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A Proposal for Enhancing and Measuring Infant-Directed Maternal Utterances and Incidental Teaching within the SafeCare® Parent-Infant Interaction Module

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ABSTRACT

Child maltreatment is a serious and pervasive public health problem in the United States. In 2008, there were 772,000 children who were substantiated victims of maltreatment and 1,740 children died as a result of maltreatment. Approximately 33 percent of maltreatment victims were under the age of four.

Among numerous other negative sequelae, children who have been maltreated have an elevated incidence of language delay and poor cognitive functioning, both strong predictors of literacy skills and later academic achievement. Further, maternal language input is critical to a child's cognitive development and language acquisition. Maltreating mothers provide their children with far less verbal stimulation and are less likely to engage their children in learning opportunities.

Home visiting programs are effective means of preventing child maltreatment or further maltreatment by parents and may be better utilized to improve language of children. SafeCare® represents one such program. It is an evidence-based program for the treatment and prevention of child maltreatment, consisting of four modules: Parent- Infant Interaction (PII), Parent-Child Interaction (PCI), Health and Safety.

The purpose of the proposed research is to determine whether PII or a language-enhanced version of the module is effective in increasing the number of maternal utterances with her infant and the frequency of incidental teaching. The enhanced PII segment was created, not only to be an effective tool for promoting language, but also to be succinct enough to imbed into the extant protocols so as not to add a cumbersome burden to SafeCare home visitors or parents participating in the program.

A PROPOSAL FOR ENHANCING AND MEASURING INFANT-DIRECTED MATERNAL UTTERANCES AND INCIDENTAL TEACHING WITHIN THE SAFECARE® PARENT-INFANT INTERACTION MODULE

by

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Table of Contents

Child Maltreatment: Definition and Prevalence in the U.S.

Child maltreatment is a serious and pervasive public health problem in the United States. The Federal Child Abuse Prevention and Treatment Act (CAPTA, 1974) defines child abuse and neglect as, at minimum: any recent act or failure to act on the part of a parent or caretaker which results in death, serious physical injury or emotional harm, sexual abuse or exploitation; or an act of failure to act, which presents an imminent risk of serious harm (U.S. Department of Health and Human Services [DHHS], 2009).

CAPTA also provides specific definitions for sexual abuse, as well as cases related to withholding or failing to provide medically necessary treatment, yet it does not provide definitions for other types of maltreatment such as physical abuse, neglect or emotional abuse.

In an effort to improve surveillance of child maltreatment, the Centers for Disease Control and Prevention (CDC) proposed the use of uniform definitions of the various forms of maltreatment. The CDC definition offers a much broader perspective of child maltreatment than CAPTA. It defines child maltreatment as any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential harm, or threat of harm to a child. Acts of commission are those defined as acts of overt abuse, which are deliberate or intentional, including sexual abuse, physical abuse, and psychological abuse.

Neglect is deemed an act of omission in which a caregiver fails to provide for a child's basic physical, emotional or educational needs, or to protect a child from harm or potential harm. Neglect may be physical, emotional, medical/dental, educational, or entail the lack of adequate supervision and exposure to violent environments. In both acts of commission (abuse) and

omission (neglect) it is not necessary that the caregiver's intent was to cause the child harm (CDC, 2009).

According to a 2008 report by the Administration on Children, Youth and Families (ACYF), presenting the data collected by the National Child Abuse and Neglect Data System (NCANDS), 772,000 children were substantiated victims of child maltreatment during FFY 2008, a rate of 10.3 per 1,000. Approximately 33 percent of maltreatment victims were under the age of 4, while nearly 24 percent were between 4 and 7 years of age, and almost 19 percent were between the ages of 8 and 11. Among substantiated cases, the youngest children are at the greatest risk for child maltreatment, having the highest rate of victimization. The rate of child maltreatment among boys and girls between birth and 1 year of age was 21.8 and 21.3 per 1,000 respectively, while the victimization rate for children ages 4-7 was much lower, 10.9 per 1,000 for both boys and girls (DHHS, 2010).

During 2008, the highest rates of maltreatment were found among African-American children (16.6 per 1,000), American Indian or Alaska Native children (13.9 per 1,000), and children of multiple races (13.8 per 1,000). The rate of maltreatment among white children was 8.6 per 1,000, while the rate among Hispanic children was 9.8 per 1,000. Asian children had the lowest prevalence of maltreatment with a rate of 2.4 per 1,000. Overall, there was not a significant difference between the rates of maltreatment among boys and girls.

Neglect was the most prevalent form of maltreatment among all races and ethnicities, accounting for 71.1 percent of all cases; 16.1 percent of all children were physically abused; 9.1 percent were sexually abused; 7.3 percent were psychologically maltreated and 2.2 percent were medically neglected. Nine percent of all victims were categorized as having experienced other

types of maltreatment including abandonment, threats of harm, or congenital drug addiction. Of those children who suffered from abuse and neglect, 38.3 percent were maltreated by their mothers, 18.1 percent were maltreated by their fathers, and almost 18 percent (17.9) were maltreated by both parents.

Also, in 2008 it is estimated that 1,740 children in the U.S. died from abuse or neglect. Of those who died, 79.8 percent were under the age of 4 and 45.3 percent of all fatalities were under the age of 1 year. Over one-third of child deaths were attributed to multiple forms of maltreatment, 31.9 percent were caused by neglect, and 22.9 percent were caused by physical abuse. Medical neglect was responsible for 1.5 percent of child deaths. Over 70 percent of child deaths were caused by one or more parents and 26.6 percent of children were killed by mothers who acted alone.

The National Incidence Study (NIS), a congressionally mandated study of child maltreatment, also provides data on the rates of child maltreatment in the U.S. The NIS-4 is the most recent NIS study and presents data for a one year period, 2005-2006. The NIS-4 was mandated by the Keeping Children and Families Safe Act of 2003 (P.L. 108-36).

Unlike the NCANDS data, which documents only substantiated cases of child abuse and neglect by Child Protective Services (CPS), the data collected for the NIS is more inclusive and, as such, may provide a more accurate reflection of the actual prevalence of child maltreatment. The NIS recognizes that the number of maltreated children reported and investigated by CPS most likely represents a very small proportion of children who actually suffer abuse and neglect. Therefore, the study includes children reported to CPS as well as those who were not.

In order to identify maltreated children who are not included in the CPS data, the NIS utilizes data from sentinel reports of suspected maltreatment. Sentinels are professionals working in various sectors of the community such as health, law enforcement, social services, shelters, day care centers, and public housing who have regular contact with children and families.

Though there is no standard training for sentinels, they are considered capable of recognizing when a child has been maltreated and able to provide enough information in order for those conducting the NIS to determine whether the maltreatment constitutes the study's definitions of abuse or neglect. Often, sentinels are already mandatory reporters for child maltreatment. During the study period, sentinels are asked to watch for maltreated children and report suspected cases to CPS or to NIS directly.

NIS classifies maltreatment according to two standards: the Harm Standard and the Endangerment Standard. In order for a child to be counted under the Harm Standard, the child must have experienced observable harm from his maltreatment. The Endangerment Standard includes all children under the Harm Standard as well as those children believed by a sentinel reporter or by CPS to have been placed by at serious risk of harm by their caregiver, either through action or omission (Sedlak, Mettenburg, Basena, Petta, McPherson, Greene, & Li, 2010).

Subcategories of abuse and neglect fall under both the Harm Standard and the Endangerment Standard. Subcategories of abuse include physical, sexual and emotional abuse, while categories of neglect include physical, emotional, and educational neglect. The Endangerment Standard also encompasses forms of neglect that are not countable under the Harm Standard including: lack of preventive health care, child support problems, and unspecified

allegations of neglect. Further, the category "all maltreatment" under the Endangerment Standard includes children considered endangered by their parents' lifestyles, which may include alcoholism, drug abuse, and prostitution. Unlike the NCANDS data, the NIS-4 Endangerment Standard excludes congenital drug addiction.

According to the Harm Standard, 1,256,600 children were maltreated over the course of the one-year study period. As in the NCANDS study, the NIS-4 study reflects that the majority of maltreated children suffered from neglect. Of the 1,256,600 maltreated children, 553,300 were abused and 771,700 were neglected. Three hundred and twenty-three thousand children suffered physical abuse, 135,300 suffered sexual abuse, and 148,500 were emotionally abused. Among the neglected children, 295,300 were physically neglected, 193,400 were emotionally neglected, and 360,500 were educationally neglected.

Under the Endangerment Standard, an estimated 2,905,800 children experienced some form of endangerment during the study year, a rate of 39.5 children per 1,000 or the equivalent of 1 in 25 children in the U.S. population. The Endangerment Standard includes all children under the Harm Standard and an additional 1,649,200 children who were abused and neglected but not countable under the Harm Standard.

The NIS-4 contains three race categories: Black, White, and Hispanic. Under the Harm Standard, Black children had significantly higher rates of maltreatment (24 per 1,000) than White (12.6 per 1,000) or Hispanic (14.2 per 1,000) children, and had significantly higher rates of having incurred serious harm (8.8 per 1,000) than both White (4.6 per 1,000) and Hispanic children (5.2 per 1,000). Similarly, Black children had significantly higher rates (13.7 per 1,000) of moderate harm than White children (7.2 per 1,000). The rates of sexual abuse, all neglect, and

inferred harm were statistically marginally higher among Black children (2.6, 14.7 and 1.5 per 1,000 respectively) than among White children (1.4, 7.5, 0.7 per 1,000 respectively).

Under the Endangerment Standard, rates of maltreatment among Black children were also significantly higher (49.6 per 1,000) than both White (28.6 per 1,000) and Hispanic (30.2 per 1,000) children. The rates of maltreatment among Black children were significantly higher than both Whites and Hispanics in the categories of all abuse (14.9 per 1,000), physical abuse (9.7 per 1,000), all neglect (36.8 per 1,000), emotional neglect (18.2 per 1,000), serious harm (9.1 per 1,000), and endangered (18.1 per 1,000). Black children had significantly higher rates of physical neglect (17.9 per 1,000) than White (12.2 per 1,000) children, and had marginally higher rates of suffering moderate harm (18.6 per 1,000) than White children (11 per 1,000).

For the purpose of comparison, the NIS-4 categorizes children into 6 age categories: 0 to 2 years, 3 to 5 years, 6 to 8 years, 9-11 years, 12-14 years, and 15-17 years. Unlike the NCANDS data, the NIS-4 reflects the lowest incidents of maltreatment to be among 0-2 year olds. Under the Harm Standard of maltreatment, 0-2 year-olds had a significantly lower rate of overall maltreatment, physical abuse, and emotional neglect. The rate of Endangerment standard abuse was also significantly lower for this age group including physical abuse, emotional abuse. These differences among rates of maltreatment 0-2 year-old children may be accounted for by differences in reporters of the maltreatment.

Under the Harm Standard, girls suffered a significantly higher rate of abuse than boys (8.5 per 1,000 vs. 6.5 per 1,000). The higher rate of abuse among girls is largely attributed to the higher incidence of sexual abuse among girls. The rate of Harm Standard sexual abuse among

girls was more than 5 times that of boys. Girls were also more likely to experience inferred harm; this too, is primarily attributed to the higher rates of sexual abuse among girls.

Similarly, under the Endangerment Standard of maltreatment, girls were significantly more likely to suffer sexual abuse and inferred harm. However, under the Endangerment Standard, there was only a marginally statistically significant difference in the rates of overall abuse between girls and boys.

The rates and forms of maltreatment also vary according to a child's disability status. While children with disabilities were less likely to suffer Harm Standard physical abuse (3.1 per 1,000) than children without a disability (4.2 per 1,000), children with a disability were far more likely to experience Harm Standard emotional neglect (4.7 per 1,000) than children without a disability (2.3 per 1,000). Further, children with a disability had a much higher rate of suffering from serious harm (8.8 per 1,000), yet had a lower rate of experiencing moderate harm (6.2 per 1,000) than children without a disability (9.0 per 1,000).

Under the Endangerment Standard of maltreatment, children without a disability were more likely to be physically abused (6.2 per 1,000), sexually abused (2.4 per 1,000), and physically and emotionally neglected (15.5 per 1,000 & 15.6 per 1,000 respectively). However, children with a disability (9.1 per 1,000) were more likely to suffer serious harm as a result of their maltreatment. Children without a disability were nearly five times more likely to be categorized as endangered (15.9 per 1,000) than children without a disability (3.3 per 1,000).

The NIS-4 not only identifies a much larger number of children as having been maltreated, it also attributes the deaths of many more children to the maltreatment they suffered. During the 2005-2006 study period, it is estimated that 2,400 children died from Harm Standard

maltreatment, as opposed to the more conservative estimate reflected in the NCANDS data of 1,740 child fatalities.

According to the Georgia's Protective Services Data System Annual Report, in 2007 there were 32,951 substantiated cases of child maltreatment in the state (Georgia Department of Human Resources, 2007). Of these cases, 28,734 were due to neglect, while physical abuse accounted for 3,537. Further, 1,434 children were sexually abused, 693 emotionally abused, and 142 cases fell under the category "other abuse". The number of maltreated girls and boys was approximately the same; girls comprised 16,773, while boys accounted for 16,170 of maltreated children. The majority of maltreated children were White (18,287), as compared to 13,317 Black children and 753 children of multiple races. There were 145 Asian children, 23 Native Hawaiian/ Pacific Islander, 16 American Indian/Alaska Native, while the race of 7 children was not reported and the race of 403 of the children could not be determined. The large majority of children (30,147) were determined not to be of Hispanic origin.

Georgia Protective Services classifies a number of children as having a "special characteristic". This includes children who have been diagnosed as being emotionally disturbed, have mild to moderate intellectual disabilities, are vision or hearing impaired, physically disabled, diagnosed with a medical condition, have behavioral issues, and use alcohol and/or drugs. The large majority of these children (2,144) were neglected, 389 were physically abused, 112 were sexually abused, 84 were emotionally abused, and 15 suffered another form of abuse.

The number of substantiated cases of child maltreatment declined from 32,951 in 2007 to 26,330 in 2008. Again, the majority of cases (71.4%) were due to neglect. Medical neglect accounted for 4.8 percent of cases, physical abuse accounted for 11.7 percent of cases, 16.7 percent of children were psychologically abused, 4.4 percent were sexually abused, and 0.2

percent were categorized as having suffered other forms of maltreatment (DHHS, 2010).

The majority of maltreatment victims were White (49.2%), 41. 4 percent were African American, 6.6 percent of children were Hispanic, 2.1 percent were of multiple races. There were 12 cases of maltreatment among American Indian/Alaska Natives and 12 cases among Pacific Islanders.

In 2007, 61 children died from abuse or neglect, while in 2008, there were 68 child fatalities as a result of maltreatment (DHHS, 2010).

Sequelae of Child Maltreatment

While not all child maltreatment proves fatal, children who are abused often suffer the deleterious of effects of insecure attachment (Christopoulos, Bonvillian & Crittenden, 1988); social information processing deficit (Weiss, Dodge, Bates & Pettit, 1992); hyper-vigilance, anxiety, and difficulties with interpersonal conflict (Snow, 2009); and, cognitive deficits including auditory attention and response, visual-motor integration, as well as problem-solving, abstraction and planning (Nolin & Ethier, 2007).

For many children, the effects of maltreatment extend into adulthood and include: poor physical health, poor emotional and mental health, social difficulties, cognitive dysfunction or impairment, engagement in high-risk health behaviors, and behavioral problems (Wang & Holton, 2007). Studies of Adverse Childhood Experiences (ACE) have demonstrated associations between exposure to abuse or household dysfunction in childhood and an increase in health risk factors and poor health outcomes in adulthood. Felitti, et al. (1998) found that an increase in childhood exposure to abuse and dysfunction was associated with an increased risk for physical inactivity and severe obesity, smoking, depressed mood and suicide attempts. There was also significant dose-response relationship ($p<.05$) between the number of childhood

exposures and adult illnesses including: cancer, ischemic heart disease, chronic bronchitis or emphysema, a history of hepatitis or jaundice, as well as poor self-rated health.

Chapman, Dube, and Anda (2007) cite a number of studies linking childhood abuse to poor mental health outcomes in adulthood. Women who have suffered abuse as children or adolescents were at a greater risk for current depressive disorder (Chapman, Whitfield, Felitti, Dube, Edwards & Anda, 2004). A study comparing female patients at various primary care facilities found that women who reported having been abused in childhood had significantly higher scores for depression, anxiety, somatization, and interpersonal sensitivity (McCauley, Kern, Kolodner, et al., 1997).

Not only are those who suffered maltreatment in childhood more likely to suffer from affective disorders, these disorders tend to be more severe and difficult to treat (Walker, et al., 2000) Further, women maltreated as children are more likely to become substance abusers, while having a history of abuse has been found to be a predictor of attrition among drug rehabilitation programs (Wise, Zierler, Krieger, Harlow, Palmer, & Williamson, 1995).

Twardosz and Lutzker (2010) discuss the contributions neuroscience has made toward an understanding of the affects of child maltreatment and the potential for it to inform future strategies for prevention, intervention, and remediation. Neuroscience research indicates that maltreatment leads to atypical brain development, may disrupt the organization of neurobiological systems necessary for stress regulation and affect one's ability to be comforted by disrupting the endogenous opiate system (Chicchetti, 1989).

Others have found that the lack of sensory input due to neglect results in cortical atrophy, enlarged ventricles, small head size (Perry, 2002), as well as decreased metabolism of

the limbic areas of the brain in infants responsible for regulating emotional responses (Chugani, 2001). Further, changes in brain anatomy and functioning due to maltreatment may result high levels of cortisol in response to mild stressors (Heim et al., 2000) and psychiatric disorders (Teicher et al., 2003).

Besides the incalculable costs to individuals in terms of reduced quality of life, child maltreatment is financially costly to society as well. Wang and Holton (2007) estimated the annual cost of child abuse and neglect in 2007 to be $103.8 billion. This estimate includes direct costs including hospitalization, mental health services, child welfare services, and law enforcement. The majority of cost, however, is represented by indirect costs such as special education, juvenile delinquency, mental health and health care, adult criminal justice system, and lost productivity.

Maltreatment and Child Language Ability

Maltreated children lag behind their non-maltreated counterparts with respect to language ability. A systematic review of child maltreatment studies from 1966 to 1999, found that, of the 92 studies reviewed, most concluded that child maltreatment is related to a number of negative sequaela including delayed cognitive development, delayed language, and poor academic achievement (Veltman, 2001). Of the 42 studies that reported language outcomes, 86% indicated that maltreated children were delayed in receptive and expressive language development. Further, when these studies distinguished between neglect and abuse, there was a significant association between neglect and language delay. This finding is significant given that the large majority of maltreatment cases are due to neglect.

Socioeconomic Status and Child Language Ability

Low language ability, however, is not an issue that concerns only children who have suffered from maltreatment. It has been well established that children from lower SES households build their vocabularies at a slower rate than those of high SES families. Hart and Risley (1995) observed 42 children and their families in their homes over the course of 2 ½ years. Based on their occupations, families were described as either upper socioeconomic status (SES), middles SES, lower SES, or on welfare. Study results revealed that three-year-old children from families on welfare had smaller vocabularies and were slower to acquire new vocabulary words than were same age children from professional families.

Similarly, Arriaga, Fenson, Cronan, and Pethick (1998) compared language skills in a group of very low-income toddlers with those of a middle-income sample matched on age and sex using the MacArthur Communicative Development Inventory for toddlers, a parent report form. Scores for low-income group were significantly lower in terms of the size of expressive vocabulary, age of appearance of word combinations, and complexity of utterances.

The importance of language ability in young children cannot be overemphasized. Early language ability has been associated with the acquisition of literacy skills and later academic achievement. During a follow-up study, Hart and Risley (1995) found that measures of language skill at three years of age predicted measures of language skills at age 9-10. In a study examining the relationship between infant language development and later achievement, Hohm, Jennen-Steinmetz, Laucht, and Schmidt (2007) administered the Receptive-expressive Emergent Language Scale (REEL) to a sample of 90 infants at the age of 10 months. When the children reached 11 years of age, they were reassessed using a comprehensive test battery to measure

intellectual skills and language performance. Both receptive and expressive language performance at 10 months were significantly associated with cognitive and educational outcomes 10 years later. Infant language performance was found to be predictive of later verbal skills as well as school achievement at the end of primary school.

Furthermore, "[t]he size of a person's vocabulary is regarded as a measure of his or her intelligence" and not only are vocabulary tasks often used as a measure on IQ tests, "vocabulary is sometimes the only task on short IQ tests" (Huttenlocher, 1998, p. 195).

Maternal Language Input and Child Language Acquisition

Initially, causes of poorer language performance among low SES populations were believed to be solely the result of inherent variations of ability among various social classes; however, subsequent research has revealed that differences in children's language are largely due to varying levels of language exposure, and that maternal language input is a strong predictor of child syntax and vocabulary development. "While it is widely recognized that the acquisition of syntax depends on innately available structures in the child, it is also acknowledged that the child must receive in-put in the language he or she is acquiring" (Huttenlocher, 2002, p.338).

Smolak and Weinraub (1983) observed mothers and children during a brief play session and found that mothers of children who had large vocabularies produced significantly more speech than the mothers of the children with small vocabularies. Tomasello, Mannle, and Kruger (1986) also observed mothers and their children during a brief play session, and found a significant association between the number of mothers' utterances and the number of different vocabulary words produced by their toddlers.

With regard to SES, Hart and Risley (1995) found that differences among children of different social classes regarding rates of vocabulary acquisition were largely attributable to the

sheer number of words heard by the children. While the average child in a professional family was exposed to 2,153 words per hour, the average child in an average working-class family was exposed to only 1,251 words per hour, and children from welfare families were at an even greater disadvantage, hearing only 616 words per hour. Extrapolating these numbers over the course of a child's first four years, an average child in a professional family would have been exposed to 45 million words, an average child in a working class family would have been exposed to 26 million words, while an average child in a welfare family would have experienced only 13 million words.

Similarly, Hoff (2003) examined the relationship between child language development and socioeconomic status and found that maternal speech mediates the relationship between SES and early childhood vocabulary development. Mothers from high SES were found to produce more speech including more word types and higher mean length utterances (MLU). Maternal MLU was a significant predictor of child language, accounting for 22 percent of the variance in child vocabulary.

The significance of MLU may be explained by the fact that the longer the utterances spoken, the richer the vocabulary and the greater amount of words to which a child will be exposed. Longer utterances may also provide more information regarding word meaning because "longer utterances provide richer and potentially more varied syntactic frames surrounding words, and syntax has been demonstrated to be a good source of information regarding word meaning" (Hoff, 2003, p. 1374).

Following observations of 22 children and their mothers during children's typical daily activities, Huttenlocher, Haight, Bryk, Seltzer, and Lyons (1991) concluded that there is a substantial relationship between the amount of child-directed maternal speech and child

vocabulary growth, and that the number of word learning trials a child is exposed to is an important factor in the acquisition of new vocabulary. A later study demonstrated that, not only is there a strong correlation between language input and vocabulary growth, there is also a significant relationship between language input and children's syntactic development (Huttenlocher,Vasilyeva, Elina, Cymerman, & Levine, 2001).

Huttenlocher, et al. (2001) found that there was a significant relationship between differences in children's mastery of multi-clause sentences and the proportion of multi-clause sentences found in their parents' speech. Further, in an effort to eliminate heredity as a potential confounder, children's syntactic growth was measured over a year of preschool. There was a significant relationship between syntactic complexity of teachers' speech and syntactic growth among children.

A brief overview describing important aspects of brain development may serve as a salient explanation as to why language input is such as critical factor in language development. While much of brain development takes place in utero and is determined by genetics, a significant amount of development and change takes place in infancy, childhood while some change is evident even in adulthood. During prenatal development, billions of neurons are produced and migrate to specific locations in the brain in order to perform their appropriate functions; however, most of the synapses or connections between neurons occur after birth (Twardosz, 2007).

The role of experience after birth plays a significant role in physical, cognitive and language development. Brain development and function in infancy and childhood is largely dependent on experiences within the home environment and relationships formed (or not formed) within this environment. The role of experience in the development of synapses among neurons

takes place primarily in two distinct ways: through experience- expectant development and experience-dependent development (Greenough, Black, & Wallace, 1987; Bruer & Greenough, 2001).

During experience-expectant development, various parts of the brain produce an overabundance of synapses in anticipation of common human experiences. The production of an overabundance of connections allows for experiences to shape and prune them. The overproduction and pruning of synapses occurs at different times in different regions of the brain according to patterns of human development, and earlier development of some areas may serve as a foundation for further development in other areas. Vision, auditory development as well as some aspects of language development take place during experience-expectant periods, and importantly, if the expected experience is not available during these periods, normal development may not occur even if the experience is available at a later time (Tychsen, 2001).

During experience-dependent development, the development of neurons and connections in the brain change in response to and individual's unique experiences rather than in anticipation of experiences (Greenough, Black, & Wallace, 1987; Bruer & Greenough, 2001; Black, 2003). It is believed that most of vocabulary and literacy skills are acquired in this manner. Therefore, children learn language as a result of experiencing language, and the vocabulary they are exposed to in their early years will largely shape the development of their own lexicon.

Effects of Maltreatment on Language Development and Cognitive Functioning

Unfortunately, along with the multitude of disadvantages suffered by victims of child maltreatment, there is also evidence that "abused children have an elevated incidence of language delay and poor intellectual functioning" (Allen & Wasserman, 1985, pp. 335). Allen

and Wasserman (1985) observed mother-infant interactions in order to identify potential reasons for communicative/cognitive disorders apparent in children at a later age. The study sample consisted of 12 infants 8-25 months (mean=14) and their abusing mothers. Control dyads were matched for child age, race, SES, and area of residence.

Through observations of mother-infant dyads during a play session, abusing mothers were found to be more negative, more likely to ignore their children, and less initiating, stimulating and positive than controls. Abusing mothers rarely labeled objects, asked questions, or explained aspects of their environment. Further, the verbal interaction of abusing mothers was low compared to nonverbal means of interaction. An abused toddler received one-half the verbal stimulation that a non-abused child receives and, as compared with controls, abused infants over 14 months of age showed significant delays on Bayley scores (Allen & Wasserman, 1985).

Similarly, Eigsti and Cicchetti (2004) studied language in a sample of 19 maltreated and 14 nonmaltreated preschool-aged children. Mother-child dyads were matched on age, gender, ethnicity, socioeconomic status and maternal IQ to control possible confounders. Maltreated children were delayed in their language ability at the age of 5, and they produced less complex language and less advanced knowledge of vocabulary than their nonmaltreated counterparts.

These language delays may also be accounted for by differences in maternal language. Maltreating mothers were found to be less talkative with their children, directing fewer utterances toward them, and producing fewer types of utterances that correlate with child language abilities. Maltreating mothers produced significantly fewer yes/no questions and fewer complex multi-clause utterances than the non-maltreating group, and were also generally less responsive than nonmaltreating mothers.

Parent Training Programs and Incidental Teaching

Because of the detrimental sequelae of child maltreatment, effective interventions are necessary to ameliorate the affects on children identified as having been maltreated or at-risk for maltreatment. It is important that these programs include a language component to teach parents how to speak to their children and stress the importance of increasing verbalizations. Evidence suggests that in-home parent training programs are an effective means of delivering language instruction (Feldman, Sparks, & Case, 1993; Levenstein, 1988) and intervening with families reported for or at-risk for child maltreatment (Olds, Henderson, Chamberlin, Tatelbaum,1986; Bigelow & Lutzker, 2000).

Metzl (1980) measured the affects of the Infant Language Program (ILP) "designed to promote infant development by highlighting care-taking activities and natural occurrences in the daily routine of the child and linking them to the development of reciprocal awareness between parent and child" (p. 584). Specifically, parents were encouraged to engage in:

- Quiet talk: rocking, holding, and talking to the baby at a special time each day.
- Togetherness: moving the baby from place to place and talking about the work as household activities are carried out.
- Back talk: imitating and responding to parent vocalizations.
- Parallel talk: verbalizing what the baby is doing, particularly when he/she is laughing, crying, smiling, etc.
- Time to talk: verbalizing during routine care giving activities as feeding, bathing, dressing, and diapering.
- Let's go: exposing the infant to the sounds, sights, and people found outside of the home.

Study participants were 60 two-parent, self-supporting families and their first-born infants, randomly divided into 3 categories: control, maternal parent training, and combined parent training. A graduate research assistant administered parent training in the home when the

infants were 6, 12, and 18 weeks of age. Pretest measures at 6 weeks and posttest measures at 6 months were conducted using the Bayley Scales of Infant Development: Mental, Motor, and Social Scales and the Caldwell HOME inventory. At 6 months, infants in the experimental groups had improved significantly more on mental scores from pre to posttest and the environments of infants in the intervention groups improved significantly more on HOME scores than those of infants in the control group.

Hart and Risley (1974) developed a method to promote language, social and academic skills among preschool children. Incidental teaching is a systematic protocol of instruction provided in the context of natural environments. Hart and Risley studied the effect of incidental teaching in promoting language among preschool children and found that prompting and requiring children to use specific speech when they requested shelved play materials was effective in establishing specific speech forms in the children's spontaneous vocabularies. Children were prompted to ask for objects by name, request objects using an adjective-noun combinations, and verbalize why they wanted a particular object using a compound sentence. Incidental teaching was effective in teaching and eliciting more language from children, allowing them to incorporate new vocabulary and speech forms into their everyday speech.

Importantly, incidental teaching capitalizes on teaching opportunities that arise as a child demonstrates interest in something in her immediate environment such as a person or object. A key tenant of incidental teaching is to follow the child's lead; in other words, use what the child is already interested in as a teaching opportunity. The five steps of incidental teaching are:

- watch and listen for a sound, word, gesture, or gaze that shows your child is interested in something (child initiates)

- engage the child by suggesting, looking at same thing, naming what she's looking at, asking a question, or commenting (encourage child to do something more elaborate)
- wait (give the child the chance to do something or respond)
- give support (give help, as necessary)
- confirm--give your child the item of interest, expand a phrase, or praise the child (this is the natural consequence)

Because victims of child maltreatment are at the greatest risk for language deficits, incorporating a language component into programs that aim to prevent or intervene to prevent further maltreatment may be very beneficial to the development of the children they serve. One such program is SafeCare®, an evidence-based parent-training program delivered in the home designed to treat and prevent child abuse and neglect (Whitaker, Crimmins, Edwards, & Lutzker, 2008). It consists of four modules: Parent-Child Interaction (PCI), Parent Infant Interaction (PII), Health, and Safety.

The PII module of SafeCare is delivered by home visitors and consists of approximately six 90- minute sessions. Home visitors train parents to engage in positive physical and positive verbal interactions through teaching, modeling, watching the parent practice, and providing corrective feedback. Physical interaction behaviors taught to parents include: being responsive, imitating child behaviors, looking, smiling, holding, touching, and gentle movement. Positive verbal interactions taught to parents include: talking to your child while making eye contact, imitating child verbalizations (with the exception of whining or crying), using affectionate words and endearing terms. Parents are encouraged to talk about what they are doing as well as talk about what the child is doing.

Throughout the intervention, parents are assessed in their ability to engage in the following activities with their children: smiling, touching, looking, imitating infant, positive verbalizing, holding, and gentle movement. The four behaviors: smiling, touching, looking and positive verbalizing are core behaviors and parents must consistently and effectively demonstrate these core behaviors in order be considered to have mastered the criteria.

Research has revealed that maternal language input is a significant predictor of child language acquisition and academic success, and that maltreating mothers speak less frequently to their children, produce fewer complex utterances, and are less likely to engage in positive interactions. Therefore, the PII module of SafeCare provides an effective intervention module that not only prevents abuse and neglect, but may also increase mothers' positive verbalizations. However, with the exception of one study (Lutzker, Lutzker, Braunling-McMorrow, & Eddleman, 1987), which demonstrated that infant-directed, affectionate words could be increased in high-risk mothers through prompting, SafeCare has not collected any data on maternal language use or measured whether mothers speak more to their children as a result of the intervention. As such, there is a need to collect data on the impact of PII with regard to language, as well as explore ways in which the module may be enhanced to produce stronger language outcomes.

The purpose of the proposed research is to determine whether PII or a language-enhanced version of the module is effective in increasing the number of maternal utterances with her infant and the frequency of incidental teaching. The PII enhanced training segment was created, not only to be an effective tool for promoting language, but also to be succinct enough to imbed into the extant protocols so as not to add a cumbersome burden to SafeCare trainers and home

visitors, or parents participating in the program. This is a necessary consideration for recommending enhancements to any of the SafeCare modules.

METHOD

Participants

Six mother-infant dyads residing in the Atlanta metropolitan area should be recruited to participate in this pilot study, which aims to measure and increase infant-directed maternal verbalizations and incidental teaching.

The researcher should contact the program directors of agencies that work with mothers to discuss the purpose of the proposed research and to recruit participants. She should then contact the mothers in order to describe the requirements of participation and obtain their verbal consent to participate. Written consent for participation should be obtained during the first meeting with each mother.

The families must meet the following criteria for study participation: have at least one infant who is 3 months-old up to when the child becomes ambulatory, be representative of the population that SafeCare home visitors currently serve, speak fluent English, consent to participate in the study, and have a desire to increase positive interactions with their child.

Setting

Observation and training during the study should take place in the home of the participating families in an area commonly used for gathering, such as the living room.

Training

The researcher, to be referred to henceforth as the home visitor (HV), and a reliability observer should be trained to deliver the SafeCare Parent-Infant Interaction (PII) module. In order to become a home visitor, the researcher must attend a 6-hour training workshop on the PII

module conducted by a certified NSTRC SafeCare trainer. The HV will be provided with a manual that contains an outline of the home visitor PII sessions, applicable forms (Planned Activities Training (PAT) Checklist-Infant: HV version and PAT Checklist – Infant: Parent (P) version, additional materials (PAT Checklist-Infant scoring criteria and activity cards), and a checklist detailing developmental milestones for each age range.

The training workshop consists of didactic learning and interactive training. First, a Power Point presentation reviewing each one of the PII in-home training sessions is conducted and the 4-step training process (explanation, modeling, practice, and feedback) is explained. The trainee is then instructed on how to use and score the PAT Checklist-Infant: HV version through observing interactions via previously recorded videotapes.

Finally, the trainee participates in a role-playing session in which she acts as the HV and delivers the PII intervention to a colleague who acts as the parent. The certified SafeCare trainer observes the HV trainee for fidelity to the model and provides her with appropriate feedback. At the close of the session, the HV trainee must complete a written quiz and pass with a score of at least 85%. Following appropriate role-play and achieving a passing score on the quiz, the HV will be provided with a provisional certification to deliver the PII module.

Measures

Coding System

Currently used by SafeCare home visitors during PII is the PAT Checklist –Infant: HV version. It is based on a coding system developed by Twardosz, Shwartz, Fox, and Cunningham (1979), and later modified for Project 12-Ways (Lutzker, et. al, 1987).

The purpose of the PAT Checklist-Infant: HV is to assess interactions between mothers and infants during routine and play activities based on nine observable behaviors: smiling, touching, looking, positive verbalizing, imitating, holding, gentle movement, negative verbalizing, and negative touching. Each behavior is counted as an independent category on the checklist so that there are nine possible observable behaviors for each activity. The first four behaviors (smiling, touching, looking, and positive verbalizing) are considered core behaviors and constitute mastery criteria for each interaction assessment.

Throughout observation of mother-infant interaction during free play and other typical daily activities, the HV scores the nine maternal behaviors using the PAT Checklist-Infant: HV. The four possible scores are (-), (√), (√+) and N/A. The mother receives a (-) if she showed the behavior minimally or not at all when the opportunity was available; for example, the mother does not smile at her child or smiles very little throughout the duration of the activity. The mother receives a (√) if she demonstrated the behavior sometimes, but could use improvement. The mother receives a (√+) if she engages in a behavior consistently and appropriately throughout the observation period.

Typically, observations are between 3-10 minutes. An N/A is scored when there was not an opportunity or it would not have been appropriate for the mother to engage in a particular behavior. However, behaviors of smiling, touching, looking and positive verbalizations are considered core behaviors because they are desirable and appropriate during all interactions.

In addition to the score of (–), (√), (√+), or N/A for each maternal behavior, each behavior is also given a priority rating indicating the need for a particular behavior to be addressed. Priority ratings are marked urgent (U), high priority (HP), or monitor (M) by the HV.

A rating of urgent indicates that the behavior needs to be addressed immediately and that the mother exhibited almost no positive behaviors. A rating of high priority indicates that the behavior needs to be addressed soon and that the mother exhibited several negative and few positive behaviors. A rating of monitor indicates that the mother is not consistent in demonstrating skills, does not generalize skills to new situations, and may have low levels of negative behaviors.

In order to calculate a mother's score, the HV first sums the number of core behaviors for which a mother received a (√) or a (√+). This number is then multiplied by 25% in order to derive a final score, 0 being the lowest possible score and 100% being the highest.

Mastery is reached when the mother demonstrates positive behaviors, including the four core behaviors, in a variety of situations or at many different times; demonstrates behaviors in a highly competent manner; does not demonstrate any negative behaviors; and consistently receives score of (√) or (√+) for core behaviors. Parent success is defined as significant improvement from baseline. In order to be considered successful, the parent should achieve a score of at least 75% for demonstration of core behaviors and not demonstrate any negative behaviors.

Maternal Utterances Coding System

For the purpose of the current study, the HV should use the PAT Checklist- Infant: HV to assess the parent during sessions in order to effectively deliver the PII module and provide the parent with appropriate feedback. However, because the study's outcomes of interest are maternal utterances and incidental teaching, the HV should also record two different measures in order to assess the amount and type of maternal verbalizations that occur during observations.

The HV should use partial interval recording to record whether or not a maternal utterance took place and whether or not that utterance constituted incidental teaching. The HV should score maternal language via audio recordings taken during parent-infant observations.

Utterance

The operational definition of utterance for this study is a modified version of one used by the University of Kansas' Juniper Gardens Children's Project, a model demonstration center for promoting language and literacy readiness in early childhood. An utterance will be defined as a communication episode containing a vocalization, single or multiple words, or some combination of those elements. Utterances are separated by a pause or breath. Furthermore, in order for an utterance to be scored, it must be an infant-directed utterance. Any utterance directed toward another child or adult in the home should not be scored as an utterance. Also, vocalizations such as "oh", "mm", or "huh", should not be scored as utterances.

Incidental Teaching

For the purposes of this study, incidental teaching should be scored as occurring any time the mother follows the infant's lead and asks what the infant is looking at or reaching for and provides a name for the object; or any time the parent labels and/or describes something in the environment with which the child seems to be engaged. This could be an object at which the child is looking, the infant's body parts, parent's body parts, pieces of clothing, etc. This may involve labeling an object as well as describing its shape, color, and texture.

Incidental teaching should also be scored if the mother asks questions and provides answers. Questions should include yes/no and "wh" questions about objects or people in the immediate environment. Examples of "wh" questions include: "What color is your truck?",

"Who is this in the picture?", or "Where is your tummy?". An appropriate answer or response by the mother would be "Yes, that's your tummy!"(if the child indicates where her stomach is) or "Here's your tummy" while touching the child's stomach. Further, the mother may respond by answering and providing another question. For example, she may say "Yes, and where is your belly button?"

Incidental teaching should not be scored as having occurred if the mother only uses endearing terms, nonsensical verbalizations, or talks about things outside of the immediate environment so that the infant is unable to connect an object with a label. For example, if the mother says "daddy will be home soon", this would not be scored as incidental teaching, but would be scored as an utterance. However, if the infant's father approaches the infant, and the mother says "look, it's Daddy. Daddy is home," incidental teaching should be scored as having occurred.

Scoring Procedures

Using partial-interval recording consisting of 10-s intervals, the HV should score maternal utterances and whether or not the utterance constituted a form of incidental teaching during a 3-10 minute observation session. For every 10-s interval, the HV should mark a (√) next to utterance if an infant-directed utterance occurred, and mark (√) next to incidental teaching if any of the maternal utterances during the 10-s interval constituted incidental teaching.

If the HV observes both an utterance and incidental teaching within the 10-s interval, no further scoring should take place until the beginning of the next 10-s interval. Similarly, if the HV observes an utterance, but no incidental teaching within the 10-s interval, she should only

place one (√) next to utterance, and not place a (√) next to incidental teaching. She should begin the process again at the beginning of each subsequent 10-s interval.

The percent of occurrence for utterances should be calculated by dividing the total number of intervals in which an utterance occurred by the total number of intervals in the observation session. Similarly, the percent of occurrences for incidental teaching should be calculated by dividing the total number of intervals in which incidental teaching occurred divided by the total number of intervals in the observation session. These measures will provide information about the frequency of maternal utterances and incidental teaching, and allow the HV to ascertain whether or not utterances and incidental teaching increase with the intervention.

Reliability

The HV should establish consistent reliability with an independent observer prior to the initiation of the study by watching videos and listening to audio recordings of parent-infant interactions and scoring the occurrence of utterances and incidental teaching. The HV and observer should discuss any discrepancies in observations or understanding of measures to establish consistent scoring of maternal language use. The reliability observer need only score maternal language use, as this is the outcome of interest of the study. As such, it is not necessary to establish reliability using the PAT Checklist-Infant: HV version currently used by SafeCare.

During preliminary efforts to establish reliability, in elementary pilot work, the author found that it may be difficult to determine whether or not an utterance constitutes incidental teaching through listening to audio. For example, if a mother were to say "Let's put your pants on. I've got your purple pants", it may sound as though the mother is providing incidental

teaching. However, if the mother did not actively show her infant the pants so that the infant could connect the object with the label, incidental teaching has not taken place.

One possible remedy to avoid ambiguity is for the HV to take notes during observations, which she shares with the reliability observer prior to the scoring of the audio. The note should consist of the sentence or a fragment of the sentence spoken by the mother, and a note indicating that the mother was not actively showing the child the object. If the HV does not provide a note next to such a sentence, the reliability observer should assume that the mother was engaging the child with the object about which she was speaking. Other options include the use of videotaping or live reliability scoring during observation sessions.

Throughout the duration of the research, reliability between observers should be measured in at least 25% of the sessions in each setting. Reliability should be measured during baseline and at least 25% of subsequent observation sessions. Interobserver agreement must reach 85% in practice sessions and maintain that level during observation sessions. Interobserver agreement should be calculated by using the formula:

$$\frac{\text{Agreements}}{\text{Agreements + Disagreements}} \times 100$$

Unlike scoring using the PAT Checklist-Infant: HV, which takes place in the participants' homes during parent-infant interactions, the scoring of maternal language use should take place after the in-home sessions via audio recordings of mother-infant interactions. It is recommended that the HV use an iPod® and iTalk™ or similar devices to collect audio data. The iPod and iTalk are small, lightweight devices that can be easily transported and worn by the mothers. Both the HV and reliability observer should have downloaded Audacity®, a free audio editor and recorder, to their MAC computers or a similar application compatible with PCs. The

Audacity program allows for safe storage of audio files, as well as syncs the number of passing seconds with the audio file so that the HV and observer may analyze the data based on 10-s intervals. Once the audio file has been downloaded to Audacity, the HV should insert a tone at 10-s intervals to indicate when the HV and observer should stop scoring one interval and begin scoring the next.

Materials

Researcher Materials

Researcher materials will include:

- PAT Checklist-Infant: HV scoring sheet
- PAT Checklist-Infant: HV scoring criteria
- PAT Checklist-General: HV Version
- Enhanced Language In-Home Scoring Sheet
- Enhanced Language In-Home Scoring Criteria
- Maternal Language Checklist scoring sheet (utterances and incidental teaching)
- Maternal Language Checklist scoring criteria
- baby doll for modeling behaviors for parents
- age-appropriate infant toys
- iPod and iTalk recording devices with microphone and holder

Parent Materials

Printed materials provided to the family should include those currently provided by SafeCare during the PII module including the:

- PAT Checklist-Infant: P (parent handout) which provides descriptions of things to do with and say to an infant

- Activity Cards that provide examples of activities that parents can do with their infants
- Planned Activities Training (PAT) Manual, which includes information on child development (including developmental milestones), daily family routines, and child behavior.
- PAT Checklist-General: Parent Version, which introduces skills that parents will use as their children get older

Families should also be provided with additional materials during the PII Language Enhanced portion of the intervention. During this segment of the intervention, parents should receive:

- handout titled "Why Should I Talk to my Baby?", explaining the importance of parents talking to their children
- handout titled "Talk, Talk… and Talk Some More!" that details different ways parents can talk to their infants and emphasizes incidental teaching methods
- weekly calendar to aid in family scheduling PII opportunities titled "Talk Time is All the Time!"
- language-focused activity cards titled "Activities to Talk About!"
- Consumer Evaluation

(All materials are provided in Appendix)

Design

The study should use a multiple baseline/probe design across cohorts of mother-infant dyads in three conditions: baseline, PII training as usual, enhanced PII training. The pairing and ordering of cohorts should be based primarily on the availability of the mothers. The pairing of mothers allows the researcher to include a larger number of families in the study while reducing

the likelihood of attrition due to a long waiting period. Pairing mothers based on their availability allows the researcher to begin with the mothers who are immediately available. Further, it is the responsibility of the researcher to schedule sessions based on the family's schedule so as to be as unobtrusive as possible. Because the study includes 6 mother-infant dyads, there should be 3 cohorts. Cohort 1 should consist of families A and B, cohort 2 should consist of families C and D, and cohort 3 should consist of families E and F.

All baseline measures and training should take place during free play as this condition will allow the mother to be fully engaged with her infant, without being distracted by other tasks. As such, the free play condition is likely to produce the most responsiveness on the part of the mother. PII training as usual will be introduced in family A when baseline data demonstrate stability or it is clear that the mother has little or no use of utterances and incidental training. Baseline data should be collected in family B in close temporal proximity such that PII training as usual is introduced in family A while baseline is continued to be collected in family B until change or stability is detected with family A, and then PII training as usual should be introduced in family B.

Once the data are stable in family A during PII training as usual, enhanced PII should be introduced to family A, and PII training as usual should be introduced in family B. Similarly, once data stabilizes in the enhanced PII condition for family A, family B should be introduced to enhanced PII. This design establishes internal validity, in which family A serves as the control for family B. Staggering the intervention allows for control of confounding variables that may influence maternal behavior, therefore establishing the effect of the intervention. These steps should subsequently be followed for cohorts 2 and 3.

The graphs below depict hypothetical data collected during observation sessions of mother-infant interactions and represent percent of occurrences of utterances and incidental teaching. The circle represents the percent of occurrences of utterances and the triangle represents percent of occurrences of incidental teaching. The occurrences of incidental teaching will always be less than or equal to the occurrences of utterances. The two variables are highly correlated because incidental teaching represents a type of utterance; therefore, the percent of occurrences for incidental teaching could never be greater than that of utterances.

Three baseline measures were taken for family A. Percent of occurrences of utterances ranged from approximately 38 to 48 percent, while percent of occurrences of incidental teaching ranged from approximately 25 to 30 percent. PII training as usual was introduced once the baseline data was stable. During the initial session, percent of occurrences of utterances remained approximately the same, while incidental teaching declined. One possible explanation is that the initial session of PII training as usual focuses primarily on physical interaction skills. With the introduction of verbal interaction skills during the second session, the percent of occurrences of utterances increased significantly and remained higher than baseline thereafter. Incidental teaching however, remained approximately the same as at baseline. When enhanced PII was introduced, both utterances and incidental teaching increased significantly.

When baseline data was stable in family A, baseline measures were collected in family B. The percent of occurrences of utterances and incidental teaching were low, ranging from approximately 5 to 15 percent. During PII training as usual with Family B, percent occurrences of utterances increased to between 20 and 30 percent, while percent of occurrences of incidental teaching only increased slightly. During enhanced PII, percent of occurrences of utterances and incidental teaching increased, yet both remained under 30 percent. In an effort to increase both

utterances and incidental teaching, the HV introduced a booster of the enhancement. One example of a booster may be the HV asking the mother to refer to her parent handouts while interacting with her infant and practice each step of incidental teaching. As a result, the booster successfully increased both utterances and incidental teaching.

Once cohort 1, consisting of families A and B has completed the intervention, baseline data was collected in cohort 2, beginning with family C. The initial baseline measures for family C were significantly higher than those of family A or B; yet, subsequent baseline data decreased significantly. The percent of occurrences of utterances stabilized between approximately 25 and 35 percent, while percent of occurrences of incidental teaching were maintained at approximately 15 percent. It is open to speculation as to why the initial baseline measures were significantly higher than the following three baseline measures. Perhaps the observational session took place during a time of day when the mother is generally most talkative such as after her morning coffee, while subsequent measures were taken later in the morning or early afternoon.

During PII training as usual, percent of occurrences of both utterances and incidental teaching increased with the intervention. The change began with data collected during session 2. As previously mentioned, this is typically the session when verbal interaction skills are introduced to the mother. Percent of occurrences of utterances and incidental teaching increased further with training in enhanced PII.

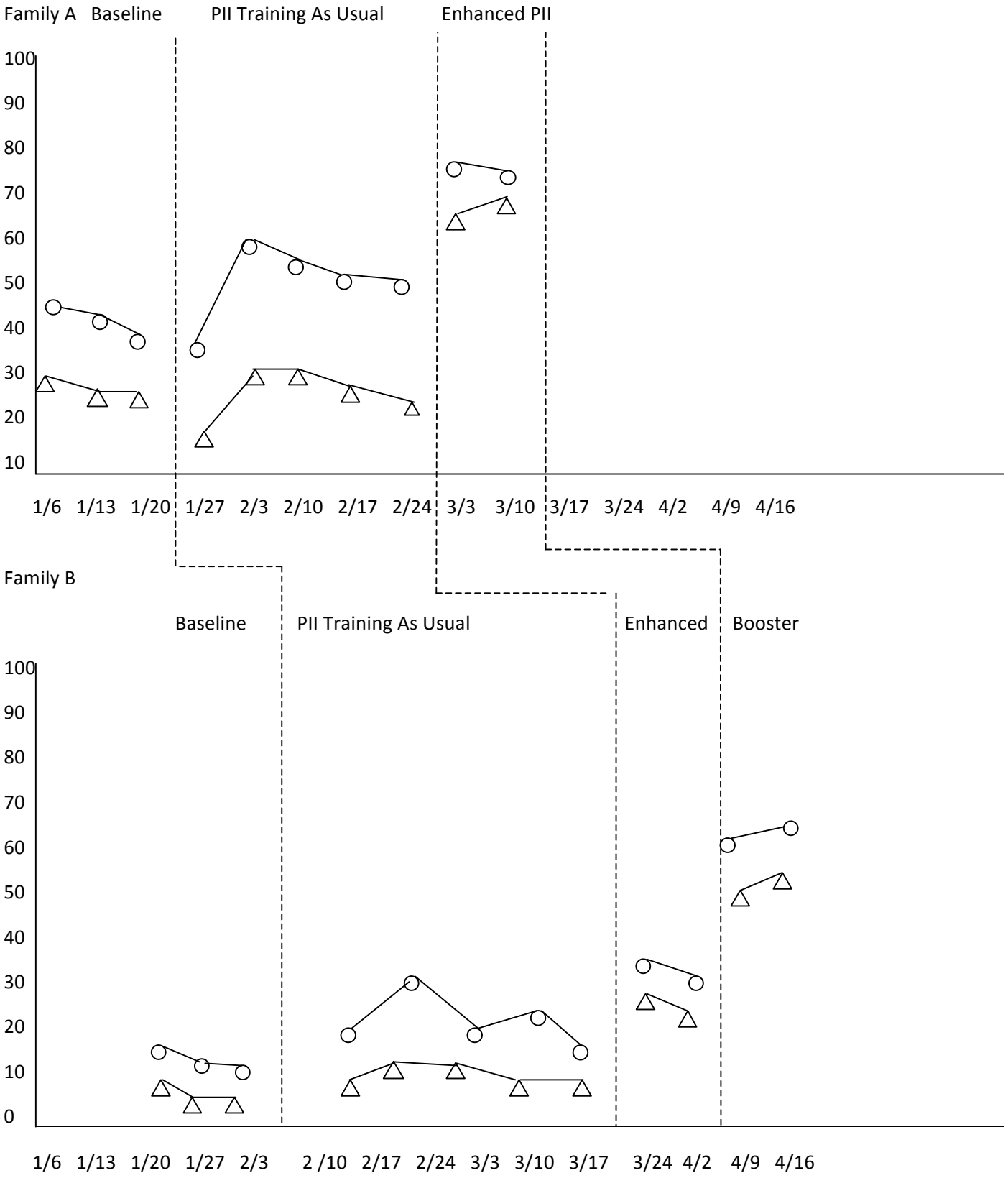
The data followed a similar pattern for family D with the exception of the unusually high initial baseline measure. Baseline percent of occurrences of utterances ranged from between 30 to 40 percent, while percent of occurrences of incidental teaching ranged from 10 to 20 percent.

PII training as usual produced a significantly higher percentage of occurrences of utterances; however, measures of incidental teaching remained approximately the same as baseline. During enhanced PII, both percent of occurrences of incidental teaching and utterances increased significantly.

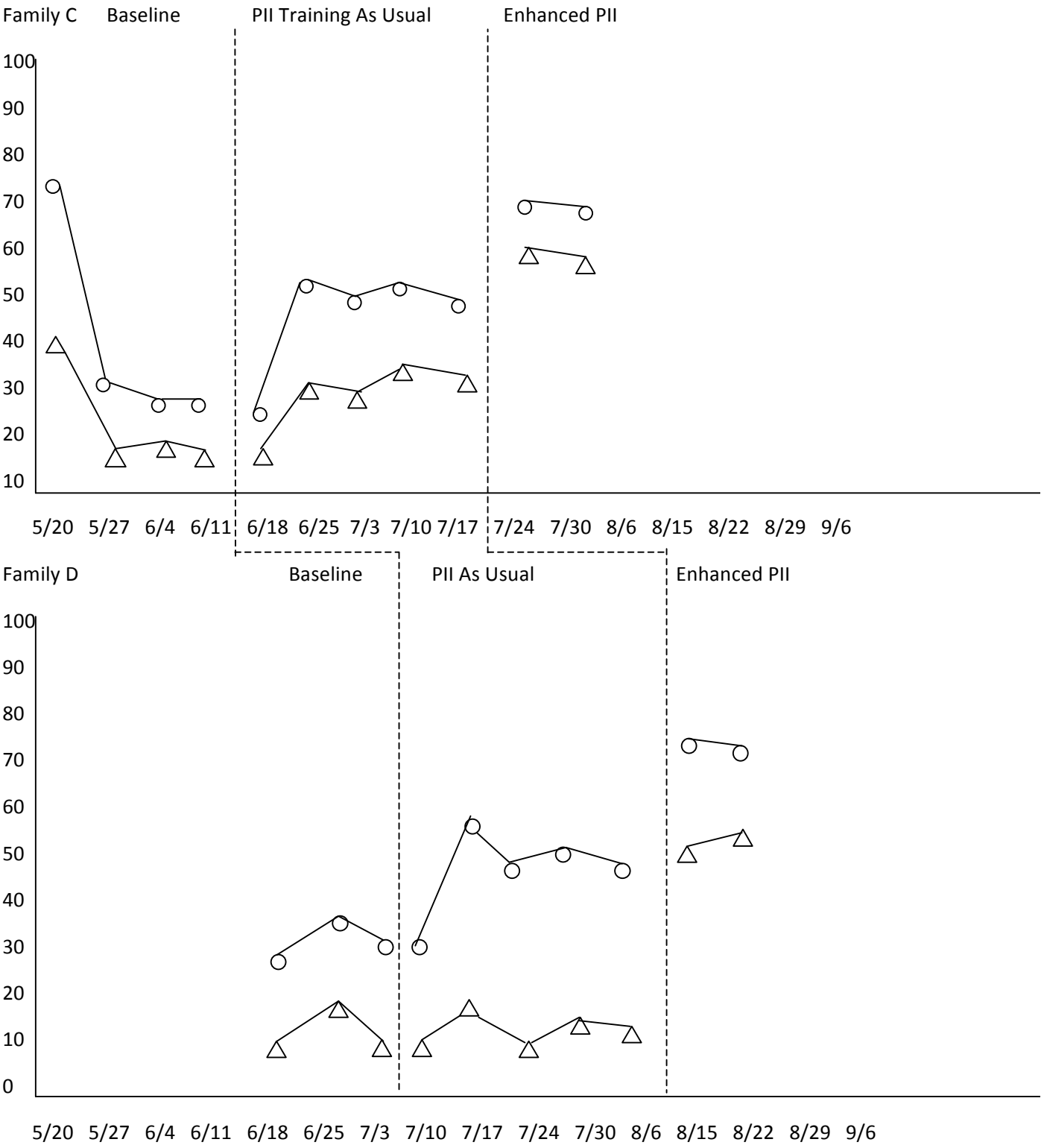
Next, baseline data were collected in cohort 3, beginning with family E. Percent of occurrences of utterances were approximately 30 percent, while percent of occurrences of incidental teaching ranged between 15 and 20 percent. When PII training as usual was introduced, there was a significant increase in the percent of occurrences of utterances (50-60%), and percent of occurrences of incidental teaching (40-50%). When enhanced PII was introduced, however, the data remain approximately the same, indicating that enhanced PII did not provide an additional benefit to the intervention.

When baseline data stabilized in family E, baseline data was collected in family F. Percent of occurrences of utterances and incidental teaching during baseline remained below 20 percent. Percent of occurrences of both variables increased with PII as usual, approximately 40 percent for utterances and 25 percent for incidental teaching. When the mother was trained in enhanced PII, the percent of occurrences of utterances remained the same as with PII as usual, however, the percent of occurrences of incidental teaching increased by approximately 15 percent.

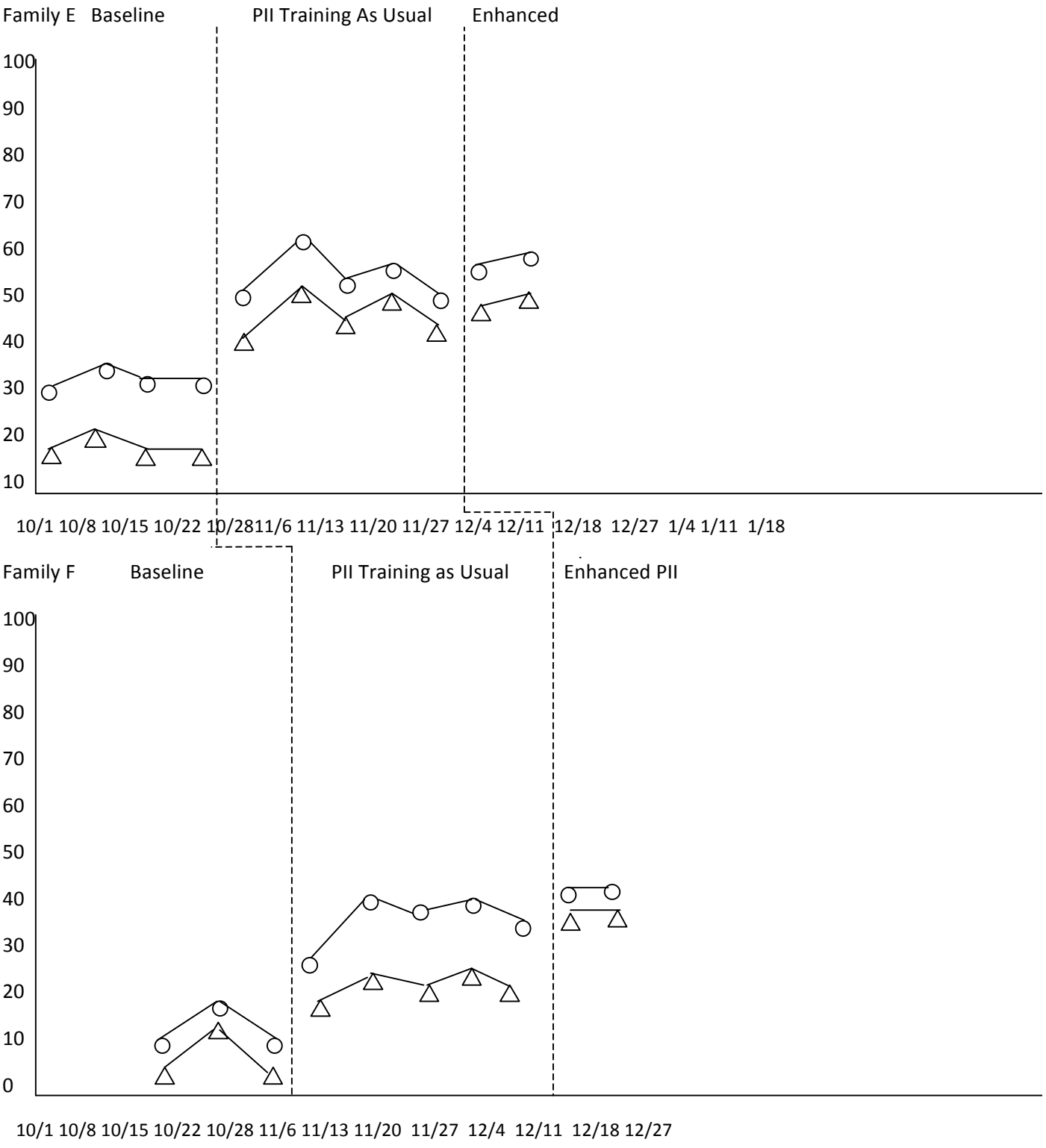
Cohort 1 % Intervals of Utterances and Incidental Teaching utterance=○ incidental teaching=△



Cohort 2 % Intervals of Utterances and Incidental Teaching utterance=○ incidental teaching=△



Cohort 3 % Intervals of Utterances and Incidental Teaching Utterance=○ Incidental Teaching=△



Procedure

Data collection for language measures should be obtained using an iPod and iTalk or similar audio recording devices. The mothers should use an iPod holder to attach the iPod and iTalk device to their waists. A microphone connecting to the iPod should be attached to the mother's lapel in order to optimize recording quality of vocalizations. The mother should be asked to wear the device throughout the entire session, but will only be recorded for the purpose of assessment during free play or a routine activity. During each visit, the HV should collect language data via recording during free play.

Introductory Session

During the initial visit to the participant's home, the HV should explain that the purpose of the PII module is to increase positive mother-infant interactions, and strengthen the mother-child bond. The HV should also review the research requirements with the participants and obtain written consent for participation.

Baseline Sessions

The HV should collect baseline data during free play using the PAT Checklist-Infant: HV, which is used to score the following nine behaviors:

- smiling
- touching
- looking
- positive verbalizing
- imitating
- holding

- gentle movement
- negative verbalizing
- negative touching

During the same observation sessions, the HV should audio record mother-infant interactions using the iPod and iTalk. The HV and reliability observer should score the audio recordings using the Maternal Language Checklist after the in-home session has been concluded.

Following the first baseline observation, the HV should review and complete the Developmental Checklist with the mother to identify any potential delays in the target infant's development. The HV should provide the mother with a Planned Activities Training (PAT) Manual that provides information on child development (including developmental milestones), daily family routines, and child behavior. The mother should be encouraged to read through the manual at her own pace.

The HV should continue to collect baseline data during subsequent sessions until the data are stable.

Intervention Sessions: PII Training as Usual

The current SafeCare PII module typically takes place over 6 sessions. First, the HV should provide the mother with the PAT Checklist-Infant: P (parent handout), which provides descriptions of things to do with and say to an infant. The HV should review the PAT Checklist-Infant: P with the mother and begin training in physical interactions during free play using the SafeCare 4-step training process: explain, model, practice, and feedback. Physical interactions to be taught include:

- Being responsive: paying attention to cues from your baby and directing your attention to your baby's facial expression, movements, and sounds
- Imitating behaviors
- Looking
- Smiling
- Holding
- Touching
- Gentle movement
- Calming a crying baby

The HV should provide the mother with a set of SafeCare Activity Cards, explain how to use them, and ask the mother to choose activities she will engage in with her infant over the course of the next week. The HV should also ask the parent how often she will be able to engage in the activities throughout the week, and if she has a safe place where they can keep the cards.

Next, PII verbal interaction skills should be introduced. The mother should be trained to use positive verbalizations with her infant including:

- talking to her child while making eye contact
- imitating her infant's verbalizations
- using affectionate words and endearing terms
- talking about what she (the mother) is doing
- talking to sleepy babies

The HV should continue to train the mother in both physical and verbal interaction skills, as well as practicing these skills together. The HV should continue to utilize the SafeCare four-step training process of explaining, modeling, allowing the parent to practice, and providing positive, constructive feedback. The HV should continue to ask the mother to practice these

skills throughout the week and to select activities in which she can interact with her infant and practice the skills.

Following training in physical and verbal interaction skills, the HV should introduce the mother to the 10 steps of Planned Activities Training (PAT) for children. The HV should provide the mother with the PAT Checklist-General: Parent Version, which introduces skills that parents will use as their children get older. While some of the steps may not yet be relevant, the introduction of these steps at the end of PII helps prepare parents for when a child gets older. The 10 steps of PAT include:

- Prepare in advance
- Explain the activity
- Explain the rules (child only)
- Explain the consequences (child only)
- Give choices
- Talk about what you are doing/incidental teaching
- Use positive interaction skills
- Ignore minor misbehavior (child only)
- Give children feedback following an activity
- Provide rewards or practical consequences (child only)

Once the HV has explained and modeled these skills, she should ask the mother to practice and provide her with positive, constructive feedback. While the HV should explain all of the skills, she should only model those skills that apply to infants and should not demonstrate the skills that apply to older children.

Intervention Sessions: Enhanced PII Training

Following PII training as usual, the HV should deliver an enhanced version of PII that places greater emphasis on verbal interactions and incidental teaching skills. During these sessions, the HV should provide the mother with additional materials including the following:

- handout titled "Why Should I Talk to my Baby", explaining the importance of parents talking to their children
- handout titled "Talk, Talk,… and Talk Some More!" that gives more specific instruction in ways a mother can communicate with their infant, as well as places a greater emphasis on incidental teaching.
- weekly calendar titled "Talk Time is All the Time" to aid in the mother's scheduling of PII opportunities
- language-focused activity cards titled "Activities to Talk About!"

The HV should begin the enhanced version of PII by revisiting the importance of mothers talking to their infants. The mother should receive a more in depth explanation than that which SafeCare currently provides. The HV should provide the mother with a handout titled "Why Should I Talk to My Baby?" which explains the many benefits children receive when they are spoken to.

The HV should then train the mother in additional interaction skills including:

- following the child's lead
- asking questions and providing answers
- commenting and labeling
- providing choices

- providing more encouragements and fewer discouragements

The HV should provide the mother with a handout titled "Talk, Talk…and Talk Some More", which explains how to perform each skill and provides specific examples of what a parent might say to her infant. The introduction of these new skills should begin with a dialog between HV and mother about each skill and what it means to the mother. All training of the new skills will utilize the same four-step strategy of explaining, modeling, practicing, and feedback.

Just as in PII training as usual, the HV should ask the mother to demonstrate each skill during free play. The HV should ask the mother to follow her child's lead by noticing in what her infant is demonstrating interest, and using this as the basis of her conversation. The HV should request that the mother ask her infant questions about in what the child is demonstrating interest. Questions include yes/no questions as well as "wh" questions such as: "What are you looking at sweet baby?" and "Are you looking at your doll?" The mother should be asked to comment on and label objects for her child. For example, the mother may say: "This is your baby doll" (mother holds for child to see and touch). "She has green eyes" (mother points to eyes).

The mother should also be asked to provide her infant with choices. For example, the mother may say: "Would you like the baby doll to wear the pink dress or the yellow dress?" while holding up both for the infant to see. Lastly, the HV should ask the mother to always provide more encouragements and fewer discouragements to her child. An example of an encouragement may be: "Good job, you chose the pink dress!" While an example of a discouragement would be the mother saying "Don't grab that. You can't have it." when the infant reaches for the object.

During observation sessions, the HV should continue to audio record the mother, as well as utilize the scoring sheet titled, "Enhanced Language In-Home Scoring", which she should score as she

scored the PAT Checklist-Infant: HV. Each behavior to be taught is listed on the scoring sheet and the HV should provide the parent with a score of (-), (√), (√+), or N/A. A score of (-) will indicate that the parent did not demonstrate the skill throughout the activity, a score of (√) indicates that the parent demonstrated the skill, but could improve the quality or frequency of the behavior, a (√+) indicates that the parent performed the skill appropriately and consistently throughout the interaction, while N/A indicates that there was not an opportunity for the parent to perform the skill. This scoring sheet should be used to provide the parent with positive, corrective feedback in order to help her to master the skills.

At the end of each of the enhanced PII sessions, the mother should be asked to select from a new set of activity cards, "Activities to Talk About!", that place a greater emphasis on parental language and the utilization of incidental teaching methods. The mother should also be provided with a weekly calendar titled "Talk Time is all the Time!" to be used as a scheduling tool. The HV and mother should discuss when activities may be practiced and what kinds of things the mother might say during the proposed activity. The mother should be asked to use the calendar to schedule activities and make notes to remind herself of the kinds of thing she might say during the activity. The HV should emphasize that the mother can and should talk to her infant at any time throughout the day. At the end of each session (just as during the delivery of PII as usual), maternal vocalizations should be recorded during free play.

Consumer Evaluation

At the end of training, the mother should receive a consumer evaluation questionnaire to assess the usefulness of the program. The questions will be rated using a Likert Scale and provide additional space for the mother's comments. The mother will be asked questions such as whether or not she found the program useful, if she found the Home Visitor agreeable and effective, and if she talks to her child more as a result of the program.

The HV should provide the mother with the evaluation at the end of the final session. The HV should tell the mother that the survey is to find out how helpful she found the program and what suggestions, if any, she thinks would make it better. The HV should encourage the mother to be honest in her evaluation. The HV should provide the mother with the survey and a brown, letter sized envelope in which she should place it once completed. The HV should then establish a time within the next few days that she will return to pick up the completed survey. Lastly, the HV should reemphasize the importance of the mother speaking to her infant, remind her of the rationales for doing so and encourage her to continue practicing the skills she has learned.

If the research indicates an intervention effect with any of the participants, a four-month follow-up should be conducted to determine if effects have been maintained postintervention.

Conclusion

In summary, infant-directed maternal language is essential to the developing infant, and home visiting programs are a natural environment to encourage mothers to talk to their infants in ways that promote infants' cognitive development and language skills, as well as strengthen the mother-infant bond. Examining maternal language within the context of the PII module will provide necessary data to measure the effects of the module on language use, and allow for effective modifications. Further research should examine whether the training mothers receive in infant-directed utterances and incidental teaching within the PII module influences the cognitive development and later academic success of infants whose mothers received such training.

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APPENDICES

Researcher Materials:

A. Enhanced PII In-Home Scoring Sheet

B. Enhanced PII In-Home Scoring Criteria

C. Maternal Language Scoring Sheet (Utterances & Incidental Teaching)

D. Maternal Language Scoring Criteria (Utterances & Incidental Teaching)

Parent Materials:

E. Parent Handout: “Why Should I Talk to My Baby”

F. Language Enhanced Activity Cards: “Activities to Talk About”

G. Calendar: “Talk Time is All the Time”

H. Parent Handout: “Talk, Talk, and Talk Some More”

I. Consumer Evaluation

APPENDIX A

Enhanced PII In-Home Scoring Sheet

Parent:	Date:
Activity:	Time:

Observer:

Parent Behavior	Score	Priority Rating	Notes
Follow Child's Lead			
Comment and Label			
Ask Questions &Provide Answers			
Provide Choices			
More Encouragements & Fewer Discouragements			

APPENDIX B

Enhanced PII In-Home Scoring Criteria

Score as you would the PAT Checklist-Infant: HV.

The four possible scores are (-), (√), (√+) and N/A.

- The mother receives a (-) if she showed the behavior minimally or not at all when the opportunity was available.
- The mother receives a (√) if she demonstrated the behavior sometimes, but could use improvement.
- The mother receives a (√+) if she engages in a behavior consistently and appropriately throughout the observation period.
- An N/A is scored when there was not an opportunity or it would not have been appropriate for the mother to engage in a particular behavior.

Each behavior should also be given a priority rating indicating the need for a particular behavior to be addressed. Priority ratings are marked urgent (U), high priority (HP), or monitor (M) by the HV.

- A rating of urgent indicates that the behavior needs to be addressed immediately and that the mother exhibited almost no positive behaviors.
- A rating of high priority indicates that the behavior needs to be addressed soon and that the mother exhibited several negative and few positive behaviors.
- A rating of monitor indicates that the mother is not consistent and behaviors should be monitored.

APPENDIX C

Maternal Language Scoring Sheet

Date: Observer: Family:

10 Second Intervals Maximum of 10 minutes	**Utterance**	**Incidental Teaching**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		

10 Second Intervals Maximum of 10 minutes	**Utterance**	**Incidental Teaching**
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
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55		
56		
57		
58		
59		
60		

Percent of Occurrences: Utterance=

Percent of Occurrences: Incidental Teaching=

APPENDIX D

SCORING CRITERIA FOR MATERNAL LANGUAGE IN HOME SCORING

Operational Definitions:

Utterance

- infant-directed: Any utterance directed toward another child or adult in the home should not be scored as an utterance.
- a communication episode containing a vocalization, single or multiple words, or some combination of those elements.
- Utterances are separated by a pause or breath.
- vocalizations such as “oh”, “mm”, or “huh”, should not be scored as utterances.

Incidental Teaching

- any time the mother follows the infant’s lead, asks what the infant is looking at or reaching for and provides a name for the object
- any time the parent labels and/or describes something in the environment with which the child seems to be engaged. This could be an object at which the child is looking, the infant’s body parts, parent’s body parts, pieces of clothing, etc. This may involve labeling an object as well as describing its shape, color, and texture.
- any time the mother asks questions and provides answers. Questions should include yes/no and “wh” questions about objects or people in the immediate environment.

Examples of "wh" questions include: "What color is your truck?", "Who is this in the picture?", or "Where is your tummy?". An appropriate answer or response by the mother would be "Yes, that's your tummy!"(if the child indicates where her stomach is) or "Here's your tummy" while touching the child's stomach. Further, the mother may respond by answering and providing another question. For example, she may say "Yes, and where is your belly button?".

- Incidental teaching should not be scored as having occurred if the mother only uses endearing terms, nonsensical verbalizations, or talks about things outside of the immediate environment so that the infant is unable to connect an object with a label.

Scoring

- Each interval consists of 10 seconds
- place a check next to utterance if an utterance occurs during the interval
- place a check next to incidental teaching if any of the utterances constituted incidental teaching during the interval
- once utterance and incidental teaching have been scored for an interval, no further scoring need take place during that interval
- calculate percent of occurrences separately for each using the formula:
- total number of intervals in which an utterance /incidental teaching occurred divided by total number of intervals in the observation session.

APPENDIX E

WHY SHOULD I TALK TO MY BABY?

- Talking to your baby will increase the bond between you and your baby
- Babies learn to talk by listening to others talking, especially their parents
- Talking to your baby will increase your baby's brain development
- The more you talk to your baby, the more new words your baby will learn and the more your baby will be able to understand
- The more language your baby learns, the easier it will be for her to read when she gets older
- The more language your baby learns and the more she reads, the better she will do in school
- The better your child does in school, the better her future will be!

APPENDIX F

TALK, TALK…AND TALK SOME MORE!

Follow your child's lead.

Notice what your child is looking at, reaching for, babbling about and use this as the basis of your conversation

Example 1: You notice your baby looking baby doll.

Example 2: You notice your baby at her is becoming a bit fussy and you know it is close to feeding time.

Ask Questions and Provide Answers

Example 1: What are you looking at sweet baby? Are you looking at your doll?

Example 2: Why are you fussy sweet baby? You must be hungry.

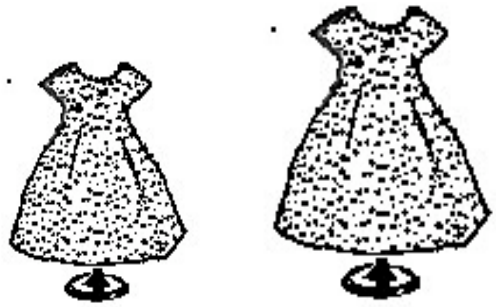
Comment and Label

Example 1: This is your baby doll. Look, she has green eyes (point to baby doll's eyes) See her eyes?

Example 2: Mama is getting out your peas and peaches. (show baby)

Provide Choices

Example 1: Do you want your doll to wear the red dress or the yellow dress?



Example 2: Do you want to eat your peas first or your peaches? (show baby)

Provide more encouragements and fewer discouragements

Children learn more and feel better about exploring their environment when they are provided with encouragements. Of course, as a parent there are times when you have to say "no" or "don't do that", but most of the time, providing encouragements makes your baby feel good and discourages bad behavior, too!

Example 1:Encouragement: Oh, you chose the yellow dress. Good job!

Example 1: Discouragement: Don't touch the dress. I'm holding it!

Example 2: You're eating all your peas. You are such a good girl!

Example 2: Discouragement: I'm feeding you. Don't grab the spoon.

APPENDIX G

Activities to **TALK** About…

Narrated Walk About

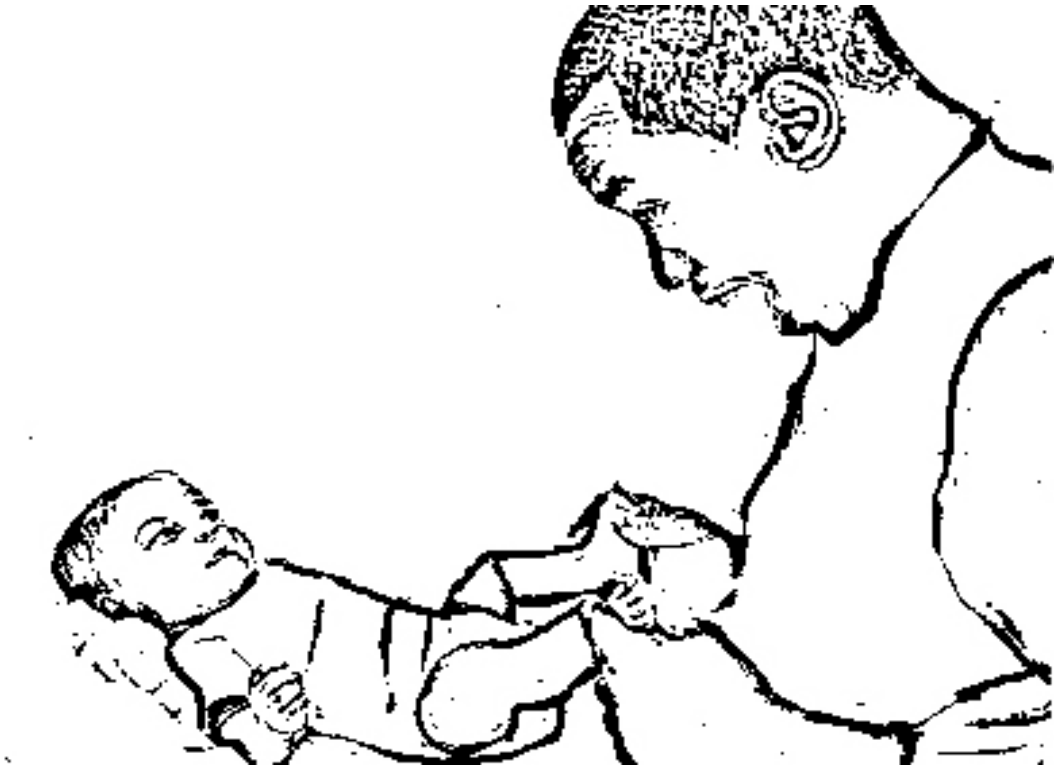
Take your baby for a walk around your house, yard, or neighborhood. Pick things up or hold him so he can get a closer look. Talk to him about what he's seeing. As you move, keep talking about what he sees and how it feels when he touches it, or the noises he might be hearing.

For example: You might pick a leaf from a tree and show it to your baby and say: "This is a leaf. The leaf is green". You may let him touch the leaf while you say: "Oh, the leaf is prickly." or "This leaf feels slippery!"

If a cat happens to cross your path, you might say: "Look sweet baby. It's a cat! Do you see the cat?

This Little Piggy

For this activity, you can use your baby's hands or her feet — she'll love it no matter what. Gently grab one finger or toe at a time and say: "This little piggy went to market, this little piggy stayed home, this little piggy had roast beef, this little piggy had none…." At the final finger (or toe), say, "This little piggy cried wee, wee, wee, all the way home" and gently tickle your baby.



String -Along Mobile: A Homemade Activity Gym

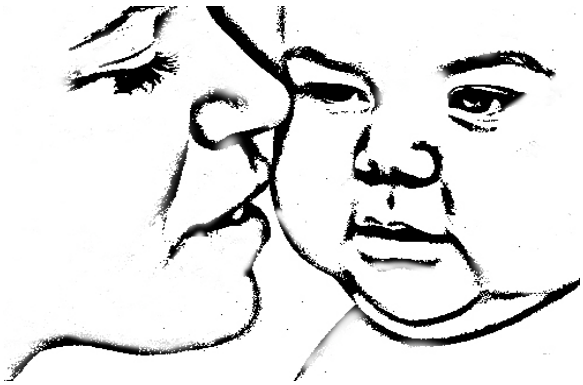
Create your own activity gym by gathering colorful and/or noisy toys or household items (such as little stuffed animals hanging from clips or clothespins, wooden spools, booties, rattles, or a ring of plastic keys) and threading them on a strong rope. Then stretch the rope with the objects across your baby's crib, close enough for him to see but far enough away so he can't reach it.

Once you've hung your activity gym, gently move the toys, narrating the show as you go. He'll likely be delighted with the sound-and-sight show and may coo and kick, but if he turns his head away or fusses, consider the show over (because he's had enough). To be on the safe side take the gym down when you are done with your game.

Singing Songs

Lullabies: Babies love lullabies. Choose one or two to use then a baby needs help falling asleep. Over time, the baby will learn to associate these lullabies with naptime. You can use lullabies at other times too- to soothe a crying baby, when feeding or burping, when a child has gotten overexcited and needs help calming down, or when you are feeling stressed and need a break.

Fun songs like Pop Goes the Weasel. Hold baby on your lap and sing, "All around the mulberry bush, the monkey chased the weasel, the monkey thought it was all in fun…pop goes the weasel." As you chant the last line, gently pop your baby up in the air by lifting your knees. Once she gets the idea, wait a few seconds before the pop so she can figure out how (and when) to pop on her own.



Books

Even babies love books! Books - like other toys – are things to touch, turn, shake, and put in your mouth. Books can also provide pictures, textures, sounds, and words. Infants enjoy touching the pictures in books and like books that have things that feel different. They also like bold colors and pictures of faces.

Board Books

Board books can be wiped clean if an infant drools on them and the pages are easy to turn.

Photo Album

Babies like to look at photo albums, too! Show your babies pictures of the family or an event.

What to do:

Let your baby touch the book and turn the pages if she can. Point to pictures in the book and tell your baby what she is looking at. Describe the different colors and textures. Read the story aloud.

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Chore Time

This activity allows you to take care of your daily chores while teaching your baby! Pick a chore such as doing the laundry, cooking dinner or grocery shopping. While doing the activity, talk to your baby about what you are doing.

For example, when doing laundry you might say: "Now mommy is folding the blue towel". While cooking dinner, you might say: "Now I'm adding the beans to the pot" or "this is a green apple". When possible and appropriate let your baby touch, and smell ingredients while telling your baby what they are.

WARNING: If cooking on a hot stove, make sure your baby is a safe distance away and never walk past her with a pot of hot water. If doing laundry, keep your child safely away from harmful products such as bleach or detergent!!

APPENDIX H

Parent Satisfaction Survey

Thank you for being part of the parent-infant interaction (PII) training offered by SafeCare®. We would like to learn some of your thoughts and feelings about the training. This will help us make the program better. Please read the following comments and circle the answer that best describes how you feel about each statement. Be as honest as you can. What you tell us will not affect your interactions with SafeCare or other agencies. You can refuse to answer any question you don't want to. Thank you for helping us by filling out this survey.

1. Interacting with my infant has become easier.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

2. I have more ideas about activities I would like to do with my infant.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

3. I think that talking to my infant is important.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

4. I talk to my infant more than I did before.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

5. I have new ideas about what to talk to my infant about.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

6. I believe that this training would be useful to other parents.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

7. The Home Visitor was negative and critical.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

8. I do not feel the PII training gave me new or useful information or skills.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1	2	3	4	5

9. Practicing during the sessions was useful.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

1 2 3 4 5

10. The Home Visitor was on time to appointments.

Strongly agree Agree Neutral Disagree Strongly disagree
1 2 3 4 5

11. The written materials were useful.

Strongly agree Agree Neutral Disagree Strongly disagree
1 2 3 4 5

12. The Home Visitor was warm and friendly.

Strongly agree Agree Neutral Disagree Strongly disagree
1 2 3 4 5

13. The Home Visitor was good at explaining the material.

Strongly agree Agree Neutral Disagree Strongly disagree
1 2 3 4 5

14. What did you like best about the program?

_____
_____
_____

15. What did you like least about the program?

_____
_____
_____

16. What do you think would make the program better or more useful?

_____
_____
_____

Other Comments

_____
_____
_____

Thank you for your help!