), computer-based (Cheng & Chen, 2010), and even virtual reality scenarios (Cromby, Standen, & Brown, 1996) have all yielded positive results in rapid acquisition of skills by persons with ID. The symbolic representation of ideas makes it easier for persons with ID to digest information rather than having to spend time on text heavy instruction. Technology also enables presentation of information in smaller and more manageable doses to reduce the risk of cognitive overload. Video via an iPhone was used with children with autism spectrum disorder (ASD) as a self-prompting tool when the children were in school. The children learned to manipulate the video prompts on the iPhone application for use only when they needed them rather than have repeated prompts throughout the day. By controlling the amount of information they received, the children maintained skills longer and learned to generalize behaviors (Cihak, Fahrenkrog, Ayres, & Smith, 2010). Another benefit of using technology with persons with ID is that instruction can be delivered in an environment free of extraneous factors. Using methods such as web-based instruction provides a situation in which to learn and practice skills without the possibility of

external variables creating diversions or distractions. Virtual reality environments represent this concept by creating alternative realities in which skills can be practiced in relative safety without associated risks that exist in the real world (Standen & Brown, 2005). This concept is noted to be especially useful for persons with ASD who may become preoccupied with irrelevant stimuli (Shipley-Benamou et al., 2002). There are no added interruptions because information can remain constant each time. Correspondingly, technology is engaging either by focusing attention to the device or by obliging the person to interface with it. A study of a 3-D computer program designed to teach persons with ID how to recognize and identify facial expressions found that the program generally had positive effects on skill acquisition. It was designed as an interactive learning module that asked 24 questions about facial expressions shown to the participant. The authors suggest high acquisition of skills were the result of engagement being couched within the design of the intervention (Cheng & Chen, 2010).

Finally, many of the technological tools contain an implied element of self-instruction with roots in Bandura's social learning theory (Bandura & Walters, 1963). Based on this concept, a person with ID can observe a behavior, imitate it, receive feedback, and hopefully generalize. Technology provides a tool through which a person with ID is able to self-regulate based on what they observe on a video, computer-screen, or hand-held device. This ideally creates self-efficacy which is linked positively with behavior change (Bandura, 1993). Some forms of modeling use another person as the model that depicts a multi-step task shown from either a first-person point-of-view or by using another person which the student watches and mimics. A study of a computer-based program used to encourage problem-solving behavior in children with ID showed that not only were participants successful in completing the program, they also increased their metacognition making it easier to generalize basic skills (Moreno &

Saldana, 2005). Technology appears to address issues related to maintenance because it provides a way to self-prompt in the absence of or in addition to face-to-face intervention (Mechling, Gast, & Fields, 2008). A computer-based program which taught independent life skills to middle-school-aged children with ID showed that when skills decreased in follow-up observations, re-watching the computer program allowed children to quickly re-master material (Ayres & Cihak, 2010). Some efforts have taken this further by creating a self-prompt mechanism within the device which gives the individual the ability to manipulate for themselves when to interface with the prompts. Using a personal digital assistant (PDA) to teach cooking skills to children with ASD allowed children to adjust prompt levels to suit their needs after the intervention had been completed (Mechling, Gast, & Seid, 2009).

Self-Modeling.

Another emerging and quite useful form of modeling uses the participants themselves as the model. This type of intervention, called self-modeling, is based on the theory that observing images of oneself successfully demonstrating desired skills creates an image of personal success which aids in adaptation. A review of 150 self-modeling interventions in various therapeutic and training applications has shown this intervention's efficacy in adaptation of behavior, generalization, reducing anxiety in completing tasks, improving mental image, combining skills, transferring role-play to real life settings, and providing boosters of underutilized skills (Dowrick, 1999). Particularly for persons with ID, self-modeling is useful because it combines visual support with a first-person perspective. Cihak et al., (2010) used an iPhone application that demonstrated the expediency of self-modeling in adapting learned skills in a real-world context. The added benefit was that the iPhone was a portable device that could be used during situations where video or computer-programs were not feasible such as a daily classroom

environment. Video-self-modeling was used to facilitate positive social interactions among preschoolers on the playground found major improvements among three of four in the sample and cite rapid skill acquisition as a major benefit of its use. (Buggey, Hoomes, Sherberger, & Williams, 2011).

Barriers to access of technology by persons with ID have been noted (Braddock, Rizzolo, Thompson, & Bell, 2004; Wehmeyer et al., 2008), however, research has shown that persons with ID can learn to use technological implementations successfully. An evaluation of a computer program designed to teach basic computer skills to persons with ID showed generally positive acquisition (Li-Tsang, Lee, Yeung, Siu, & Lam, 2007). Further, when persons with ID are able to engage with technology, their opportunities for a better quality of life increase. Two such studies exploring the benefits of access to technology by persons with ID demonstrated that they were able to interface effectively with tools to help them determine adequate employment opportunities (Stock, Davies, Secor, Wehmeyer, 2003; Wehmeyer et al., 2006).

Based on its efficacious uses as a teaching method for person with ID, parenting interventions geared to this population are also exploring self-modeling with success. The use of audiovisual learning materials combined with audio-tapes helped increase mastery in child-care and safety skills for parents with ID (Feldman & Case, 1999). Additionally, consumer satisfaction ratings showed high rates of satisfaction. Thus, technology adaptations in interventions for parents with ID provide tools that are cost-effective, as well as, beneficial in skill acquisition.

In the current study, SafeCare was adapted to the unique needs and considerations of parents with ID by employing a self-instructional technique which makes use of technology and self-modeling. Specifically, the study asks whether a mother with ID can use a digital picture

frames with pictures of her own parent-infant interactions to enhance interactions with her baby. A multiple baseline across behaviors was used to demonstrate the effectiveness of the SafeCare PII module enhanced by the digital frame.

METHOD

Participants.

One mother living in the Atlanta area participated in this research. She was diagnosed with intellectual disability (ID). Three children aged 3, 5, and 9, and one infant (0-10 months) lived with her in her home. She was referred by staff from All About Developmental Disabilities (AADD), an organization whose mission focuses on fostering relationships and community support for families with at least one member who has a developmental disability. Families involved in AADD are assigned an outreach worker whose job is to support them in accessing resources which assist them in living independently. In order to receive services from AADD, a psychological evaluation must determine IQ score and cognitive learning ability. An IQ below 70 is a most basic criterion for ID; additionally, AADD has their own criteria which determine the overall needs of each family. Generally, AADD enrolls families referred by Department of Human Services (DHS) or CPS as a place of last resort. Families involved with AADD often experience significant socioeconomic barriers, health issues, and threat of child removal.

The selection criteria for the referral were: a diagnosis of ID for the parent; an infant 0-10 months living in the home; and the parent expressing an interest in learning parenting skills. An ID diagnosis was defined as a psychological observation that included a cognitive ability score below 70 on the Wechler Adult Intelligence Scale (WAIS). The age range for the infant was selected based on the typical age range for the SafeCare Parent Infant Interaction (PII) module. In addition to the selection criteria listed above, AADD included their own criteria for referral such as a history of cooperation with AADD and an adequately stable home environment. Based on these criteria, four mothers were referred. One mother was dropped from AADD services

altogether and one mother had her children removed from the home. Of the two mothers who consented to participate, one was lost to attrition and the other completed the study after eight weeks. Pseudonyms are used to identify the mother and her infant.

Mother. “Juliet” was involved with outreach services at AADD for five years. Her file indicated she was referred to the program by a family member for the purposes of accessing supportive resources and not because of an immediate crisis, which typifies many AADD referrals. AADD provided her with an outreach worker with whom she met on a semi-monthly basis. The outreach worker offers support in accessing community resources such as financial and housing assistance programs and independent living skills such as health care for her family and balancing a budget. The psychological evaluation using the WAIS yielded a result of 66 in verbal and 72 in performance with a diagnosis of mild mental retardation, limited problem-solving skills, and slow information processing. She completed nine years of school before dropping out. She has since completed her GED, and has an average reading level of 3.6 according to her psychological evaluation. Her evaluation also suggested Juliet was very eager to learn skills that would help her become more independent.

At the beginning of the intervention Juliet was a single mother living in a two-bedroom apartment with her 10-month-old son, Roderick, and three other children ages 3-9. Between the fourth and fifth home visits, another young female friend moved in and began living in the apartment with them. Juliet was 23 and unemployed, with a monthly income of \$679. Two weeks following the introduction of the intervention, she began participating in a job training program with the hope that she could obtain employment.

Child. Juliet's son, "Roderick", was 10-months-old when the study began and 15-months-old when the study was completed. He was Juliet's fourth child. During the first visit to Juliet's home, Roderick was assessed using a developmental milestone checklist created by SafeCare and based on Centers for Disease Control (CDC) guidelines. The checklist contained age-appropriate cognitive, physical, and social skill markers which can be used to ascertain if developmental delay exists and whether medical attention is advised. Roderick did not show signs that suggested serious developmental delay, and was afforded regular medical check-ups as a result of AADD's involvement with the family. Roderick was social and able to play well with other children and communicate using sounds or hand gestures. Cognitively, Roderick displayed skills appropriate for his age such as drinking from a cup and following simple instructions. Physically, Roderick was strong and began walking several steps alone by the end of the intervention. He was beginning to exhibit some verbal skills at the time of the intervention.

Home Visitor and Observer.

The researcher (who will hereafter be referred to as HV for home visitor) successfully completed the SafeCare Parent-Infant Interaction (PII) module training, and conducted all primary data collection. A Graduate Research Assistant (GRA) from the Center for Healthy Development was also trained in the SafeCare PII module and served as the reliability observer.

Setting.

The intervention took place in the living area of Juliet's two-bedroom apartment. The apartment complex was located in a low SES area that consisted mostly of government-subsidized housing. The HV was able to informally speak with neighbors and acquaintances living in the apartment complex to ascertain that many living there received some form of assistance related to housing arrangements. The condition of the complex was characterized by

boarded-up windows, trash on the premises, and broken glass in the playground area. AADD staff recommended that all home visiting sessions take place as early in the day as possible because of potential safety issues. Juliet had recently relocated to a newer apartment within the complex, thus although her apartment was sparsely furnished, it contained newer and cleaner furniture than many other apartments.

Observation System: The PAT-IV.

The intervention relied on one primary form of observation, The Planned Activities Training checklist, infant version (PAT-IV) that was specially adapted from the PAT-IV form currently used by SafeCare providers. The purpose of the PAT-IV was to record Juliet's demonstration of PII skills by direct observation. Target PII skills were: smiling, touching, looking, positive verbalizing, imitating infant, and gentle movement. Each skill counted as an independent category on the checklist; thus, there were seven possible observable skills for each activity. The skills were grouped into two skill sets: physical (touching, holding, and gentle movement) and non-physical (smiling, looking, positive verbalizing, and imitating infant). Four of the skills (smiling, looking, positive verbalizing, and touching) were identified as core skills that could be demonstrated in every interaction between parent and infants. The observations were divided into 10 one-minute intervals for each skill, so that occurrence-nonoccurrence data could be obtained. The PAT-IV with definitions for each skill is included in Table 1.

Observational Assessment and Scoring.

PII skills were observed at baseline, the beginning of each training session, and postintervention through direct observation by the HV using the PAT-IV. One of three activities was observed during an observation. These activities were selected from two daily activities and one free play activity. The daily activities were chosen by Juliet prior to baseline because they

were activities she expressed as being more challenging and needed more practice. During each observation, Juliet was asked to interact with Roderick in her usual manner without any feedback from the HV who informed her that she should act as she typically would and pretend as if no one was there. The observation began when the HV started her stopwatch and Juliet and Roderick began engaging in the activity. The observation ended once the HV observed that Juliet had successfully completed the daily activity or when Juliet and Roderick were becoming disengaged and distracted during play at which point the HV would cut off the stopwatch. When the reliability observer was present, the HV introduced her to Juliet and explained that the observer was helping the HV and would also watch the activity. For these observations, the HV and reliability observer generally sat next to one another so that they could simultaneously start and stop their stopwatches.

Partial-interval recording was used to estimate occurrence or nonoccurrence with which each skill on the PAT-IV was demonstrated. Each observation was divided into one-minute intervals, using a stopwatch with a vibrating alarm set to vibrate every minute until the conclusion of the observation. During the observation, the HV and the observer independently marked a \surd for each interval in which the skill occurred. A \surd was only marked once per skill per interval. An interval was only counted if it lasted the full 60 seconds. For example, if an observation lasted 5 minutes and 30 seconds, only 5 minutes or 5 intervals of data were recorded. An “n/a” could also be scored for a non-core skill (imitating, holding, and gentle movement) if the HV ascertained that the context of the activity precluded use of the skill. For example, during a play activity in which the infant was crawling on the floor, holding and rocking are not relevant and could therefore be scored “n/a”. These intervals were dropped and consequently not included in the final calculation. The number of intervals in which a skill occurred was converted to a

percentage by dividing the number of intervals in which it occurred, by number of total intervals. A composite score for each skill set was derived by taking the sum of all of the intervals in which the skills in that skill set occurred, and dividing by the total number of intervals in that skill set. Based on these individual scores and the HV's visual observation of skills being demonstrated properly, the HV was able to adjust training to focus more on the skills that were not improving or were being under-utilized. For example, if Juliet was being trained in the physical skill set (holding, rocking, and touching) and demonstrated each skill correctly, but missed several opportunities for holding Roderick, the HV might offer more feedback on holding or ask her to practice using another activity. If Juliet still was not able to demonstrate the skills correctly and at the appropriate times, the HV might have to use an alternative training technique such as modeling or taking additional pictures of holding, end the session, and try again in the next visit.

Data from each session were graphed by the HV following the session. Visual analysis from graphed data was used to determine when skill acquisition was mastered and when more training was necessary. Juliet moved on to the next skill set training once mastery criteria were met in the skill set trained in the previous sessions. Mastery for each skill set was considered to be correct demonstration of all the skills in a skill set during an activity without any feedback by the HV and a score of 80% occurrence or higher. During training for the new skill set, Juliet was expected to maintain mastery of the skills in the previous skill set. If the score for a skill dropped, booster training was provided until she once again achieved mastery. Final mastery was reached when Juliet was able to demonstrate all of the skills (both skill sets) on the iPAT without feedback from the HV and a score of 80%.

Training.

Home Visitor Training. Home visitor training consisted of a six-hour training workshop on the Parent- Infant Interaction (PII) module conducted by a certified SafeCare Training Specialist from the National SafeCare Training and Research Center (NSTRC). The HV trainee was provided with a manual containing an outline of the PII sessions, the Planned Activities Training checklist, infant version PAT-IV, all training materials given to parents, and a quiz about the PII module.

The training workshop consisted of didactic learning, as well as, interactive training. First, a Power Point presentation explained each one of the PII in-home training sessions and provided and the four- step training process (explanation, modeling, practice, and feedback). The HV trainee was instructed how to use the PAT-IV and score observations using videotaped parent-infant interactions. Finally, the HV trainee participated in a role-playing PII session with another HV trainee while the SafeCare Training Specialist observed and scored for fidelity to the module. After the role-play, the training specialist provided feedback and addressed additional questions from the HV trainee. At the close of the session, a written quiz was administered to the HV trainee in order to assess fundamental understanding of the PII model. Based on the role-play and quiz, the Training Specialist determined the HV had attained mastery and could successfully deliver the PII module to parents.

In addition to the SafeCare PII training workshop, the HV took several additional steps to become comfortable with delivery of the module using the digital frame enhancement in an actual home setting. The HV delivered a “practice run” of the PII module with a volunteer parent with typical development and infant not participating in the study. The “practice run” served to further familiarize the HV with the PII module and pilot the introduction of the digital

camera and digital frame during the training sessions. The HV also attended one additional SafeCare PII training session which served as a “booster session” before delivery with the study population.

Observer Training. The observer was a Graduate Research Assistant (GRA) from the Center for Healthy Development who was also trained in the SafeCare PII module by an NSTRC Training Specialist. Additional training sessions with a focus on application and scoring of the PAT-IV were held. These training sessions were led by the HV and included discussion of the use and scoring of the PAT-IV, as well as practice application by observing previously videotaped PII sessions of SafeCare home visitors already delivering the PII module in the field obtained with permission through the NSTRC data files.

Reliability.

Reliability Observer Training. The HV and the observer began practicing reliability observations several months prior to the initial home visit by viewing previously recorded videos of SafeCare certified home visitors conducting PII module training sessions. During practice, the HV and observer scored the video independently using the PAT-IV. After the conclusion of the observations, the HV compared scores and led discussion aimed at consistent application of the observation system. Scoring and discussion continued in order to obtain increasingly accurate reliability until mastery criterion of 85% was reached.

Interobserver Reliability. Reliability observation sessions were conducted at each baseline session, one training session, and one immediate posttraining observation. No reliability data were collected at follow-up because prior interobserver reliability scores were so high that it was deemed unnecessary. During reliability observations, the observer accompanied the HV on the home visit. The HV and observer independently scored Juliet’s performance using the PAT-

IV, but only the HV provided training and feedback to the parent during the remainder of the session. Each of the measured skills scored by the home visitor or the observer was entered into a formula to obtain interobserver reliability:

Materials.

Parent Training Materials. Juliet was provided with standard SafeCare PII module training materials during the first home visit. The Daily Activities Checklist- Infant Version DAC-IV was used to identify daily activities such as meal times and diapering that she found challenging with Roderick. Two activities from the DAC-IV were chosen by the HV and Juliet and were used throughout the delivery of the PII module during observation of the skills on the PAT-IV. A preliminary version of the newly developed SafeCare iCards provided to Juliet, contained definitions and examples of each of the skills on the PAT-IV. The iCards were a revised and enhanced version of the PAT-IV parent handout formerly used with the SafeCare PII module for all parents. They were developed to be more user friendly by increasing pictorial content and providing succinct text explanations for each skill, as well as, incorporating information on determining a child's emotional state (sad, sleepy, alert, etc). The Developmental Checklist included age-specific developmental milestones used to help identify issues related to appropriate development. Activity cards describing various activities in which parents can engage with their infants to encourage proper development were also provided as a resource and for practice following each training session. These cards were written in simple language and contained some pictorial information to make them more accessible for the parent to use. Juliet and the HV decided upon a secure location in her home to keep these materials so they were accessible for each home visit. The iDAC and iCards are provided in Appendices A-B.

Digital Frame. An Opteka digital picture frame with an 8- inch (800 x 600 pixel) LCD screen was given to Juliet after the first training session which was the second home visit. The digital frame is an electrically powered photo screen onto which stills or short videos can be uploaded from the memory card of a digital camera and shown in sequence. Once the photos are uploaded, the frame runs a slideshow continuously throughout the day unless it is turned off.

Stopwatch. An Independent Living Aids (ILA) vibrating stopwatch keychain was used during observations of Juliet and Roderick. The ILA stopwatch can be set to vibrate at regular intervals and is small enough that the keychain can be discretely attached to a clipboard or pocket during an observation. The HV and observer each were provided with stopwatches they set to vibrate at 60-second intervals so that the Juliet was not distracted by noise during the observations.

Procedure.

Recruitment. The process for recruitment involved several steps to ensure full understanding by Juliet. Recruitment began with a routinely scheduled visit to her home by the AADD outreach worker to ask if she had interest in meeting with the HV to discuss participating in the research. Once she agreed to a meeting, the HV and the outreach worker visited her home again to explain the SafeCare PII module, use of the digital camera, and expectations for research. At the beginning of the meeting the HV introduced herself as a researcher from Georgia State University who was conducting a project to understand better how to help parents play with their babies. During this meeting, the informed consent document (ICD) was read aloud by the HV as Juliet sat beside them and followed along. The HV modified her language according to Juliet's needs and employed an interactive questioning strategy to establish understanding of the research. For example, when Juliet and the HV were reviewing the ICD, the

HV asked Juliet to explain a sentence in the procedures section about how play could help Roderick grow and learn. The HV asked Juliet to describe examples of how she had taught Roderick something while they were playing. The HV then engaged Juliet in a discussion about being a parent and what she might hope to learn from the experience. The HV also made sure to emphasize how important her feedback was in making the SafeCare PII better for parents. The HV also brought the digital frame into Juliet's home and demonstrated how they would use it. The HV explained to Juliet that at the end of the project, she would receive \$30 and get to keep the digital frame. Once she consented and the outreach specialist determined she had reached sufficient understanding and did not feel undue pressure to participate, consent was obtained and the first session was scheduled.

Baseline. During baseline, the HV and reliability observer observed Juliet using the PAT-IV to identify occurrence of the seven PII skills. Juliet and the HV then used the DAC-IV to identify one daily activity and one play activity which were used for observation throughout training. They chose an additional daily activity that was observed only during baseline and postintervention as a generalization measure. The HV explained to Juliet that the purpose of the baseline session was to observe her interacting with Roderick as she typically does, thus no feedback would be provided. She was then asked to interact with Roderick during each of the chosen activities and to pretend that the HV and observer were not present. To derive a datum point, data from the two training activities were used to calculate a cumulative mean. Data from the third activity constituted a second datum point representing the generalization measure. If baseline data showed < 15% occurrences, no second baseline would be required.

Training Condition. The skill set with the lowest score was trained first. The basic training procedure for each session per skill was explanation, modeling, practice, and feedback.

During training, Juliet and the HV reviewed each skill on the iCards individually, and discussed ways she could incorporate each one into interactions with Roderick. Each skill was modeled by the HV and practiced by Juliet with positive and corrective feedback provided by the HV. This sequence was followed for each of the skills in each particular skill set. After practicing each skill independently, Juliet and the HV practiced using them simultaneously with the HV offering praise and suggestions for missed opportunities. For example, if a mother was practicing smiling, the HV would also suggest using looking and positive verbalizing at the same time. At the close of each session, Juliet and the HV discussed any additional questions or comments and chose one age-appropriate activity from the Activity Cards for practice of newly trained skills. At the beginning of the next session, Juliet was asked to perform skills from the previous skill set using one of the agreed upon activities, and the data derived from these sessions were calculated and graphed. The data determined which skills required more training and when it was time to move on to a new skill set. For the non-physical skill set, training took two sessions rather than one. In this case, data collection still occurred at the beginning of the next session even though training was incomplete. Once the parent attained mastery with all the skills in one skill set, training began in the next skill set.

Introduction of the Digital Picture Frame and Alarm Mechanism. The enhanced version of the PII training for Juliet involved modeling, practice, and feedback, and also staging, with her and Roderick posed in the newly learned skills which were photographed and uploaded to the digital picture frame. The purpose of the digital frame was to provide Juliet with a visual representation successfully self-modeling the PII skills so that during the day when the HV was not present the pictures could serve as a permanent source of prompting. Throughout the training, the HV captured photos of Juliet correctly modeling each of the PII skills. This

generally took place during training using the iCards. After Juliet had practiced using one of the skills during training with consistent success, the HV would capture photos of her repeating the skill exactly as she had just demonstrated. The HV would ask Juliet to repeat the skill several times or pause during the activity to ensure the skills were modeled correctly and visible in the photographs. Sometimes, the HV would give Juliet verbal instruction while she was posing to assure the shots were an acceptable representation of the skill being trained. After the HV was able to capture several shots of the skill, the HV and Juliet would move on to training and adding pictures of the next skill. Photos of verbal interactions, such as positive verbalizing, had to be captured so as to demonstrate the interaction in a still shot without the assistance of audio. For example, a picture of talking needed to show Juliet with her mouth open as she was speaking to Roderick. Often each skill required several shots, and poses varied depending on how well Juliet was able to pose for the camera. Toward the end of training in a skill set, the HV and Juliet were able to capture all skills in a skill set used at once. For these photos, the HV would praise Juliet for using multiple skills by identifying each one. For example, for a picture in which Juliet was holding Roderick, the HV might say, “good, I like the way you are not just holding Roderick, but also rocking, smiling, and looking at the same time. Let’s try and take a picture of you doing this”.

The digital frame was introduced once several images for each skill trained in that session had been captured with the digital camera. All photos were uploaded to the digital frame at the close of each session so that Juliet was able to practice throughout the week. Each time new photos were uploaded to the digital frame, Juliet and the HV reviewed each one together to make sure she had clear understanding of the PII skills depicted in each shot. Simple questions such as, “what are you doing in this picture?” and “which skills are you using with Roderick in this

picture?” provided assurance that Juliet would be able to look at each photo in the absence of the HV and identify the skills being shown. After Juliet and the HV reviewed the photos, the HV set the frame to automatically queue a slideshow of the photos on a continuous loop. Juliet and the HV determined times and activities during the day that she could practice interactions using the digital frame as a guide. The continuous loop allowed her to self-model positive PII interactions at any time throughout the day and served as a constant reminder to practice. Photos of new skills were continuously uploaded to the frame until Juliet had a complete catalog of all the skills on the PAT-IV. When the HV arrived at Juliet’s apartment each week, the HV would check to see whether the frame had been turned off and engage Juliet in a discussion about how she liked the frame and how she had used it to practice in the week prior.

Implementation of the SafeCare Enhanced PII Module. During the remainder of the sessions, new skills were introduced and the four- step training sequence was employed with more photos uploaded to the digital frame. At the beginning of each training session, the previous session’s interaction skills were assessed using the PAT-IV with no feedback from the HV. The data from each of these observations were graphed and ascending trends in one skill set allowed the intervention to be introduced with the next skill set. The new skill set used the same training process with photos of successful demonstrations of PII skills recorded and uploaded. Juliet was asked to continue to practice the skills frequently throughout the week using the digital frame as a training tool. After training of all skills occurred, practice of PII continued utilizing boosters as needed for skills she had yet mastered, and continuously adding new content to the digital frame as needed to build a cumulative catalog of PII skills. The HV provided ongoing feedback as Juliet progressed towards integration and mastery of both skill sets during interactions with Roderick. In the final session, an observation of Juliet demonstrating all of the

PII skills was conducted by the HV and observer using the PAT-IV. At the conclusion of the session and once Juliet had achieved mastery, the HV reminded her there would be three follow-up visits occurring at one-month, two-month, and three-month intervals in which she would be assessed on PII skills again. A session by session description of the procedure is provided in Table 2.

Follow-up Observation. Follow-up observations occurred at one-month, two-month, and three-month intervals to evaluate skill maintenance. Juliet was told that the HV and observer would return to conduct four additional one-hour visits to observe how well the new skills were being maintained. During these follow-up visits, she was asked to engage in two activities with Roderick and demonstrate the PII skills without any prompting from the HV. One activity measured in the baseline and one new activity in which she had not been trained was observed by the HV. Juliet was informed that this was just to see how well the training helped in interacting with Roderick, and to interact the way she normally did when no one was watching. Juliet was also asked about her use of and experience with the digital frame. If the HV found that the skills were not being maintained, booster sessions would be conducted. In these sessions, the HV focused on the skills being underutilized by modeling the skills and sharing opportunities for their use. The HV would then go through the digital frame to find instances in which Juliet had used the skill correctly to remind her of the ways in which she was already incorporating it into various activities. Then, the HV and Juliet would practice the skill in another activity so that Juliet would have the opportunity to use the skill correctly and in context.

Experimental Design.

A multiple probe design across skills was used to demonstrate the effectiveness of the SafeCare PII module enhanced by the digital frame. This design establishes internal validity by

demonstrating a functional relationship between the intervention and the outcomes by the sequential introduction of the independent variable across time. The strength of multiple probe design is that fewer baseline sessions than a multiple baseline design are used. This design is particularly useful in training parents with ID because it does not involve numerous baseline sessions that may be redundant, or excessive amounts of training all at once. Training is introduced sequentially as the parent's skill acquisition improves in each of the skill sets. In order to determine whether the physical or nonphysical skill set was introduced to begin the training process, the skill set with the lowest percent after baseline was used. Once mastery was obtained for that skill set, introduction and training for the new skill set began. Prior to the introduction of the new skill set, another baseline probe was conducted. The staggered introduction of training and improved outcomes helped demonstrate the relationship between skill acquisition and training.

Consumer Evaluation.

After the final training session, Juliet was asked to respond to a consumer evaluation questionnaire to assess the usefulness of the SafeCare program and the digital frames. The consumer evaluation was conducted by the reliability observer after the HV had already left the home. The questionnaire was read aloud and followed an interactive question and answer format applicable to each parent's cognitive ability. The questions were rated using a Likert Scale with additional space for comments. The 10 questions on the evaluation were divided into three categories: attitudes about the program content, attitudes on delivery of content by the home visitor, and attitudes about the use of the digital frame. After the parent had completed the evaluation, it was folded and placed in a sealed envelope.

RESULTS

Interobserver Reliability.

Reliability observations occurred in 42% of the sessions: baseline, one training session, and the immediate posttraining observation. Interobserver reliability was maintained above 90% over the duration of the study with an interobserver reliability rating mean of 96% overall and 96.1% and 96.2% for nonphysical and physical skill sets respectively. The mean and range of reliability percentages for the parent-infant dyad are presented in Table 3.

Results of Enhanced SafeCare Training on Skill Acquisition.

The effects of the PII intervention and digital frame enhancement on the occurrence of PII skills are shown in Figure 1. Data show a significant increase in the occurrence of PII skills in both skill sets after training and the digital frame were introduced. The baseline datum point was taken from an average of one daily activity and one play activity. Baseline means for physical and non-physical skills were 16.65 and 58.3, respectively. Consistent with multiple probe design, each skill set was introduced sequentially so that physical skills were trained beginning in session 2 and non-physical skills began in session 3. Physical skills exhibited the most remarkable change with over 83% increase from baseline. After the intervention and frame were introduced, a dramatic increase in the occurrence of physical skills was demonstrated with a mean of 83% and continued to increase for the remainder of the training with a range of 83-100%. Nonphysical skills maintained a range of 50-62.5% before the training condition was introduced in session 3. In session 3, skill demonstration increased to 83% with only partial training and 91.6% after training was completed. The mean percentage of occurrence continued to increase in both skill sets for the remainder of the training condition so that the range was 83-100% for physical and 83-92.5% for nonphysical. The steady increase of skill demonstration

from baseline implies that use of PII skills is proportionate to the introduction of the PII module and digital frame enhancement.

Further indications of the efficacy of the PII module and digital frame were that Juliet continued to show generalization of the skills she had been trained in after training of those skills was completed. For example, after Juliet had been trained in physical skills and during her training in nonphysical skills, she continued to maintain a 100% mean average of occurrence in physical skills for the remainder of training condition. Additionally, after she received partial-training in two of the four skills in the nonphysical skill set, Juliet performed those two skills with 100% percent occurrence in the next observation session and those she was not fully trained in with 83.3% occurrence.

Generalization data points were collected at baseline and at the final training session from an activity not used during training. Data gleaned from the generalization activity also convey a high level of skill acquisition. Baseline measures for generalization were 33.3 for physical and 58.3 for non-physical and increased to 100% for physical and 83% for nonphysical in the final session. This significant increase suggests that Juliet was able to use the skills she had learned during training and apply them to a new parenting activity with success.

After one month, data show a slight decrease for both physical and non-physical skills with a mean of 90% and 83% respectively. Data were derived from an average of one activity Juliet had received training in during the intervention and one she had not. Both skill sets decreased almost 10% from the final training session with non-physical skills faring .5% better than physical.

Consumer Satisfaction.

The results of the consumer satisfaction survey were quite favorable. After participating in the program, Juliet perceived playtime with Roderick as more fun and she felt very sure of herself when she thought about using playtime to help Roderick maintain healthy development. She believed the information was delivered well, and she was able to pick it up easily. She considered the digital frame was easy to use and helpful for instruction, but expressed she felt uncomfortable posing for some of the pictures for the frame. The responses from the satisfaction survey are shown in Table 4.

DISCUSSION

The purpose of this research was to determine the effect of adaptations to the SafeCare PII module for parents with ID. Specifically, could a mother with ID use a digital picture frames with pictures of her own PII to imitate PII taught by the HV to enhance interactions with her child. It represents the only other research conducted using the SafeCare PII module, but with significantly faster acquisition of skills suggesting the efficacy of the digital frame enhancement. Although there were no systematic efforts to differentiate between the efficacy of the enhancement versus SafeCare as usual, skill acquisition occurred more quickly than in the previous SafeCare PII study which used verbal prompts only with typically developing high-risk mothers (Lutzker et al., 1987). In addition to rapid skill acquisition, the enhanced PII module produced a significant increase in the mother's appropriate demonstration of both physical and non-physical skills across a range of daily and play activities whose effects were maintained up to two months. During the two follow-up visits, Juliet demonstrated mastery in activities in which she had not been trained, thus demonstrating the ability to generalize skills.

Juliet also demonstrated generalization of skills through her use of them with her older children. Because the other children were often in the room during training, Juliet took the opportunity to practice skills with them, particularly the verbal skills such as positive verbalizing and imitating behaviors. In her consumer evaluation she notes, "I learn to play with my baby and use eye contact with my baby, also my kids", suggesting she was able to adapt the trained skills to interactions with all of her children and not just Roderick. This suggests potential for using the digital frame enhancement to PII to encourage positive parenting behaviors for parents with ID. Doing such could possibly prevent maltreatment and child removal.

The primary objective of the research was to make adaptations to the SafeCare PII module which was appropriate and sensitive to parents with ID. Building from an established literature base, this research addressed concerns found in previous studies with parents with ID related to positive behavioral outcomes for families and maintenance of skills over time. Skills trained in parenting programs often take many sessions before skill acquisition occurs and generalization of skills continues to lag (Wade et al., 2008). Some studies suggest best results for positive outcomes point to repetition when training skills, but caution that parents will become disengaged with repeated information or find the training condescending (Llewellyn & McConnell 2002). The current study addresses the need to provide opportunities for monitoring and reinforcement of skill acquisition through the addition of the digital frame which provides a continuous source for prompting of behavior that is unobtrusive and accessible. Furthermore, the repeated presentation of skills utilizing various formats (face-to-face, digital frame) likely helped to alleviate boredom and saturation which resulted in faster and more engaging skill acquisition.

Juliet was able to attain mastery in each skill set after a maximum of two sessions. She consistently performed each skill well during training, but because she had recently entered a job search program, home visits were not able to be scheduled with regularity. Although home visits were as many as 22 days apart, she regularly demonstrated mastery of skills from the previous session. At one-month follow-up she was observed while bathing Roderick, an activity in which she had not been trained, and demonstrated all of the applicable skills at least one-third of the time. Skill acquisition and maintenance, despite a variable home visiting schedule, indicates that Juliet was able to use the photos on the digital frame as a training resource during times when the HV was not present in the home.

Although there was no way to know for certain, there were both visual and verbal indications that Juliet was using the digital frame in between home visits. Each time the HV arrived at Juliet's apartment, she would check to see whether the frame was turned on. The frame was turned on in 4 of the 7 visits, about 60% of the time. All of the visits for which the frame was turned on happened between sessions 1-4, during the time the bulk of the training was taking place. At each visit, the HV would ask Juliet to tell her about using the frame or looking at the frame during her regular day. Juliet was generally able to provide examples for how and why she looked at the frame, for example, she wanted to show a friend the pictures and was able to explain the skills she was using to her friend. In another instance, the photos in the frame reminded her to practice talking and imitating with Roderick using a picture book.

Further evidence that Juliet was using the frame between sessions was the observed association between the frequency of occurrence of skills during an observation and the frequency with which they appeared in photos on the frame. Photos demonstrating verbal skills such as imitating sounds were more difficult to capture in a still shot. Consequently, there was less representation of this skill among the photos that were taken. Although imitating was not considered applicable in every activity, Juliet missed several opportunities to use this skill with Roderick and it was consistently revisited during training. This suggests that because she had limited examples of this skill on the digital frame, there were fewer opportunities to practice between sessions which resulted in less demonstration during observations.

Juliet was clearly very engaged with using the digital frame which contributed to a greater interest during training and an increased opportunity for practice outside of home visits. One of the AADD outreach workers mentioned that many of the mothers did not have pictures of themselves and their children, and appreciated the opportunity to amass them in one place. Juliet

was uncomfortable posing for photos at first, but eventually she began to appear more comfortable and even offered ideas as to how she could pose with Roderick to correctly demonstrate a skill for each shot. Helping to create her own instructional materials kept her engaged and appeared to give her confidence; an important factor in the adoption of behaviors for parents with ID. During reviews of pictures on the digital frame at the end of each session, Juliet was almost always able to identify PII skills in each image suggesting that she was paying attention during training. Similar to other studies using pictorial instructional formats (Feldman, 1994, 1999) this research contributed additional evidence of its usefulness in conveying information among parents with ID, but with the addition of self-modeling.

Another implication is recognizing the heterogeneity of parents with ID by acknowledging the social-ecological factors in their immediate situations which can influence outcomes to a large degree. Parents with ID often exhibit psychiatric co-morbid conditions and other socioeconomic barriers, live in adverse environments, or generally prioritize other immediate needs over parenting programs. The use of the digital frame makes it easier to be sensitive to a parent's preoccupation with other issues. As mentioned earlier, Juliet's schedule became very busy halfway through the intervention. She was attending a job placement program that kept her out for most of the day during the week. Once she arrived home at 5pm, her children were home from school and her home environment became too hectic for a home visit. Several times she had to reschedule appointments so that home visits did not occur with any regularity. The digital frame was able to serve as an important prompt during long periods without a home visit.

One objective of this study was to use the digital frame as an application of the self-modeling intervention with parents with ID. The intervention was intended to promote self-

efficacy which would result in readier adoption of PII skills. Self-modeling likely helped in two ways. First, Juliet appeared to become more confident in her ability as a parent as the study proceeded. She frequently discussed how she noticed when other parents were not using PII skills. For example, she learned to take the opportunity to teach Roderick names of items as she talked to him and noticed that other parents in her complex did not do this. Additionally, she was able to recall the moment in time when each picture was taken and recite some about the context of the situation because she had been there. In one instance, the HV and Juliet were reviewing the photos on the frame at the end of a session and Juliet looked at one of the photos of bouncing taken on a previous day and commented on how many times she had to take the picture to make sure it came out just right. Thus, self-modeling may be a useful intervention enhancement for parent engagement and skill acquisition.

The intent of this research was to contribute to the growing body of research using technology interventions in the context of parenting programs (Whitaker & Self-Brown, 2008). Possibly because Juliet was young, she was familiar and confident with using technology. She frequently corresponded with the HV through text messages on her cellular phone and often used abbreviations and symbols when communicating. Consequently, she had little difficulty operating the digital frame. When the HV returned for the second training session, Juliet had already successfully uploaded her own pictures to the frame. So as not to confound the research, she was asked to remove them until the conclusion of the intervention.

The digital frame is a relatively inexpensive technology that provides an appropriate medium for behavioral training methods. Whereas the research design did not separately examine the digital frame from the standard PII module, observation suggested that engagement

with the frame remained high for the majority of the training. Further, the photos uploaded to the frame support the use of pictorial training materials and the self-modeling intervention.

While the SafeCare PII module with digital frame enhancement appears to have been effective at increasing the instances of parent-infant skills, there are several obvious limitations to this research. The narrow parameters and vulnerable status of the targeted population made recruitment difficult. As a result, the research evolved into a single-case experiment. The problem with a small sample is that it lacks sufficient size to draw any conclusions about or generalizations across mothers. The results did suggest rapid skill acquisition by Juliet and served to lay the groundwork for a replication that compares PII alone to PII with the digital frame enhancement.

The primary limitation was the absence of any analysis to determine whether the frame itself was responsible for the rapid skill acquisition. Anecdotal evidence suggests the frame may have had an effect, though it was unclear whether Juliet used the frame to self-prompt during times when the HV was not in the home. Additionally, the use of the newly developed iCards was not measured for their usefulness during the intervention. The purpose of the new cards were to be a more user friendly tool for relaying information about each behavior through the use of smaller text and accompanying pictures. The effect these could have had on Juliet learning the skills might confound evidence pointing to the frame as the reason for rapid skill acquisition and maintenance.

The time commitment by participants required for this research may also reflect a limitation. Parents who have jobs or many children living in the home with them may find it difficult to participate for 90 minutes per week. Additionally, parents in this population commonly receive services from various agencies and might struggle with balancing them. A

meta-analysis of effective components of parenting programs supports this assertion and revealed that participation with many services negatively affects efficacy (Kaminski, Valle, Filene, & Boil, 2008). In Juliet's case, scheduling an appointment for a home visit was difficult because of her busy schedule, and in two instances she forgot about the home visits altogether.

Literature suggests that because of experiences of discrimination among this population, especially with regard to their children, parents with ID are often wary of beginning any services they may perceive as questioning their parenting ability (McConnell & Llewellyn, 2002). In both instances of filling out the iDAC to identify daily activities they felt were challenging with their infant, the mothers selected very few activities as "difficult" and stressed to the HV that the most were no trouble. Whether this was actually the case or they were attempting to project an appearance of competency could be considered a hindrance in selecting activities that truly needed training.

Others living in the household may also be suspicious of service providers coming into the home for the purpose of parent training. The young mother who was lost to attrition lived in the household with three other female relatives who were all mothers themselves. The HV experienced resistance on several occasions during her attempts to visit the home. Phone calls were not returned, appointments were skipped, and in one instance no one came to the door although there were clearly people inside. In discussions with the mother's outreach worker, it was learned that the women in the house objected to anyone other than themselves offering parenting advice to the mother and felt that the home visits were intrusive and unnecessary.

Contributing to the limitations of use of the digital frame was lack of control of the frame between home visits. Near the end of the intervention, the HV began to find that the frame had been turned off when she arrived for home visits. A new roommate moved in around this time

and was slept on the couch in the living area next to the frame, turning it off at night when she went to sleep. No protocol existed for ensuring that the frame was turned on at least part of the time during the day and Juliet admitted at follow-up that the frame had been off the majority of the time after training was completed. Juliet also used the frame for personal use during the intervention by uploading pictures of other children unrelated to the research to the frame. She was asked to remove them until after the training to rule out sequence effects. It is unclear whether this affected the results, but illustrates confounds that can occur when the instructional material is out of the HV's hands.

The digital picture frame was relatively easy to operate, but for individuals with limited cognitive functioning, some barriers to use may exist. For the most part, Juliet only had to learn how to use the on and off switch. Should she try to move it to another location or if someone in the household accidentally pressed a button, the frame could be rendered useless until the next home visit.

The photos uploaded to the frame also created some limitations. For example, verbal interactions such as talking and imitating were sometimes difficult to capture in a still shot. The video option on the digital frame could not be run simultaneously with the still shots and required more complicated instructions for switching back and forth. Because there was more difficulty in taking stills that adequately portrayed verbal skills, there were fewer instances of these skills represented in the photo log. It is possible that an unequal catalogue could contribute to uneven acquisition of skills as was suggested by Juliet's lower use of imitation during observations.

Finally, posing for pictures or having pictures uploaded to the frame may cause discomfort for some parents. Initially, Juliet expressed discomfort posing for pictures, and

displayed some resistance when the HV asked her to pose for several pictures at a time. It is possible that some people may not enjoy having their picture taken or may be opposed for cultural reasons. Possible alternatives might need to be addressed for the sake of contextual fit.

Despite limitations related to the technological intervention and social contextual factors, observation by the home visitor and reliability observer showed Juliet participated actively throughout the intervention which resulted in an impressive increase of occurrence of skills surpassing data seen in many typically developing mothers (Lutzker et al., 1987). She attained mastery in physical skills after only one training session and continued to maintain those skills even when she had moved to the next skill set. There were several occasions that merited concern when the HV observed Juliet's reactions to extraneous issues in her personal life. During these times, training was put on hold in order address whatever needed the most immediate attention. For example, training in the second skill set was split over two sessions when the HV recognized Juliet had reached saturation for the day and needed to talk about something else.

The single-case experiment using a digital picture frame in addition to the SafeCare PII module with a parent with ID yields some promising outcomes about the potential of technology adaptations in parenting programs, specifically among high-risk populations. The PAT-IV produced high reliability, contributing to the validity of the research. With a sound protocol in place, larger studies will provide an essential evidence base for replication of the positive outcomes resulting from this parent-infant dyad. In replicating this research on a larger scale, it will be necessary to improve issues of recruitment by pulling from a larger pool of potential applicants and creating relationships beyond only one agency.

In order to reduce attrition, it is also important to take into consideration the social factors that may mitigate the success of an intervention. Issues such as household organization and

interaction with other agencies should be addressed and dealt with at the beginning of the research. Creating a calendar or refrigerator magnet with the HV's contact information and appointment times could potentially assist in making time commitments more manageable for parents. Building relationships with other family members in the parent's support network is also crucial in creating a space for the HV in the same support network.

Anecdotal and observational data strongly imply that the digital picture frame was useful in delivery of the PII curriculum to Juliet. Future research should contain a more rigorous component for the analysis of its efficacy within the intervention. Additionally, particular focus on the amount and frequency of skills displayed in each image uploaded to the frame could ensure that the parent is being properly exposed to each skill and can help to identify those that might be underrepresented. Creating a systematic way to categorize and appraise each photo would lend extra validity by defining what constitutes a useful image. The integration of the digital frame into the Parent Child Interaction Module of SafeCare would continue to make its use relevant to the parent as the child develops. As a child ages, parents must adapt their behavior particularly to utilize more verbal skills as the child becomes more curious and active (Pomerlau et al., 2003). The video and audio capabilities on the digital frame could be used for parents to begin to transition into more use of verbal versus non-verbal skills.

In continuing to add to the research related to parents with ID, it is important to consider teaching strategies that are practical and relevant. Their lives are often situated within a classist context which leaves them few opportunities to move forward socially. Much of the "best practices" parenting literature is written in a middle-class context that has little relevance in many of these parents' lives. Asking a parent to uphold a middle-class standard without offering a way there, sets them up to fail, and it is important for parents with ID to have achievable goals

in order to produce positive outcomes. Mother-child interactions should always be considered with a broader social context that acknowledges many factors besides the mother which contribute to a child's development. In working with parents with ID who often encounter additional health and structural barriers, it is necessary to suspend preconceived notions and proceed from their current abilities without judgment. In-depth qualitative research that asks parents with ID to describe their experiences of being a parent by placing them at the center of the discussion would help to develop interventions and enhancements that are appropriate.

In summary, this research points to possibilities of using technology combined with the self-modeling intervention for parents with ID. Technology offers a promising new advantage for engaging with parents and creating a less intrusive or patronizing atmosphere when working with a population of parents who can be suspicious of visits by those working in child care fields. The addition of self-modeling as a method of instruction creates variation within the delivery of curriculum making it more user friendly and lending agency to the parent. This research also contributes to the large evidence-base for the efficacy of SafeCare, specifically the PII module. Despite its limitations, this research holds promise for the use of technology in SafeCare modules and parenting programs targeted for parents with ID.

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FIGURES, TABLES, AND APPENDICES

Table 1. PAT-IV

Parent: _____

Date: ___/___/___ Time: ____

Child: _____

Observer: _____

Setting/ Activity: _____

Condition: Baseline Training Follow-up

Parent Behavior	Occurrence per minute (10, one-minute intervals)									
Smiling*☺ Looking at infant & turning mouth up; Laughing										
Looking*☺ Facing infant with open eyes										
Imitating Infant* Imitating vocalizations or movements; Respectful										
Positive Verbalizing*☺ Endearing Terms, praise; Talking about an activity; Talking with eye contact										
Holding~ Completely lifting infant off surface; Warm, direct contact										
Gentle Movement~ Gently moving infant back and forth or up and down.										
Touching~☺ Patting, kissing, tickling; Affectionate/gentle contact										

* Indicates Non-Physical Behaviors, ~ Indicates Physical Behaviors, ☺ Indicates Core Behaviors

Calculating Total Score:

1. Number of intervals in which observed behavior received a \checkmark = ____
2. Answer from #1 divided by total number of intervals X 100 = ____%
3. **Total Score:** sum of number of intervals from all behaviors divided by total number of intervals. =

Scoring:

\checkmark : The behavior occurred

X: The behavior did not occur

n/a: No opportunity to use this skill (supplemental skills only)

Scores:

1. Physical skills: _____
2. Non-physical skills: _____

Table 2. Session by session procedure outline

Session #	Description	Use of Digital Frame
Session 1	Consent. Baseline data collection in 3 activities, 2 for training (play and feeding), and 1 for generalization (diapering/dressing).	
Session 2	Observation. Training in physical skill set. Introduction of digital picture frame.	Physical skills photos uploaded to frame.
Session 3	Observation. Training in non-physical skill set.	Non-physical skills photos uploaded to frame.
Session 4	Observation. Continuation of training in non-physical skill set.	Non-physical skills photos uploaded to frame.
Session 5	Observation. Training in both physical and non-physical skill sets	Physical and non-physical skills photos uploaded to frame.
Session 6	Final observation in all baseline activities.	
Follow-up #1	Observation. (Dressing and bathing)	
Follow-up #2	Observation. (Play and caring for a sick child)	

Table 3. Means and ranges of interobserver agreement (%) across skill sets

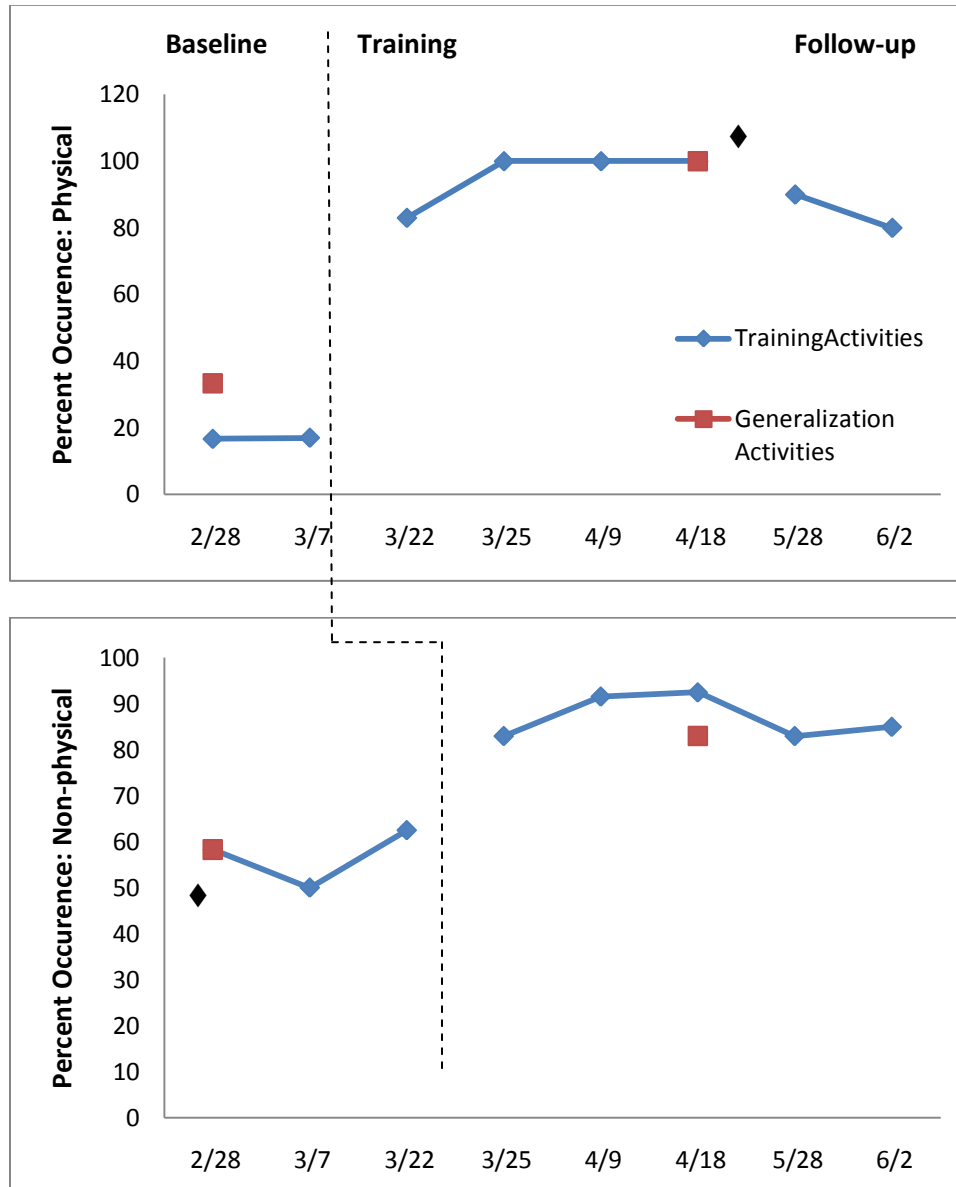
Skill Sets	Baseline	Observation 1	Observation 2
Physical	90.3 (83-100)	100	98.3 (95-100)
Non-physical	97.2 (91.6-100)	100	91.36 (86.6-100)
Cumulative	94.4 (92.8-100)	100	94.7 (91.4-100)

Table 4. Results of Consumer Satisfaction Survey

1. Since I finished the PII program, play time with my baby is			
Very fun	Fun	The same	Not very fun
2. When I think about playing with my baby now, I feel			
Very sure of myself	Sure of myself	A Little unsure	Very unsure
3. When I think about how to help my baby learn and grow, I feel			
Very sure of myself	Sure of myself	A little unsure	Very unsure
4. When the home visitor explained the information about playing with my baby, I			
Understood well	Understood	Was a little confused	Was very confused
5. The amount of time it took to learn how to play with my baby like the home visitor taught was too long			
Too long	A little long	The right amount	A short time
6. When I think about using the picture frame, I think it was			
Very easy	Easy	A little tricky at times	Very hard
7. When the home visitor explained how to use the picture frame, I			
Understood well	Understood	Was a little confused	Was very confused
8. When I had to use the picture frame to help me learn about playing with my baby, I felt...			
Very uncomfortable	Uncomfortable	Comfortable	Very Comfortable
9. When I think about how helpful the picture frame was in helping me learn about playing with my baby, I think the picture frame was			
Unnecessary	Only a little helpful	Helpful	Very helpful
10. When I think about the number of visits I got from the home visitor, I think it was			
Too many	The right amount	A little too many	Way too many

Comments: "I really like Emily when I seen her. She was nice at everything she was doing and I learn to play with my baby and use eye contact with my baby also my kids. I like Kate Emily friend too because their so sweet and they love my kids and my kids love them too. I will enjoy seeing them again. They are good person. In my kids eyes and my eyes they past threw the my hearts and the kids hearts. Thank you all for sending them here.

Figure 1. Percent Occurrence per Skill Set. The ♦ denotes a data point in which the training and generalizability scores were the same.



Appendix A. iDAC

Infant Daily Activities Checklist

Family: _____ Child: _____ Age: _____

Home Visitor: _____ Date: _____

Timing: Pre-PII Final PII session

Directions: For part I, check any item that applies to the infant. See Session Outline for guidance if any are checked. For Part II, talk about each daily activity with the parents and put a ✓ where they rates their ease with completing each. Make notes as necessary.

Part I. Infant Information

More than 3 weeks early? Exposure to drugs/alcohol? Special medical needs?

Part II. Daily Activities Rating

Activities I do with my infant...	How much change does the activity need?				Notes
	No change needed	Very little change needed	Some change needed	A lot of change needed	
Waking up					
Getting dressed					
Waiting (while parent fixes food)					
Eating					
Diapering					
Bathing					
Waiting time (while parent is busy)					
Getting ready to go out					
Visiting with others at home					
Playing interactively playing w me					
Getting ready for bed					
Going to bed (bed time)					
Going to doctor/dentist					
Going to other appointments					
Going shopping/on errands					
Staying without parent					
Other: _____					

Appendix B. iCARDS

iCards

These cards will help you understand how to read your baby so that your baby grows and learns.

Babies don't talk like adults, but they do communicate their needs. These cards will help you understand your baby's signals and how to respond to them.



5 States



Asleep

This state is usually easy to see in a babies! Their eyes are closed, and they aren't moving around except sometimes a little twitch or jerk.



Upset

Babies in this state seem all tense...they may ball their fists and turn red. They probably cry and aren't interested in playing or interacting.



Drowsy

Babies' eyes open and close in this state. The eyelids look heavy. Toys may not interest them, or their reaction may be slower than normal, like they're trying to stay awake. They may be fussy and cry.



Calm-Alert

Babies in this state are probably quiet and don't move much. They are very interested in what's going on. They may turn their head to follow your voice and your face.



Excited

Babies in this state are full of energy and happy. They might kick their legs, move their arms, laugh, and smile. They are very ready to play and talk, and they generally love gentle touch.

L♥TTS of B♥nding

Do these 4 things with your baby all the time, every day!



LOoking



Talking

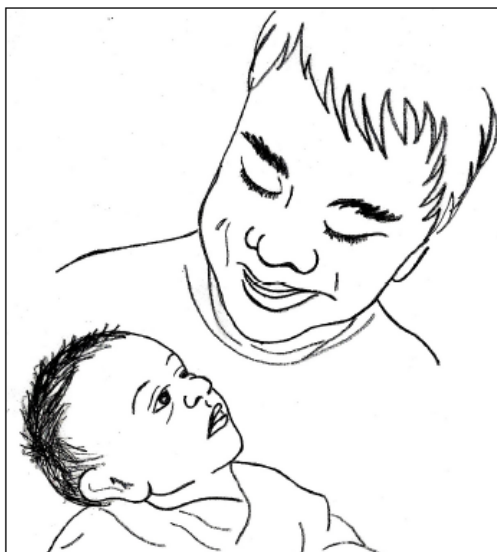


Touching



Smiling

Looking



Looking means making close eye contact with your baby.

Why is it important to look at my baby?

- Looking is a way to communicate.
- Looking lets your baby study your state and lets you study your infant's state.
- Babies love looking at faces!

What else do I need to know?

- Make close eye contact with your baby because babies do not see clearly when they are first born.
- Babies like to look at faces and bold, contrasting colors, like black and white polka dots or stripes

Talking



Talking means chatting about activities and using loving words or praise.

- Talk about what you are doing all the time to help your baby learn new things and new words.
- When your baby is in a calm-alert state, talk in an excited voice.

Why is it important to talk to my baby?

- Babies learn about the world and about language when you talk to them.
- Your baby bonds with you through talking.

What else do I need to know?

- Talk to your baby and make eye contact and smile at the same time.
- When your baby makes a sound, copy that sound in a loving way and your baby will “talk” more!

Touching



Touching means gentle and affectionate contact.

Why is it important to touch my baby?

- Touch helps you bond with your infant.
- Babies need touch to grow up healthy.

What else do I need to know?

- Always support your infant's head.
- Never shake your baby.
- Most babies like to be touched during different types of activities, like mealtime, baths, and dressing.
- You can touch your baby in a lot of ways:
 - Kissing
 - Patting gently
 - Stroking the face
 - Raspberries on the belly
 - Rubbing hands, feet, head
 - Gentle tickling

Smiling



Smiling means showing a happy expression or laughing while looking at baby.

Why is it important to smile at my baby?

- ☑ Smiling at your baby helps you bond.

What else do I need to know?

- ☑ Smile at your baby from the very first moment!
- ☑ Your baby will smile at you around 6 weeks old.
- ☑ The more you smile, the more your baby will smile!

Other B♥nding Behaviors

Do these 3 things with your baby every chance you get!



Holding



Imitating



Rocking

Holding



Holding means warm, close contact while completely lifting infant off surface.

Why is it important to hold my baby?

- Holding makes your baby feel comfortable, safe, and happy.
- Your baby likes to feel your warmth, softness, and heartbeat.

What else do I need to know?

- Always support your baby's head.
- Some babies like to be held in different ways. Try these different ways with your baby:
 - Cradle your baby in your arms
 - Hold your baby up against your shoulder
 - Put your baby on your lap with her face away from you so she can look around. Hold her around the waist and under the legs to support her.

Imitating



Imitating means respectfully copying infant vocalizations or movements.

Why is it important to imitate my baby?

- Imitating helps babies learn new things about how people communicate.
- Babies bond when you interact with them by imitating their expressions and sounds.

How can I imitate my baby?

- When your baby smiles, makes his eyes big, opens his mouth, yawns, looks surprised, or makes noises, copy him.

What else do I need to know?

- If your baby is upset, do not imitate him. Try to have a concerned look on your face — never an angry or frustrated one.

Rocking



Rocking is gentle, repetitive motion that calms an infant.

Why is it important to rock my baby?

- Gentle rocking can make your baby feel better if she is upset.
- Many babies like gentle movement and closeness.

How do I rock my baby?

- Rock your baby while holding her securely and sitting or walking slowly around.

What else to I need to know?

- Never shake your baby.
- If your baby starts to get upset, stop rocking or try to change the way you are moving.

