ROLE OF PARENTAL ANXIETY ON PEDIATRIC FEEDING DISORDERS

Nyaz Didehbani, M.S.

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APPROVED:

Kim Kelly, Major Professor
Eugenia Bodenhamer-Davis, Committee Member
James Hall, Committee Member
Laura Austin, Committee Member
Linda Marshall, Chair of the Department of
      Psychology
Michael Monticino, Interim Dean of the Robert B.
      Toulouse School of Graduate Studies

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The proposed study examined the relationship between parental anxiety, measured both

subjectively (via self-report questionnaires) and objectively (via salivary cortisol) and the child's

feeding progress. Children diagnosed with a feeding disorder were recruited with their parents at

Our Children's House at Baylor ($n=19$; 11 females, 8 males). The patients and their parents were

housed in the clinic for an eight-week intensive multidisciplinary pediatric feeding disorder

treatment program. Calorie intake was recorded daily as outcome measures of treatment

progression. Parental anxiety was measured by the Pediatric Inventory for Parents (PIP), state

anxiety on the State Trait Anxiety Inventory (STAI), and by salivary cortisol at three different

time points. The present study attempted to examine whether parental feeding (phase three of

treatment program) would continue to cause a decrease in the child's caloric intake. In averaging

ten meals prior to parental feeding in comparison to the average of ten meals following parental

feeding, there was no significant difference as measured by a *t*-test. Paired *t*-tests examined

parental anxiety from time one to time two and found that salivary cortisol increased

significantly $t(15) = -6.07$, $p = .000$ from Time 1 ($M = 2.30$, $SD = 1.64$) to Time 2 ($M = 5.24$, $SD = 2.58$). This demonstrated that while parental anxiety increased as measured by salivary

cortisol, the children continued to make improvements. This may be the result of the

multidisciplinary feeding program which encompassed a strong behavioral component and

parent training. Even though the current results did not demonstrate a direct relationship between

parental stress and caloric intake, parental stress as measured by salivary cortisol did increase.

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INTRODUCTION

Background

Feeding disorders occur in approximately 25-40% of toddlers and school-aged children and range from mild to severe (Tarbell & Allaire, 2002). It is estimated that about 25% of normally developing infants and about 35% of children with developmental disabilities have some type of feeding problem. A feeding problem is one of the most frequently observed difficulties seen in children (Chatoor, Ganiban, Surles, & Doussard-Roosevelt, 2004). These problems range from refusing to eat or drink by mouth, gagging, vomiting, eating a limited number of foods or textures, and dependence on tube feedings (Lindberg, Bohlin & Hagekull, 1991). Other symptoms include coughing or choking while eating or drinking, drooling excessively during feeding, difficulty chewing or drinking, liquid leaking out of nose, poor weight gain, and frequent respiratory infections or pneumonia. Severity of feeding disorders also varies from eating limited types or textures of food to having a severe feeding disorder that requires tube feeding or other medical procedures. Severe feeding disorders include tube-fed children, post-traumatic feeding disorders, infantile anorexia, and extremely low birth weight children.

Some children may be labeled as "picky-eaters" and may eat a limited variety of food. These children are often in treatment programs that enhance the variety and textures of food. Often times food textures influence eating behavior and may either encourage acceptance of the food or rejection of the food (Patel, Piazza, Santana, & Volkert, 2002). Children may avoid higher textured food because it may be associated with gagging or vomiting. The therapist must manipulate the texture of foods in order to improve eating behavior (Patel, Piazza, Layer, Coleman, & Swartzwelder, 2005).

Severe feeding disorders may be the result of a chronic condition, including those infants who survived premature birth. These children may present with a number of medical conditions that involve respiratory, cardiac, gastrointestinal, metabolic, or neurological systems. The medical condition alone may cause pain and discomfort for the child during feeding. This causes a suppressed appetite and fatigue for the child. Treatments surrounding the medical condition such as tube feeding, restricted diets, and surgery also negatively affect the feeding process (Franklin & Rodger, 2003).

Some children with severe feeding disorders undergo invasive oral procedures and some may require enternal tube feeding (liquefied food is sent directly to the stomach through a tube). Tubes can be inserted through the nares and oesophagus to the stomach (NG tube), through an external opening in the gastric wall by a surgical implantation of a catheter (G tube), or other methods (Pedersen, Parsons, & Dewey, 2004). These children experience months of feeding-related procedures and are not able to regulate their appetite. This may create a food aversion, which again leads to an increase in the necessity of the feeding tube and continues the vicious cycle of dependence (Tarbell & Allaire, 2002). Children who have only received their nutrition through a feeding tube may not have learned that food intake reduces feelings of hunger. Since tube-fed children receive most if not all of their food via the tube, they have the most difficulty in returning to eating orally (Linscheid, 2006). Some of these children associate the negative experience with the feeding process involving the mouth, nose, throat and esophagus. They may display a strong food phobia with an extreme food aversion and are often diagnosed with post-traumatic feeding disorder (PTFD). While the prevalence is unknown, it is hypothesized that the number of children with PTFD continues to rise with the increase in esophageal surgery and other medical procedures that affect eating (Benoit & Coolbear, 1998).

Another severe form of a feeding disorder defined by Chatoor et. al., (2004) has been termed infantile anorexia. Infantile Anorexia is defined as a (1) child who refuses food for at least one month; (2) child's food refusal onset occurred before the age of three; (3) child shows no signs of hunger, but shows interest in interactions with caregiver; (4) child displays significant growth deficiency; (5) child's difficulty with food was not a result of a traumatic event; and (6) child's feeding problems is not a result of an underlying medical problem (Chatoor, 2002). Chatoor et al., (2004) emphasized the importance of the parent-child interaction during feeding for these children and noted that the children with infantile anorexia demonstrate higher incidence of distractions. Unlike most children with feeding disorders, these children are playful and engaged with their feeder. However, they avoid feeding by talking and using other distractions.

Researchers have shown that children with infantile anorexia have a difficult temperament and are generally more negative. The poor temperament and disrupted feeding have been linked to difficulties in physiological regulation. Most of the researchers have investigated the amplitude of reparatory sinus arrhythmia (RSA) as a means of observing physiological regulation. Typically, high RSA as seen during rest, reflects a slowed heart rate. During more active states, RSA decreases as a result of an increased heart rate. Research has shown that typically developed children demonstrate an initial decrease in RSA followed by an increase in RSA (relaxed state) when feeding. Dysregulation in this system may make it difficult for a child with a feeding problem to calm down as seen in children with infantile anorexia (Chatoor et al., 2004). Several studies have demonstrated this poor physiological regulation in children with infantile anorexia. Chatoor et. al., (2004) found that children with infantile anorexia displayed higher physiological arousal and had difficulty in returning to a lower arousal state. This research

concluded that these children are prone to distractions in the environment and require a more neutral and calm feeding environment.

Another population with a severe feeding disorder includes children who are born with extremely low birth weights. These children are at risk for further medical problems and development difficulties. Research has shown that malnutrition during early postnatal care has detrimental effects on the child's development, especially on the growth of the central nervous system (Hayakawa, Okumura, Hayakawa, Kato, Ohshiro, Tauchi, Watanabe, 2003). Feeding disorders that affect growth are later linked to cognitive deficits, language delays, neurosensory impairments, behavioral issues, and eating disorders (Chatoor et. al., 2004; Auslander, Netzer, & Arad, 2003). Research has shown that children born with low birth weight are at increased risk for developing behavior problems and inattentiveness (Saylor, Boyce, & Price, 2003). One study by Goldberg, Corter, Lojkasek, & Minde (1991), found clinically significant behavioral problems in 46% of the children with low birth weights compared to only 6% in normal weight children.

Overall, children with feeding disorders experience a number of aversive events surrounding feeding. The infant may avoid food in order to prevent the anticipated pain, discomfort, or experience of intense anxiety (Benoit, Green, & Arts-Rhodas, 1997; Chatoor, Ganiban, Colin, Plummer, & Harmon, 1998). Aversive responses are crying, gagging, coughing, retching, vomiting and escape behaviors such as arching backward, squirming and crawling away (Benoit & Coolbear 1998). Chatoor, Ganiban, Harrison, Hirsch, Borman-Spurrell, & Mazek (2000) developed the following operational diagnostic criteria: (1) The infant demonstrates food refusal after a traumatic event or repeated traumatic events to the oropharynx or esophagus (e.g., choking, severe gagging, vomiting, reflux, insertion of nasogastric or

endotracheal tubes, suctioning, force-feeding); (2) The event(s) triggered intense distress in the infant; (3) The infant experiences distress when anticipating feedings (e.g., when positioned for feeding when shown the bottle or feeding utensils, and/or when approached with food); or (4) The infant resists feedings and becomes increasingly distressed when force-fed.

Feeding is a highly integrated activity that involves motor skills, including oral motor skills, behavioral control in feeding, and appetite regulation. Eating orally involves a sequential pattern that starts with an initial acceptance of the food, then chewing the food, followed by swallowing (Gulotta, Piazza, Patel, & Layer, 2005). Typical children follow a progressive feeding pattern starting with the consumption of liquids (3 to 4 months old). The child then consumes cereals and baby foods at 4 to 6 months, soft solids at 6 to 9 months, and table-texture foods at 12 to 14 months. Higher textured foods may require more advanced oral motor skills. Early or late progression through these phases may create a feeding problem. Some children may not have developed enough motor strength, and as a result, have not properly learned the skills involved in eating. On the other hand, some may not have been exposed to a variety of foods and textures. Other children may have learned to associate negative behaviors with feeding (Patel et. al., 2005).

Past literature has classified feeding disorders based on organic or nonorganic etiologies (Tarbell & Allaire, 2002).Organic factors include physiological abnormalities, neuromuscular conditions, allergies, and acute infectious diseases. Organic factors however, are not sufficient to explain the child's feeding problems (Werle, Murphy, & Budd, 1993). Instead, the current literature suggests a combination of etiologies that include physical, social, developmental, behavioral, and environmental issues (Tarbell & Allaire, 2002). While the etiology of feeding disorders is unknown, Burklow, Phelps, Schultz, McConnel, & Rudolph (1998) found 5 different

ways to help explain why some children develop a feeding problem. These researchers noted that these disorders may be a result of: (a.) structural abnormalities, (b.) neurological conditions, (c.) cardio-respiratory problems, (d.) metabolic dysfunctions, or (e.) behavioral contingencies. While most children had more than one of the above conditions, about 85% had behavioral problems associated with feeding (Burklow et. al., 1998). For this reason, behavioral interventions are common for children with feeding disorders.

<div align="center">Treatment of Feeding Disorders</div>

It is important to note that each child's feeding problem is unique thereby making standardized protocol interventions difficult to implement (Linscheid, 2006). Researchers have thus applied a number of treatment interventions for children with feeding problems. These include behavioral-based programs, family-oriented therapy, flooding, systematic desensitization, and interdisciplinary treatment programs (Tarbell & Allaire, 2002). Due to the high incidence of behavioral problems in children with feeding disorders, researchers focus on behavioral interventions.

Research indicates that treatment interventions that incorporate behavioral strategies may be most effective in treating children with feeding disorders (Blissett & Harris, 2002). The most effective behavioral treatments are those that incorporate a flexible protocol that adjusts for each child as behaviors change (Linscheid, 2006). Researchers suggest that the caregivers should begin with previously accepted food and then modify the food one change at time by either changing the taste, texture, or quantity. It is recommended that each feeding session should end on a positive note if possible and if not, the session should end at a pre-set time. Tarbell & Allaire (2002) developed an effective 3-fold treatment plan that included an acquisition phase, a

fluency phase, and finally, generalization. During acquisition, the child learned the new behavior through prompting, shaping, modeling, and feedback. During fluency training, the child practiced the new behavior and received reinforcement to increase the speed and accuracy of the task. Then during the generalization phase, the child performed the new behavior in a number of settings. Throughout this process, appropriate rewards such as verbal praise were important in reinforcing the appropriate behavior and extinguishing inappropriate behavior (Blissett & Harris, 2002).

Behavioral interventions may include appetite manipulation and/or contingency management. Appetite manipulation is less often discussed and it involves inducing hunger in a child by reducing caloric intake in hopes of motivating the child to eat. This is accomplished by restricting food between meals to increase the child's hunger for feeding sessions. The child's hydration status and medical signs of low blood sugar are frequently checked in both in and out-patient settings to ensure the child's safety. Contingency management includes reinforcement (positive and negative), and sometimes mild punishment (Linscheid, 2006). Specific techniques have included using specific prompts when presenting food, providing praise, pairing non-preferred food with preferred food, ignoring disruptive behavior, using time-out, or physical guidance (Werle, Murphy, & Budd, 1993). Most often positive reinforces are immediately delivered (social praise, access to toys, or attention) when the child displays the target behavior e.g., eating, swallowing, drinking. However, if the child exhibited avoidant behaviors (e.g., head turns, food refusals), the feeder enforced a mild punishment such as turning away from the child (Linscheid, 2006).

One type of behavioral strategy involves the manipulation of antecedents or consequences. These techniques include stimulus fading, presentation of preferred and non-

preferred foods, positive reinforcement and extinction (Mueller, Piazza, Moore, Kelley, Bethke, Pruett, Oberdorff & Layer, 2003). Benoit & Coolbear (1998) distinguish between feeding behaviors as a result of either classical or operant conditioning. They explain that classically conditioned feeding behaviors are not as affected by punishments and rewards that follow the behavior, but are instead dependent on stimuli that precede the behavior. Feeding behaviors that result from operant conditioning are dependent on stimuli that follow the behavior. Parental presence during feeding may serve as a discriminatory stimulus in that it precedes the child's feeding and reinforces the child's behavior. Therefore, the parents' presence during feeding can either maintain or extinguish the target behavior (Miller, 2006). As a result, parents are not often present during the initial phases of an in-patient treatment program. Parents are most often observing the feeding process from outside the feeding room (Linscheid, 2006). Treatment interventions that target the parents may be most effective in treating children with feeding disorders (Blissett & Harris, 2002).

Behavioral interventions are only as successful as their ability to generalize from the clinic setting to the natural environment. Thus, it is important to train parents throughout the intervention process (Werle et al., 1993). Since the majority of feeding behavior occurs in the home, the caregiver's ability to implement the intervention is crucial (Mueller et al., 2003). Werle et al. found that parent training in the home was an important component in increasing food intake in children with feeding disorders. The behavioral intervention included parent instruction, discussion, handouts, role plays, behavioral rehearsal during meals, verbal feedback following meals, and occasional videotape review of a feeding session. They found that positive changes in the parents' behavior during the feeding session increased appropriate feeding behaviors by each child. Mueller et al. found similar results in that parent training with simple

written and verbal instructions were sufficient in improving parents' implementation of the feeding program at home.

Treatment interventions may also vary depending on the severity of the feeding problem and whether or not the child is tube-fed. Some researchers have implemented flooding and systematic desensitization for children with PTFD. Flooding involves rapid exposure of the feared stimulus (frequent exposure of food to the lips). The feeder is simultaneously soothing and calming the child throughout the process. This is done to help the child tolerate their feelings of anxiety and discomfort associated with eating. Systematic desensitization on the other hand is a more gradual exposure of the feared stimulus. The child has more control of the rate of exposure and the feeder responds according to the child's comfort (Benoit and Coolber, 1998). Benoit & Coolbear (1998) proposed a three-part treatment program for children with PTFD that included: (1.) physiological and environmental changes to promote good eating habits, (2.) nutritional monitoring, and (3.) behavior therapy (flooding). The results indicated that children with PTFD who had anatomical or mechanical problems of their upper airway did not respond as well to the three-part children compared to other children with PTFD.

The treatment program for tube fed children usually differs from non tube-fed children in that the goal also includes a reduction in caloric intake through the feeding tube. A study by Simpson, Schanler, & Lau, 2002, showed that the earlier a child is introduced to oral intake of food, the faster the reduction in tube feeding occurs. Tarbell & Allaire (2002) found that behavioral programs that were centered on contingency management treatment (extinction, time-out, positive reinforcement, and shaping), were the most efficacious intervention. Benoit, Wang, & Zlotkin (2000) randomly assigned tube fed children into either a nutritional intervention group or a behavioral interventional group. The nutritional intervention provided ways to manage

meals and environmental recommendations. In addition to the components of the nutritional intervention, the behavioral intervention also used behavioral techniques such as extinction. Approximately half of the behavioral group was weaned off their feeding tubes compared to none of the nutritional group.

Treatment for feeding disorders often includes a multidisciplinary team. The team may work to strengthen muscles of the mouth, increase tongue movement, increase tolerance to different foods or liquids, and coordinate the suck-swallow breathing pattern. The first step in treatment is to treat any underlying medical disorder, which is normally done by a gastroenterologist. Nutritionists then develop meal plans and work to provide adequate nourishment for the child. Behavioral psychologists help the child and the family in dealing with behavioral issues associated with feeding. Occupational and speech therapists work on the child's food aversions, oromotor (mouth and tongue) skills, and fine motor skills that interfere with feeding. Many of the children with feeding disorders are afraid of new tastes and textures (neophobia), thus, speech therapists offer foods with different consistencies and textures for children who are extremely sensitive to having things in his or her mouth. Finally, social workers act as a liaison and provide resources for the families. For example, they work with the insurance companies to provide services and offer support for the families (Burklow et al., 1998)

Research consistently demonstrated that a multidisciplinary intervention is the most effective treatment for children with feeding disorders. A strong collaboration among on disciplines including medical doctors, psychologists, speech therapists, occupational therapists, nurses and other health care providers is necessary for a successful intervention. Linscheid (2006) also noted that a flexible protocol per child and positive parent involvement are important and necessary components to improve children with feeding problems.

Parent-Child Relationship

Many researchers view feeding disorders as a relationship disorder (Feldman, Keren, Gross-Rozval, & Tyano 2004). Providing adequate nutrition and food for development are vital to the early parent-child relationship. The first interactions between mother and child revolve around feeding (Franklin & Rodger, 2003). When a child encounters an early feeding problem, the feeding relationship between mother and child is disrupted. Feeding is associated with pain and mother with feeding. An association of the mother with pain intensifies the feeding problem. Mothers report that they have a hard time forming the initial bond with a child because of a disruption in the early feeding interaction (Franklin & Rodger, 2003).

While most of the literature focused on mother-child relationships, Franklin & Rodger, 2003, investigated some father-child interactions. The researchers found that unlike the mothers, the fathers did not have difficulty in bonding. This may have resulted because fathers are secondary to the attachment of a child, since the mothers are typically the primary caregiver. The fathers view the relationship with their child in more authoritative terms and are present in feeding to discipline the child while the mothers feed. Mothers noted that supportive fathers who were patient and persistence in feeding were vital components to a successful mother-child feeding interaction. The father's support contributed to a healthy parent-child relationship.

Didehbani (2006) investigated the role of parental presence during feeding sessions in an in-patient feeding program. The population (n = 22) included children diagnosed with a feeding disorder between the ages of 23 months and 7 years old. The patients and their parents were housed in the clinic for an eight-week treatment program with a focus on behavior intervention. The program involved four phases of progressive parent involvement during feeding; 1. parent

observation outside the feeding room, 2. parent observation inside the feeding room, 3. participation in feeding, and 4. parent feeding. Exploratory analysis of day to day caloric intake for each child revealed an overall decrease in caloric intake in the middle of the treatment program. While each child improved (as measured by caloric intake) from enrollment to discharge, they all showed a similar decline in calories around the midpoint.  For this reason, it was hypothesized that the caloric decrease resulted from the parents' entrance into the feeding session (during phase 2). The study compared the average caloric intake across 3 days prior to parental entry to the average caloric intake 3-days post-parental entry. The results revealed a significant decline in caloric intake following parental entry into the feeding environment. The researchers concluded that the decrease may have either been a result of a simple change in the child's feeding environment (presence of another person), or it may have been a result of the parent's presence. If the decline in caloric intake was indeed a result of parental presence, then the study provided further support for the effects of a disrupted parent-child relationship.

Several other studies compared parent interactions in children with feeding disorders and in those without disorders. Berkowitz and Senter (1987) (as cited in Feldman, Keren, Gross-Rozval, & Tyano, 2004) found that during direct observations of the interaction, the mother of the child with a feeding disorder avoided physical closeness and showed less affection.  Polan & Ward (1994) added that parents of children with a feeding disorder displayed less unintentional touch (accidentally brushing against the child) and engaged in less play with their child. However, during feeding, the mothers showed a higher need for control and high intrusiveness (forceful touch). In response to the negative behaviors by the parent, the child engaged in oppositional behavior. The child refused food and often pushed the mother away during the feeding session (Franklin & Rodger 2003; Feldman et al.). This rejection interfered with healthy

attachment and the development of a positive parent-child relationship. This becomes problematic because research suggests that frequent affection and touch by the parent results in better neurobehavioral development and better cognition (Feldman et al. 2004).

The disrupted parent-child relationship contributes to the child's behavior problems, especially during feeding (i.e. refusing food, gagging, pushing the parent). Research shows that chronically ill children display more psychological and behavioral problems compared to children without a chronic illness (Franklin & Rodger, 2003). West & Newman (2003) suggest that the relationship between the negative behaviors of the parents and behavior problems of the child appear bidirectional. They note that the parent's behavior is reflective of the child's behavior and vice versa. Behavioral problems as well as attachment may be due to unfortunate pairing of the mother with the infant's distress of feeding. Consequently, the parent becomes a discriminating stimulus in the feeding setting and is therefore ineffective at getting the child to eat (Raina et al., 1987) examined 3,294 chronically ill children and found them five times more likely to have neuroses or have a behavioral problem (i.e. attention deficit disorder, social problems, or academic problems). Chatoor et al. (2004) has also investigated the parent-child relationship and demonstrated the importance of a calm and relaxing feeding environment in order to enhance the child's feeding. Thus, it is important to understand and observe the impact of the parents' mood and behavior on the care of child with a feeding disorder.

Emotional Intelligence

The adaptive capacity to monitor and appraise the emotions of others has been termed emotional intelligence (Salovey & Mayer, 1990). Emotionally relevant information is picked up through social exchange and used to make inferences about others people's feeling (i.e. anxiety,

fear, happiness, etc.). Emotional intelligence suggests that children develop these skills as they learn to discriminate between emotions, facial expressions, and learn to relate how environmental cues affect others' emotions (Bennett, Bendersky, & Lewis, 2005). Thus at a young age we develop these skills and continue to refine emotional intelligence into our adult years (Rosenbaum & Ronen, 1997).

Rosenbaum and Ronen (1997) suggest children are able to pick up on their parent's emotions, particularly anxiety. They also suggested that physical proximity and the salience of the expressed affect increase the mutual inference of parent-child anxiety levels. Traditional perspectives on parenting and childhood anxiety indicate a relation between parenting behavior and childhood anxiety (Wood, Mcleod, Sigman, Hwand, & Chu, 2003; Woodruff-Borden, Morrow, Bourland, & Cambron, 2002). Studies have also revealed that poor anxiety regulation skills are passed from parent to child. Anxious mothers model fearful cognitive style which increases the child's chance of developing an anxiety disorder (Moore, Whaley & Sigman, 2004). In other words, parents who model poor coping strategies are more likely to have children who lack an ability to evaluate and regulate their own fear and anxiety levels effectively (Woodruff-Borden et al., 2002). Studies now show that certain parenting styles such as high control, low warmth, and high criticism are also related to anxiety disorders. These negative coping styles may transfer onto the child and as a result, the child may develop an anxiety disorder (Moore et al., 2004).

Researchers have also shown that negative emotions and emotional intelligence are negatively correlated (as cited by Denham, 1986 in Bennett, Bendersky, & Lewis, 2005). The study demonstrated that children who are exposed to constant negative emotions are less likely to anticipate how other's feel and focus more on their own needs and feelings. Children may thus

express more distress and dysregulation. However, children of parents who are more responsive and express more positive emotions display higher emotional intelligence (Bennett et. al., 2005. In investigating emotional intelligence and attachment styles, researchers show that the more secure attachment the child displays as a result of a responsive parent, the more accurate the child discriminates facial expressions. However, those who displayed an avoidant attachment, have difficulty in accurately discriminating emotions, especially happiness (Kafetsios, 2002).

Attachment

Attachment has also been said to involve the same regulatory process as emotional intelligence in which the mother-infant interaction continuously regulates the baby's shifting arousal levels and emotional states (Schore 2001). In this regard, the parent is a naturally occurring biofeedback mechanism by which the child learns to regulate physiological and emotional responses (e.g. approach, avoid). Therefore, it is of utmost importance that parents monitor and regulate their own emotional arousal (e.g. fear, anxiety, frustration) in order to promote normal eating and adequate oral nutritional intake.

Theories of attachment explain the importance of the mother-child relationship and note that the initial bond relates to the child's future development. The formation of a healthy attachment is determined in the first two years of life (Franklin & Rodger, 2002). Research demonstrates that the parent's ability to meet the child's needs early on is the most important determinant for the child's future relationships. The parent's level of stress may however pose a direct threat to the parent's responsivity to their child's immediate needs thereby disrupting the parent-child relationship (Hadadian & Merbler, 1996). Investigators note that a secure attachment is positively related to a mother's ability to respond to the child's need (Roberts,

1989). Burke (1978) as cited in Hadadian & Merbler, 1996 further states that higher levels of stress decrease a caregiver's ability to respond and adapt to the child's needs. Therefore parental stress is an important contributing factor for child development.

Parental Stress and Anxiety

*Caretaker Role*

The difficulty in forming a functional bond between parent and child may be due to the high level of stress involved in the child's regimen. Caring for children with feeding problems contributes to high stress levels in parents. The parents have additional tasks related to the child's disorder including medical treatment, nutritional care, and in some instances hospitalization. Parental anxiety about the child's feeding habits may contribute to the stress encountered during the feeding interaction. This high level of stress prompts the mother to continue the negative interactions and forceful feeding which intensifies the child's feeding problem (Feldman et al. 2004). Parents must redirect their priorities and their energy for themselves, their sick child, and other family members (Raina et. al., 2004).

Studies continually show that parents of children with disabilities experience higher levels of stress as a result of the caretaker role. The caretaker becomes physically exhausted by juggling the needs of the ill child, the family's needs, and their own needs. Caretakers also carry the extra burden of the high financial costs of the child's medical care which contributes to more stress on the family (Solomon & Breton, 1999). This high level of stress negatively affects learning, processing, and recalling of information. Parents may thus have difficulty in implementing the child's complex regimen with a compromised cognitive processing and as a

result children may be less receptive in adhering to their medical regimen (Streisand, Braniecki, Tercyak, & Kazak, 2001).

Pedersen et. al., 2004 compared parental stress in parents who had children with feeding tube, other chronic illness, and healthy children. The investigators found that parents who have tube fed children experienced more overall stress than parents with healthy children, parents with diabetic children, and parents of children with growth deficiencies. The research demonstrated that parents of children with feeding tubes have added stress as the medical regimen is complex and labor intensive (more so than daily insulin injections for the children with diabetes). The parents have the added responsibility concerning the proper usage and care of the feeding tube. The time commitment for the parents with tube fed children was more extensive and the parent had little time for personal activities. These parents are often frustrated with the care involved with a tube fed child (Pedersen et. al.).

Another study discussed the stages that a parent experiences when they learn that their child has a chronic illness. McCollum & Gibson (1970) (as cited in Solomon & Breton, 1999) discussed the theoretical model with a parent who had a child diagnosed with Cystic Fibrosis. The researchers noted that the caretaker is initially overwhelmed with acute stress, grief, guilt, and anger upon learning of the diagnosis, followed by a stage of denial and eventually a long-term adaptation stage. The caretaker's ability to cope with stress determined the psychosocial outcome for the family (McCollum & Gibson as cited in Solomon & Breton).

The severity of the disorder, chronicity, increased dependence of the child, level of physical and intellectual impairment of the child, child behavior, social factors, and caregiver characteristics are all psychosocial factors that contribute to the caregivers stress (Raina, et. al., 2004; Pedersen et. al., 2004). Parents are often physically overwhelmed with the increased

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number of demands (Graves & Ware, 1990). The parents must carefully observe food intake, medication, restrictive diets, and must constantly monitor oral feeding and/or tube feeding which adds to the stress (Franklin & Rodger, 2003). Parents make judgments about the child's demands, and if these demands are high and appear beyond the capabilities of the parents, the parents will experience stress. The parent will likely employ some type of coping mechanism in order to reduce the stress (Brehm, Kassin, Fein, 2004). While some parents adapt and cope, others employ ineffective coping strategies such as force feeding (Raina et al.). When parents use these inappropriate coping mechanisms, disruptive and often counterproductive behavior by the child is the inevitable byproduct. The child continues to refuse food and the parent continues to experience stress (Brehm et al., 2004).

It is now common practice for highly medically involved children to spend large amounts of time undergoing medical procedures at home as well as in medical facilities. Auslander et. al., (2003) noted that parents of children with low birth weights have stress related to the uncertainty about the child's health. Parents of gastrostomy tube fed children are often required to accomplish complex tasks (e.g. cleaning and maintaining gastrostomy tube) which place demands of a medical role uncommon in the typical parent-child interaction. In medical situations, parents can become highly anxious and question their own ability to successfully support/comfort their child during the procedure, especially if it is a difficult or painful one (Piira, Sugiura, Champion, Donelly, & Cole, 2004).

*Role of Anxiety on Parent-Child Interactions*

Anxiety disorders are common psychiatric disorders in adults and children. Because of the high prevalence, the focus of current researchers has turned to investigating the genetic and

environmental risk factors. Research has indicated a strong familial link in that children of parents with anxiety disorders compared to parents without anxiety are up to seven times more likely to have a diagnosis of an anxiety disorder. In the past, environmental factors including parent-child relationships have been minimized despite the vast literature showing a link between a child's psychological well-being and family dynamics (Woodruff-Borden et. al., 2002).

There have been a number of studies that investigated relation between parenting styles and behaviors with childhood anxiety. The studies have focused on three different models of parenting; acceptance (warmth and responsiveness toward the child), control (excessive regulation of the child's activities), and modeling of anxious behavior (promotion of the child's ineffective problem-solving and coping) (Wood et. al., 2003). Craske (1999) (as reported in Moore, Whaley & Sigman, 2004), explained that parenting styles affect a child's development of trait anxiety and possible anxiety disorder. Children learn behaviors through their environment and may view the world as unsafe if their parents exhibit little compassion and are overly critical. Other children may assume that they are not able to cope with difficult situations when the parents are too controlling. Parents are models to their children and children quickly absorb behaviors and emotions from their environment. For example mothers with anxiety demonstrate fear which is learned from their child who may later exhibit the same fearful characteristics (Moore et. al., 2004).

Some argue that parenting styles are not a direct predictor of the child's emotional character but instead act as a moderator. However, parenting style is usually measured as a self-report measure and is not always as accurate a measure as direct observation of the parenting behavior. While the literature review by Wood et. al., 2003 presented mixed results of parenting

and childhood anxiety, they found that an observed parental control as seen in a parent-child interaction, was consistently linked to childhood anxiety.

Whaley, Pinto, and Sigman (1999) were the first to examine the interaction between an anxious mother and her child compared to a non anxious (control) mother and her child. Anxious mothers were defined as having an anxiety disorder or related disorder based on the Anxiety Diagnostic Interview Schedule for *DSM-IV* (ADIS-IV). They observed parent child interactions during a mildly stressful task. The study included 18 clinically anxious mothers compared to 18 normal control mothers. They found that anxious mothers provided less warmth and exhibited more control. Woodruff-Borden et. al., (2002) found similar results. The researchers suggested that anxious parents, as measured by the ADIS-IV, interact differently with their children than non-anxious parents; i.e. anxious parents were withdrawn and disengaged from tasks that involved both the parent and their child. When the parents were engaged with their child, the productivity was lower and they were less likely to praise the child. They further suggested that the children, who are exposed to anxious parents, have more difficulty managing their own stress (Woodruff-Borden et. al.).

A study by Stark, Humphrey, Crook, & Lewis, 1990 examined the families of children with either anxiety or depression. The researches, found that compared to other families without a psychiatric diagnosis, the families were less cohesive and less supportive. The families demonstrated more conflict and engaged in fewer positive interactions. The children complained of high family control and did not feel they were as part of the decision making process (Stark et. al.). In looking at the interactions, another study found that parents encouraged the fear in their child which maintained the child's anxiety. Rosenbaum et al. (1988) noted that children model fearful reactions if the parents express fearful responses.

While most parents are not clinically diagnosed with anxiety or its related disorders, mild levels of anxiety are experienced by the majority of parents at least some of the time (West & Newman, 2003). Thus, West & Newman investigated the effects of mild anxiety and depression on a child's temperament and behavior problems. Behavioral problems included externalizing behaviors such as hyperactivity, aggression, and conduct problems as well as internalizing behaviors such as anxiety. The researchers used the Symptom Checklist-90-R to assess parent psychopathology, the Toddler Behavior Assessment Questionnaire-Revised to assess child temperament, and the Child Behavior Checklist to assess behavior problems. Results indicated that mild parental anxiety and depression were negatively correlated with the child's attention, compliance, and the ability to calm down after heightened negative arousal, and positively correlated with problem behaviors. The investigators also found that the children had more difficulty in regulating their own emotions and had difficulty with affect regulation. Overall they found that children with anxious parents displayed more problems in emotion regulation, while children of depressed parents showed more behavioral problems. These results are consistent with the research on emotional intelligence in that children pick up the parent's emotions and behave accordingly. Saylor et. al., (2003) also found that early parental stress was correlated with behavior problems in children.

The consequences of anxiety were also investigated by Stark et. al., (1990). The researchers found that families with depression or anxiety were less open and engaged in fewer pleasant activities. As a result, the children of these families viewed their home life to be less supportive and did not feel involved in family decisions. As one can imagine, the potential stress in this situation increases for the child. Therefore, the children were left to struggle through situations on their own, which can become highly problematic when children are left to struggle

with a feeding disorder. Parents must learn adaptive ways to cope with their stress in order to facilitate a nurturing environment (Woodruff-Borden et al., 2002). One study demonstrated that teaching appropriate coping mechanisms for mothers, improved the mental health and emotional outcome of their chronically ill child (Melnyk, Alpert-Gillis, Feinstein, Crean, Johnson, Fairbanks, Small, Rubenstein, Slota, & Corbo-Richert, 2004).

*Stress on Parental Health*

Stress plays a major role in one's health and in the ability to function (Klassen Lee, Rain, & Lisonkova, 2004). Parents may feel guilty, helpless, and experience fear in response to the child's feeding problem. The inability of parents to provide adequate nurturance such as feeding leads to lower self-efficacy, feelings of rejection, increased doubt in their capabilities as a parent, and increased stress (Auslander et al., 2003). While parental stress and anxiety are expected responses to the high demands placed by an ill child, it becomes problematic if it persists for a long period of time (Auslander et. al., 2003; Lazarus & Folkman, 1984). It can affect a person's sense of well-being, mental health, and physical health (Raina et al., 2004). Cadman, Rosenbaum, Boyle, & Oxford (1991) found that parents with disabled children are at an increased risk for developing mental illness than in parents of children without a disability.

The high level stress experienced by parents with children with a chronic illness may interfere with the roles of the parent and negatively affect the parent child relationship (Auslander et. al., 2003). Thus, parents may not always provide the best care when their psychosocial health is debilitated. Klassen et al. (2004) found that child behavior was strongly related to parental psychosocial health, and stress was one factor that played a role in parental health. The parent's health dictated their interactions with their child. Research suggests that

anxious parents tend to withdraw from interactions with their child. Specifically, anxious parents seem to only attend to a child who shows negative affect. The parent then focuses on decreasing the unwanted affect, which may not be alleviating the child's problem (Woodruff-Borden, et. al., 2002).

## Defining and Measuring Stress

A person's perception of stress contributes to his or her physiological and psychological experience of stress. Physiological stress can best be defined in terms of Canon's "fight or flight" response. It is characterized physiologically by sympathetic nervous system and two major neuroendocrine axes: the sympathetic-adrenal medullary (SAM) axis and the hypothalamic-anterior pituitary-adrenal (HPA) axis. The SAM axis regulates the secretion of the catecholamines norepinephrine and epinephrine into the bloodstream which increase heart rate and blood pressure (De Vente, Olff, Amsterdam, Kamphuis, & Emmelkamp, 2003; Flinn & England, 1995). HPA activation results in the secretion of the glucocorticoids (cortisol in humans) (De Vente et al., 2003; Flinn & England, 1995).

As mentioned, cortisol is secreted in response to psychosocial stress. The circadian release of cortisol is necessary for everyday functioning and is involved in the release of energy, immune activity, and learning (Ennis, Kelly, & Lambert, 2001). Short-term release of cortisol prepares the body to respond to the changing environment (e.g., it potentiates glucose availability). However, chronic cortisol secretion is associated with negative psychological functioning states including the inability to cope, helplessness, and affective disorder (Blood, Blood, Bennett, Simpson, Susman, 1994; Flinn & England, 1995; De Vente et al., 2003). This prolonged release of cortisol is often seen in parents who have children with chronic illnesses,

likely due to the chronic stress of having to care for a sick child (Flinn & England). The deleterious effects of chronic cortisol release on a caretaker's health have been well documented (Krantz, Forsman, & Lundberg, 2004). Researchers have measured cortisol in serum, urine, and saliva. Salivary cortisol is a reliable measure of HPA activity and its relatively simple chemistry construction allows for better analysis compared to serum or plasma measurements of cortisol (Flinn & England; Magnano, Diamond, & Gardner, 1989). Salivary cortisol offers a noninvasive, simple measure of HPA activation (Krantz et. al.).

Self-report questionnaires are often used to measure psychological stress. Psychological stress can be defined as a relationship between the individual and the environment that occurs when the demands of the environment exceed the person's resources (Lazarus & Folkman, 1984). While a number of questionnaires measuring stress exist, the State Trait Anxiety Inventory (STAI) by Spielberger (1970) is most often used (Blood et. al., 1994). Its reliability and validity are well established for measuring both state anxiety (temporary emotional states) and trait anxiety (overall disposition to anxiety) (Blood et al.; Auslander et. al., 2003).

There are also several self-report measures of stress specific to parents who have children with chronic illness. One example is the Pediatric Inventory for Parents (PIP). The PIP measures parental stress related to the child's illness. This questionnaire is divided into four subscales: (1.) communication with the family/medical professional, (2.) emotional functioning, (3.) medical care, and (4.) role function. The communication subscale explores the communication between the child's parent with the medical staff and other family members. The emotional functioning subscale looks at the parent's isolation, fear, and other mood symptoms. The medical care subscale investigates the parents' stress in relation to the child's medical procedures and decisions associated with those procedures. Finally, role function measures the impact of the

caretaker role on the parent's daily routine. Each subscale yields a frequency score (frequency over the last week) and a difficulty score (level of difficulty). In addition to each subscale score, a total frequency score and total difficulty score are also calculated. Higher scores on each scale indicate greater frequency or difficulty of parental stress (Streissand, Braniecki, Tercyak, & Kazak, 2001). The PIP displays high internal consistency reliability for each subscale and the Cronbach α ranges from .80 to .96.  Streissand et al. also found significant correlations with the overall PIP frequency and overall PIP difficulty to the state anxiety measure on the STAI in parents of children with cancer. While the PIP was initially developed in an oncology setting with parents of children who have cancer, it is an appropriate measure for other illness populations (Streisand et al.; Lewin, Storch, Silverstein, Baumester, Strawser, & Gerrken, 2005). Lewin et al., 2005, found comparable internal consistency for the overall frequency and difficulty domains in addition to significant correlations between most subscales of the PIP and maternal ratings of state anxiety as measured by the STAI. The medical care subscale on the PIP for frequency and difficulty and PIP emotional distress subscale for difficulty were not significantly correlated with state anxiety on the STAI (Lewin et al.).

IMPLICATIONS

Some mothers of children with feeding disorders report difficulty bonding with, and may have feelings of ambivalence toward, the children. Consequently, some parents of children with feeding disorders may feel guilt and engage in constant self-evaluation as to how well they are functioning as a parent. If the child fails to improve, the parent's self-esteem and self-perception may decline, which reportedly results in high levels of stress (Raina, et. al., 2004).

Purpose

The proposed study examined the relationship between parental anxiety, measured both subjectively (via self-report questionnaires) and objectively (via salivary cortisol) and the child's feeding progress. Linscheid (2006) demonstrated that a child may initially show a reduction in caloric intake when a parent enters a feeding a room and observes the feeding. This was replicated in the earlier study by Didehbani (2006). However, Linscheid further explained that the child will soon adapt with the realization that the contingencies remained the same with the parent present during the feeding sessions. The current proposal sought to examine what transpires when the parent begins to feed the child. This study utilized the same treatment program and facility as the previous study by Didehbani, (2006). The study had four hypotheses: (a.) The first hypothesis was built upon the earlier finding by Didehbani (2006) - that parental presence in the feeding room (Phase 2) caused a decrease in the child's caloric intake. The present study attempted to further examine whether parental feeding (Phase 3) would continue to cause a decrease in the child's caloric intake; (b.) The second hypothesis predicted that parental anxiety, as measured subjectively and objectively, would increase from phase 1 (parental observation outside the feeding room) to Phase 3 (parent participation in feeding); (c.) The third

hypothesis predicted a positive correlation between parents' subjective and objective measures of

anxiety: and (d.) The final hypothesis predicted a negative correlation between calories

consumed by the child and parental anxiety, measured both subjectively and objectively.

METHODS

Participants

Participants included 20 children diagnosed with a feeding disorder and one of the child's parents. All children in this study were G-tube fed in order to control for significant differences in treatment goals with other children in the feeding program who did not use a feeding tube. Parents aged 22 to 45 years and their children aged 18 months to six years were treated at Our Children's House at Baylor in Dallas, TX. The patients and their parents were housed in the clinic for an intensive multidisciplinary pediatric feeding disorder treatment program with a focus in behavior intervention. The program used a differential reinforcement method in order to increase feeding behavior through reinforcement and extinguish inappropriate behavior during the feeding sessions (Miller, 2006). Based on the current literature, the program was comparable to other programs found in other similar studies. Each parent completed an informed consent form for their participation as well as provided experimental assent for their child prior to participation in the study.

Materials

*State Trait Anxiety Inventory (STAI).* The STAI is a 40-item self-report measure of adult anxiety that includes measures of both state and trait anxiety. In the current study only state anxiety was measured. State anxiety changes over time and reflects a person's immediate perceived feelings of tension (Spielberger & Vagg, 1984).

*Pediatric Inventory for Parents (PIP).* The PIP is a 42-item self-report questionnaire that investigates parental stress related to their child's chronic illness. The PIP reveals both a frequency score and difficulty score for each of the four subscales: (1.) communication with the

family/medical professional, (2.) emotional functioning, (3.) medical care, and (4.) role function (Streissand et. al., 2001).  See earlier description of each subscale.

*Salivary Cortisol Collection.* Salivary cortisol was collected using standardized salivette tubes (Sarstedt, Numbretch, Germany). Each tube contained a cotton swab that the parent gently chewed to stimulate the flow of saliva for 2-3 minutes (Rasmussen et. al., 2005). Three samples were obtained at each collection time.  After collection, samples were shipped to Germany for analysis (Kirschbaum & Hellhamer, 1994).

Procedure

*Parent Procedure*

All participating parents completed the State Trait Anxiety Inventory (STAI), Pediatric Inventory for Parents (PIP), and provided three samples of salivary cortisol on Day 4 of the study (during Phase I; see below).  These results served as baseline measures.  Parents again completed the STAI, PIP, and provided three samples of salivary cortisol at the start of phase 3 (parent participation in feeding; see below). As noted, preliminary research suggested that introduction of a parent into the feeding session resulted in a drop in the child's caloric intake (Didehbani, 2006).

*Feeding Sessions*

All participating children received multidisciplinary treatments including, medical supervision by physicians, nursing staff, a nutritionist, a psychologist, a speech and occupational therapist and a social worker. The behavioral component of the feeding therapy consisted of positive reinforcement of the targeted behaviors of accepting bites, chewing and swallowing. All

avoidance behaviors, including food refusal, gagging, and vomiting were ignored. Behavioral protocols were standardized yet adjusted to accommodate individual differences in preferred reinforcement. Initial protocols ranged from continuous reinforcement in which the child was allowed continuous access to the reinforcer as long as he/she accepted food, to taking bites of food in a 1:1 or 2:1 ratio of reinforcement (i.e, the child has access to the reinforcer following acceptance of 1 or 2 items, respectively).

All feeding sessions were conducted in a room that contain a table, two chairs, an appropriate seating system for the child (e.g., high chair, Rifton chair, etc), and a one-way mirror. Total grams consumed (pre-meal minus post-meal food weight) and protein grams were measured. Meals were conducted 5 times per day for 25 minute sessions. The child was fed in a chair facing either the parent or therapist (depending on the phase of the program) at arm's length. The order of food presentation was determined at the beginning of the meal and each item was placed in a separate bowl. All food and liquid was measured prior to the feeding session. Food was measured in grams on a scale and liquid was measured using 30 mL medicine cups. All food and liquid was again measured in the same manner at the end of the session.

At mealtime, the person administering the food made direct eye contact and said, "It's time to eat." Once the child attended, the therapist or the parent would say "Take a bite." Reinforcement was provided when acceptance occurred. Reinforcement included verbal praise such as "Good eating, you took a bite." If the child did not accept the entire bolus, the same bolus was presented until it was accepted or until the session ended. Inappropriate and disruptive behaviors (head turns, refusal, crying, etc.) were ignored. At the end of the meal, the therapist or parent would say "The meal is over, it is time to____ (do the next activity)." Then the child was taken out of the chair and was cleaned. Total grams and protein intake were calculated by a

nutritionist and recorded daily for each child. A summary of what was eaten was recorded on a tracking sheet (See Appendix 1 for sample).

*Feeding Protocol*

Parent involvement in the program was structured into four phases; *1)Parent observation outside of feeding room, 2) Parent participation in non-feeding therapies and in reinforcement during feeding, 3) Parent Participation in feeding,* and *4) Caregiver feeding,* with the final goal of successful meals with the parent.

*Phase 1:  Parent Observation Outside Feeding Room*

During this phase of parent observation, parental visitation was limited to the time after dinner through 30 minutes prior to breakfast the next day. Therefore, the child participated in therapies and feedings during the day without primary caregiver involvement. The focus of this phase of treatment was to provide remediation for oral-motor and sensory processing deficits that interfered with feeding and to structure behavioral expectancies and begin eliminating habits not conducive to normal eating or to improve behaviors conducive to normal eating. The parents began observing feeding sessions from behind a one-way mirror, often times with a psychologist, social worker, or therapist.  This initiated the training process.

*Phase 2:  Parent Participation in Non-Feeding Therapies and in Reinforcement During Feeding*

Phase 2 of parent participation began once the child adjusted to the routine and some progress had been made in the feeding sessions. The focus of Phase 2 of treatment was to include parents in the daily routine. The parent sat next to the therapist feeding the child and provided

reinforcement for the child's eating behavior. During the meal, parents praised their child verbally with cuing from the feeder or by following the lead of the feeder. Parents also practiced active ignoring strategies in response to any food refusal behaviors. During this phase parents began attending daily oral-motor and sensory integration therapy sessions. The goal of this phase was for the child and the parent to become accustomed to participation in treatment while continuing to make progress with oral intake.

*Phase 3: Parent Participation in Feeding*

Phase 3 began parent participation in feedings when the child showed progress in accepting food. Parent participation was initiated once the child demonstrated an increase in intake of food, reduced disruptive behaviors, and adjusted to parent involvement in other therapy sessions. Parents began feeding the second half of the child's meals with the therapist in the room providing support and feedback. The emphasis of this phase of treatment was to continue training and introduce caregivers into the feeding sessions. The goal of this phase of treatment was to maintain progress while the parent fed the child.

*Phase 4: Caregiver Feeding*

During the final phase, parents continued feeding meals with the therapist observing from outside the feeding room. During the last 5 to 7 days parents were expected to feed the majority of the meals.

RESULTS

Demographic Variables

The child population consisted of eleven females and eight males with ages ranging from 23 months to 11 and half years (M = 51.8, SD = 32.1). There were 14 Caucasian children, one African-American child, two Hispanic children, two Asian children, and one other. A total of 17 mothers and one father participated in the study. There were 14 Caucasian parents, one African-American parent, two Hispanic parents, and two Asian parents. Out of the 18 completed parent-child pairs, 13 parents were married, 4 single, one was separated, and one had a partner.

Hypothesis 1

Caloric intake for each child was averaged across 10 meals immediately prior to parent feeding and compared to the child's caloric intake while the parent was feeding (caloric intake of consecutive meals with the parent feeding was averaged up to 10 meals). The number of meals averaged post parent feeding varied for each child, as staff and other family members continued to feed the child during this phase of the program. The means and standard deviations of caloric intake pre and post parent feeding are presented in table 1. Caloric intake was slightly lower pre-parent involvement (M = 151.48) as compared to after the parent entered the room (M = 154.87). A paired $t$-test indicated no significant difference t(17) = -.519, p = .611.

Table 1

*Caloric Intake Pre and Post Parent Feeding*

|  | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Pre Calories | 18 | 0.0 | 344.8 | 151.48 | 108.72 |
| Post Calories | 18 | 0.0 | 408.1 | 155.39 | 121.13 |
| Age in months | 19 | 23.00 | 138.0 | 51.79 | 32.11 |
| Valid N (listwise) | 18 | | | | |

## Hypothesis 2

Multiple paired *t*-tests were run to examine changes in parental stress as measured by state anxiety (STAI), PIP subscales, and salivary cortisol across the different time points. State anxiety measured at Time 1 (Day 4 of admission) compared with Time 2 (parents feeding), was not different (t(17) = -.793, p = .439). On the PIP, only one subscale, medical care, decreased significantly across the two time points, for both difficulty of medical care t(17) = 2.77, p = .013 and frequency of medical care t(17) = 3.36, p = .004. Salivary cortisol increased significantly t(15) = -6.07, p = .000 from Time 1 (M = 2.30, SD = 1.64) to Time 2 (M = 5.24, SD = 2.58).

## Hypothesis 3

Correlations were run to examine the relation between state anxiety, cortisol, and PIP measures at each time point. At Time 1, no anxiety measure was correlated with any other anxiety measure. At Time 2, only state anxiety was significantly correlated with the frequency of emotional disturbance subscale of the PIP r(18) = .60, p<.01. No other measures were significantly correlated.

Hypothesis 4

Correlations were also run to examine percent change from Time 1 to Time 2 of anxiety measures with caloric intake. Percent change of state anxiety from Time 1 to Time 2 was significantly correlated (p< .05) with caloric intake from Time 1 to Time 2 (after parents started feeding their child) r(17) = .52, p < .05. Percent change of PIP subscale medical care frequency was correlated with caloric intake r(17) = -.51, p < .05.  Percent change of salivary cortisol was not correlated with percent change of caloric intake from time 1 to time 2.

Table 2
*Caloric intake and Stress measures across each time point*

|  | Time 1 Mean | Time 1 Std. Deviation | Time 2 Mean | Time 2 Std. Deviation |
|---|---|---|---|---|
| Caloric Intake | 82.14 | 82.47 | 155.39 | 121.13 |
| State Anxiety | 56.47 | 9.2 | 58.61 | 10.63 |
| Cortisol | 2.3 | 1.64 | 5.65 | 2.49 |

DISCUSSION

The present study examined feeding disordered children, caloric intake, and parental stress in a multifaceted treatment program. It was first hypothesized that parental participation in feeding would delay the child's progress as measured by caloric intake. This hypothesis was based on an earlier finding by Didehbani (2006) in which caloric intake of the child decreased when a parent entered the feeding the room (Phase 2). The present study investigated the same in-patient feeding program as was examined in the Didehbani (2006) experiment. However, the current study extended the earlier research in that it examined the parent-child interaction during parent feeding, by measuring the caloric intake of the child in relation to parental stress immediately prior to and after parent feeding (Phase 3 of the feeding protocol). The aim of the first hypothesis was to investigate whether or not caloric intake would remain low when the parents actually fed the child. Contrary to hypothesis 1, caloric intake of the child did not decrease from therapist feeding to parent feeding.

Because of the variability in the number of consecutive meals fed by each parent across each child, an exploratory *t-test* was also preformed to compare caloric intake of one meal prior to parents feeding with the caloric intake of the first meal fed by the parents. The average caloric intake of the meal prior to parents feeding (M = 150.07, SD= 134. 58) was higher than the first meal fed by the parents (M = 131.61, SD = 107.16). Again, the difference was not significant t(16) = 1.04, p = .315.

To investigate further changes during the feeding session, children's negative behaviors during each meal were examined. Staff documented the behavioral observations of each child during each feeding session. These behaviors included head turns, coughing, food refusals, laughing, and singing. The current study focused only on the negative behaviors (any avoidant

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behaviors or food refusals) pre/post parent feeding. The frequency of negative behaviors by the child during each meal was averaged across 10 meals prior to the parents feeding and compared to the average number of negative behaviors while the parents were feeding. The results of the t-test were significant $t(17) = -4.752$, $p = .00$. Negative Behaviors, as defined by head turns, coughing, food refusal, or any other avoidant behaviors were more frequent when the parents fed their child ($M = 5.54$, $SD = 3.10$) compared to staff feeding the child ($M = 2.47$, $SD = 1.28$). This suggested that while the child's caloric intake improved, the child continued to exhibit more avoidant behaviors during each meal with the parent feeding. Many researchers have documented that children are aware of their parent's fears and anxiety and respond accordingly. West & Newman (2003) have noted a connection between parental mood, including anxiety with behavioral difficulty in their children. A recent study also demonstrated a link between parental stress and problematic behaviors by their child during feeding sessions (Greer, Gulotta, Masler, & Laud, 2008). Since behavior problems in ill children are typically the result of problems in the family and not due to the actual illness, intervention at the family level may be the most effective treatment (Graves & Ware, 1990). The current finding however, showed that the children continued to progress and make positive associations with feeding. This improvement may be the result of the multidisciplinary feeding program which encompasses a strong behavioral component and parent training. Research has shown that a multifaceted intervention is the most effective in improving caloric intake of children with feeding disorders (Burklow et al., 1998).

The second hypothesis explored changes in the different measures of parental stress. T-tests revealed that only one subscale of the PIP, medical care, was significantly less from baseline to Time 2. Both the frequency of medical care and difficulty of medical care decreased from time one (baseline) to Time 2. The level of stress related to medical care likely decreased

because of the level of parent training and involvement in the multidisciplinary feeding program. The feeding phases were progressive in nature and allowed the parents to observe the feeding process and medical treatment in an in-patient setting. This likely eased the parents' concerns and anxiety about the medical procedures involved in their child's care. Research has shown that parent involvement in their child's care reduces the parent's anxiety as they become more familiar and comfortable with the medical regimen (Mueller et al., 2003; Franklin & Rodger, 2002; Auslander et. al., 2003). The self reported state anxiety did not significantly increase, but the objective measure (salivary cortisol) showed an increase in stress from enrollment to Time 2 (immediately prior to parents feeding). This demonstrated that parents may have minimized their levels of stress and anxiety in self-report questionnaires. This incongruency between self –report anxiety and cortisol has been previously reported and suggests that the accuracy of self-reports may be related to situational factors as seen in the current study (Harrell, Kelly, and Stutts, 1996). Conversely, other researchers suggested, that cortisol secretion may be more sensitive to situational stressors, e.g. novelty (Kurina, Schneider, & Waite, 2004). This may help explain the increase in parental salivary cortisol from enrollment (observing the feeding process) to the parents feeding the child despite the non significant change in objective measures.

The third hypothesis examined correlations among the anxiety measures at each time point. At time 1, state anxiety was not correlated with any other anxiety measure. At time 2, prior to parents feeding, state anxiety was significantly correlated with the frequency of emotional disturbance subscale. Emotional disturbance subscale measures the parents' anxiety and negative mood. This suggested that the parents' anxiety at that time may have resulted from the emotional stress of having to feed their child. Salivary cortisol was not correlated with the self-report questionnaires at either time point, but it did increase significantly from enrollment to Time 2,

indicating parental stress prior to feeding their child. Research has shown mixed results in the correlation of psychological (self-report) and physiological measures (cortisol) of stress (Weekes, 2006). Weekes (2006) argued that subjective self-report questionnaires may not capture an accurate measure of stress. Situational factors also strongly influenced parents' responses on self-report measures of stress. In the present study, after many weeks of observing staff, the parents were faced with the emotionally difficult situation of feeding their child the entire meal (Phase 2). The parent's situation changed from simply observing staff to being the person solely responsible for the child's feeding. The situational stress from enrollment to Time 2 changed, and as a result, the parents may have answered the self-report questions based only on their emotional anxiety related to feeding their child. This may have caused the increase on the emotional disturbance subscale of the PIP without increasing the other subscales on the PIP or state anxiety on the STAI.

The fourth hypothesis examined correlations between the percent change of anxiety measures with caloric intake from time 1 to time 2. The positive correlation between state anxiety and caloric intake demonstrated that the child's caloric intake increased even though the parents' experienced an increase in state anxiety from time 1 to time 2. This may indicate the effectiveness of the multimodal feeding intervention. The parent training implemented in the program also contributed to the child's success and the parent's ability to encourage feeding regardless of their (parental) stress level. Another demonstration of intervention effectiveness was observed in the decrease of parental stress related to frequency of medical care (PIP). The fact that parents were constantly informed and immersed in the medical care of their child helped facilitate progress and reduce anxiety related to necessary procedures.

Exploratory analyses were also run to investigate parental stress and caloric intake at discharge from the feeding program. The results indicated that state anxiety was correlated with the PIP subscale role function for both frequency r(14) = .53, p <.05 and difficulty r(14) = .73, p < .01 at discharge. This subscale measured the parents' stress related to the disruption of daily activities (i.e., missing important meetings or work) as a result of their child's chronic illness. The finding likely demonstrated that the parent's involvement in the intensive feeding program contributed to their stress upon discharge, as the child's living situation changed (child went home) and thus the parents schedule changed. This disruption in the parent's daily routines is often seen in parents who have children with a chronic illness.

A final exploratory analysis revealed that parents' cortisol levels from enrollment to discharge increased significantly as measured by a paired *t*-test t(13) = -6.34, p = .000 as did caloric intake from enrollment to discharge, t(16) = -3.73, p = .002. Parents' stress may have increased because of the changing situation. Parents were now faced with the difficult responsibility of feeding their child at home without the immediate support and guidance from the health care professionals. Parents may have exhibited some fears and some doubts about their own ability to continue to the child's feeding progress following discharge. While the parents' anxiety increased as the child prepared to go home, the children's caloric intake continued to improve. This again reiterates the strengths in a multidisciplinary feeding program in that the children's average caloric intake increased despite the increased levels of parental stress.

Even though the current results did not demonstrate a direct relationship between parental stress and caloric intake, parental stress as measured by salivary cortisol did increase from enrollment to the time when the parents were to feed their child. The parent-child interaction during feeding was also observed by the significant increase in the child's negative behaviors

when their parents were involved in the feeding. Thus, further research to investigate the parent-child dynamics during feeding seems warranted based on these results.

Limitations include an overall small sample size, and participation of only tube fed children. Further research should include larger sample sizes and cross comparisons with non tube fed children. A follow-up investigation on examining relationships between caloric intake, parental stress, and negative behaviors by the child during the feeding sessions is warranted based on the current findings. This will provide a better understanding of the parent-child interactions.

In regards to measures of stress, current and past objective stressors should be evaluated in addition to the parent's subjective perception of stress, thus demonstrating the parents' stress levels in relation to current life situations. It may also help distinguish the causes for each person's stress. A measure of the parents' coping strategies, resiliency, and social support should also be investigated to help determine the levels of stress experienced by each parent. Understanding the levels and causes of a parent's stress will help differentiate between a parent who is primarily stressed by their child's feeding difficulty versus a parent who is primarily stressed by with other major stressors (e.g., job loss, marital difficulty, financial concerns).

Additional research examining parental stress in relation to interactions with their child in pediatric feeding programs also seems warranted based on these preliminary results. Closer observation of the parent-child interaction during feeding as compared to therapist interaction during feeding may help develop specific training programs for the parents. Interventions and training directed toward the parent of a child with a feeding disorder may decrease the child's negative behaviors observed during feeding (e.g., head turns, refusals) and thus, facilitate implementation of shorter interventions.

APPENDIX

FOOD INTAKE CALORIE DATA SHEET

**Child:**                              **Date:**_____

| | Meal | Amount Consumed | Extra Food/Amount Added | Calories per jar** | Calories | Protein |
|---|---|---|---|---|---|---|
| Food Offered 1: | 7:30 | | | | | |
| Food Offered 2: | 7:30 | | | | | |
| Food Offered 3: | 7:30 | | | | | |
| Drink Offered 4: | 7:30 | | | | | |
| | | | | Total Cal for Meal: | | |
| Food Offered 1: | 9:30 | | | | | |
| Food Offered 2: | 9:30 | | | | | |
| Food Offered 3: | 9:30 | | | | | |
| Drink Offered 4: | 9:30 | | | | | |
| | | | | Total Cal for Meal: | | |
| Food Offered 1: | 11:30 | | | | | |
| Food Offered 2: | 11:30 | | | | | |
| Food Offered 3: | 11:30 | | | | | |
| Drink Offered 4: | 11:30 | | | | | |
| | | | | Total Cal for Meal: | | |
| Food Offered 1: | 2:00 | | | | | |
| Food Offered 2: | 2:00 | | | | | |
| Food Offered 3: | 2:00 | | | | | |
| Drink Offered 4: | 2:00 | | | | | |
| | | | | Total Cal for Meal: | | |
| Food Offered 1: | 5:30 | | | | | |
| Food Offered 2: | 5:30 | | | | | |
| Food Offered 3: | 5:30 | | | | | |
| Drink Offered 4: | 5:30 | | | | | |
| | | | | Total Cal for Meal: | | |

**To assist dietary with conversions, please indicate total calories in jar of baby food being used.

REFERENCES

Auslander, G. K., Netzer, D., & Arad, I. (2003). Parental anxiety following discharge from hospital of their very low birth weight infants. *Family Relations*, *52*, 12-21.

Bennett, D.S., Bendersky, M., & Lewis, M. (2005). Antecedents of emotion knowledge: predictors of individual differences in young children. *Cognition and Emotion, 19*, 375-396.

Benoit, D., & Coolbear, J. (1998). Post-traumatic feeding disorders in infancy: behaviors predicting treatment outcome. *Infant Mental Health Journal, 19*, 409-421.

Benoit D., Green D., & Arts-Rodas, D. (1997). Posttraumatic feeding disorders., *Journal of the American Academy of Child and Adolescent Psychiatry. 36*, 577-578.

Benoit, D., Wang, E., Zlotkin, S. (2000). Discontinuation of enterostomy tube feeding by behavioral treatment in early childhood: a randomized controlled trial. *Journal of Pediatrics, 137*, 498-503.

Berkowitz, C. & Senter, S. (1987). Characteristics of mother-infant interactions in nonorganic failure-to-thrive. *Journal of Family Practice*, *25*, 377-381.

Brehm, S., Kassin, S., & Fein, S., (Eds.). (2004). *Social psychology*. New York: McGraw-Hill.

Blissett, J., & Harris, G.  (2002). A Behavioral intervention in a child with feeding problems. *British Dietetic Association*, *15*, 255-260.

Blood, G. W., Blood, I. M., Bennett, S., Simpson, K. C., Susman, E. J. (1994). Subjective anxiety measurements and cortisol responses in adults who stutter. *Journal of Speech and Hearing Research, 37,* 760-768.

Burke, W.T. (1978). *The development of a technique for assessing the stresses experienced by parents of younger children*. Unpublished doctoral dissertation, University of Virginia.

Burklow, K.A., Phelps, A.N., Schultz, J.R., McConnell, K., & Rudolph, C. (1998).  Classifying complex pediatric feeding disorders. *Journal of Pediatric Gastroenterology and Nutrition, 27*, 143-147.

Cadman, D., Boyle, M., Szatmari, P., & Offord, D. R. (1987). Chronic illness, disability, and mental and social well-being: findings of the Ontario child health study. *Pediatrics, 79*, 805-813.

Cadman, D., Rosenbaum, P, Boyle, M, & Offord, D.R. (1991). Children with Chronic Illness: Family and Parent Demographic Characteristics and Psychosocial Adjustment. *Pediatrics,* 87, 884-889.

Chatoor, I.  (2002). Feeding disorders in infants and toddlers: diagnosis and treatment.  *Child Adolescent Psychiatry Clinical North America*, *11*, 163-183.

Chatoor, I., Ganiban, J., Harrison, J., Hirsch, R., Borman-Spurrell, A., & Mazek, D. (2000). Maternal characteristics and toddler temperament in infantile anorexia. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 743-751.

Chatoor, I., Ganiban, J., Colin, V, Plummer, N., & Harmon, R. (1998). Attachment and feeding problems: a reexamination of nonorgainc failure to thrive and attachment insecurity. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 1217-1224.

Chatoor, I., Ganiban, J., Surles, J., & Doussard-Roosevelt, J. (2004). Physiological regulation and infantile anorexia: a pilot study. *Journal of American Academy of Child and Adolescent Psychiatry, 43*, 1019-1025.

Craske, M.G. (Eds.). (1999). *Anxiety Disorders: Psychological Approaches to Theory and Treatment*. New York: Westview Press.

Denham, S.A. (1986). Social cognition, prosocial behavior, and emotion in preschoolers: contextual validation. *Child Development, 57*, 194-201.

De Vente, W., Olff, M., Amsterdam, J. G., Kamphuis, J. H. & Emmelkamp, P. M. (2003). Physiological differences between burnout patients and healthy controls: blood pressure, heart rate and cortisol responses. *Occupational Environmental Medicine, 60,* 54-61.

Didehbani, N., (2006). *Parental influence on pediatric feeding disorders*. Unpublished master's thesis, University of North Texas, Denton, Texas.

Ennis, M., Kelly, K. S., & Lambert, P. L. (2001). Sex differences in cortisol excretion during anticipation of a psychological stressor: possible support for the tend-and-befriend hypothsis. *Stress and Health, 17*, 253-261.

Feldman,R., Keren, M., Gross-Rozval, O., & Tyano, S. (2004). Mother-child touch patterns in infant feeding disorders: relation to maternal, child, and environmental factors. *Journal of the American Academy of Child and Adolescent Psychiatry*, *43*, 1089-1097.

Flinn, M.V & England, B.G. (1995). Childhood stress and family environment. *Current Anthropology*, 36, 854-866.

Franklin, L. & Rodger, S. (2003). Parents' perspectives on feeding medically compromised children: implications for occupational therapy. *Australian Occupational Therapy Journal, 50,* 137-147.

Goldberg, S., Corter, C., Lojkasek, M., & Minde, K. (1991). Prediction of behavior problems in four-year-olds born prematurely. *Annual Progress in Child Psychiatry and Child Development*, 92-113.

Graves, J., Ware, M. (1990). Parents and health professionals' perceptions concerning parental stress during a child's hospitalization. *Child Health Care*, *19*, 37-42.

Greer, A.J., Gulotta, C.S., Masler, E.A., & Laud, R.B. (2008). Caregiver stress and outcomes of children with pediatric feeding disorders treated in an intensive interdisciplinary program. *Journal of Pediatric Psychology, 33*, 612-620.

Gulotta, C.S., Piazza, C.C., Patel, M.R., & Layer, S.A. (2005). Using food redistribution to reduce packing in children with severe food refusal. *Journal of Applied Behavioral Analysis*, *38*, 39-50.

Hadadian, A. & Merbler, J. (1996). Mother's stress: implications for attachment relationships. *Early Child Development and Care*, *125*, 59-66.

Harrell, E.H., Kelly, K., Stutts, W.A. (1996). Situational determinants of correlations between serum cortisol and self-reported stress measures. *Psychology and Education: An Interdisciplinary Journal*, *33*, 22-25

Hayakawa, M., Okumura, A., Hayakawa, F., Kato, Y., Ohshiro, M., Tauchi, N., & Watanabe, K. (2003). Nutritional state and growth and functional maturation of the brain in extremely low birth weight infants. *Pediatrics, 111*, 991-995.

Kafetsios, K., (2002). Attachment and emotional intelligence abilities across the life course. *Personality and Individual Differences*, *37*, 129-145.

Kirschbaum, C., & Hellhamer, D. H. (1994). Salivary cortisol in psychoneuroendocrine research: recent developments and applications. *Psychoneuroendocrinology, 19,* 313-333.

Klassen, A. Lee, S., Rain, P., & Lisonkova, S., (2004). Psychological health of family caregiver of children admitted at birth to a NICU and healthy children: a population-based cross-sectional survey. *BMC Pediatrics*, *24*, 1-11.

Krantz, G., Forsman, M., & Lundberg, U. (2004). Consistency in physiological stress response and electromyographic activity during induced stress exposure in women and men. *Integrative Physiological & Behavioral Science*, *39*, 105-118.

Kurina, L.M., Schneider, B., & Waite, L. J., (2004). Stress, symptoms of depression and anxiety, and cortisol patterns in working parents. *Stress and Health*, *20*, 53-63.

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York: Springer.

Lewin, A. B., Storch, E. A., Silverstein, J. H., Baumester, A. L., Strawser, M. S., & Gerrken, G. R., (2005). Validation of the pediatric inventory for parents in mothers of children with type 1 diabetes: an examination of parenting, stress, anxiety, and childhood psychopathology. *Families Systems & Health*, *23*, 56-65.

Linscheid, T.R., (2006). Behavioral treatment for pediatric feeding disorders. *Behavior Modification*, *30*, 6-23.

Lindberg, L., Bohlin, G., & Hagekull, B. (1991). Early feeding problems in a normal population. *International Journal of Eating Disorders, 10*, 395-405.

Magnano, C. L., Diamond, E. J., & Gardner, J. M. (1989). Use of salivary cortisol measurements in young infants: a note of caution. *Child Development*, *60*, 1099-1101.

McCollum, A.T., & Gibson, L.E. (1970). Family adaptation to the child with cystic fibrosis. *Journal of Pediatrics*, *77*, 571-580.

Melnyk, B., Alpert-Gillis, L., Feinstein, F., Crean, H., Johnson, J., Fairbanks, E., Small, L. Rubenstein, J., Slota, M., & Corbo-Richert, B. (2004). Creating opportunities for parent empowerment: program effects on the mental health/coping outcomes of critically ill young children and their mothers. *Pediatrics, 113*, 597-607.

Miller, K. L. (Eds.). (2006). *Principles of Everyday Behavioral Analysis.* Belmont: Thomson Wadsworth.

Moore, P.S., Whaley, S.E., & Sigman, M., (2004). Interactions between mothers and children: impacts of maternal and child anxiety. *Journal of Abnormal Psychology*, *113*, 471-476.

Mueller, M.M., Piazza, C.C., Moore, J.W., Kelley, M.E., Bethke, S.A., Pruett, A.E., Overdorff, A.J., & Layer, S.A. (2003). Training parents to implement pediatric feeding protocols. *Journal of Applied Behavior Analysis*, *36*, 545-562.

Patel, M.R., Piazza, C.C., Layer, S.A., Coleman, R., & Swartzwelder, M. (2005). A systematic evaluation of food textures to decrease packing and increase oral intake in children with pediatric feeding disorders. *Journal of Applied Behavior Analysis*, *38*, 89-100.

Patel, M.R., Piazza, C.C., Santana, C.M., & Volkert, M. (2002). An evaluation of food type and texture in the treatment of a feeding problem. *Journal of Applied Behavior Analysis*, *35*, 183-186.

Pederson, S.D., Parsons, H.G., Dewey, D. (2004). Stress levels experienced by the parents of enternally fed children. *Child: Care, Health & Development*, *30,* 507-513.

Piira, T., Sugiura, T., Champion, G.D., Donnelly, N., Cole, A.S.J. (2204). The role of parental presence in the context of children's medical procedures: a systematic review. *Child Care, Health, and Development*, *31*, 233-243.

Polan, H., & Ward M. (1994). Role of the mother's touch in failure to thrive; a preliminary investigation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 33, 1090-1105.

Raina, P., O'Donnell, M., Schwellnus, H., Roenbaum, R., Kinh, G., Brehaut, J., et al. (2004). Caregiving process and caregiver burden: conceptual models to guide research and practice. *BMC Pediatrics*, *4*, 1-13.

Rasmussen, L. S., O'Brien, J. T., Silverstein, J. H., Johnson, T. W., Siersma, V. D., Canet, J.T., et al. (2005). Is peri-operative cortisol secretion related to post-operative cognitive dysfunction? *Acta Anaesthesiologica Scandinavica, 49*, 1225-1231.

Roberts, W. L. (1989). Parents' stressful live events and social networks: relations with parenting and children's competence. *Canadian Journal of Behavioral Science*, *21*, 132-146.

Rosenbaum, J.F., Biederman, J., Gersten, M., Hirshfeld, D. R., Meminger, S.R., Herman, J.B., et al. (1988). Behavioral inhibition in children of parents with panic disorder and agoraphobia. a controlled study. *Archives of General Psychology*, *45*, 463-470.

Rosenbaum, M., & Ronen, T. (1997). Parent's and children's appraisals of each other's anxiety while facing a common threat. *Journal Clinical Child Psychology, 26,* 43-52.

Salovey, P., &Mayer, J.D. (1990). Emotional intelligence. *Imagination, Cognition, and Personality*, *9*, 185-211.

Saylor, C. F., Boyce, G. C., & Price, C. (2003). Early predictors of school-age behavior problems and social skills in children with intraventricular hemorrhage (IVH) and/or extremely low birthweight (ELBW). *Child Psychiatry and Human Development*, *33*, 175-192.

Schore, A. N. (2001). Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal, 22,* 7-66.

Simpson, C., Schanler, R.J., Lau, C. (2002). Early introduction of oral feeding in preterm infants. *Peidatrics*, *110*, 517-522.

Solomon, C.R., & Breton, J.J., (1999). Early warning signals in relationships between parents and young children with cystic fibrosis. *Children's Health Care*, *28*, 221-240.

Spielberger, C. D., & Vagg, P. R. (1984). Psychometric properties of the STAI: a reply to Ramanaiah, Franzen, and Schill. *Journal of Personality Assessment*, *48*, 95-97.

Stark, K .D., Humphrey, L. L., Crook, K., & Lewis, K. (1990). Perceived family environments of depressed and anxious children; child's and maternal figure's perspectives. *Journal of Abnormal Child Psychology*, *18*, 527-547.

Streisand, R., Braniecki, S., Tercyak, K.P., & Kazak, A.E. (2001). Childhood illness-related parenting stress: the pediatric inventory for parents. *Journal of Pediatric Psychology*, *26*, 155-162.

Tarbell, M. C. & Allaire, J.H., (2002). Children with feeding tube dependency: treating the whole child. *Infants & Young Children: An Interdisciplinary Journal of Special Care Practices*, *15*, 29-41.

Weekes, N., Lewis, R., Patel, F., Garrison-Jakel, J., Berger, D. E., & Lupien, S. J., (2006). Examination stress as an ecological inducer of cortisol and psychological response to stress in undergraduate students. *Stress*, *9,* 199-206.

Werle, M.A., Murphy, T.B., & Budd, K.S. (1993). Treating chronic food refusal in young children: home-based parent training. *Journal of Applied Behavior Analysis*, *26*, 421-433.

West, A. E., & Newman, D. L. (2003). Worried and blue: mild parental anxiety and depression in relation to the development of young children's temperament and behavior problems. *Parenting: Science and Practice*, *3*, 133-154.

Whaley, S. E., Pinto, A., & Sigman, M. (1999). Characterizing interactions between anxious mothers and their children. *Journal of Consulting and Clinical Psychology*, *67*, 826-836.

Wood, J., McLeod, B., Sigman, M., Hwang, W., & Chu, B. (2003). Parenting and childhood anxiety: theory, empirical findings, and future directions. *Journal of Child Psychology and Psychiatry, 44,* 134-151.

Woodruff-Borden, J., Morrow, C., Bourland, S., & Cambron, S. (2002). The behavior of anxious parents: examining mechanisms of transmission of anxiety from parent to child. *Journal of Clinical Child and Adolescent Psychology, 31,* 364-374.