EFFECT OF BUG-IN-THE-EAR-FEEDBACK AS AN INTERVENTION TO PROMOTE ATTACHMENT BEHAVIORS IN THE ADOLESCENT MOTHER/INFANT DYAD

By

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This document is dedicated to my children, Kofi and Stephanie.
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EFFECT OF BUG-IN-THE-EAR-FEEDBACK AS AN INTERVENTION TO
PROMOTE ATTACHMENT BEHAVIORS IN THE ADOLESCENT
MOTHER/INFANT DYAD

By

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Background: Previous studies have shown that compared with adult mothers,
adolescent mothers are less verbally and emotionally responsive, show less positive
affect, and have less intense emotional and behavioral attachment interactions with their
children. These less than optimal adolescent mother/infant attachment interactions have
been found to affect the child’s healthy growth and development.

Objectives: The study aimed to identify and characterize the frequency of
attachment behaviors exhibited in the infant/adolescent mother dyad and obtain a
baseline of the frequency of the interaction on the NCAST Feeding Scale. The second
aim was to implement an individualized bug-in-the-ear feedback parent training model to
improve the frequency and quality of infant-mother interaction and assess its efficacy
using the NCAST Feeding Scale. The third aim was to compare mother/infant attachment
behavior frequencies pre and post training.
Methods: A non-concurrent multiple baseline design across three participants was used. Baseline videotaping was done at the home of three 15-year old African American mothers as they formula fed their infants who were between the ages of 11/2 to 51/2-months. The baseline sessions were repeated until a stable baseline of interaction behaviors was achieved. The individualized intervention using a bug-in-the-ear feedback was instituted based on the occurrence or non-occurrence of target behaviors that were identified using the NCAST Feeding Scale.

Results: The baseline phase of the study clearly identified low frequency and non-occurrence of attachment behaviors of the verbal/communication type. After the intervention was instituted in the second phase of the study there were positive effects in the mother’s behaviors which in turn positively impacted infant behavior. This was particularly notable in the area of the child responding to the mother.

Conclusion: Findings from this study extend and strengthen previous research in this area that has shown that adolescent mothers are less verbal to their infants. Although the intervention was successful in this study, it is important to indicate that the bug-in-the-ear feedback intervention was a labor intensive approach in changing mother/infant interaction behaviors. Thus, further nursing research is warranted on exploring the best approaches in changing these rather complex and difficult behaviors.
Defining Attachment

Attachment in humans refers to an affectional tie that one person forms with another specific individual. The first individual is most likely the mother and attachment tends to endure (Ainsworth, 1989). Through theoretical developments of John Bowlby and Mary Ainsworth, a rich knowledge base of attachment has emerged which emphasizes the importance of the infant’s security. According to Bowlby (1982), the pathway followed by each developing individual and the extent to which he or she becomes resilient to stressful life events is determined to a very significant degree by the pattern of attachment developed during the early years. Subsequent studies have confirmed that a mother’s attachment to her infant is a major contributor to the child’s healthy growth and development (Ainsworth, 1989).

Attachment in Bowlby’s framework is the bio-behavioral process that leads from distress to solace, from real or perceived danger to “felt safety.” It can be defined as proximity seeking, comfort-seeking, and security-seeking in situations of real or perceived threat of danger. The ability of the mother and the infant to communicate is a delicate yet necessary element in a good relationship. Mothers use various sensorimotor means to interact with an infant. Touch and visual contact are the most powerful means of communicating with an infant (Brazelton & Cramer, 1990). Crying, smiling, grasping, reaching out and establishing visual contact are among the attachment behaviors that infants display to maintain proximity with their parents and express their needs.
Attachment in Adolescent Mothers

Adolescent mothers may be at high risk for negative parent – child interactions. Studies have shown that compared with adult mothers, adolescent mothers are less verbally and emotionally responsive, show less positive affect, and have less intense emotional and behavioral involvement with their children (Christopher, Bauman & Veness-Meehan, 1999). There is much evidence in the literature suggesting that adolescent mothers are at risk for adverse psychological and behavioral problems that can affect the mother’s life course as well as the infant’s health and development. Adolescent mothers have displayed higher levels of parenting stress and are less responsive and less sensitive in interactions with their infants than adult mothers (Passino et al., 1993).

Further, adolescent mothers may be less competent to parent in terms of their emotional development, parenting experience, and parenting skills (Furstenberg, Brooks-Gunn, Chase-Lansdale, 1989). Consequently, children of adolescent mothers have been found to suffer more physical, intellectual and emotional difficulties. Disturbed attachments have been implicated in the development of dysfunctional parent-child relationships (Koniak-Griffin, 1988) and other negative outcomes. Since adolescents are responsible for almost 500,000 births in the United States annually (Ventura, Martin, Curtin & Matthews, 1998), and there appears to be such an ominous impact of this phenomenon on the infant and his or her long term outcome, it is imperative that this public health problem is closely analyzed.

Ethological Theory

Ethology is concerned with the adaptive, or survival, value of behavior and its evolutionary history (Hinde, 1988). This theoretical orientation was first applied to research on children in the 1960s, but has become more influential in recent years. The
origins of ethology can be traced to the work of Darwin. Its modern foundations were laid by two European zoologists, Lorenz and Tinbergen (Dewsbury, 1992). Watching the behaviors of animal species in their natural habitats, Lorenz and Tinbergen observed behavioral patterns that promote survival. The most well known of these is imprinting, the early following behavior of baby geese that ensures that the young will stay close to the mother, be fed, and protected from danger. From the ethological perspective, attachment is an innate human survival mechanism.

**Function of Imprinting and Innate Signaling in Parent-Infant Bonding**

Bowlby (1969), who first applied this idea to the infant-caregiver bond, was inspired by Lorenz's studies of geese imprinting. He believed that the human baby, like the young of most animal species, is equipped with a set of built-in behaviors that helps keep the parent nearby, increasing the chances that the infant will be protected from danger. Contact with the parent also ensures that the baby will be fed, but Bowlby was careful to point out that feeding is not the basis of attachment.

According to Bowlby, the infant's relationship to the parent begins as a set of innate signals that call the adult to the baby's side. As time passes, a true affectionate bond develops, which is supported by new cognitive and emotional capacities as well as a history of consistent and sensitive, responsive care by the parent. Out of this experience, children form an enduring affectional bond with their caregivers. This enables the child to use this attachment figure as a secure base across time and distance.

**Defining Affectional Bonds**

Affectional bonds are formed as a result of reinforcing interactions with the attachment figure and the child. Emotional life is seen as dependent on the formation, maintenance, disruption or renewal of attachment relationships. Consequently, the
psychology and psychopathology of emotion are deemed to be largely the psychology and psychopathology of affectional bonds. The fundamental assumption in attachment research on human infants is that sensitive responding by the parent to the infant's needs results in an infant who demonstrates secure attachment, while lack of such sensitive responding results in insecure attachment (Lamb, Thompson, Gardner & Charnov, 1985). Theorists have postulated several varieties of insecure attachment. Ainsworth et al. originally proposed two: avoidant, and resistant also called ambivalent (Ainsworth, Blehar, Waters, & Wall, 1978).

The work of Klaus and Kennell (1976) on maternal bonding had a great impact on nursing practice. Maternity and neonatal hospital settings were modified to promote early and extensive contact between mothers and their newborn infants in order to promote attachment. However, this hypothesis of a critical period has been challenged by other studies (Gay, 1981; Rubin, 1984). Given the contradictory findings early contact cannot be used as the sole marker on which mother/infant attachment is evaluated, even though beneficial effects have been reported. Attachment can also be evaluated in periods past the immediate postpartum period.

**Studies of Affectional Mother-Infant Bonds in Adolescents**

It has been suggested in the literature that adolescent mothers by virtue of their immaturity have difficulty establishing optimal interactions with their infants. In a study conducted in the University of Pittsburgh, thirty-eight full-term, first-born infants of adolescent mothers were assessed at six months of age in a standardized laboratory setting using a modified Ainsworth Strange Situation procedure (Broussard, 1995). The attachment security rate within this sample was 23.7%. Attachment security problems were attributed to faulty interaction patterns between the adolescent mother and infant.
Another study conducted through Oklahoma State University compared adolescent mothers’ and older mothers’ interaction patterns with their six-month-old infants. During feeding, the adolescent mothers demonstrated less expressiveness, less positive attitude, less delight, less positive regard, fewer vocalizations and a lower quality of vocalizations than non adolescent mothers. During play, the adolescent mothers demonstrated less inventiveness, patience and positive attitude (Culp, Culp, Osofsky & Osofsky, 1991).

**Behavioral Approach and Learned Helplessness**

**Defining the Dependency and Drive Reduction Model**

The behavioral approach of attachment is based on the dependency and drive reduction model. Dependency is viewed as an acquired drive originating because the helpless infant is dependant on his mother for gratification of his basic physiologic needs (Sroufe, Duggal, Weinfield & Carlson, 2000). The crying and other behaviors characteristic of the infant are reinforced through his/her mother’s nurturing actions, making them more likely to occur again. The stimulus provided by the mother’s face and presence signals impending gratification. This is how the infant acquires a drive to be close to his/her mother and seek her attention. This dependency drive is eventually generalized to other people in the child’s life.

By the second half-year, an infant exhibits purposeful goal directed behavior. (Sroufe, Duggal, Weinfield & Carlson, 2000). Infants behave in order to elicit a particular response from the mother such as raising arms to indicate a desire to be picked up. At this point, the infant actively participates in the regulation process.

**Importance of Early Relationship Experiences**

Early relationship experiences are vital because they are the first models of patterns of self-regulation. Infants generalize to what they experience. If they learn that they can
turn to others when in need and get responses they will believe in their own effectiveness in maintaining regulation. Also because their needs are routinely met, they will believe in their self worth. A sense of personal effectiveness follows from routinely having one’s actions achieve their purposes. These positive expectations towards others as well as self-confidence are logical outcomes of experiencing routinely responsive care. This provides an important foundation for later self-regulation (Sroufe, Duggal, Weinfield & Carlson, 2000).

**Learned Helplessness**

When care is chaotic, inconsistent or rejecting such as in high-risk mothers including adolescents, an anxious attachment relationship may evolve. In the face of inconsistency, the infant may maximize the expression of attachment behaviors, emitting high intensity signals such as inconsolable crying, or alternatively may learn to cut off expression or attachment behaviors (Sroufe, Duggal, Weinfield & Carlson, 2000). This strategy is consistent with the theory of learned helplessness.

Learned helplessness occurs when a person cannot control outcomes. Mark (1983) defines this as an adaptive response to situational demands. It is further explained by Seligman (1975), who developed the concept as the reduction of efforts and motivation after an individual’s efforts have little or no impact on the outcome. In the most extreme form of this condition, the person does not try to initiate anything. The effects of learned helplessness are experienced in one or more of the following domains: motivational, affective and cognitive (Abramson, Seligman & Teasdale, 1978).

In a recent study examining the concept of learned helplessness, prenatal characteristics including cognitive readiness for parenting, intelligence and personal adjustment of 121 adolescent mothers were examined and correlated with the behavior
outcomes of their children (Sommers et al., 2000). The findings indicated that by age 3, many of the children were at high risk for atypical and perhaps dysfunctional development. Less than 30% of the sample which was generally healthy at birth showed normal cognitive development, emotional functioning and adaptive behavior at 3 years of age. The learned helplessness model provides a possible explanation for the behaviors that are seen in these children. It may be that for children who have rarely been successful with interacting with their mothers, withdrawal is an effective self defense mechanism protecting them from greater failure.

**Interventions to Counter the Development of Learned Helplessness**

On a positive note, it may be possible that many learned helplessness. Risk factors can be reduced by instituting intervention programs to facilitate the development of an early, successful attachment bond between the adolescent mother and her infant. One example of such an intervention is that of Field (1998) who investigated 40 full term 1 to 3 month old infants born to depressed adolescent mothers who were low socioeconomic status and single parents. The infants were given 15 minutes of either massage or rocking for 2 days per week for a 6-week period. A comparison of infants in the massage therapy group with infants in a rocking control group showed that the massaged infants spent more time in active alert and awake states and cried less. Over the 6-week period, the massaged infants gained more weight and showed greater improvement on emotionality, sociability and soothability. There were also decreases in stress hormones. These results suggest that actively engaging infants may have a positive effect on the overall well being of the child.
Family Stress Model

Defining the Family Stress Model

Another theoretical approach that could be used in explaining less than optimal attachment in the adolescent mother–infant dyad is the family stress theory. Family stress theory postulates that acute stressors when accumulated could lead to family crises, including physical, emotional, or relational crises (McDonald, 1999).

ABCX Theory of Family Stress

Hill's (1971) theory of family stress was formulated after the Great Depression, based on extensive observations of families who survived contrasted with those whose families did not. As Hill interviewed families who had lost their jobs and were existing in extreme poverty, he looked for factors which contributed to family survival of these circumstances. From these qualitative data, Hill theorized that there are two complex variables that act to buffer the family from acute stressors and reduce the direct correlation between multiple stressors and family crisis. These were formulated into what he called his ABCX theory of family stress.

The “A” variable is the stressful event; the “B” variable refers to the complex of internal and external family resources and social support available to the family, i.e., the social connectedness within the family, as well as social connectedness outside the family. Hill theorized that social isolation would significantly increase the impact of the multiple stresses on the family functioning. In contrast, positive social supports would minimize the impact. Hill's "C" variable, the perception factor, was the second predictor of the extensiveness of the impact of stress on the family.
Applying Family Stress Theory to Adolescent Mothers and Infants

Applied to the adolescent mother/infant dyad, this theory suggests that families with poor resources, who perceive the pregnancy as a crisis, may have poor mother-infant interactions and function at lower levels. After a period of reorganization, families with higher cognitive appraisals and support are able to regroup and operate at a higher than baseline level while families with poor support and lower cognitive appraisals continue to function at a lower level.

Family stress theory, when applied to attachment behaviors of the adolescent mother-infant dyad, clearly underscores the importance of social support and how nursing could play a vital role in promoting the well being of the adolescent mother-infant dyad. This could be in the form of providing social support throughout the pregnancy or the initiation of prevention programs. There are documented studies that have shown the clear benefits of early prenatal involvement by community nurses in high risk mothers (Darmstadt, 1990).

Adopting the attachment paradigm as a framework for early intervention and primary prevention in the adolescent mother-infant dyad has tremendous nursing practice implications. The literature suggests that the experimenter-mother interaction provides emotional support for the mothers participating in intervention programs and that such support is an important variable enhancing the quality of maternal behavior (Kelly & Barnard, 2000). Further, several researchers have suggested that professionals’ intervention behaviors could serve as models for mother-child interaction behaviors. However, there is little information on the best conditions of intervention and its effect on later development. It is evident from the preceding theoretical review that effective mother-infant interaction may be compromised in the adolescent mother/infant dyad,
leading to negative outcomes in the child. It is therefore imperative that effective interventions such as parent training are established to help improve the long-term outcomes of these children.

**Parent Training Paradigm**

The birth of a child is a very emotional time for mothers who may experience a wide range of emotions from joy and excitement to frustration and disappointment. While such emotions come naturally, knowledge and skills related to parenting are less natural. Most studies suggest that behavioral parent training is an effective early intervention strategy for families with infants (Breismeister & Schaefer, 1997). Important components of early intervention are teaching mothers to read and interpret infant cues, effectively manage the infant’s behavior and to promote positive mother-child interactions. This type of intervention may ultimately prevent negative outcomes in the child.

**Contribution of Self-Efficacy and Social Learning Theory**

Behaviorally focused parent training is a generic term that refers to teaching parents how to become therapeutic change agents for their children (Hoffman, 1998). Parents are provided the appropriate knowledge, skills, and incentives to initiate coping efforts and persistence in the face of difficulty in relating to their child. Parent training is designed to offer parents new resources for enhancing their parenting skills (Breismeister & Schaefer, 1997). One of the benefits of the parent training approach is that it allows parents to develop a well established sense of mastery and confidence in their parenting skills.

This concept of achieving mastery and confidence is consistent with Bandura’s theory of self efficacy. Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over
events that affect their lives (Bandura, 1995). A strong sense of efficacy enhances human accomplishment and personal well-being in many ways. People with high assurance in their capabilities approach difficult tasks as challenges to be mastered rather than as threats to be avoided. Such an efficacious outlook fosters intrinsic interest and deep engrossment in activities. Such individuals set themselves challenging goals and maintain strong commitment to them. They heighten and sustain their efforts in the face of failure. These individuals quickly recover their sense of efficacy after failures or setbacks. They attribute failure to insufficient effort or deficient knowledge and skills which are acquirable. They approach threatening situations with assurance that they can exercise control over them. Such an efficacious outlook produces personal accomplishments, reduces stress and lowers vulnerability to depression (Bandura, 1986).

The self-efficacy literature suggests that efficacious expectation alone will not produce the desired performance if the component capabilities are lacking (Bandura, 1977). People also require the appropriate knowledge, tools, skills, and incentives that can be acquired through learning.

Social learning theory has its roots in the behaviorist notion of human behavior as being determined by learning, particularly as shaped by reinforcement in the form of rewards or punishment. This theory is based on early research in behaviorism conducted by Ivan Pavlov, John Watson, and B. F. Skinner. One of the key premises of social learning theory is that the child’s behavior, whether adaptive or maladaptive, desirable or undesirable, is in part a product of the child’s history and present interactions with people and circumstances that impact on the child (Breismeister & Shaefer, 1998).
In the context of promoting attachment behaviors and for an interaction between a mother and child to be effective, the infant and mother must give clear cues to each other. The mother must know how to respond to the infant’s cues and the infant must respond to the mother’s cues and the environment must facilitate the interaction that occurs. The interaction becomes a cyclical learning event that either reinforces the behavior that occurs or facilitates its termination (Barnard, Morisset & Spieker, 1993).

**Incorporation of Behavioral Principles in Parent Training**

Many procedures in parent training can be derived from the general behavioral principles. Early research was patterned in many ways after the style of research developed by Skinner (1957). A fundamental feature of the methodology is the detailed analysis of the behavior of an individual and some type of intervention procedure brought into contact with the target behavior. The specific behavioral parent training procedure is determined by specific problems and needs (Breismeister & Shaeffer, 1997). In the context of the young mother and her infant, providing the appropriate knowledge and skills through parent training may enhance the reciprocal interacting abilities of the dyad. Because the innate characteristics of the child are difficult or impossible to alter, interventions practiced to date for promoting mother child attachment have focused on the mother’s behaviors. The goals of these interventions have been to increase competence of the mother in interpreting and responding to the infant’s communication cues by alleviating distress and promoting growth-fostering behaviors (Barnard, Morisset & Spieker, 1993).

The specific parent-training that will be used in this study consists of prompting and cueing (antecedent stimulus variables) by the investigator through a wireless earphone. This training approach relies heavily on Skinner’s stimulus-response model.
A number of published studies have shown the clear benefits of early intervention programs in facilitating the development of early attachment between mother and child. Meyer and Anderson (1999) reported on an individualized family based intervention that significantly reduced maternal stress and depression and enhanced mother-infant feeding interactions. Barnett (1995) identified that the most promising parent training programs operate at the level of preventative and early interventions with identified high risk populations. Intervention programs that were particularly effective focused on changing behavior rather than on changing attitudes and/or feelings (Elder, 1997).

**Nursing Theory and the Nursing Meta-paradigm**

**King’s Theory of Goal Attainment**

Imogene King’s (1981) theory of goal attainment is consistent with self-efficacy and parent training. She defines persons as social beings who are rational, sentient, perceiving, thinking, feeling, able to choose between alternative actions, able to set goals [and] select means toward goals. Her meta-paradigm of the nursing process relies on a conceptual framework of three systems: (a) the personal, relating to the individual, (b) the interpersonal, involving the interaction between individuals particularly the nurse and patient, and (c) social, involving the individual’s relationships with family and other external systems. It is in the context of this interpersonal system that nurse and patient set goals and evaluate their achievement (Burney, 1991).

Parent training of young mothers, by nursing, in the context of King’s theory is the interpersonal system that the nurse and patient set goals and evaluate their achievement. The key to King’s theory is this nurse-patient transaction. The personal system is just as vital to the theory, because it recognizes the significance of different perceptions of the nurse and patient especially since transactions require perceptual accuracy in nurse-client
interactions and congruence between role performance for nurse and client (Chinn & Kramer, 1991). King suggests that it is the capacity of human beings to interact meaningfully with one another in the pursuit of common goals that allows progress of the patient on all three levels (Aggleton & Chalmers, 2000). King’s theory effectively demonstrates that communication, goal setting and attainment are ways to help patients meet their self care needs, one of the main goals of nursing. This can be translated to the achievement of self-efficacy.

**Congruence of King’s Theory with Bandura’s Self Efficacy Theory**

According to Bandura (1997), individuals’ self-efficacy beliefs powerfully influence their attainments. He views people as self-organizing, proactive, self-reflecting and self-regulating. From his theoretical perspective, human functioning is viewed as the product of a dynamic interplay of personal, behavioral, and environmental influences. This is the foundation of Bandura’s (1986) conception of reciprocal determinism, the view that (a) personal factors in the form of cognition, affect, and biological events, (b) behavior, and (c) environmental influences create interactions that result in a triadic reciprocity, a framework for self efficacy. It is evident that these two theories, Bandura’s self efficacy theory and King’s theory of goal attainment, though from different fields and perspectives, are congruent.

In Bandura’s self-efficacy framework, nursing interventions can be viewed as environmental influences that may effect change. In King’s theory, nursing is part of the interpersonal system. She acknowledges the importance of the nurse’s role in assessing the environment and making alterations conducive to promoting health.
**Implications for Nursing Practice**

In light of the current managed care era and the emphasis on health promotion and disease prevention, nurses who work with families of young children are charged with identifying and implementing effective early intervention strategies that promote positive parent-child interactions (Elder, 1995; Tucker et al., 1997).

Consistent with King’s nursing meta-paradigm and the preceding theoretical linkages described, it is apparent that good assessment or obtaining a baseline of behavior is an important step in the nursing process as well as being an imperative phase in effecting change. Nurses must be able to identify individual family values and needs, set goals in collaboration with the family and modify effective intervention strategies such as parent training to match the identified needs and goals of individual mothers while maintaining the essential components of the intervention for reaching the desired outcome of self efficacy in the young mother.

**Summary**

A mother’s attachment to her infant is recognized as a major contributor to the child’s healthy growth and development. Attachment theory postulates that certain inborn behaviors such as crying, reaching and smiling in human neonates are exhibited in order to bring a protective, nurturing attachment figure into close proximity (Bowlby, 1982). This closeness provides the infant with security and gratification and serves as the blueprint for all later attachment relationships. Disturbed attachments have been implicated in the development of dysfunctional parent-child relationships and other negative psychosocial outcomes.

Although a plethora of research has been done on this subject, very few studies have been conducted in the recent past. Much of the research available for review was
conducted in the 1980’s and 1990’s. Review of this literature suggests that a disproportionate percentage of insecure attachments have been found in infants of adolescent mothers. Studies also reveal that a greater than expected incidence of intellectual delays and/or behavioral disturbances is found in children of adolescent mothers. Since adolescents are responsible for almost 500,000 births in the United States annually (Ventura, Martin, Curtin & Matthews, 1998) and the emphasis on health care is primary prevention, it is imperative that effective interventions are established to help improve the long-term outcomes of these children.

Over the years, a number of infancy intervention programs have been developed to overcome interaction disturbances with parent training. Although many of the interventions described are dated, they demonstrate that through early intervention, mothers learn the skills necessary to provide their infants with a nurturing environment (Lambert, 1998). Badger (1980) reported significant gains for infants and increases for the mothers in self-esteem after implementation of parent-training interventions of at risk mother-infant pairs. Similarly, Field (1980) reported encouraging results in her work with adolescent mothers and their preterm infants.

It has also been suggested in more recent literature (Kelly & Barnard, 2000) that the experimenter-mother interaction provides emotional support for the mothers participating in intervention programs and that such support is an important variable enhancing the quality of maternal behavior. Further, several researchers have suggested that professionals’ intervention behaviors should serve as models for parent-child interaction behaviors (Koniak-Griffin, Verzemneiks & Cahill, 1992; Kelly & Barnard,
However, there is little information on the best conditions of intervention and its effect on later development.

**Statement of Purpose**

The purpose of this study is to examine the effects of a bug-in-the-ear feedback parent training intervention on interaction behaviors between the adolescent mother and her infant. There are three specific aims for this study. The first is to identify and characterize the frequency of attachment behaviors exhibited in the infant/adolescent mother dyad and obtain a baseline of the frequency of the interaction on the NCAST Parent Child Interaction Scale. The second aim is to implement an individualized bug-in-the-ear feedback parent training model to improve the frequency and quality of infant-mother interaction and assess its efficacy using the NCAST Parent Child Interaction Scale. The third aim is to compare operationalized mother/infant attachment behavior frequencies pre and post training.

Research terminology used in this study will be presented in later chapters.
CHAPTER 2
REVIEW OF THE LITERATURE

Importance of Mother – Infant Interaction

Guralnick & Neville (1997) summarize 20 years of prevention and early intervention research and conclude that social competence is increasingly perceived as the central focus in the psychological development of children. The central aspect of a child’s social competence and confidence is a secure attachment providing the growing child with the resilience, trust and ability to regulate emotions. There is compelling evidence that very early experiences are related to later development and antecedent studies consistently reveal that specific patterns of interaction during the first year are systematically related to attachment quality of the infant (Svanberg, 1998). Parental antecedents of particular interest have been the mother’s sensitivity, emotional warmth and support as well as synchrony and mutuality in the interaction (De Wolff & van IJzendoorn, 1997).

Importance of interventions in adolescent mothers

As Steele and Steele (1994) note, it is fortunate that a majority of mothers are secure, affectionate and consistent. However, it has also been suggested in the literature that adolescent mothers by virtue of their immaturity have difficulty establishing optimal interactions with their infants and this may compromise infant growth and development (Starn, 1992).

Although research conducted on adolescent mother infant interactions dates back to the 1980’s and 1990’s, the long impact continues to resonate in public policy In 2000,
President Clinton called on Congress to enact his budget initiative to provide $25 million to support living arrangements for teen mothers, help reduce repeat pregnancies and improve the help of mothers and children (US Department of Health and Human Services, 2000). The federal government estimates that approximately $40 billion per year is spent on helping families that begin with a teenage birth. Studies indicate that providing early intervention programs can reduce federal spending on adolescent pregnancy sequelae (Nguyen, Parris, & Place, 2003). The Nurse Home Visitations Program in Elmira, New York, based on the David Olds Home Visitation Model has been found to be very effective (Karoly et al., 1998).

**Review of Intervention Literature in the Adolescent /Mother Infant Dyad**

Over the years, a number of other infancy intervention programs have been developed in a variety of high risk populations to overcome interaction disturbances with parent training. Because the innate characteristics of an infant are difficult or impossible to alter, interventions practiced to date have focused on the behaviors of the mother or the primary caregiver. The goals of these interventions have been to increase competence of the parent in interpreting and responding to the infant’s communication cues by alleviating distress and promoting growth fostering behaviors, in essence to promote synchrony (Barnett, Morisset & Spiker, 1993).

In a recent study, parent-child advocates were trained to provide one-on-one intervention facilitating healthy parent-child interactions in a homeless population. They focused on training parents how to increase sensitivity and responsiveness to their children. Specific, positive and individualized feedback to parents related directly to increasing the quality of the parent-child interaction (Kelly, Buehlman & Caldwell, 2000). Other researchers also have examined strategies used by effective parent trainers
to produce changes in parent behaviors (Dangel & Polster, 1984). Strategies identified as successful include clear directions and specific feedback with praise.

Hester, Kaiser, Albert and Whiteman (1996) found that coaching, providing positive examples, giving specific instructions and giving specific rather than general feedback were effective parent training strategies and concluded that early intervention personnel should be taught to use these strategies in the early intervention setting. Bernstein et al (2001) emphasized that in order to support the parent-child relationship, an interventionist must go beyond traditional early intervention and parent education. Instead emphasis should be placed on the verbal and physical ongoing communication between each mother and their vulnerable child.

In summary, it is evident from the preceding literature review that effective mother-infant interaction may be compromised in the adolescent mother/infant dyad, leading to negative outcomes in the child. It is therefore imperative that current, effective interventions are established to help improve the long-term outcomes of these children. A majority of the adolescent parenting programs described in the literature are group oriented and are not directed at improving the mother-infant interaction. Instead they focus on the acquisition of knowledge and skills to increase competence in caring for the infant.

Further it is important to recognize that different adolescent mothers will have varied strengths and may need different kinds of help with regard to preventative strategies (Svanberg, 1998). A one-size fits all approach to intervention may not always apply to the individual mother/infant dyad. These shortcomings clearly underscore the importance of using an alternative research approach in exploring effective parent
training interventions. More research is needed on low cost training strategies that are uniquely suited for individual caregiver needs. Therefore, the proposed study will address these concerns by employing a single subject design and an individualized intervention with antecedent stimulus delivered to the adolescent mother via a simple wireless earphone, also referred to as bug-in-the-ear (BITE) feedback.

**Bug-in-the-ear feedback (BITE)**

Immediate feedback has been found to be more effective than delayed feedback in increasing desirable behaviors such as teaching, how to deliver positive consequences and instructional prompts (O’Reilly, Renzaglia & Lee, 1994). For example, Lancioni & Boelens (1996) demonstrated the efficacy of immediate computer delivered feedback in increasing the drawing accuracy of children with mental retardation.

A number of studies have used the bug-in-the-ear feedback to deliver immediate feedback. Such studies fall into three categories. One area of focus is providing immediate and corrective feedback to counseling trainees with the overall aim of improving clinical intervention skills (Gallant, Thyer & Bailey, 1991). A second area of focus using BITE is with teachers with emphasis on skill acquisition and finally using BITE with parents who are provided immediate feedback when dealing directly with their children, the focus on increasing desirable parenting skills (Crimmins, Bradlyn, St. Lawrence & Kelly, 1994; Wolfe et al., 1982).

Advantages of using an earphone that receives a transmitted signal are numerous. In addition to minimizing disruption and providing immediate feedback, the use of electronic instrumentation such as the BITE device can be used when individuals are not trained in complex intervention techniques (Coleman, 1970). It also eliminates the risk of observer influence when used for intervention training. Further, with today’s
technological advances, this technique may fit well with the learning styles of today’s adolescent. Accustomed to immediate gratification, youth today are responsive. They crave stimulation and expect immediate answers and feedback (Brown, 1997). Bug-in-the-ear technique may be a good tool for intervention for this generation.

**Single Subject Design**

Single subject design, derived from behavior analysis, is a research design that provides an experimental model for the study of individuals over time. The design is a clinically viable, controlled experimental approach to the study of a single case or several subjects, and the flexibility to observe change under ongoing treatment (Portney & Watkins, 2000). Single subject design requires the same attention to logical design and control as any other experimental design based on a research hypothesis. The independent variable is the intervention and the dependent variable is the subject’s response defined as the target behavior that is observable, quantifiable and a valid indicator of treatment effectiveness (Portney & Watkins, 2000).

Single subject design is widely used in behavior analysis research where it originated from and also in treatment design and intervention testing research in an array of fields including special education, social work and learning disabilities as well as in a number of allied health researches ranging from occupational therapy, physical therapy, disability rehabilitation and medical gastroenterology (Elder, 1997; Madsen & Bytzer, 2002; Zhan & Ottenbacher, 2001). The gold standard of nursing research thus far remains the group comparison design with a dearth of nursing research studies using single subject design.

There are numerous characteristics of single subject design that makes it a powerful research approach, particularly when dealing with individual subjects. Those elements
that distinguish single subject design from group designs or case study include baseline logic; each subject serving as his own control; replication and visual analysis of the data (Bailey & Burch, 2002). This methodology is most appropriate for this research question that addresses the individual’s behavior as well as the subject serving as her own control. Furthermore, by replicating the single subject intervention with several single subjects it may be possible to obtain a generalized overall intervention effect.
CHAPTER 3
METHODOLOGY

Participants and Setting

Three adolescent mothers and their infants participated and completed this study. Inclusion criteria for the participants were based on conditions that are optimal for mother/infant interactions and also based on conditions that minimized the risk of the impact of confounding variables such as age, racial and cultural differences on interaction behaviors. Thus, mothers recruited: (1) were close in age (2) were between the ages of 13 and 18 years (3) were of similar race and socio-economic background (4) had no previous parenting experience (5) had a vaginal delivery and (6) were in good mental and physical health as determined by their health care provider. Inclusion criteria for the infants were (1) thirty six weeks gestation or greater (2) no congenital abnormalities (3) between the ages of zero and six months (4) formula fed and (5) in good general health as determined by their health care provider.

Excluded from this study were mothers who were (1) older than age 18 years (2) had previous parenting experience (3) had experienced a cesarean section (4) in poor mental and physical health as determined by their health care provider. Exclusion criteria for the infants were (1) less than thirty six weeks gestation (2) presence of congenital abnormalities (3) greater than six months of age. (4) currently breast feeding and (5) infants in poor health as determined by their healthcare provider. Formula feeding was used as an inclusion criteria to minimize the possible psychological discomfort associated with videotaping in this population, particularly when breast feeding. Further,
mother/infant interactions are likely to be different when formula feeding versus breast-feeding.

Capital City and Gadsden County Healthy Start Programs are community action programs that provide free comprehensive early childhood health and education programs to low income children while involving their parents in the total child development process. Pregnant adolescents are an integral part of this program. After obtaining approval from the University of Florida Institutional Review Board (IRB) and Florida Department of Health IRB, three adolescent mothers and their children and three alternates were recruited from this setting through a Healthy Start Social Worker.

In an effort to reduce participant attrition, the Investigator frequently checked in by phone and maintained contact with the mothers of the participants as well as the Social Workers of the Gadsden County and Capital Area Healthy Start.

**Pilot Testing**

All procedures including instruments and the intervention were pilot tested with an 18-year old participant and her 6-month old infant who were not part of the study. The data from the pilot study provided important insight regarding how the study was to be conducted particularly in terms of the mechanics of videotaping and the delivery of the intervention.

**Participant 1**

Participant 1 was a pleasant, cooperative 15 year-old, single African American young woman who lived at home in the Tallahassee area with her mother and four teenaged siblings. She was entering the 10th grade in an alternative school in the fall semester. This was her first pregnancy. Her pregnancy was uncomplicated and baby was vaginally delivered at term.
Infant 1

This was a 3-month old African American male infant delivered vaginally at term. He weighed 6 pounds and 11 ounces at birth. He was healthy with no congenital abnormalities. He was on Carnation Good Start formula for the first three sessions and was changed to Isomil formula due to frequent episodes of diarrhea. His weight was appropriate for his age and he had a healthy appetite.

Participant 2

Participant 2 was also a 15 year-old, single African American young woman who lived at home in the Tallahassee area with her mother and two teenaged siblings. She was also entering the 10th grade in a local high school in the fall semester. This was her first pregnancy. She also had an uncomplicated pregnancy and baby was vaginally delivered at term.

Infant 2

This was a 51/2-month old African American male infant delivered at term, weighing in at 6 pounds and 7 ounces. He was healthy with no congenital abnormalities. At age 51/2 months, he was rather large for his age. He ranked in the 85th percentile for height and over the 99th percentile for weight. He was on Isomil formula and recently had begun taking solid foods.

Participant 3

Participant 3 was a 15 year-old African American young woman who lived at home with her mother and two teenaged siblings in the Quincy/Havana area. This was her first pregnancy. Her pregnancy was uncomplicated except for one admission for pre-tem labor in the 7th month. Her baby was delivered vaginally at term. She was entering the 10th grade of an alternative high school in the fall semester.
Infant 3

This was an 11/2-month old African American male infant delivered at term. He weighed 7 pounds and 2 ounces at birth. He was healthy with no congenital abnormalities. His size was appropriate for his age. He was on Carnation Good Start formula and had a healthy appetite.

Procedures

At each mother’s home, the study was thoroughly explained and informed consent obtained from the participants’ mothers (since each participant was an adolescent and there was no parental involvement of the fathers of the babies of all three participants). Assent was obtained from each of the adolescent mothers. During the first visit, each participant was asked about general information and appointments were then made for subsequent home visits when videotaping occurred.

Experimental Procedure

A non-concurrent multiple baseline design across participants was used. The demonstration of experimental control in the multiple baseline design depends upon approximately equal effects of the treatment being observed with each baseline. The experimenter needs to ensure that the baselines are as functionally equivalent as possible (Bailey & Burch, 2002). Therefore, baseline videotaping was done at the 1.00 pm feeding of the infants of all three 15 year-old mothers. After baseline stability was reached, the intervention phase was instituted but staggered, several days to several weeks apart, across participants due to their different schedules and availability. A modified intervention (Intervention 2) was instituted for the first two participants after only subtle changes in target behaviors were observed after the first intervention was instituted. The third participant received the modified intervention only.
There were a total of nine sessions for Participant 1, eight sessions for Participant 2 and six for Participant 3 (see Table 3-1). At the conclusion of the study all adolescent mothers received a gift certificate of $25-$35 (depending on the number of sessions).

Table 3-1. Videotaping Schedule of Participants

<table>
<thead>
<tr>
<th></th>
<th>Baseline Sessions</th>
<th>Intervention 1</th>
<th>Intervention 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Participant 2</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Participant 3</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Baseline Phase

The Investigator videotaped each mother-infant dyad at home during numerous (three to four) 1:00 pm feeding sessions. Baseline videotaping during feeding was done at the same time of each day for all participants. To minimize the risk of observer influence, the camcorder was set up on a tripod following pre-established guidelines (obtained after a pilot study) and the Investigator waited in a different room while each mother fed the baby.

The baseline sessions were repeated until a stable baseline of interaction behaviors was achieved. The individualized intervention was designed and instituted based on the occurrence or non occurrence of target behaviors that were identified during the baseline phase.
**Intervention**

To minimize observer influence and/or bias, an instant replay camcorder set on a tripod was used during the intervention phase. This device transmitted instant images to the Investigator on a portable television set and allowed the Investigator to prompt, cue and provide reinforcement to the participants via a wireless headphone on desired behaviors from a different room. The first intervention involved the Investigator’s randomly interjecting several prompts for desired behaviors and providing reinforcement when the desired behaviors were exhibited. After several sessions with this intervention with the first two participants, very subtle changes in target behavior were noticed. After debriefing with the participants, a very structured modified intervention was developed where prompts, cues and reinforcements were given in sequence. In addition, the language used in delivering the prompts was simplified and specific examples of the target behavior were also given. The instant replay was also eliminated at this time. This modified intervention incorporating participant feedback was instituted with all three participants and found to produce a significant change in target behaviors. As a result of the first two participants’ positive response to the modified intervention, Participant 3 received this modified intervention only after her baseline stability was achieved.

**Instruments for Evaluating Dependent Variables**

**NCAST**

The Nursing Child Assessment (NCAST) Feeding scale was used to operationalize attachment behaviors as well as code attachment behaviors as they occurred in videotaped mother-infant interactions. This scale has been widely used in assessment of attachment behaviors and has been subjected to much validity and reliability testing. The content validity for NCAST was derived from the Bayley Test of Infant Development,
the Merrill Palmer and Stanford–Binet Scales and later modified according to the observations of William Frankenberg (NCAST, 1995).

The scale demonstrates high internal consistency of the total score, parent score and the infant score. The Crohnbach’s alpha for the total parent score is .87 and for the total child it is .81 (NCAST, 1995). The test-retest reliability is better for the parent items than for the infant items. The total score generalizibility coefficient for the parent score is 0.75 and lower for the infant, 0.53 (NCAST, 2000). The validity of the scale predicting later IQ has been established in several samples. A longitudinal intervention project follow up revealed that scores for fostering of cognitive growth from the 10 month feeding scale showed a correlation of .50 with the child’s Bayley Mental Developmental Index at 24 months of age (NCAST, 2000).

The scale is based on the Barnard Model that assumes that mothers and infants have certain “responsibilities” to keep the feeding interaction going. The infant has the role of producing clear cues and being responsive to the mother. The mother has the responsibility of responding to the infant’s cues, alleviating the infant’s distress and providing opportunities for growth and learning (NCAST, 2000). The NCAST Feeding Scale is therefore divided into five categories under which there are a number of subcategories of attachment behaviors.

In this study, due to the exhaustive nature of the items on the original NCAST Feeding Scale, it would have been very difficult to code the videotaped sessions of all 76 behaviors in the subcategories. Therefore four out of the five major categories were assessed. These important attachment behaviors were identified and operationalized using previous research in this area as well as the opinions of expert panel of pediatric health
care professionals. A family care physician with a pediatric focus and three registered nurses were surveyed informally on the most important behaviors in the selected attachment categories. The categories were: mother’s sensitivity to cues, mother’s providing growth-fostering situations, infant’s clarity of cues and infant’s responsiveness to mother. The category of alleviation of distress was eliminated because there was not a consistent opportunity for those target behaviors to be exhibited during the baseline phase of the study. Further, only 13 selected behaviors in the subcategories were measured.

According to the literature, the NCAST scale has been modified and adapted for a number of reasons, including the culturally modified scale (Leon Siantz, in press). However, the rate of occurrence of attachment behaviors and the resulting implications have not been explored in the NCAST literature. In fact, the NCAST scale only measures the presence or absence of attachment behaviors. A number of studies have documented the internal reliability of the categories or subscales of the NCAST tool (Mogan, 1987; NeNamara, 1985). NCAST related research reports that the categories or subscales of sensitivity to cues, clarity of cues and responsiveness to parents as being the poorest in internal consistency reliability, yet there is no documentation in the literature on studies that have explored the reliability of the individual subscale items (NCAST, 2000). This lack of documentation on the reliability of the subscale items of this tool is a flaw of NCAST as a research tool. In this study, occurrence rate of individual, specific, subscale attachment behaviors was examined.

**Operational Definitions**

**Independent Variables**

**Sensitivity to cues.** The three target behaviors for this category of attachment behaviors were:
• Mother positions the infant so that the infant’s head is higher than her hips.
• Mother comments verbally on infant’s hunger cues before feeding.
• Mother positions the child so that trunk to trunk contact is maintained during feeding.

**Social-emotional growth fostering.** The three target behaviors for this category of attachment behaviors were:

• Mother is in “en face” position for more than half of the feeding.
• Mother uses positive statements in talking to the child during the feeding.
• Mother smiles during the feeding.

**Cognitive-growth fostering.** The three target behaviors for this category of attachment behaviors were:

• Mother talks to the child using two words at least three times during the feeding.
• Mother verbally describes the feeding or feeding situation to the child.
• Mother talks to the child about things other than the feeding.

**Clarity of cues.** The three target behaviors for this category of attachment behaviors were:

• Child displays a “build up of tension” at the beginning of each feeding. This was further operationalized as the child shaking his head from side to side, crying and looking for the bottle at the beginning of each feeding.
• Child demonstrates a decrease in tension within a few minutes after feeding has begun. This was further operationalized as the child stops shaking his head from side to side and stops looking for bottle.
• Child’s readiness for feeding. This was further defined as child’s eagerness to feed and looking in the direction of the bottle. This target behavior was not included in the final analysis of the study because of the difficulty in distinguishing it from the target behavior of builds up tension.

**Responsiveness to Mother.** The two target behaviors for this category of attachment behaviors were:

• Child looks in the direction of the mother when feeding.
• Child responds to feeding. This was further operationalized as child relaxed with rhythmic breathing as he sucks on the bottle.

**Dependent Variables- Frequencies of Mother and Infant Attachment Behaviors.** Different aspects of this tool have been used in similar studies where videotaped sessions were scored and coded for presence of behaviors, thus the NCAST staff were qualified in training the coders. The NCAST trainers are selected advanced practice nurses trained at the University of Washington where the NCAST tool was developed.

In order to establish inter-observer reliability, two nurse observers, were trained to use the NCAST tool. A third observer, who was not a nurse and who had not been trained in the use of the scale by the NCAST staff, was trained by a trained observer using the NCAST materials. The three independent observers coded target behaviors of the videotaped sessions. The time interval coding method was used for the target behavior. Infant feeding for participants lasted between 6 1/2 minutes and 11 minutes. Thus, 6 minute sessions of each videotaped interaction were coded and frequencies of occurrences of behaviors were recorded every 20 seconds.

**Inter-observer Reliability**

Inter-observer reliability checks were randomly obtained for 50% of all behaviors coded and frequencies measured. The reliability checks were conducted by the three observers independently viewing the videotapes at least twice at one sitting, three days after the initial coding was completed. Inter-observer agreement was calculated on an interval by interval basis for coding of mother and infant behaviors by calculating the number of agreements divided by the number of agreements plus the number of disagreements (Bailey & Burch, 2002). In this study, intervals in which target behaviors
were not observed were counted as agreements for the behaviors that occurred in high frequency and were not counted for behaviors that occurred in low frequency. The inter-observer agreement on the behavior coded was averaged to obtain the overall inter-observer agreement for each attachment behavior coded. Inter-observer reliability of 83% to 100% was obtained for the various behaviors coded using this interval agreement calculation (see Table 3-2). The subscale item of the infant’s readiness to feed was eliminated from the study because of consistently poor reliability scores and the difficulty the observers had in distinguishing that behavior from the behavior of build up in tension.

**Data Analysis**

As is customary with single subject experimentation, the data were analyzed visually for the trends or direction of change in behaviors, which may refer to the value or magnitude of the performance at the point of the intervention compared to the baseline. Since a multiple baseline design was employed in this study, data points at baseline and intervention were closely examined for trends, stability and variability as well as replication of the previous condition. The slope of the trend for baseline, intervention and modified intervention phases was assessed for a linear trend.

<table>
<thead>
<tr>
<th>Behavior coded</th>
<th>Participant 1</th>
<th>Participant 2</th>
<th>Participant 3</th>
<th>Mean Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head higher than hips</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Trunk to trunk position</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Comments on child’s hunger

Enface position 100% 100% 75% 92%

Smiles during feeding 75% 87.5% 87.5% 83%

Uses positive statements 87.5% 87.5% 87.5% 87.5%

Talked to child using 2+ words 100% 100% 100% 100%

Describes feeding 100% 100% 100% 100%

Talks to child about other things 87.5% 75% 87.5% 83%

Response to feeding 100% 100% 100% 100%

Looks in Mother’s direction 87.5% 75% 87.5% 83%

Builds up tension 100% 100% 100% 100%

Decrease in tension 100% 100% 83% 96%

**** Readiness to feed 48% 48% 48% 48%

**** This attachment behavior was not included in the final analysis of the study
CHAPTER 4
RESULTS

Findings

Coding of six minute feeding sessions revealed that in the baseline phase of the study, all three participants exhibited higher frequencies of attachment behaviors that were task oriented and exhibited low frequencies of attachment behaviors that involved communication with the infant. Attachment behaviors that were exhibited in low frequency were the target of the individualized intervention. Multiple baseline design demonstrated the replication of intervention effects across participants. Experimental control was strengthened by the display of independent baselines and the observation of change in the target behavior only when the intervention was instituted. The data for baseline and intervention phases were graphed. Pictorial representation of interventions for the low frequency target behaviors demonstrated that there was a cause and effect particularly between the modified intervention and the target behaviors.

Sensitivity to Cues

In the baseline phase all three adolescent mothers consistently exhibited the behaviors of positioning the infant’s head higher than hips and maintaining the trunk to trunk position the majority of the feeding time. The frequency of maintaining the position of the infant’s head higher than hips was almost at the ceiling across all participants except during the third baseline session with Participant 1, when she had a lower than usual frequency of this particular target behavior as well as the behavior of maintaining the trunk to trunk position. She however went back to her baseline for both behaviors in
the subsequent session. Participant 2 also had a consistent lower frequency compared to
the other participants of maintaining trunk to trunk position in all sessions. However, she
had a larger baby which may explain the lower frequency of this particular target
behavior in this participant (see Table 4-1 and 4-2).

Table 4-1 Sensitivity to Cues: Frequency of Infant’s Head Higher than Mother’s Hips

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
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<th>Baseline</th>
<th>Baseline</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Session 1</td>
<td>Session 2</td>
<td>Session 3</td>
<td>Session 4</td>
</tr>
<tr>
<td>Participant 1</td>
<td>18</td>
<td>17</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Participant 2</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Participant 3</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Table 4-2 Sensitivity to Cues: Frequency of Mother Maintaining Trunk to Trunk Position

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Baseline</th>
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<th>Baseline</th>
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<tbody>
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<td></td>
<td>Session 1</td>
<td>Session 2</td>
<td>Session 3</td>
<td>Session 4</td>
</tr>
<tr>
<td>Participant 1</td>
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<td>14</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Participant 2</td>
<td>9</td>
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<td></td>
</tr>
<tr>
<td>Participant 3</td>
<td>16</td>
<td>14</td>
<td>16</td>
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</tbody>
</table>

Conversely, all three adolescent mothers rarely commented on the infant’s hunger
during the baseline sessions, thus this behavior was the target for intervention in this
category across participants (see Figure 4-1).

**Participant 1**

During the four baseline sessions, this participant never commented on her infant’s
hunger cues. The first intervention resulted in a subtle change in behavior from a
frequency of 0 during feedings to a maximum frequency of 3 in the intervention phase. The modified intervention resulted in the highest increase in frequency up to 5 comments made during a feeding (see Figure 4-1).

**Participant 2**

Similarly, Participant 2 rarely commented on her infant’s cues. She made a maximum of 2 comments related to her infant’s hunger cues during the baseline phase. The first intervention yielded a maximum of 3 comments. The modified intervention resulted in this participant making 6 comments during a feeding related to the child’s hunger (see Figure 4-1).

**Participant 3**

Participant 3 commented only once on her infant’s hunger cues during two of the feeding sessions of the baseline phase. She received the modified intervention only, which resulted in minimum of 4 and a maximum of 5 comments being made related to the infant’s hunger at each feeding session in the intervention phase (see Figure 4-1).

**Social-Emotional Growth Fostering**

Coding selected behaviors for the attachment category of social-emotional growth fostering revealed that across participants all three adolescent mothers displayed high frequencies of maintaining enface position with the infant (see Table 4-3). In contrast, there was a low incidence of the selected behaviors of smiling during feeding and using positive statements towards the infant during feeding across all three participants.
Table 4-3 Social-Emotional Growth Fostering. Frequency of Mother Maintaining Enface Position

<table>
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<tr>
<th></th>
<th>Baseline Session 1</th>
<th>Baseline Session 2</th>
<th>Baseline Session 3</th>
<th>Baseline Session 4</th>
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<tbody>
<tr>
<td>Participant 1</td>
<td>16</td>
<td>18</td>
<td>10</td>
<td>18</td>
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<tr>
<td>Participant 2</td>
<td>16</td>
<td>16</td>
<td>15</td>
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<tr>
<td>Participant 3</td>
<td>18</td>
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<td>15</td>
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Accordingly, the two identified behaviors of smiling during feedings and using positive statements towards the infant were the targets for intervention. Again in the fashion of multiple baseline design experimental control was determined by the independent baselines (see Figure 4-2).

**Participant 1**

During the four sessions in the baseline phase, this participant smiled only once and never made any positive statements during feeding sessions. There was a significant improvement in the frequency of the target behavior of smiling during feeding after the first intervention up to 3 smiles during a feeding and an even higher frequency of smiling after the modified intervention up to a maximum of 7 times. On the other hand, there was a very subtle to no change in the behavior of using positive statements with the child after the first intervention. Both participants in the first intervention admitted to having difficulty formulating positive statements. Thus, with the modified intervention, specific examples such as “he is so cute” and “he is beautiful” were given as prompts. This
resulted in a slight increase in the frequency of the target behavior of using positive statements in this participant (see Figure 4-2).

**Participant 2**

Participant 2 had a much higher frequency of smiling during the baseline phase. She smiled up to 4 times during a feeding session. However, she rarely used positive statements in the baseline phase. The first intervention resulted in an increase in smiling behaviors. The modified intervention resulted in an even greater increase. Consistent with the first participant’s pattern, the first intervention did not lead to any significant changes in the use of positive statements in this participant. The modified intervention however resulted in an increase, up to 5 comments made per feeding session in this phase (see Figure 4-2).

**Participant 3**

This mother rarely smiled or used positive statements during the three baseline sessions. During the modified intervention phase, she smiled up to 7 times per feeding and made up to 6 positive statements about the infant per feeding session (see Figure 4-2).
Figure 4-1. Frequency of mother’s comments on infant’s hunger during baseline and intervention phases
Figure 4-2 Frequency of mother’s smiles and use of positive statements during baseline and intervention phases
Cognitive Growth Fostering

All three selected behaviors of the attachment category of cognitive growth fostering were communication behaviors. The frequencies of the behaviors of talking to the infant using more than two words; the number of times the mother described the food or the feeding situation as well as the frequency of talking to the child about other things were coded in each feeding session. Intervention was targeted for all the three selected behaviors in this attachment category. The baseline behaviors and intervention effects are illustrated in Figure 4-3.

Participant 1

This participant talked to her infant using multiple words once during the first baseline session and three times during the third baseline session. She did not exhibit this behavior during the other two sessions in the baseline phase. Further, she never described the food nor did she talk to the infant about other things during all four baseline sessions. There was a significant improvement in the frequency of the mother using more than two words and talking to the child about other things in the first intervention and yet a further increase in the frequencies of these two behaviors with the modified intervention. There was only an overall slight improvement in the frequency of describing the food and the feeding situation (see Figure 4-3). This participant reported that this selected behavior was irrelevant. In her words “how can you describe formula?”

Participant 2

This participant used multiple words two times during the first baseline feeding session and did not repeat this particular behavior during the remainder of the baseline phase. She also, never described the food nor to talk to the child about other things during the baseline phase. Similar to the previous participant there was a significant
improvement in the frequency of this participant using more than two words and talking
to the infant about other things in the first intervention and yet a further increase in the
frequencies of these two behaviors with the modified intervention. Additionally, there
was only an overall slight improvement in the frequency of describing the food and the
feeding situation.

**Participant 3**

The only cognitive fostering behavior exhibited by this participant in the baseline
phase was using multiple words once in the first baseline session. After receiving the
modified intervention, there was an increased frequency of all three behaviors, although
the behavior of describing the food increased in frequency minimally (see Figure 4-3).

**Child’s Clarity of Cues**

All three infants consistently exhibited clear hunger cues. There was an inverse
relationship between the frequency of building up tension behaviors and the frequency of
decreasing tension behaviors (see Table 4-4 and Table 4-5). This suggests that the infants
appropriately exhibited hunger cues and were appropriate in their response to the feeding.

| Table 4-4 Child’s Clarity of Cues-Builds up Tension |
|------------------------|------------------------|------------------------|------------------------|
| Baseline Sessions      | Intervention 1         | Intervention 2         |
| Infant 1               | X                      | X                      | X                      |
| Infant 2               | X                      | X                      | X                      |
| Infant 3               | X                      | X                      | X                      |
|                        |                        | X                      | X                      |
Table 4–5 Child’s Clarity of Cues—Decrease in Tension

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<tr>
<th>Infant</th>
<th>Baseline Sessions</th>
<th>Intervention 1</th>
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<tr>
<td>1</td>
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<th>Infant</th>
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Figure 4-3 Frequency of mothers exhibiting cognitive growth behaviors during baseline and intervention phases.
Child’s Response to Mother

Although all three infants intermittently looked in the direction of their mother in all feeding sessions in the baseline phase there was an increase in the frequency of this particular target behavior with the communication interventions that were directed at the adolescent mothers for the other attachment categories.

Infant 1

This infant looked in his mother’s direction between 6 and 10 times per feeding in the baseline phase. This behavior increased to a frequency of a maximum of 15 in the first intervention phase and a further increase up to 16 in the modified intervention phase (see Figure 4-4).

There was clearly a correlation between the intervention effects of the mother’s behavior and this particular target behavior of the infant. This was the second most pronounced increase in frequency of all the target behaviors measured in this particular mother/infant dyad (see Figure 4-5).
Figure 4-5 Relationship between Infant 1 looking in mother’s direction and target behaviors during baseline and intervention phases
**Infant 2**

This infant also looked in his mother’s direction 6 to 9 times during a feeding session in the baseline phase. This behavior increased to a maximum frequency of 15 in the first intervention phase and up to 16 in the modified intervention phase (see Figure 4-6 and Figure 4-7). This was the most pronounced change in target behaviors of this particular mother/infant dyad.

![Graph showing frequency of infant looking in mother's direction](image)

**Infant 3**

The behavior change in this particular infant was more conservative. He looked in the direction of his mother 8 to 9 times per feeding session in the baseline phase. This increased to a frequency of 12 and a maximum of 14 in the modified intervention phase (see Figure 4-8). Although an improvement, the change in behavior was not as dramatic in comparison to the other two mother/infant dyads (see Figure 4-9).
Figure 4-7. Relationship between Infant 2 looking in mother’s direction and target behaviors during baseline and intervention phases.
Summary of Findings

Pictorial representation of interventions for the low frequency communication target behaviors demonstrated that there was a cause and effect particularly between the modified intervention and the target behaviors. The modified intervention consisted of structured prompting followed by reinforcement for each target behavior exhibited. The change in behavior was immediate in nearly every case and the resulting change in infant behavior could be seen as well. The findings of the study also demonstrate the importance of communication in mother/infant interactions.
Figure 4-9. Relationship between Infant 3 looking in mother’s direction and target behaviors during baseline and intervention phases.
CHAPTER 5
DISCUSSION

Overview

This study evaluated the effectiveness of a bug-in-the-ear feedback as an intervention to promote attachment behaviors in the adolescent mother/infant dyad. The intervention was based on an assessment of the frequency of occurrence and non-occurrence of attachment behaviors coded and defined by the NCAST Feeding Scale. The baseline phase of the study clearly identified low frequency and non-occurrence of attachment behaviors of the verbal/communication type that required intervention. Additionally, after the intervention was instituted in the second phase of the study there were positive effects in the mother’s behaviors which in turn positively impacted infant behavior. This was particularly notable in the area of responding to the mother.

Findings from this study extend and strengthen previous research in this area that has shown that adolescent mothers are less verbal to their infants (Brooks- Gunn & Chase-Landale, 1995; Culp, Osofsky & O’Brien, 1996). Additional studies have established the importance of interactions between a mother and her infant as crucial for optimal child development (Beckwith & Cohen, 1984; Olson, Bates & Kaskie, 1992; Sroufe, 1985). Infants exposed to greater verbal stimulation have been found to be more likely to have better verbal comprehension later on in life (Lacroix, Pomerleau & Malcuit 2002; Olson, Bates & Bayles, 1984). However, a number of studies have documented that African American adolescents communicate less with their infants (Barnett, Duggan, Devoe & Burnell, 2002; Nitz, Ketterlinus & Brandt, 1995). Yet there is a dearth of
nursing research that explores the impact of this behavior on child development in African American children. Additionally, there is a scarcity of recent intervention studies focusing on African American adolescent/infant interactions in the nursing literature.

The findings of this study support the importance of interventions such as parent training to improve the quality and frequency of attachment behaviors, particularly as they relate to verbal behaviors of the adolescent mother and her infant. Improvement in these mother/infant behaviors ultimately can have a positive impact on the child’s development.

This chapter will include discussion of important similarities and differences across adolescent mothers in this study and across study phases. In addition, there will be a discussion of the parent training, issues of recruiting and retention, limitations of the study, recommendations for future research and implications for nursing practice, all with linkages to theory.

**Participant Characteristics and Behaviors**

All three adolescent mothers were very similar in their social characteristics. They were all African American, 15 years old, in the 10th grade, had a varying number of teenage siblings, and lived at home with very supportive mothers who were heads of the household, who had themselves been teenage parents. None of the infants’ fathers were actively involved in parenting. Behaviors observed across participants during feeding sessions in the baseline phase were very similar. Although these young women were pleasant, cooperative and quite talkative with the Investigator, they all remained very quiet when feeding their infant and appeared to approach feeding as a task that had to be completed. The adolescent mothers were very successful in exhibiting target attachment
behaviors in high frequency that were physical or task oriented including positioning the infant appropriately, maintaining trunk to trunk and enface positions.

Further, all participants exhibited idiosyncratic behaviors during the baseline phase which did not include any of the target attachment behaviors. These were also physical and task oriented. Although not reported in the results section of the study, these idiosyncratic behaviors were addressed with successful results during the intervention phase. Participant 1 in all sessions interrupted the feedings between two to four times to check the infant’s bottle to see how much had been consumed and how much was left. During baseline, Participant 2 prodded her infant to finish his feedings even when he was obviously satiated. Participant 3 was very interested in keeping the infant’s face clean. In her first baseline session, she interrupted the feeding to remove a tiny piece of lint from the infant’s ear. During her third session, she interrupted the feeding to clean his nose. Such physical behavior with relatively little verbal interaction has been shown in previous studies (Osofsky & Osofsky, 1970; Sandler & Vietze, 1980).

Communication behaviors including smiling to the infant were minimal or absent across all three participants. From a behaviorist standpoint, Skinner (1957) explained verbal activity as an effect of environmental contingencies, particularly audience response. Thus it can be postulated that adolescent mothers do not communicate with their infants because they do not get a response. Actually one of the participants in the study indicated that it was difficult to talk to an infant who did not talk back to her. Participant 2 exhibited the highest frequency of communication behaviors in the baseline phase. She smiled more and communicated more (compared to the other participants) with her 51/2-month old infant who was the oldest infant in this group. This is probably
due to the fact that this particular mother responded to the infant’s being more interactive with her because of his stage of development. This behavior is consistent with research reported in the NCAST literature suggesting that behaviors including maternal vocalizations and mutual gaze increase with the age of the infant. McNamara (1985)

It was evident in this study that each infant responded to his mother’s increased verbal activity by gazing in the mother’s direction. There was an increase in frequency of infants looking in their mother’s direction during the intervention phases. These infants were obviously stimulated by their mother’s voice and had their attention captured. Infant 3 had the lowest improvement in the frequency of this target behavior of looking in the mother’s direction. He was also the youngest infant (11/2 months old) in this group. Again, this finding was consistent with McNamara’s (1985) research.

In order to improve mother/infant communication earlier on in the infant’s life, interventions such as those used in this study need to be instituted. Via operant conditioning, behaviorists have shown that techniques of positive reinforcement shape the repertoire of individual behaviors (Skinner, 1957). Simple reinforcement of mother/infant communication can alter the verbal behaviors such as those observed in this study. Reinforcement was an integral facet of the parent training in this study.

**Parent Training**

Bug-in-the-ear feedback as a vehicle for parent training is an innovative and current approach to adolescent parent training. All three participants were accepting and comfortable using the ear phone device and intrigued by the use of technology in parent training. This came as no surprise since today’s adolescents are responsive and thrive on their visual and auditory senses to learn (Seel, 1997). One participant stated “this is just like talking on a cell about my baby…its cool.”
However, the first two participants’ target behavior only improved marginally in the first intervention phase. During this phase of the study, reinforcement was randomly given to randomly interjected prompts to participants to exhibit target behaviors. This intervention format resulted in a subtle change in the frequency of the target behaviors. Debriefing with the participants revealed that the participants needed more structure in their prompting, needed to be reinforced after the exhibition of each target behavior and required simplified language. This resulted in the creation of a modified intervention which was instituted in all three participants and was quite successful in improving the exhibition and frequency of target behaviors.

This was a very interesting and important aspect to the study principally because the original intervention had been pilot tested and was successful on a participant who was not part of the study. However, she was an 18 year-old college freshman who was very different from the participants of the study. This variable was difficult to control because of the Investigator’s inability to control the characteristics of the participants who were recruited for the study.

**Recruiting for the Study**

Recruiting and retaining participants in this study was very challenging. The plan initially was to recruit participants through primary care providers in the Tallahassee/Quincy area. After a nine-month recruiting effort, no participants were interested in participating in the study. Thus, Florida Department of Health Institutional Review Board approval was sought to include Capital Area Healthy Start and Gadsden County Healthy Start as sites for recruiting. Recruiting efforts were a lot more successful at these sites. It was very important to work closely with the Social Workers who were involved with the participants and who functioned as the referral sources.
A total of 8 participant referrals were received. Two potential participants declined participation after receiving information on the study. Six participants were involved in the study at some point but 3 did not complete their participation due to an array of reasons. The participants who dropped out of the study were all between 17 and 18 years old, and most were concerned about being videotaped and paranoid about the possibility of others having access to the videotape. The key to retaining the participants in the study was establishing a good rapport with the participants’ mothers and maintaining friendly phone contact. It was easier to establish this rapport with the mothers who were supportive of their daughters’ participation in the study. It was very interesting that all three participants who were retained until the completion of the study had mothers who themselves were teenage mothers. The attrition rate is considered as one of the limitations of the study.

**Limitations of the Study and Recommendations**

Several limitations of the study that suggest avenues for future research warrant comment. These limitations are presented below, including recommendations for future research.

- Only three adolescent mother/infant dyads participated in this study. It would be worthwhile to replicate this work with a larger sample.

- The three adolescent mother/infant dyads in this study were all African American and of similar socio-cultural backgrounds. It would be beneficial if future research was conducted on participants from a different race and socio-cultural backgrounds. Comparisons could provide valuable information on whether race and culture influence adolescent mother/infant interaction behaviors.

- The Investigator videotaped mother/infant interaction in the family’s home during each home visit. Although the Investigator waited in another room while the videotaping occurred, there is no information regarding what effect if any, the Investigator’s presence in the home may have had on the participants’ behavior.
As a result of the risk of attrition, phases of this study were not prolonged. However, it cannot be assumed that the intervention implemented in the intervention phases was comprehensive enough to maintain long-term optimal mother/infant interaction behaviors. Thus, a solution would be to extend the intervention phases. Additionally, further research is needed to determine the amount of parent training that is required to maintain optimal mother/infant interactions in the adolescent mother/infant dyad.

One of the sub items of the NCAST Feeding Scale was eliminated from the final analysis of the study due to poor inter-observer reliability. Another sub item behavior emerged to be difficult to exhibit in the mother who formula feeds her infant. It is therefore imperative that further research is conducted to explore the reliability of the sub items of the NCAST Feeding scale especially for formula fed infants.

Finally, it would be interesting to explore the reasons why some mothers were interested and supportive of their daughters’ participation in the study and while other mothers were not. This information will be invaluable in understanding the social needs of the families of the adolescent mother and also could provide a guide in recruiting adolescent mothers for future studies.

**Implications for Nursing Practice**

The findings of this study demonstrated that a prompting intervention using a bug-in-the-ear feedback can increase the frequency of target attachment behaviors in the adolescent mother/infant dyad which according to the literature can ultimately have a positive impact on the infant’s development. Although the intervention was successful in this study, it is important to indicate that the bug-in-the-ear-feedback intervention was a labor intensive approach in changing mother/infant interaction behaviors. Yet it can not be assumed that the intervention implemented in the intervention phases was comprehensive enough to maintain long-term optimal mother/infant interaction behaviors.

Thus, further nursing research is warranted on exploring the best approaches in changing these rather complex and difficult behaviors. Since adolescents respond well to technology, further nursing research can explore how technological approaches
such as tele-health or computerized prompting can be used as a large scale intervention approach to improve interaction behaviors between the adolescent mother and her infant.

Nurses are at the front line and can play significant roles in promoting interaction behaviors in the adolescent mother/infant dyad. Good assessment or obtaining a baseline of behavior is an important step in the nursing process as well as being an imperative phase in effecting change. Nurses must be able to identify individual family needs, set goals in collaboration with the family and modify effective intervention strategies such as parent training to match the identified needs of individual mothers while maintaining the essential components of the intervention for reaching the desired outcome of self efficacy in the young mother.

The implications for nursing practice are important because the application of research to practice is significant in expanding the knowledge base of nursing practice related to mother/infant interactions. Unfortunately, there is a clear deficiency of evidence-based practice in the context of mother/infant interactions. To illustrate, postpartum/newborn printed discharge instructions from eight different hospitals across the country were recently reviewed. None of these documents addressed the issue of the importance of mother/infant communication and its effects on child development despite the empirical evidence available in the nursing literature. It is also important to note that all three participants in this study reported that they did not realize the importance of mother/infant communication.

Hopefully, findings from this study will illuminate and make current the importance of adolescent mother/infant interactions, particularly as they relate to
communication and infant development. In light of the current managed care era and the emphasis on health promotion and disease prevention, nurses who work with families of young children are charged with identifying and implementing effective early intervention strategies that promote positive parent-child interactions to prevent any possible long term cognitive sequel in children of adolescent mothers. At present, most hospitals have a number of education materials available to patients through visual technology, computers and in print. It is imperative that nurses and other health care providers stress the importance of optimal mother/infant interactions in their patient education curriculum. Additionally, since patient education alone may not be adequate in changing mother/infant interactions, other avenues of intervening need to be considered. Furthermore, as demonstrated in this study, the approach of the interventions should be able to engage the adolescent consumer in order to ensure effective learning.
Informed Consent to Participate in Research

If you are a parent, as you read the information in this Consent Form, you should put yourself in your child’s place to decide whether or not to allow your child to take part in this study. Therefore, for the rest of the form, the word “you” refers to your child.

You are being asked to take part in a research study. This form provides you with information about the study and how your privacy will be protected. The Principal Investigator (the person in charge of this research) or a representative of the Principal Investigator will also describe this study to you and answer all of your questions. Your participation is entirely voluntary. Before you decide whether or not to take part, read the information below and ask questions about anything you do not understand. If you choose not to participate in this study you will not be penalized or lose any benefits to which you would otherwise be entitled.

1. Name of Participant ("Study Subject")

________________________________________________________________________

2. Title of Research Study

Effect of Bug-in- the-Ear feedback as an Intervention to Promote Attachment Behaviors in the Adolescent Mother /Infant Dyad.
3. Principal Investigator and Telephone Number(s)

Afua Ottie Arhin, MSN, RN  
850-656-0358 (Home)  
850-556-6613 (Mobile)

4. Source of Funding or Other Material Support

University of Florida  
Florida Nurses Foundation

5. What is the purpose of this research study?

The purpose of this study is to find out if a wireless headphone can be used to help teach young mothers how to take care of their infants.

6. What will be done if you take part in this research study?

In the first phase of the study, you will be videotaped as you feed your baby formula at home. This part of the study will last two weeks up to a maximum of four weeks and will involve two or more home visits by the Researcher. You and your baby will be videotaped only during the home visits. Each visit will last approximately ninety (90) minutes to 2 hours. The Researcher will let you know after the first visit if this part of the study will involve more than the expected two home visits.

The second part of the study is the training phase. You will be asked to wear a wireless headphone through which you will get instructions on how to help your baby as you feed him/her. The instructions given will be from a widely used nursing attachment tool known as the NCAST. This tool has been tested and found to be safe and effective in similar situations. The instructions will be given by the researcher who is an experienced mother/baby RN. Examples of instructions would be “hold your baby closer” or “change your baby’s position.”

During this part of the study the researcher will visit your home once a week for three weeks. Each visit will last approximately 2 hours. Like before, you and your baby will be videotaped.

As a follow up, three weeks and four weeks after the training, you and your baby will be videotaped again in your home as you feed. Each of these two visits will last approximately ninety (90) minutes.
During the videotaping, the camcorder will be set up on a tripod in the room you will be feeding your baby in. The Researcher will not always be present in the room. Using the well-known nursing tool, the videotape will be coded by research assistants at a later time to measure you and your baby’s interaction. If you have any questions now or at any time during the study, you may contact the Principal Investigator listed in #3 of this form.

You and your family will have the opportunity to review the videotapes throughout the study. All videotapes will be stored in a locked cabinet in the researcher’s office during the time the study is being conducted. When the study is completed all videotapes will be destroyed.

7. **If you choose to participate in this study, how long will you be expected to participate in the research?**

The first part (before you get training with the headphone) will last two weeks up to a maximum of four weeks and includes two sessions or more. The training part will last about three weeks and will include three sessions. As a follow up, three and four weeks after the training you and your baby will be videotaped again.

Each session will last approximately ninety minutes to 2 hours. The whole study should take no more than nine weeks, or a total of eighteen 18 hours.

8. **How many people are expected to participate in this research?**

Six adolescent mothers and their infants will be enrolled in the research. Three adolescent mothers and their infants will be expected to participate in the entire research from start to finish.

9. **What are the possible discomforts and risks?**

You may have some minor discomfort knowing that you are being videotaped and having to wear a wireless headphone while feeding your infant. There are no identified risks associated with this study.

Throughout the study, the researchers will notify you of new information that may become available and might affect your decision to remain in the study.

If you wish to discuss the information above or any discomforts you may experience, you may ask questions now or call the Principal Investigator or contact person listed on the front page of this form.
10a. What are the possible benefits to you?

You may or may not personally benefit from participating in this study. If the parent training interventions are shown to help how you and your baby interact, then you would directly benefit. You will also get important information that you can use in helping your baby and how he/she grows and develops.

10b. What are the possible benefits to others?

If the parent training has a good effect, then this method can be used to help other adolescent mothers in their interactions with their infants.

11. If you choose to take part in this research study, will it cost you anything?

No, this study will not cost you anything.

12. Will you receive compensation for taking part in this research study?

You will receive $4.00 towards gift certificates to Wal-Mart for each completed session up to a maximum of nine sessions.

13. What if you are injured because of the study?

If you experience an injury that is directly caused by this study, only professional consultative care that you receive at the University of Florida Health Science Center will be provided without charge. However, hospital expenses will have to be paid by you or your insurance provider. No other compensation is offered. Please contact the Principal Investigator listed in Item 3 of this form if you experience an injury or have any questions about any discomforts that you experience while participating in this study.

14. What other options or treatments are available if you do not want to be in this study?

The option to taking part in this study is not to take part in this study. If you do not want to take part in this study, tell the Principal Investigator or her assistant and do not sign this Informed Consent Form.

15a. Can you withdraw from this research study?

You are free to withdraw your consent and to stop participating in this research study at
any time. If you do withdraw your consent, there will be no penalty, and you will not lose any benefits you are entitled to.

If you decide to withdraw your consent to participate in this research study for any reason, you should contact Afua O. Arhin at (850)656-0358 or (850) 561-2874.

If you have any questions regarding your rights as a research subject, you may phone the Institutional Review Board (IRB) office at (352) 846-1494 or the Florida Department of Health, Institutional Review Board at 850-245-4585 or toll free in Florida at 1-866 433-2775.

15b. If you withdraw, can information about you still be used and/or collected?

If you withdraw no more data about you will be collected. However, information that was gathered before you withdrew may be analyzed.

15c. Can the Principal Investigator withdraw you from this research study?

You may be withdrawn from the study without your consent for the following reasons:

- If home visit appointments are not kept on more than three occasions.
- If Principal Investigator feels threatened in the home environment.

16. How will your privacy and the confidentiality of your research records be protected?

Information collected about you and/or your baby will be stored in locked filing cabinets or in computers with security passwords. Only certain people have the legal right to review these research records, and they will protect the secrecy (confidentiality) of these records as much as the law allows. These people include the researchers for this study, certain University of Florida officials, the hospital or clinic (if any) involved in this research, and the Institutional Review Board of University of Florida and the Florida Department of Health (IRB; an IRB is a group of people who are responsible for looking after the rights and welfare of people taking part in research). Otherwise your research records will not be released without your permission unless required by law or a court order.

If the results of this research are published or presented at scientific meetings, your identity will not be disclosed.
17. How will the researcher(s) benefit from your being in this study?

In general, presenting research results helps the career of a scientist. Therefore, the Principal Investigator may benefit if the results of this study are presented at scientific meetings or in scientific journals.

18. Will I know the results of this study?

Yes, all participants will be informed in writing the findings of the study when completed. Again, your identity will not be disclosed.

Signatures

As a representative of this study, I have explained to the participant or the participant's legally authorized representative the purpose, the procedures, the possible benefits, and the risks of this research study; the alternatives to being in the study; and how privacy will be protected.

______________________________________________  _____________
Signature of Person Obtaining Consent           Date

Consenting Adults. I have been informed about this study’s purpose, procedures, possible benefits, and risks; the alternatives to being in the study; and how my (or the participant’s) privacy will be protected. I have received a copy of this Informed Consent Form. I will be given the opportunity to ask questions before I sign, and I have been told that I can ask other questions at any time.

Adult Consenting for Self. By signing this form, I voluntarily agree to participate in this study. By signing this form, I am not waiving any of my legal rights.

______________________________________________ _____________________
Signature of Adult Consenting for Self    Date
Parental Consent Forms for Adolescents 18 years or Less

Signatures

As a representative of this study, I have explained to the participant or the participant's legally authorized representative the purpose, the procedures, the possible benefits, and the risks of this research study; the alternatives to being in the study; and how your privacy will be protected.

Signature of Person Obtaining Consent __________________________ Date ______________

Consenting Adults. You (and/or the participant) have been informed about this study’s purpose, procedures, possible benefits, and risks; the alternatives to being in the study; and how your (or the participant’s) privacy will be protected. You have received a copy of this Informed Consent Form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time.

Parent/Adult Legally Representing the Subject. By signing this form, you voluntarily give your permission for the person named below to participate in this study. You are not waiving any legal rights for yourself or the person you are legally representing. After your signature, please print your name and your relationship to the subject.

Signature of Parent/Legal Representative (for Minor Mother) __________________________ Date ______________

Print: Name of Legal Representative of and Relationship to Participant:

Signature of Parent/Legal Representative (for Child) __________________________ Date ______________
**Adolescent Assent Form**

The purpose of this study is to learn the effects of a wireless head phone as a parent training intervention on interaction behaviors between the adolescent mother and her infant.

You will first be videotaped as you feed your baby formula at home. This part of the study will last three weeks and will involve three home visits by the Investigator. The second part of the study is the training phase. You will be asked to wear a wireless headphone through which you will get instructions on how to help your baby as you feed him/her. This part of the study will last three weeks and will involve three home visits by the Investigator. Like before, you and your baby will be videotaped. As a follow up, three weeks and four weeks after the training, you and your baby will be videotaped again in your home as you feed.

Although legally you cannot "consent" to be in this study, we need to know if you want to take part. If you decide to take part in this study, and your parent or the person legally responsible for you gives permission, you both need to sign. Your signing below means that you agree to take part (assent). The signature of your parent/legal representative above means he or she gives permission (consent) for you to take part.

Please check one of the following boxes:

- [ ] No, I do not want to take part in this study
- [ ] Yes, I want to take part in this study

_________________________ ______________________
Assent Signature of Participant Date

**Signatures**

As a representative of this study, I have explained to the participant or the participant's legally authorized representative the purpose, the procedures, the possible benefits, and the risks of this research study; the alternatives to being in the study; and how privacy will be protected.

_________________________ ______________________
Signature of Person Obtaining Consent Date
LIST OF REFERENCES


BIOGRAPHICAL SKETCH

Afua Arhin received a Bachelor of Science in Nursing from University of Ghana in West Africa and a Master of Science in Nursing from University of Wisconsin in Madison. Her research interests are in adolescent sexuality and parenting, learning styles and single subject methodology. She is an Assistant Professor at Florida A & M University in Tallahassee.