THE EFFECTS OF MATERNAL PSYCHOSOCIAL FACTORS ON MATERNAL COMPETENCE FOR INFANT FEEDING

By

Sharon Karp

Dissertation

Submitted to the Faculty of the

Graduate School of Vanderbilt University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in

Nursing Science

May, 2008

Nashville, Tennessee

Approved:

Professor Melanie Lutenbacher

Professor Vaughn Sinclair

Professor Patricia Temple

Professor Joseph Hepworth

Professor Sharon Barton

ACKNOWLEDGEMENTS

It is very hard to begin to appropriately thank all of those who helped me throughout my graduate work. First and foremost, I have to thank Dr. Melanie Lutenbacher, my advisor and chair. I would not have reached the end of this process without her support and encouragement. She has been both a mentor and friend and taught me much about being a nurse and a researcher. I owe a great deal of who I am as a professional to her influence. To the members of my committee, Drs. Barton, Hepworth, Sinclair, and Temple, I thank you for your enthusiasm and support of my work. I could not have asked for a better group of researchers to learn from.

I also would like to thank the faculty and staff of the School of Nursing who have been continually supportive throughout my coursework and dissertation process. I would like to thank the Vanderbilt Iota Chapter of Sigma Theta Tau International for financial support of this project. I would also like to send a special thanks to the staff, nurses, and doctors of the Vanderbilt Pediatric Continuity Clinic and the East WIC clinic. For their welcome acceptance of me into their space and allowing me to spend my days recruiting their patients, I am immensely grateful. I would like to especially thank my classmates, Haley Hoy and Hongxia Liu, for their support. To Haley, I would like to extend an additional thanks for her sense of the hilarious and keeping me laughing during this arduous task. A special thank you goes to Terrah Foster for being a “partner in crime” as we both sought our paths, and livelihood, as nurse researchers.

To my family, I owe a tremendous thank you for their support, encouragement, and time. My siblings, their spouses, my niece, and my nephews have provided me with such support, encouragement, and happy diversion. To my parents, I thank you for your life-long love, support, and guidance. To my mother, I am especially indebted, as this document would never have really come together if it was not for her phenomenal editing and formatting. Thanks to all.

TABLE OF CONTENTS

Page

ACKNOWLEDGMENTS iii

LIST OF TABLES vii

LIST OF FIGURES x

Chapter

I. INTRODUCTION 1

II. REVIEW OF LITERATURE 10

Infant Feeding Practices 11
Maternal Role Competence 18
Theoretical Foundations of MRA/MRC 21
Conceptual Definitions of MRC/MRA 22
Measures of MRC/MRA 26
Characteristics and Outcomes of MRC Literature 34
Summary of Maternal Role Competence Literature 42
Review of Key Factors Related to Maternal Competence and Infant Feeding Practices 44
Age and Developmental Status of the Mother 45
Social Support 51
Depressive Symptoms and Self-Esteem 58
Summary 66
Conclusion 70

III. RESEARCH DESIGN AND METHODS 75

Research Questions and Hypotheses 75
Research Design 76
Setting and Sample 77
Procedures 79
Measures 80
Data Analysis 93

IV. FINDINGS 95

Introduction 95
Sample Characteristics 95
Overview of Infant Feeding Practices 99
Infant Feeding Knowledge Score 111
Infant Feeding Practice Score 114
Assessment of Infant Feeding Attitudes 116
Assessment of Maternal Psychosocial Factors 118
Relationship of Variables of Interest in Identified Research Questions 122
Research Question # 1 124
Research Question # 2 128
Research Question # 3 130
Additional Relationship of Interest 135
Relationship to Maternal Age 135
Ancillary Analyses 137
Analysis of Differences between Racial Groups 137
Analysis of Differences in Women Who Breastfed and Those Who Did Not Breastfed 138
Analysis of Specific Infant Feeding Practices 139
Analysis of Differences between Mothers Based on Interview Location 141
Multivariate Analysis 142
Enter Method Regression Models 143
Step-wise Method Regression Models 146

V. DISCUSSION 149

Infant Feeding Practices 149
Infant Feeding Attitudes 152
Psychosocial Variables 153
Predictors of Infant Feeding Knowledge, Attitudes, and Skills 156
Study Strengths and Limitations 161
Clinical Implications 163
Future Research 164

Appendix

A. TOOLS TO ASSESS MRC OR SIMILAR CONSTRUCT 166

B ADOLESCENT INFANT FEEDING QUESTIONNAIRE 168

REFERENCES 177

LIST OF TABLES

Table		Page
1.	Psychosocial measures	87
2.	Infant feeding questionnaire subscales	90
3.	Knowledge and practice scores of infant feeding	93
4.	Maternal characteristics	97
5.	Infant profile	99
6.	Recommended infant feeding practices	100
7.	Type of initial infant feeding	101
8.	Amount of formula/milk intake a day by age group	103
9.	Infant intake of juice in a day	104
10.	Infant intake of water in a day	104
11.	Daily liquid Intake in ounces	105
12.	Age when given cereal in a bottle	106
13.	Cereal as first food offered	106
14.	Age in months when given solid food	107
15.	Servings of fruits and vegetables a day	107
16.	Servings of fruits and vegetables a day, by age group	109
17.	Influential person related to infant feeding	111
18.	Report of individual knowledge questions used to calculate total practice score	113
19.	Range of knowledge scores	114

20. Report of individual feeding practices used to calculate total practice score 115

21. Range of practice scores 116

22. Knowledge and practice scores of infant feeding..... 116

23. Infant feeding practices subscales of maternal attitudes related to feeding..... 118

24. Maternal psychosocial measures..... 121

25. Psychosocial variables and measures of task specific maternal competence-attitudes..... 126

26. Psychosocial variables and infant feeding knowledge and skills 128

27. Correlations of psychosocial variables and general maternal competence 129

28. Relationship of maternal age 136

29. Relationship of maternal age to variables of interest 136

30. Difference between African-American and Non African-American women 138

31. Difference between mothers who breastfed or not 139

32. Differences between mothers based on amount of water given in a day..... 140

33. Difference between mothers and TV watching while feeding..... 141

34. Difference between mothers interviewed at Vanderbilt versus WIC clinic 142

35. Multiple regression predicting maternal concern for infant hunger..... 144

36. Multiple regression predicting maternal awareness of infant hunger cues 144

37. Multiple regression predicting maternal concern for infant overeating 145

38. Multiple regression predicting maternal sense of competence 145

39. Step wise multiple regression predicting maternal concern for infant hunger 147

40. Step wise multiple regression predicting maternal awareness of infant hunger cues 147

41. Step wise multiple regression predicting maternal concern for infant overeating 148

42. Step wise multiple regression predicting maternal sense of competence 148

LIST OF FIGURES

Figure		Page
1.	Conceptual framework of relationship of maternal psychosocial factors to maternal competence for infant feeding.	9
2.	Maternal BMI distribution	98
3.	Significant factors correlated with Infant feeding attitudes	131
4.	Significant factor correlated with knowledge of infant feeding	133
5.	Significant factors correlated with skills relate to infant feeding	133
6.	Significant factors correlated with general mate rnal role competence	134
7.	Relationship of general maternal competence to task specific measures of competence	134

CHAPTER I

INTRODUCTION

The exponential rise in overweight children over the past four decades has culminated into our present national obesity epidemic (CDC, 2003a; Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006). The foods that mothers choose to feed their infants coupled with the manner in which they feed their infants develop the foundation for food consumption throughout life (Bronner, Gross, Caulfield, Bentley, & Kessler, et al., 1999; Savage, Fisher, & Birch, 2007). And yet, attempts to promote healthy eating and prevent obesity in children, particularly in infancy, are few and obsolete (Piscano, Lichter, Ritter, & Siegal, 1978).

Obesity is generally defined as an excess of body fat or adipose tissue that frequently results in significant impairment in health (Burton, Foster, Hirsch, & Van Itallie, 1985). New definitions from the Centers for Disease Control and Prevention (2003b) identify *overweight* for the pediatric population as a Body Mass Index (BMI) at or above the sex-and age-specific 95th percentile mark on the 2000 CDC standardized growth charts and *at-risk for overweight* as being at or above the 85th percentile. The term obese is no longer used to describe the pediatric population because of the dynamic nature of children's growth and the desire to not label children unnecessarily. BMI is commonly used to define overweight and obesity in both pediatric and adult populations because it

correlates well with more accurate measures of body adiposity and obesity-related comorbid conditions (AAP, 2003).

National data collected in 2004 have shown that 33.6% of children aged 2 to 19 years old have a Body Mass Index at or above the 85th percentile, while 17.1% have a BMI at or above the 95th percentile, on the 2000 CDC standardized growth charts (Ogden, et al., 2006). Of children aged 2 to 5 years old, 13.9% are at or above the 95th percentile on the BMI chart, with 18.8% of 6 to 11 year olds and 17.4% of 12 to 19 year olds also classified as overweight (Ogden et al.). Data from the National Health and Nutritional Examination Survey (NHANES) have shown differences across both gender and racial lines. Among young girls, aged 2 to 5 years, 10.0% of Non-Hispanic whites are overweight, with 16.3% of non-Hispanic blacks being overweight and 15.1% of Mexican American girls being considered overweight. For 2 to 5 year old boys the numbers for each group are 13%, 9.7%, and 23.2% respectively (Ogden et al.).

The financial impact of overweight and obesity on America's healthcare system is considerable. It is estimated that $100 billion a year is spent in the U.S. alone to treat the physical and mental health consequences of obesity (MacKenzie, 2000). Allison, Zannoli, and Narayan's (1999) study reported that 5.7% of healthcare costs in the United States, or approximately $52 billion annually, are spent on the care of patients with conditions attributable to obesity. Estimates attribute $127 million of annual spending on hospital care in the U.S. to the pediatric overweight population (Ebbeling, Pawlak, & Ludwig, 2002).

What and how mothers feed their young children has enormous health

implications. Health problems such as hypertension, Type 2 diabetes mellitus, asthma, dsylipidemias, and sleep disorders have been linked to being overweight (Covington et al., 2001; Betz, 2000; Ebbeling, et al., 2002; MacKenzie, 2000; Valente et al., 2001). Other childhood consequences of being overweight include decreased self-esteem, loneliness, nervousness, and high risk behaviors. Often, overweight children are stereotyped, teased, and ostracized (Ebbeling et al.).

Infant feeding practices such as excessive juice intake and bottle use after one year of age have been associated with an increased risk for obesity (Bonuck & Kahn, 2002) while allowing a child to consume excessive amounts of juice has also been linked to an increased risk for nonorganic failure to thrive and short stature, (Dennison, Rockwell, & Baker, 1998; Smith & Lefshitz, 1994). In a pattern similar to the majority of American adults, children do not consume a proper amount of fruits and vegetables and consume too much fat and sugar (Dennison et al.; Fox, Pac, Devaney, & Jankowski, 2004). These patterns and other inappropriate feeding practices predispose children to poor eating habits and the risk of obesity and other health problems throughout their life.

Choices that mothers make related to the feeding of their infants include the decision to breastfeed, when to initiate solid foods, the amount and type of solid foods, juices and other non-milk substances a child is given, and the use of bottles and feeders. Although there is a general understanding of many of the sociodemographic characteristics (e.g., age of the mother) that are related to infant feeding practices, scant information is available about the personal factors of mothers that may influence their decisions about what and how to feed their

children and which factors may be malleable to intervention. Therefore this is an important area for further research. Understanding the variables that influence the care a mother provides to her infant may better inform clinicians and developers of interventions to promote healthy eating habits for infants.

Parenting is a demanding job for all mothers but adolescent mothers are a sub-group of mothers that are more likely to be challenged by the physical, emotional, and cognitive demands of their infant and the problem solving skills required to care for their children (Secco et al., 2002; Secco & Moffatt, 2003). Their challenges with parenting are often associated with their own developmental immaturity and developmental needs that may conflict with their infants' needs, and a lack of knowledge about child growth and development (Koniak-Griffin, 1993; Koniak-Griffin, Logsdon, Hines-Martin, & Turner, 2006). Adolescent mothers may hold different beliefs about ideal mothering behaviors than older mothers. For example, one sample of adolescent mothers identified keeping the baby clean as a characteristic of an ideal mother, compared to comforting and nurturing the infant, which was identified by older mothers (Mercer, 1985).

As a group, adolescent mothers breastfeed less often, initiate solid foods sooner, and feed their children less nutritious foods than older mothers (Bronner et al., 1999; Carruth, Nevling, & Skinner, 1997; Dennis, 2002; Libbus & Kolostov, 1994; Parraga, Weber, Engel, & Reeb, 1988; Solem, Norr, & Gallo, 1992; Spear, 2006; Winkelstein, 1984). Adolescent mothers have less knowledge of nutrition and infant developmental milestones related to eating and they tend to rely on

their own mothers for information about feeding their children (Bentley et al., 1999; Black, Siegel, Abel, & Bentley, 2001, Carruth et al.; Winkelstein). The tendency towards a higher prevalence of preterm deliveries and low birth weight infants, especially those weighing less than 1500 grams, which is considered very low birth weight, (Martin, Hamilton, Ventura, Menacker, Park, & Sutton, 2002) also complicates the adolescent mother's care for her child. Depending on their condition (e.g., low birth weight, gestational age), many preterm infants require special feedings and introduction of solid foods at an appropriate adjusted age, as well as close monitoring of their growth (Ritchie, 2002).

Feeding is a considerable portion of the daily care that mothers provide to their infants and is frequently cited as an area of maternal concern (Bowman, 2005; Pridham, Saxe, & Limbo, 2004; Virden, 1988). A new mother may question her decisions related to feeding and her own ability to feed her infant. Often, a new mother's perception of her success in feeding her baby becomes a reflection of her overall competence as a mother. Many mothers believe that their mothering skills are reflected in the appearance of their infant. A heavy infant is identified as a healthy infant, the result of successful parenting and feeding.

A woman's perceived level of competence as a mother, along with her knowledge and skill levels and the attitudes she holds about certain parenting practices (e.g., infant feeding) are important factors in determining the success of her parenting efforts. Nursing research has identified factors that may contribute to a woman's subjective feelings of competence or comfort in her role as mother,

such as age, parity, and psychological mood (Flagler, 1988; Mercer, 1985; Mercer & Ferketich, 1994; Rutledge & Pridham, 1987; Secco, Ateah, Woodgate, & Moffatt, 2002; Walker, Crain, & Thompson, 1986b; Warren, 2005). Research has not clearly identified how these feelings may relate to actual parenting practices, such as infant feeding. A clearer understanding of these factors is needed to further nursing research and practice. Nursing has the potential to have a central role in working with parents to prevent and effectively manage issues related to their children's care, especially their children's nutrition and control over their weight. An understanding of factors that influence these processes is critical in identifying malleable points for clinical intervention. Four factors have emerged from the literature review as possible influences on maternal parenting: maternal age, the level of maternal depressive symptoms, self-esteem, and social support.

Psychosocial factors, such as the level of social support a new mother has, her age, or depressive symptoms can influence her perceptions of competence as a mother and thus, the care that she provides to her infant (Dormire, Srauss, & Clarke, 1988; Lesser, Koniak-Griffin, & Anderson, 1999; Mercer & Ferketich, 1994). Young mothers may develop perceptions of competence from inaccurate self-assessments of their own knowledge, ability, and skills related to caring for their infant.

Family support can have considerable influence on how mothers view themselves and the decisions that they make in the care of their infants. For example, in relation to infant feeding practices, family support has been shown to

have a significant influence on the decision to breastfeed and the timing of introduction of solid foods (Bentley et al., 1999; Kaufman & Hall, 1989). Multi-generational parenting is noted repeatedly throughout the literature, especially among young African-American mothers, and should be considered in evaluation of the development of parenting beliefs and practices (Bentley, et al., 1999; Koniak-Griffin et al., 2006; Underwood, et al., 1997).

Psychological mood (e.g., depressive symptoms) is noted to influence a wide range of maternal and infant outcomes by adversely influencing a women's ability to care for her infant (Logsdon, Wisner, Pinto-Foltz, 2006). Maternal depression is not only linked to lower perceptions of maternal competence (Mercer & Ferketich, 1994), but also child maltreatment, poor infant cognitive development (Beck, 1998; Chung, McCullum, Elo, Lee, & Culhane, 2004) and unsafe parenting practices, such as not using car seats (McLennan & Kotelchuck, 2000). Research has shown a link between postpartum depression and failure to thrive in developing South Asian countries (Patel, DeSouza, & Rodrigues, 2003). Among American women, more recent work has found that mothers with depressive symptoms, at two and four months postpartum, had reduced odds of continuing to breastfeed, playing with the infant, and talking to the infant. It is also reported that mothers with higher depressive symptoms have increased odds of engaging in less than optimal newborn feeding practices (i.e., giving cereal, water, or juice), although regression models were not statistically significant (McLearn, Minokovitz, Strobino, Marks, & Hou, 2006).

From review of the literature, there is a general understanding of how

maternal psychosocial factors influence general feelings of maternal competence and some parenting behaviors, although it is unclear how these psychosocial factors and a woman's feelings of competence interact to influence actual knowledge, attitudes, and skills related to specific parenting behaviors (i.e., infant feeding practices). Understanding personal maternal factors that may impact maternal feeding practices, and in turn, children's weight is needed to further nursing research and practice. The overall purpose of this study is to examine the relationship between psychosocial factors and maternal competence for infant feeding in a sample of first-time adolescent mothers. The main study research questions are:

1. What is the relationship between maternal psychosocial factors and maternal competence for infant feeding?
2. What is the relationship of maternal psychosocial factors and general maternal competence?
3. What is the relationship between general maternal competence and maternal competence for infant feeding?

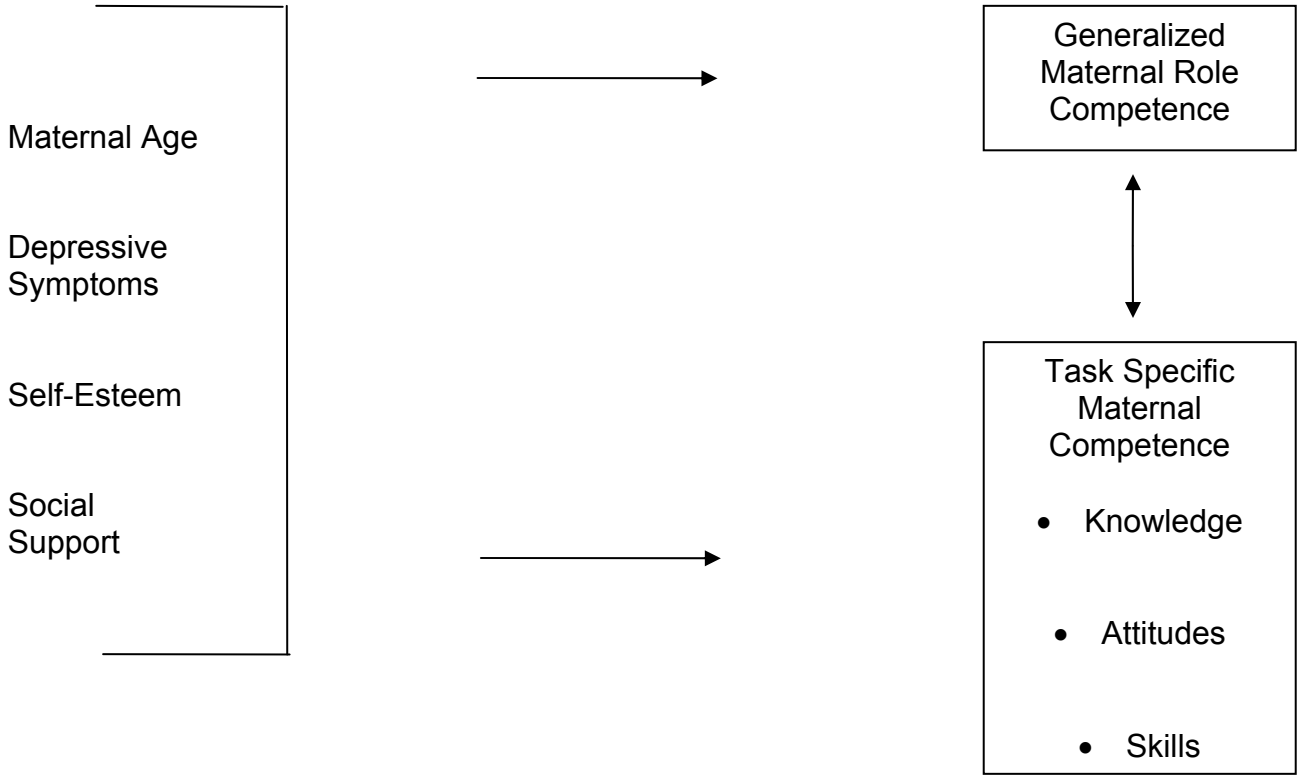

Figure 1. Conceptual framework of relationship of maternal psychosocial factors to maternal competence for infant feeding.

CHAPTER II

REVIEW OF LITERATURE

This chapter presents a critical review and analysis of literature pertinent to the development of the conceptual framework used to guide this study. The specific purpose of this project was to assess the relationship of maternal psychosocial factors and measures of maternal competence and their effect on infant feeding practices. Maternal Role Attainment Theory (MRA) was used as a reference to identify important variables and their relationships in order to help develop the conceptual framework for this project. The concept of maternal role competence (MRC) emerged as a key variable of interest, particularly in relationship to the idea of competence for infant feeding. Literature related to the theory of maternal role attainment or the concept of maternal role competence was used to evaluate how previous researchers had conceptualized and operationalized the concept of MRC. Further review of the literature related to adolescent mothers and infant feeding practices then guided the development of the framework (See Figure 1). This project was focused on determining how maternal psychosocial factors (i.e., social support, depressive symptoms, and self-esteem) influence both an adolescent mother's sense of competence for the task of infant feeding (defined as a mother's knowledge, attitudes, and skills related to infant feeding) and her general feelings of overall competence as a mother. A mother's perceptions of both general competence and task specific

competence for infant feeding are hypothesized to influence actual infant feeding practices.

Infant Feeding Practices

To provide a context for the conceptual framework, a more extensive review of literature related to infant feeding practices, specifically maternal knowledge, attitudes, and skills related to infant feeding, is presented. Choices that mothers make related to the feeding of their infants can include the decision to breastfeed, when to initiate solid foods, the amount and type of solid foods, juices and other non-milk substances a child is given, and the use of bottles and feeders. A mother's decision to breastfeed has numerous health benefits for the child. Breastmilk provides an ideal balance of nutrients for babies and has been found to have factors that promote brain growth and cognition, which enhances intellectual and visual development. Breastmilk provides immunologic protection to infants and protection against certain infectious agents, allergic diseases, sudden infant death syndrome, and diabetes (Landers, 2003). The AAP (2005) has recommended that breastmilk, with rare exceptions, be the preferred feeding for all infants. *Healthy People 2010* also has set the goal of increasing the proportion of mothers who breastfeed their infants to 75% in the early postpartum period, 50% at 6 months, and 25% at 1 year of age (Li, Zhao, Mokdad, Barker, & Grummer-Strawn, 2003).

Recent research findings suggest that breastfeeding is protective against the development of obesity (Bergmann, et al., 2003; Ebbeling, et al., 2002;

Gillman, 2002). These findings may be related to chemical differences in breast milk compared to infant formula. Other researchers believe that breastfed infants learn better self-control over their eating habits, leading to less caloric intake (Ebbeling et al.). An additional hypothesis to explain the protective nature of breastfeeding and the risk for the development of obesity is that mothers who breastfeed may have feeding styles that are less controlling and more responsive to infant cues of hunger and satiety (Taveras, Scanlon, Birch, Rifas-Shiman, Rich-Edwards, & Gillman, 2004). Taveras and colleagues found that the longer mothers reported breastfeeding, the less likely they were to restrict their child's food intake. This finding is significant because studies have found that parental control over a child's eating habits is linked to the development of childhood obesity (Birch & Fisher, 1998; Johnson & Birch, 1994).

The American Academy of Pediatrics (AAP) (2003) recommends that infants not be fed solid foods until 4 to 6 months of age. By introducing foods early, mothers may be encouraging overfeeding and establishing unsound food habits (Parraga et al., 1988). The effects of early introduction of foods on children's weight is inconclusive; however, it is known that for younger infants (i.e., those under one year of age) solid foods substitute, but do not adequately replace, nutrients from breastmilk and formula (Mehta, Specker, Bartholmey, Giddens, & Ho, 1998), putting children at risk for malnourishment.

Inappropriate infant feeding practices, such as overfeeding of formula and non-milk liquids and the early initiation of solid foods, are often the result of mothers' lack of knowledge and skills related to infant feeding practices.

Furthermore, maternal attitudes related to food and weight can have considerable influence on mothers' infant feeding practices. Mothers who are less aware of infant nutritional requirements have been found to be more likely to introduce solid foods earlier than recommended and to overfeed their children (Winkelstein, 1984). In addition, research has found that many mothers report their infants meeting developmental milestones required for feeding (i.e., able to hold a cup or spoon, sitting in a chair) sooner than generally accepted normal ages (Carruth, et al., 1997). While this finding is not directly related to inappropriate infant practices, it can be used to explain why many mothers think their behavior is appropriate and believe that their infants are ready to eat solid foods, despite professional recommendations against the early introduction of foods. This lack of knowledge related to infant nutrition, feeding, and development can influence mothers' actual skills and abilities related to infant feeding. To appropriately feed their children, mothers have to not only be able to identify healthy choices for their children; they also have to be able to feed their children a balanced and nutritious diet. Studies have found that mothers routinely overfeed their infants and have difficulty providing a balanced amount of calories and nutrients (Carruth et al.; Devaney, Ziegler, Pac, Karwe, & Barr, 2004; Skinner, Ziegler, Pac, & Devaney, 2004; Winkelstein). In one descriptive study, over 50% of infants were routinely fed more than 125% of the Recommended Daily Dietary Allowance (RDA) of calories (Winkelstein). Overall, these studies show that many mothers lack the skills to provide nutritious balanced meals to their children.

Maternal attitudes related to infant feeding can vary from what constitutes a healthy child, to what are appropriate foods to feed a child. A mother's attitudes regarding infant feeding practices can be influenced by a wide variety of variables. A woman's knowledge, social support network, and culture can all affect her views regarding how and what she feeds her children. The home and family environment that a mother lives in, especially a young mother, can have a substantial effect on her attitudes related to what and how she should feed her infant.

Despite recognition of breastfeeding as superior to formula-feeding, many women consider themselves incapable of breastfeeding, questioning their own ability to maintain a healthy balanced diet for themselves, which they see as necessary to breastfeed (Gabriel, Gabriel, & Lawrence, 1986; Hannon, Willis, Bishop-Townsend, Martinez, & Scrimshaw, 2000). Research also has shown that even if mothers are knowledgeable about breastfeeding and believe it is the best way to feed an infant, many still choose not to breastfeed (Gabriel, Gabriel, & Lawrence, 1986; Hannon, et al.; Underwood et al. 1997). Many women report they dislike the idea of breastfeeding, citing embarrassment, fear of pain, and limitations on freedom as reasons against it (as cited in Losch, Dungy, Russell, & Dusdieker, 1995; Hannon et al.).

The influence of culture is viewed by many to be an important variable in the development of maternal attitudes related to infant feeding practices (Hodes, Jones, & Davies, 1996; Kannan, Carruth, & Skinner, 1999). Within much of the literature related to infant feeding practices, poverty and minority status are

commonly used as measures to identify the cultural context of a mother's life. Attempts within the literature to evaluate the cultural influences on maternal infant feeding practices have primarily focused on the beliefs and practices of low-income, ethnic minority women (Baughcum, Burklow, Deeks, Powers, & Whitaker et al., 1998; Bentley, et al., 1999; Underwood, et al., 1997). Among populations of low-income, inner city African-American women, practices such as adding cereal to very young infants' bottle and not following formula preparation guidelines, such as adding three times the recommended amount of powder to the infants' bottles, are noted in the literature as evidence of cultural influences. Both of these behaviors appear to be in response to a cultural belief that infant formula is insufficient nourishment for an infant to grow properly (Bentley et al.; Underwood et al.). Mothers report that their feeding practices are learned from family members and others within their community, and they are unaware their feeding practices may be potentially harmful to their children (Underwood et al.).

Qualitative research has found that many mothers believe a "bigger infant is a better infant" (Baughcum, et al., 1998, p. 1011), that higher weight is seen as benign or a sign of health (Heinig, et al., 2006), and solid or big-boned children and adults are a cultural ideal (Jain et al., 2001), possibly explaining the frequent overfeeding of infants. Research shows that low-income mothers report not trusting or believing in standardized charts that define overweight and obesity; they believe that a child's growth is predestined and attributed to an inherited metabolism, and that it is difficult to limit or structure a child's eating. Maternal decisions related to the timing of food introduction and food choices appear to be

related to convenience and the mother's personal preference for foods, rather than choosing foods that are appropriate for the child (Baughcum, et al.). Mothers of low SES status also report being proud to be able to buy snacks and treats for their children (Jain et al.). Being able to feed a child the amount and types of food that are desired by the child fits a cultural perception of being a good parent.

Using the findings from their qualitative work, Baughcum et al., (2001) developed the Infant Feeding Questionnaire (IFQ) to assess maternal attitudes and behaviors related to infant feeding. The scale was initially piloted with a sample of adult women from diverse socioeconomic backgrounds to investigate the relationship of maternal income status and BMI, child weight status and maternal attitudes related to infant feeding practices. An initial finding from the pilot test of the IFQ with a population of 453 adult mothers was that "regardless of children's weight in the second year of life, obese mothers reported more concern about their infant undereating or becoming underweight" (Baughcum et al., p. 398). Further examination of this relationship determined that this effect may be primarily related to the association between low SES and maternal obesity. In addition, variations were seen among the women when grouped by income group. A weak association was noted between mothers with a low income and concern about their infant overeating or becoming overweight and the actual overweight status of the infant, while a much stronger association was noted in the high income group of women, with the mothers in the high-income group being more concerned about their child overeating (Baughcum et al.).

These findings further support the complex nature of maternal attitudes related to infant feeding and the need for further investigation into the variables that may influence the development of healthy feeding practices.

The health implications of infant feeding practices demand immediate attention. The difficulty, however, arises in the numerous contextual factors that can influence mothers and families in their choices and decisions related to what and how they feed their young children. Within the literature, there are gaps in the understanding of the development of infant feeding practices. A general understanding exists of the sociodemographic characteristics and outcomes that are related to infant feeding practices. However, current literature does not provide a clear understanding of how the personal factors of a mother can influence the care she provides her infant. In order to develop appropriate clinical interventions to promote healthy eating habits, infant feeding practices need to be understood on a personal level, particularly a mother's knowledge, attitudes, and skills related to infant feeding practices. A young mother's competence in feeding her infant can become a reflection of her overall competence as a mother. Understanding the variables that further influence a young mother's perceptions of competence can advance the development of interventions to promote healthy eating habits for infants.

Maternal Role Competence

There is a broad variety of literature that attempts to identify the numerous factors that may affect parenting beliefs and practices, such as those of infant feeding. Unfortunately, scientists lack a complete understanding of how all these factors may come together and actually influence parenting. One area that has some promise is the literature related to the concept of maternal role competence. The literature related to maternal role competence has evaluated many factors that may influence a woman's personal, subjective feelings of competence in her role and tasks as a mother (Flagler, 1988; Mercer, 1985; Mercer & Ferketich, 1994; Rutledge & Pridham, 1987; Secco et al., 2002; Walker 1986b; Warren, 2005). However, this literature is deficient in further evaluating the relationship of these subjective feelings of maternal competence to actual parenting practices. Understanding how these two areas of research could be linked may help to understand the complex relationship of factors that influence parenting practices, such as feeding. A next step to advance nursing research would be to attempt to link these feelings of competence to actual, measurable knowledge, attitudes and skills related to parenting. This linkage may provide insight into the complex development of parenting beliefs and practices, thus identifying possible areas of intervention for nurses working with families.

In 1981, Mercer presented her theoretical framework of maternal role attainment and maternal role competence. Mercer saw a need for nursing research to explain the numerous factors that may contribute to a woman's successful incorporation of the complex role of mother into her life. Mercer's

(1981) work further developed Rubin's (1967) theory of maternal role attainment that focused on the development of a maternal identity, defined as comfort within the role of mother, in the early postpartum period (Rubin, 1967). Mercer's expansion of Rubin's work fulfilled a need to identify factors that either individually or in combination facilitated or deterred maternal role attainment. She also expanded the time frame of study beyond the common one-month postpartum time period, to a period that includes the full year postpartum, which captured a more complete picture of the role attainment process (Mercer, 1981).

Mercer (1985) defined maternal role attainment as "the process in which the mother achieves competence in the role and integrates the mothering behaviors into her established role set" (p. 198). The process involves advancing through phases of role attainment, with the infant seen as an active partner in the relationship (Mercer, 1981). According to the theory, a mother advances through four stages to reach the final goal of maternal role identity (Mercer, 1981; Mercer & Ferketich, 1995).The stages include the anticipatory phase; the formal phase; the informal phase; and the personal, maternal role identity phase which is the endpoint of maternal role attainment and is characterized by a "woman's sense of competence and satisfaction in the role, attachment to the infant, harmony with other roles, and comfort with the maternal identity" (Mercer & Ferketich, 1995, p. 334). The anticipatory phase of maternal role attainment occurs during pregnancy, with the formal phase of role attainment beginning with the birth of the infant. Mothers typically rely on professionals and other individuals, such as family, to provide advice and aid in care during this stage. During the informal

stage, mothers finally begin to respond to their infant's unique characteristics and develop their own mothering behaviors. The entire process has been found to occur over 3 to 10 months, with adolescent mothers requiring 6 to 10 months to move to the formal phase (Mercer, 1981; Mercer, 1985; Mercer & Ferketich, 1995; Secco, 2002).

Recent work by Mercer (2004) has advanced the conceptual understanding of maternal role attainment theory and has called for the term MRA to be replaced with "Becoming a Mother" (BAM). The move away from the term MRA is in response to the static nature of the term, while BAM is more encompassing of the fluctuation that occurs in the mothering process (Mercer, 2004). This change was followed by a critical analysis of the current state of the knowledge of nursing interventions that advance the process of becoming a mother. Literature that "focused on a facet of maternal behavior in the process of MRA/BAM with a measured maternal outcome, for example preparing for the infant, gaining either confidence or competence in skills and knowledge in infant care, and learning to read infant cues and behavior" was evaluated (Mercer & Walker, 2006, p. 569). Interventions that had a noted objective of preparing for childbirth, managing maternal stress, anxiety, and/or depression, and infant outcomes were noted by the authors to be excluded from their review (Mercer & Walker, 2006). This exclusion raises concern as to the usefulness of understanding the efficacy of nursing interventions that have no actual clinical implication, such as reducing maternal depression, or enhancing maternal-child behaviors, such as breastfeeding. For this area of nursing research to be

beneficial, nurse researchers must have more measurable outcomes than just increasing a women's "sense of role competence" and be able to show how that subjective feeling actually impact a woman's health and that of her child.

Theoretical Foundations of Maternal Role Attainment/Competence

Much of the work of Rubin (1967), Mercer (1981) and subsequent researchers develops from role theory within an interactionist approach. The use of role theory explains the set of behavioral expectations that are attached to a given position (i.e., the social norms of appropriate mothering behaviors), while a symbolic interactionist approach allows for understanding how a mother individually responds and is responded to in regard to her social behavior (Mead, 1934). A key assumption of Mercer's work reflects the interactionist approach by acknowledging that a mother's behavioral responses "reflect her perceptions of her experiences in the role, her infant's and others' responses to her enactment of the role, and the situational context, although a 'core self' is still relatively stable in shaping and constraining the way she will define situations" (Mercer, 1981, p. 74). Within Mercer's (1981) original conceptualization, the infant is viewed as an active partner in the social interaction process, with socialization capabilities present from birth, which rejects the symbolic interactionist perspective that infants are asocial at birth and their nature is determined by what they encounter. This principle is found in further conceptualizations of the maternal role competence and attainment throughout the literature (Koniak-Griffin, 1993; Secco, 2002; Secco & Moffatt, 2003).

The maternal role is identified as a complex social and cognitive process that is learned, reciprocal, and interactive (Mercer, 1981; Rubin, 1967). This statement suggests a move beyond symbolic interactionism and role theory, towards Social Cognitive Theory (Bandura, 1977). Bandura's Social Cognitive Theory proposes that humans are actively engaged in their own development and make things happen by their actions. A fundamental assumption of the theory is that individuals possess self-beliefs that enable them to have control of their thoughts, feelings, and actions (Pajares, 2002). While Bandura's theory is not explicitly stated as aiding in the development of Rubin's and Mercer's work, references to it can be seen, especially in the statement of role acquisition being a cognitive process. Secco (2002) is the first nurse researcher in the area of maternal role attainment to give credit to Bandura's Social Cognitive Theory as guiding this area of research. She acknowledges that Bandura's work has similarities with role theory, emphasizing the importance of experience in role performance (Secco, 2002). The inclusion of Bandura's work into the theoretical understanding of MRA allows for broader understanding of maternal role attainment as not just a social process, but also a complex individual response that is influenced by numerous personal and environmental factors.

Conceptual Definitions of MRC/MRA Used Throughout the Literature

Throughout the theoretical and conceptual literature related to MRA and MRC, numerous conceptual definitions are used, making comparisons across studies difficult. Rubin's (1967) theory of MRA focused on the outcome of

maternal identity, defined as comfort within the role of mother. Mercer's (1985) definition of maternal role attainment is broader, identifying a more complete process of role acquisition, which includes achieving competence in the role and integration of the mothering role into their already established role set. Maternal role competence is defined as a mother's actual skills and interactions in the care of her infant that promote the infant's development. MRC can either be measured by observers who rate maternal behaviors or by a mother's self-reported perception of her competence in the role (Mercer & Ferketich, 1994). The final phase in MRA of personal, maternal identity or role integration (Mercer, 1981, 1985) is analogous to Rubin's (1967) conceptual definition. Similar to the initial work of Mercer (1981, 1985, 1986), numerous nurse researchers have also focused on the idea of maternal competence, or a similar term (Flagler, 1988; Rutledge & Pridham, 1987; Secco, 2002; Walker, Crain, & Thompson, 1986b).

Following the work of Rubin (1967) and Mercer (1981), several researchers appeared to identify similar constructs to maternal role competence. The work of these authors seems similar, focusing on personal, subjective assessments by women of their confidence as a mother, though with variations in terminology. Walker, Crain, and Thompson (1986b) use a definition for maternal role attainment that is similar to Mercer's definition of MRC, although they conceptualize maternal identity as a distinct component of MRA, "one that is focused on cognitive and affective attributes of the mother-infant relationship" (Walker et al., 1986b, p. 353). The variation in conceptual terms, such as maternal identity (Walker et al., 1986b) and maternal role attainment (Mercer,

1985) can be confusing, as the former appears to be individually focused and the latter is focused on the social process of mothering. However, Mercer's and Walker et al.'s MRC and MRA appear to be similar constructs, with Walker et al. (1986b) moving beyond just the subjective nature of MRC and evaluating clinically relevant, behavioral aspects of MRA. Secco (2002) developed a definition of maternal role competence that encompassed both the mother's perceptions of her role competence and the infant's responses to her actions in the context of infant care. Her conceptualization is a refinement of the understanding of MRC from Rubin's (1967), Mercer's (1981, 1985), and Walker et al.'s (1986a, 1986b) previous work. Secco (2002) defined maternal competence in infant care as "the mother's self-evaluation or rating of her knowledge and abilities within her role as infant care provider, as well as her evaluation of the infant's behavioral response to her interventions" (p. 100). A personal sense of maternal role competence is developed as a mother achieves her own level of perceived ability that allows her to make independent decisions about the care of her infant (Secco, 2002).

Walker, Crain, and Thompson (1986b) make a further distinction between the terms MRA and maternal identity that differs from the previous work of Rubin and Mercer. MRA is defined and operationalized in terms of self-confidence in actual role performance (Walker et al., 1986b). In addition to this restructured conceptualization of MRA, Walker and colleagues (1986b) identify perceived (subjective) role attainment and demonstrated (behavioral) role attainment as distinct components of maternal role attainment, along with the concept of

maternal identity. The distinction between the subjective and objective components of maternal role attainment allows for a more complete understanding of the clinical significance of MRA. Secco's (2002) model of infant care competence also identifies the relationship of both perceived infant care and performed infant care competence as part of maternal role competence and acquisition, supporting the work of Walker et al. (1986b). Comparison of a woman's perceived role attainment/competence to her actual performed mothering skills may allow for the identification of women and their infants at risk and in need of intervention. The contrast of a woman's actual performed mothering abilities, such as her infant feeding practices, to her own beliefs about how well she is caring for her child, can identify areas of "disconnect" that need to be addressed through further intervention.

Earlier work by researchers has included conceptual definitions of maternal role competence and role attainment that were more task-specific, evaluating a mother's care and response to her new infant (Flagler, 1988; Rutledge & Pridham, 1987). While the conceptual definitions appear very similar to those of previous researchers (Mercer & Ferketich, 1994, Secco, 2002; Walker, Crain, & Thompson, 1986b), as they are evaluating a mother's personal experience, they are limited by the authors' time frame of interest - the immediate postpartum period. Similar to Mercer (1985), Flagler (1988) defined maternal role competence as the adequacy of a woman's experiences in mothering, identifying a mother's ability of reading her infant's behavioral cues as a sign of increasing competence. Competence for infant care was defined as the "extent

to which a mother perceives herself to be knowledgeable and capable of accomplishing the tasks involved in caring for and feeding a newborn" (Rutledge & Pridham, 1987, p.187). Flagler (1988) did follow the similar course of Rubin and Mercer and identified role theory from a symbolic interactionist approach as the conceptual framework for her study, but without acknowledgement of any of the previous work by Rubin (1967) or Mercer (1981). In contrast to Mercer and colleagues, Flagler (1988) was not interested in the process of role attainment and focused only on the concept of role competence within the immediate postpartum period, limiting the understanding of this complex phenomenon. Rutledge and Pridham (1987) identify a completely different theoretical background (i.e., a stress and coping model) as guiding the development of their conceptualization, yet their conceptual definition of maternal competence appears to be compatible with others that are seen in the literature. The conceptual basis and the time specific focus of Rutledge and Pridham's (1987) work does limit comparisons to other research.

Measures of MRC/MRA

Among the reviewed empirical articles related to maternal competence, numerous tools were used to evaluate the concepts of maternal role competence and role attainment, making comparisons problematic. Scales were used that assessed concepts such as maternal self-esteem, maternal attachment, perceived mothering, and infant feeding ability (Flagler, 1988; Mercer, 1985; Mercer & Ferketich, 1994; Rutledge & Pridham, 1987; Secco et al., 2002).

Scales varied depending on the focused or general conceptualization that was used by the researcher. See Appendix A for a synopsis of the tools, their purposes, and reported psychometric information.

First attempts to evaluate MRC by Mercer (1985) initially operationalized maternal role attainment by using four measures: Feelings about the Baby; Gratification in the Mothering Role, Interviewer-Rated Mothering Role Behaviors, and Self-Reported Ways of Handling Irritating Child Behaviors. Justification was not given for the choice of these measures over others as being representative of MRC as conceptualized by Mercer (1981). These tools were used to assess maternal attachment, satisfaction in the parenting role, desirable parenting behaviors, and to discriminate abusive from nonabusive parents, respectively. Variables such as a woman's self-concept and personality traits and social support system, previously identified by Mercer (1981) as relevant, were not evaluated. In addition to the above mentioned measures, Mercer (1985) also used semi-structured interviews, with forced-choice answers, to collect data about women's views and feelings during the process of maternal role attainment.

In 1994, Mercer and Ferketich began using the Parenting Sense of Competence Scale (PSOC) to assess a mother's personal perception of maternal role competence. The move toward a single measure of probably occurred in response to the maternal interviews conducted in Mercer's (1985) prior work. In response to semi-structured interviews, mothers reported a wide range of challenges and role skills that could result in feelings of incompetence.

Furthermore, mothers also reported a wide range of characteristics that could be used to describe the ideal mother (Mercer, 1985). The four tools that Mercer (1985) had used to assess MRC did not adequately assess many of the themes that the mothers had identified in interviews. Use of the PSOC appears to not only allow for more complete assessment of the ideas presented by mothers in earlier research, but also corresponds better with Mercer's (1981) conceptual definition of MRC. Researchers have also used the PSOC to assess maternal competence in adolescent mothers (Hermann, Van Cleve, & Levisen, 1998; Percy & McIntyre, 2001; Sadler, Anderson, & Sabatelli, 2001) and mothers of preterm infants (Hall, Shearer, Morgan & Berkowitz, 2002), along with the relationship of parental competence and family functioning (Knauth, 2000).

The PSOC was designed to measure self-esteem in parenting, which is described as the cognitive outcome of a self-evaluation process (Mercer & Ferketich, 1994). The PSOC has two subscales, Skill/Knowledge and Valuing/Comfort, that assess parents' perceptions of the degree to which they have acquired the skills and understanding to be a good parent and the degree to which the individual values parenthood and is comfortable in that role (Gibaud-Wallston, 1977). The PSOC was initially developed for use with parents in the early postpartum period. Researchers have been able to successfully use the measure at later time points, such as 4, 6, and 8 months postpartum (Hermann, Van Cleve, & Levisen, 1998; Mercer & Ferketich, 1994; 1995), and 2 years postpartum (Percy & McIntyre, 2001). The ability to measure MRC beyond the immediate postpartum period is important because many mothers need 3 to 10

months to advance through the stages of role attainment (Mercer, 1981; Mercer, 1985; Mercer & Ferketich, 1995; Secco, 2002). Therefore, MRC should not just be assessed in the immediate postpartum period.

Flagler (1988) and Virden (1988) assessed a similar construct as Mercer and Ferketich (1994), with the use of subscales of the Maternal Attitude Scale (MAS). The MAS has been found to correlate highly with the PSOC (Gibaud-Wallston, 1977). The use of the MAS subscales (i.e., the Period of Initial Adaptation and Maternal Anxiety) was appropriate considering Flagler's (1988) conceptual focus on a mother's ability and response to her infant's behavioral cues as being representative of maternal role competence. The Period of Initial Adaptation Subscale measures a mother's ability to perceive her infant's cues and respond appropriately; this scale is specifically focused on the postpartum period, Flagler's time frame of interest. The Maternal Anxiety Subscale measures mother's anxiety related to child rearing, reflecting a mother's response to her own abilities as a mother. The use of the MAS subscales by Virden (1998) in subsequent research is questionable. Virden (1988) was interested in investigating how the method of infant feeding was related to maternal role adjustment in the first month postpartum. She described how feeding is a substantial portion of the care responsibilities that a mother has, and thus, her perception of ability as a mother is a reflection of her success in infant feeding. Virden (1988) used the same subscales as Flagler (1988) to operationalize the concept of maternal role adjustment, not maternal role competence. Feeding type, breastfeeding or bottlefeeding, was used to

differentiate between the mothers and their scores of role adjustment. Initial type of infant feeding was identified as a predictor of maternal role adjustment, with women who breastfed having less anxiety and higher scores of mother-infant mutuality (Virden, 1988). Virden's (1988) conceptual framework lacks a reasonable explanation of how the measures of maternal role adjustment and the initial type of infant feeding are related. This poor conceptual definition of maternal role adjustment and the lack of rationale for the use of MAS subscales raise questions as to the construct validity of Virden's (1988) work and the usefulness of the MAS in future research.

Among the reviewed research, the most common measure of the construct of maternal role competence, or a similar term, is a semantic differential scale (Myself as Mother). Researchers used this scale to evaluate perceived maternal competence, role attainment, or maternal identity (Flagler, 1988; Fowles, 1998; Koniak-Griffin & Verzemnieks, 1991; Walker et al., 1986a, 1986b). The scale is repeatedly noted to have internal consistencies of .81 to .85 and retest reliability estimates of .72 to .87 (Fowles, 1998; Koniak-Griffin & Verzemnieks, 1991; Walker et al., 1986a, 1986b). Mothers are asked to evaluate themselves using bipolar adjective pairs, such as kind-cruel, good-bad, dangerous-safe, and mature-immature. High scores indicated positive maternal self-evaluations (Walker et al., 1986a, 1986b). Unlike the PSOC, the semantic differential (SD) scale appears to have a more generalized focus on what is a good mother. Whereas the PSOC assesses a mother's personal perception of her acquisition of skill and value of parenthood, a SD scale captures a more

generalized, overall view of how a woman sees herself as a mother. Considering the broad, comprehensive conceptual frameworks related to mothering that are used by many of the researchers, the use of the SD scale appears appropriate. For researchers attempting to identify more task specific notions of MRC, this scale may not be as appropriate.

Some researchers used scales that attempted to assess maternal perceptions related to specific aspects of infant care (Fowles, 1998; Pridham et al. 1991; Secco, 2002). Pridham et al. (1991) used two questionnaires, The Birthing Questionnaire and What Being the Parent of a New Baby is Like, to assess variables such as a mother's infant feeding plan and transition markers of a mother's infant feeding ability and infant care capability. A subscale of the Birthing Questionnaire, the Perceived Competence Scale (PCS), was used by Fowles (1998). Secco created the 22 item Infant Care Questionnaire (ICQ) to assess perceived ability in providing care to an infant in the early postpartum period, which appeared similar to the scales used by Pridham et al. and Fowles. The ICQ has 3 domains: Mom and Baby, Emotionality, and Responsiveness. Cronbach alpha coefficients for the three subscales were reported as .86, .79, and .58, respectively (Secco, 2002). Convergent validity of the scale was supported by significant correlation of scores on the Mom and Baby dimension and prenatal ratings of prior infant care experience. A considerable number of the 14 questions in the Mom and Baby domain are related to the task of infant feeding. A moderate and significant (r = .48, p=.001) correlation was found between the Mom and Baby dimension and the Maternal Confidence Scale, a

12-item Likert scale instrument that measures maternal confidence in interpreting newborn behavioral cues (Secco, 2002). All these scales asked mothers specific questions related to how prepared or competent she felt regarding specific mothering tasks, such as feeding and bathing. The use of these scales was appropriate, given the particular focus of these researchers on the relationship between maternal role competence and infant care. Unfortunately, the use of these scales is limited to the early postpartum period, further restricting their usefulness in evaluating populations of women with older infants and comparison to other literature that evaluates maternal competence across a longer period of time.

The variation seen in the numerous measures used to assess maternal role competence, or a comparable term, can cause much confusion in evaluation of the existing literature related to this concept. The majority of the researchers used measures with reported moderate to high test-retest reliabilities and alpha coefficients, with few reporting alpha coefficients that could have limited the confidence in the findings of their work (Flagler, 1988; Secco et al., 2002). However, one of the most noted significant issues related to the measures reviewed was the timing of assessment. Some researchers only measured the construct of maternal competence in the immediate postpartum period, limiting the usefulness of both the tools and their data. Others evaluated maternal competence either longitudinally or at varied time points (Hermann, Van Cleve, & Levisen, 1998; Mercer & Ferketich, 1994; Percy & McIntyre, 2001; Sadler, Anderson, & Sabatelli, 2001), allowing for more general comparisons. Future

research needs to evaluate the development of maternal competence beyond the immediate postpartum period, and view it as a process that can change over time.

Questions are also raised as to the validity of the assessments used specifically by Mercer and colleagues to assess MRC (Knauth, 2000; Mercer, 1985; Mercer & Ferketich, 1994, 1995). Mercer and Ferketich used only the Parenting Sense of Competence Scale to operationalize a mother's perception of maternal role competence, as did Knauth in her secondary analysis of Mercer's original work. In the development of her conceptual framework, Mercer conceptualized MRC as a mother's actual skills and interactions in the care of her infant that promote the infant's development. Mercer (1981) reported that MRC can either be measured by observers who rate maternal behaviors or by a mother's self-reported perception of her competence in the role (Mercer & Ferketich, 1994). The idea that either of these two measures are interchangeable as the assessment of a woman's MRC is confusing. Mercer (1981; 1985) gives no conceptual explanation of how measures of perceived competence (i.e., subjective feelings) would be equivalent to performed measures of competence (i.e., objective assessment). It is assumed that there would actually be more disconnect between personal evaluations of competence and objective measures of competence, as it is human nature to either under-evaluate or over-evaluate one's ability. It is not logical that an objective measure of a woman's knowledge and ability related to mothering will always be equivalent to her own sense of competence. Future work to advance the

conceptual understanding and clinical usefulness of MRC would benefit from the inclusion of both the mothers' subjective perceptions of competence and an objective measure of mothering competence, such as competence for a specific parenting task (i.e., infant feeding), as proposed by Walker, Crain, and Thompson (1986b) and Secco (2002).

Characteristics and Outcomes of MRC Literature

Among the studies reviewed, a majority had sample characteristics that were quite homogeneous. The majority of mothers were White, with some education, and middle-class (Flagler, 1988; Fowles, 1998; Mercer & Ferketcih, 1994, 1995; Pridham, Lytton, Chang & Rutledge, 1991; Walker, Crain, & Thompson, 1986a, 1986b). The variation in samples of these studies limits the generalizability of findings. This lack of generalizability is a common problem in maternal-child research, and shows the need for research with varied populations. Studies that did attempt to evaluate different groups of women usually identified samples that may have different challenges to deal with as mothers, such as adolescents, or first-time adult mothers (Secco, Ateah, Woodgate, & Moffatt, 2002; Rutledge & Pridham, 1987; Virden, 1988).

For a majority of the reviewed studies, mothers' perceived role competence was the only significant outcome variable assessed (Fowles, 1998, Mercer & Ferketich, 1994, 1995; Pridham, Lytton, Chang, & Rutledge, 1991, Rutledledge & Pridham, 1987, Tarkka, 2003; Virden, 1988). Within this area of literature, some researchers did evaluate the relationship of behaviors, such as

infant feeding, to the outcome of perceived competence. Rutledge and Pridham (1987) found that the type of feeding (i.e., breastfeeding or bottlefeeding) influences a mother's self perception of her infant care competence, which is similar to Virden's (1988) finding that initial type of infant feeding is a significant predictor of maternal role adjustment Similar to other research, perceived infant care competence was the outcome variable of interest. Breastfeeding was viewed as a variable that would influence perceptions of competence, not as a possible outcome of a woman's competence. Researchers did not question if breastfeeding was a function of the higher education and general self-confidence of the women, rather than influencing perceptions of infant care competence. In the end, these findings present few actual suggestions for nursing practice and further research is needed to evaluate the complex relationship between maternal feelings of competence and maternal feeding behaviors.

A few studies do go beyond just measuring perceived maternal competence and attempt to assess the relationship to actual maternal-infant interaction (Flagler, 1988; Koniak-Griffin and Verzemnieks, 1991; Secco et al., 2002; Walker et al., 1986b). In descriptive studies, Walker and colleagues (1986b) assessed the relationship of adult mothers' visual interaction and maternal expression to subjective measures of role competence, while Secco, et al. (2002) examined differences in perceived and performed infant care competence in a sample of adolescent mothers. Walker et al. found no correlations between behavioral ratings and subjective indicators of role competence (operationalized as self-confidence in infant care) in a sample of

adult primiparous and multiparous mothers, while Secco et al. did find an inverse relationship between adolescent mothers' perceptions of competence and actual performed competence, as measured using the Home Observation for Measurement of the Environment (HOME).

Using the Maternal-Infant Adaptation Scale (MIAS), Walker et al. (1986b) assessed mothers' visual interaction and maternal expression of affect during feeding episodes and correlated these scores to subjective measures of role competence. Most correlations between behavioral ratings and subjective indicators of role competence (operationalized as self-confidence in infant care) were not statistically significant (Walker et al., 1986b). These findings were true for both primiparous and multiparous mothers. Mothers completed subjective competence scales during the immediate postpartum period in the hospital and again at 4 to 6 weeks postpartum, along with the evaluation of interactions during infant feeding. The authors reported that these findings were not surprising, given that it can take several months for new mothers to match their own mothering behaviors to infant cues, negating the rationale of measuring subjective components of role attainment shortly after birth and comparing them to role performance later in the postpartum period (Walker et al., 1986b). Sociodemographic variables (maternal age, maternal education, and SES) were noted to be the only exogenous variables related to behavioral (feeding) ratings for first-time mothers (Walker et al., 1986b).

In a longitudinal, exploratory study of adolescent mothers, Secco et al. (2002) examined differences in perceived and performed infant care

competence. Self-rated maternal competence was assessed during both the prenatal and postnatal period, using the Infant Care Expectation Questionnaire (ICEQ) and the Infant Care Questionnaire (ICQ), respectively. The Home Observation for Measurement of the Environment (HOME) Scale was used to evaluate adolescent mothers' performed infant care competence, by assessing their ability to provide a cognitively stimulating home environment for their child. The HOME was administered in the adolescent mother's home when her infant was between 12 to 18 months old. The sample for this study was split almost evenly between White Canadian (47.5%) adolescent mothers and Aboriginal Canadian (41.3%) adolescent mothers, with a mean age of 16.83 years (Secco et al., 2002).

The timing of assessment in each study may have limited findings and the overall generalizability of the work. Walker et al.'s (1986b) sample completed competence scales during the immediate postpartum period in the hospital and again at 4 to 6 weeks post partum, along with the evaluation of interactions during infant feeding. They reported their lack of findings were not surprising, given that it can take several months for new mothers to match their own mothering behaviors to infant cues, negating the rationale of measuring subjective components of role attainment shortly after birth and comparing them to role performance later in the postpartum period (Walker et al., 1986b). Secco et al.'s timing of assessments is also questioned. They assessed mothering competence with a scale developed for the early postpartum period (the Infant Care Questionnaire) and compared the findings to the HOME, which assesses

the cognitive stimulation a mother gives to an older infant. The authors note that the negative relationship that was found between these two measures resulted from high self-ratings of infant care competence and lower nurse researcher's ratings of performed infant care (Secco et al., 2002). This notation by the authors is inappropriate, given that the authors appear to improperly use mean ICQ and HOME scores to explain the correlation that they found. Causal relationships cannot be inferred from correlational findings, which the authors appear to be doing.

It is not reasonable to assume that a new mother's feelings of competence in providing basic infant care will directly influence her later demonstrated mothering skills that promote her child's development. Numerous other variables, such as the mother's own growth and development over time and social support system were not taken into account. The timing of the assessment underscores the importance of examining mothers' perceived competence as compared to actual performed mothering at times that are appropriate. The findings of these studies are really only generalizable to the immediate postpartum period and do not take into account the notion that MRA is seen as a process that occurs over time (Mercer, 1985). Future research should attempt to better match measures of maternal competence to the actual parenting practice being evaluated.

Two of the reviewed studies specifically investigated the effect of educational interventions on maternal feelings of competence using experimental designs. Koniak-Griffin and Verzemnieks (1991) investigated the effects of an

educational intervention program on affective and behavioral components of MRA (competence) in adolescent mothers. Flagler (1988) sought to investigate how maternity nurses can assist first time mothers (*n*=61) to develop maternal role competence by giving information related to their infants' temperament. The sample populations were different (adolescents and first-time adult mothers) along with the timing of the interventions (prenatally and immediately postpartum). After a four-part, prenatal, educational intervention, Koniak-Griffin and Verzemnieks (1991) were unable to find statistical differences between groups of mothers' perceived competence and their scores on the Nursing Child Assessment Feeding Scale (NCAFS). However, mothers in the experimental group did have overall higher NCAFS scores than those in the control group, which the authors saw as a clinically significant performance trend (*M* = 57.88, *SD*=6.38 vs. M =54.18, *SD*=6.14) (Koniak-Griffin & Verzemnieks, 1991). Flagler (1988) sought to investigate how maternity nurses can assist first time mothers (*n*=61) to develop maternal role competence by giving information related to their infant's temperament. A modified version of the Brazelton Neonatal Assessment was used to help mothers get to know their "baby's unique characteristics" (Flagler, p. 276). Like Koniak-Griffin and Verzemnieks, Flagler (1988) was unable to find a statistical difference between mothers on their perceived competence scores after completion of her intervention.

The findings of these studies are limited by the sample sizes and the relative homogeniety of each group. Koniak-Griffin & Verzemnieks (1991) did attempt to control for the sample weaknesses through random assignment and

researchers being blinded to the mothers' group status, but further limited their study through a possible diffusion of treatment effects to the control group when the researchers conducted postpartum exercise and infant care classes for the control group to reduce "resentful demoralization" (Koniak-Griffin & Verzemnieks, 1991). Flager's work was also limited by the use of a post-test only control group, making it difficult to compare the mothers who received the intervention to those who did not. Flagler's intervention occurred in the immediate postpartum period and the lack of pre-test comparison in their study did not allow for the control of extraneous variables that may have accounted for the lack of significant findings between the two groups and not the intervention. Furthermore, she reported using a tool with a marginally acceptable alpha coefficient of .57, which limits the confidence in the findings of her study (Flagler, 1988). Aside from the methodological challenges that limited the findings of this study, the conceptual framework for this study also may have lead to significant limitations. As noted before, Flagler (1988) was not interested in MRA beyond the immediate postpartum period and she gave significant attention only to infant disposition as the variable that influences maternal feelings of competence. Flagler (1988) ignored other significant variables, especially the personal and psychosocial characteristics of the mother that are recognized by other researchers as influencing the complex process of becoming a mother (Koniak-Griffin, 1993; Mercer, 1981, 1985, 2004; Mercer & Walker, 2006).

The experimental design of both Flagler's (1988) and Koniak-Griffin and Verzemnieks' (1991) studies allowed for the presentation of causal implications,

but the validity of the studies was threatened by small sample sizes that limited power and generalizability and tools with questionable reliability and validity, which threatened construct validity (Flagler, 1988; Koniak-Griffin & Verzemnieks, 1991). Furthermore, the findings from these studies can be brought into question because of the lack of longitudinal evaluation of the interventions that were each tested. Koniak-Griffin and Verzemnieks (1991) suggested that their work would have been strengthened by continued follow-up of the subjects, to further evaluate the effectiveness of their educational intervention beyond the immediate post-partum time period. Flagler (1988) conducted a one-time intervention in the immediate postpartum period and conducted follow-up evaluation at 4 to 6 weeks postpartum. Flagler (1988) noted that the lack of significant findings may have been related to the fact that many of the mothers may not have known what to even do with the information they received during the intervention. This study could have been strengthened had the intervention been repeated or additional information given to the mother's about how to relate to their infant, given the infant's temperament. Additionally, the intervention may have lacked effectiveness because of the timing. The immediate postpartum period, when a new mom is most likely exhausted and overwhelmed, may not always be the most appropriate time for an intervention.

Finally, of the reviewed studies, only one evaluated the possible, long-term relationship between maternal role attainment and child outcomes. Walker and Montgomery (1994) followed up on 77 children and their mothers who were part of larger studies conducted nine years earlier (Walker et al., 1986a, 1986b).

Child adjustment scores were assessed using the Child Behavior Checklist (CBCL) which measures both behavior problems and social competence for children in activities, social relations, and school. However, no clear predictors of child outcomes based on maternal role indicators were found (Walker & Montgomery, 1994). The authors note that their findings may have been related to measurement of maternal identity indicators in the early postpartum period, when the maternal role may not be fully internalized, and the influence of other aspects of childrearing, such as social support, peer relationships, and family structure over time (Walker & Montgomery, 1994). However, the authors' results could have been the result of comparing general measures of competence, measured in the immediate postpartum period, to the complex outcome of social and cognitive development in school age children. Walker and Montgomery's (1994) work demonstrates the need for the specific measurement of perceived and performed maternal role competence evaluating specific parenting practices, such as infant feeding practices, at time periods that are appropriate to the behavior of interest.

Summary of Maternal Role Competence Literature

Overall, the inconsistency in samples characteristics, conceptual definitions, and timing of evaluation used throughout the literature related to maternal role competence make comparisons across studies difficult. This difficulty in comparison is further confounded by the multiple measures used by the researchers to operationalize the constructs of interest. Because of the

numerous differences in constructs measured, it is difficult to determine key variables that not only influence a mother's development of role competence, but also are clinically relevant to professionals working with mothers and their infants. Researchers fail to focus on important parenting behaviors, such as feeding, that may be related to maternal feelings of competence. The few studies that do seek to compare perceived mothering competence and actual performed mothering, as a basis for identifying interventions, are difficult to compare because of sample characteristics and the timing and choice of measures. The literature that attempts to associate maternal feeding practices to perceptions of competence and role adjustment identified maternal feeding practices as indicators of competence, not outcomes (Rutledge & Pridham, 1987; Virden, 1988). So much of the clinical value of these studies is lost. The available literature related to maternal competence focuses on the measurement of a vague concept, without clear delineation of health outcomes that are significant to nursing. Nevertheless, there is an overall broad research understanding of the contextual variables that influence maternal competence, but researchers are unsure of how these contextual factors may influence parenting practices and maternal-child outcomes. To appropriately develop nursing interventions aimed at mothering behaviors, such as feeding, and to evaluate maternal-child outcomes, researchers need to focus their evaluation of maternal competence on specific tasks of mothering that can influence the health of infants.

Review of Key Factors Related to Maternal Competence and Infant Feeding Practices

A substantial amount of research has been conducted on maternal role competence and attainment, yet it is also difficult to determine the factors that actually influence a mother. In the reviewed studies, the conceptualizations of maternal role competence and attainment have similarities and differences. The studies vary in how role competence is operationalized and measured. Despite these differences, the majority of nurse researchers identify numerous personal, environmental, and social variables that influence maternal role attainment and maternal role competence. Relevant variables that have been found to influence maternal role attainment include age, support systems, self-concept and personality traits of the mother, child-rearing attitudes, and infant temperament. Culture, socioeconomic level, and education also have been seen to influence the maternal role (Koniak-Griffin, 1993; Mercer, 1981; Secco, 2002; Walker et al., 1986b). Mercer (1981) notes that many independent variables will interact with one or more of the other variables to account for the variance that is seen in maternal role acquisition. The numerous variables that have been noted to influence MRC/MRA allow for significant variation in the assessment and evaluation of mothers. Because of the numerous conceptualizations and measures used, it is difficult to ascertain the distinct aspects of the concept of maternal competence and any direct influence of maternal perceptions on actual mothering behaviors. Furthermore, despite acknowledgement of the numerous contextual factors (e.g., personal, environmental, and social variables) that influence maternal role attainment and maternal role competence, few

researchers actually assess clinically relevant variables that are amenable to intervention. Research is needed to identify psychosocial variables that directly influence feelings of maternal competence and parenting behaviors, but are also open to evaluation and/or intervention. Four relevant psychosocial variables that are measurable and clinically relevant to the concept of maternal role competence and parenting practices (i.e., infant feeding) were identified from the review of the literature: age and developmental status of the mother, social support, depressive symptoms, and self-esteem. Each is discussed in the context of their relationship to maternal perceptions of maternal competence/attainment and the relationship to parenting practices, specifically infant feeding practices.

Age and Developmental Status of the Mother

Overall, adolescent mothers represent approximately 10% of the over 4 million births that occur in the USA annually (Hamilton et al., 2004; MMWR, 2003). In 2003, 421,626 young mothers gave birth in the United States. Of this number, 414,961 were between the ages of 15 and 19 years old and 6,665 were under the age of 15 years old. Approximately 80% of these young women are first-time mothers (Hamilton, et al., 2004). In the state of Tennessee, 4,163 young women between the age of 10 and 17 gave birth in 2004 (http://health.state.tn.us/newsreleases/031006.htm). Adolescent mothers are considered to have more difficulty with parenting because of their developmental immaturity, lack of knowledge about child growth and development, and their

own developmental needs that may conflict with their infant (Koniak-Griffin, 1993). Adolescent mothers are noted to be more likely than older mothers to be challenged and stressed by the demands (i.e., physical, emotional, and cognitive), responsibilities, and problem solving that are required to care for their child (Secco et al., 2002; Secco & Moffatt, 2003). Furthermore, adolescent mothers have been recognized as having different beliefs about ideal mothering behaviors. In one study, adolescent mothers identified keeping the baby clean as a characteristic of an ideal mother, compared to comforting and nurturing the infant, which was identified by older mothers (Mercer, 1985). Young mothers may develop perceptions of competence from inaccurate self-assessments of their own knowledge, ability, and skills related to caring for their infant.

Erickson's (1963) theory of human development identifies the major task of adolescence as identity formation versus identity diffusion. More specific developmentally mature traits, such as empathy and flexibility, are necessary for mothers to be able to appropriately respond to negative infant behaviors, such as crying and fussiness (Mercer, 1986; Secco et al., 2002). Being less empathetic to her infant may hamper a mother's ability to put herself in the role of the infant and thus make her feel less competent in the care that she provides (Mercer, 1986). Bornstein and Putnick (2007) note that "to the extent that adolescent mothers are challenged by their own developmental crises in the search for personal identity, they are less likely to invest in parenting or command the wherewithal to parent optimally" (p. 850).

Few researchers have actually assessed the interaction of developmental status (e.g., identity maturity) and variables that may influence feelings of maternal role competence (i.e., social support, depression). Mercer (1986) investigated the role of developmental behaviors in relationship to maternal behaviors. She found that measures of personality integration and flexibility represent developmental constructs, increasing with age and correlating significantly with maternal age. Adolescent mothers were noted to have lower flexibility and empathy scores than adult mothers, evidencing their lesser experience in life and interaction with others (Mercer, 1986). Teenage mothers who were found to be more competent in maternal behavior, compared to their peers, were found to have greater personality integration (identity formation), greater empathy, a lower activity level, lower intensity of response, and a higher threshold to stimulus (Mercer, 1986). Secco, and colleagues (2002) also note that in a sample of adolescent mothers, older (17 to 19 years old) mothers were found to have higher scores on measures of responsiveness to their infants compared to the younger adolescent mothers (15 to 17 years old). Age may not be the best proxy for developmental status and maturity as a mother, but it does appear to be the most common measure used in the literature.

Research related to specific feeding practices has noted that adolescent mothers are less likely to initiate and continue breastfeeding than adult mothers (Dennis, 2002; Spear, 2006). Small studies of adolescent mothers have reported rates of 50% of young mothers attempting to breastfeed, but few continue for any extended period of time. Qualitative work identifies pain, embarrassment of

public exposure, lack of interest, unease with the actual act of breastfeeding, myths related to breastfeeding, and perceived inconvenience, particularly related to socializing, are common themes discussed by the young mothers as reasons for not breastfeeding (Brownell, et al., 2002; Hannon et al., 2000).

Compared to adult mothers, adolescent mothers tend to add cereal and other solid foods to their infant's diet sooner than recommended (Dennis, 2002; Bronner et al., 1999; Carruth et al., 1997; Nevling et al., 1997; Spear, 2006). Infants of adolescent mothers also have been found to have considerably higher dietary fat intake at 6 and 12 months of life than the infants of adult mothers (Carruth et al., 1997). Adolescent mothers have been found to add cereal to their infants' diet significantly sooner than adult mothers and offer their infants more sweetened noncarbonated and carbonated beverages than adult mothers, though differences are not always statistically significant (Nevling et al., 1997). These findings are clinically significant, identifying the fact that infants of adolescent mothers are at risk for inappropriate feeding practices, possibly leading to malnourishment secondary to the replacement of needed nutrients from the empty calories of excess food and sweetened beverages.

Unlike other researchers, Bronner and colleagues (1999) compared the initial type of infant feeding (breastfed, bottle-fed, or both) to the timing of introduction of solid foods. Within their sample of mothers, 32% reported introducing the infant to solid foods (usually cereal in the bottle) by 7 to 10 days postpartum and 77% of the participants in the study reported introducing some solid food by 8 weeks postpartum. Chi-square analysis revealed that mothers

who introduced solid foods and nonmilk liquids before 4 months of age were more likely to be young (< 19 years), returning to work or school, and feeding with formula. Breastfeeding was found to be protective against the early introduction of foods and nonmilk liquids (Bronner et al., 1999). Information was not given by the authors to differentiate the percentage of adolescent mothers who breastfed compared to adult mothers, therefore not allowing for further evaluation of the dual implication of age and breastfeeding on the early introduction of solid foods to infants.

Adolescent mothers have been noted to be different than adult mothers in regard to their assessment of their infant meeting developmental milestones required for eating solid foods. Adolescent mothers assessed their infants as able to hold a spoon and drink from a cup sooner than adult mothers reported their infants performing the same behavior (Carruth et al., 1997). This finding is significant because it supports the notion that mothers may not base their feeding decisions solely on knowledge of infant development or infant feeding cues, but rather a combination of factors. Both groups of mothers reported feeding their infants solid foods months before the children were reported to have met the developmental milestones required to eat from a spoon or hold a cup (Carruth et al., 1997). This finding is supported by Winklestein (1984), who found that mothers who had waited to introduce solid foods after their infants were 3 months of age or older had significantly higher knowledge scores of infant nutrition than mothers who had fed their infants solids earlier than 3 months old. She also found that 78% of the mothers in her study based their decisions on how to feed

their infants on their own feelings and not the behaviors of the infant (Winkelstein, 1984). Winkelstein (1984) reported that many mothers may mistake crying always as a sign of hunger and unnecessarily feed the child. In addition, mothers, especially young ones, may mistake normal infant curiosity about the food of adults, as a sign of readiness to eat similar food, when they are not developmentally ready to even swallow pureed solid foods.

Much of the research that investigates maternal competence and maternal feeding practices does not differentiate between adolescent and adult mothers and makes distinctions based on age difficult to detect. It is not uncommon for researchers to include both adult and adolescent mothers of low SES and low education in their samples or even to exclude young mothers from their sample population (Barton, 2001; Bronner et al., 1999; Carruth et al., 1997; Flagler, 1988; Mercer & Ferketich, 1994,1995; Pridham, Lytton, Chang, & Rutledge, 1991; Solem et al., 1992), making it difficult to discern if the differences between these groups of mothers are a function of the developmental status of the adolescent mothers or their similar characteristics with the adult mothers. Adding to the complex nature of adolescent mothers' feeding decisions, this group of mothers also has been found to have less knowledge of nutrition and infant developmental milestones needed for eating, and they tend to rely on their own mothers for information on how to feed their children (Bentley, et al., 1999; Carruth et al, 1997; Winkelstein, 1984). Inappropriate feeding behaviors are just one example of how adolescent mothers may have difficulty taking on the role and tasks of being a mother.

Social Support

There is a wide variation throughout the literature in the use of the concept of social support. Within the maternal role competence literature common definitions of social support include specific examples such as spousal support (Mercer & Ferketich, 1995) or more broad definitions such as a person social network (Panzarine, Slater, Sharirps, 1995). Functional elements of social support that are commonly noted in the literature include informational, instrumental, emotional, and appraisal support (Warren, 2005). The concept of social support is recognized as a significant factor that influences the process of maternal role attainment and mothering behaviors (Koniak-Griffin, 1993; Mercer, 1981); however, few researchers include measures or report findings of these factors within their work. In the development of her theoretical framework, Mercer (1981) notes that women's positive perceptions of receiving support, particularly from husbands, have been found to be positively related to adaptive maternal behaviors. However, subsequent studies by Mercer and colleagues either fail to assess a mother's support system or do not find significant relationships between perceived or received social support and maternal competence (Mercer, 1985; Mercer & Ferketich, 1994, 1995).

Recent work by Tarkka (2003) and Warren (2005) presents current evidence that social support and feedback about performance as a mother are important for first-time mothers. In samples of first-time Western-European mothers, both authors found positive relationships between reports of social support and maternal competence. Tarkka found significant moderate

correlations between maternal competence and measures of functional and emotional support, aid, and affirmation (i.e., support for decision making). Warren found that a majority of women reported moderate to high overall confidence in infant care practices, and a majority of the women reported high levels of informational, instrumental, emotional, and/or appraisal support from multiple sources including their own mothers, partners, and healthcare professionals. Informational support and appraisal support were the only two types of social support that were then found to be significantly related to maternal confidence in infant care scores (Warren).

Warren (2005) noted an interesting finding from this study that an equal percentage of women (77%) reported receiving informational support from both their own mothers and public health nurses. She notes that this finding is not supported by previous literature that has found that women's own mothers are usually most often the sources of information for infant caregiving, particularly in the immediate newborn period. She posits that this finding identifies a key time that healthcare professionals (e.g. public health nurses) can intervene and provide informational support to new mothers on appropriate infant care practices. Similar to Warren's work, Tarkka (2003) also found that mothers did report receiving affective or emotional support from public health nurses, and this was only weakly correlated to reports of maternal competence (r = .16, p = .02) (Tarkka, 2003).

Additional research has specifically evaluated the role of social support in the adaptation of adolescent mothers to the parental role. Dormire, Stauss, and

Clarke (1988) found that adolescent mothers tend to have less social support than older populations of mothers and report higher stress related to parenting. A significant finding in their work was that a mother's sensitivity to infant cues, as measured with the Nursing Child Assessment Teaching Scale (NCATS), was related to affective support (defined as communicated caring) (Dormire et al., 1988). Overall, affective support, more than aid or affirmation, was significantly related to the adolescent mothers' interactive capabilities with their infants. However, the findings from this study should be taken with caution, as the study was only exploratory in nature, with a very small sample size (*n*=18) and the adolescents were compared to a separate, normative samples of older mothers (Dormire et al., 1988). These findings were supported by similar research conducted by Panzarine, Slater, and Sharirps (1995) that evaluated the relationship of social support, depressive symptoms, maternal confidence, and maternal infant interaction during feeding. In a sample of predominately low-income, African-American, adolescent mothers, with a mean age of 15.5 years (range 13-18 years), mothers who reported depressive symptoms also reported less confidence in their parenting abilities. It was noted that while mothers in this study did not vary in the frequency that they received social support, adolescent mothers that reported depressive symptoms were less satisfied with the support they received (Panzarine et al., 1995). Social support was noted by the authors to be part of the complex relationship of maternal psychosocial factors, including depressive symptoms that may be related to feelings of maternal competence and feeding interactions (Panzarine et al., 1995).

Family support can have considerable influence on how mothers view themselves and the decisions that they make in the care of their infants. For example, in relation to infant feeding practices, family support has been shown to have a significant influence on the decision to breastfeed and the timing of introduction of solid foods (Bentley et al., 1999; Kaufman & Hall, 1989). Multi-generational parenting is seen repeatedly throughout the literature, especially among young African-American mothers, and should also be considered in evaluation of the development of parenting beliefs and practices (Bentley, et al., 1999; Koniak-Griffin, et al., 2006; Underwood, et al., 1997).

Within the literature there is significant evidence for the role of familial social support influencing infant feeding practices of mothers. In a qualitative study, Bentley et al. (1999) investigated the infant feeding practices of low-income, African-American adolescent mothers who were living with their own mothers. The authors were curious as to the effect that the maternal grandmothers would play in the development of feeding practices. A total of 19 first-time mothers, aged 13 to 20 years, who resided with their own mothers, were interviewed. The maternal grandmothers were also interviewed. All of the infants were formula fed. A significant finding was that grandmothers played a dominant role in the timing and choice of foods that were introduced to the infants. The authors identified three mechanisms for the grandmothers' influence on infant feeding: (1) the adolescent mother actively sought the grandmother's advice; (2) the maternal grandmother took the initiative in infant feeding decisions and the adolescent consented; or (3) the maternal grandmother implemented her

preferred feeding practices without the mother's knowledge (Bentley et al., 1999). Several grandmothers were quoted as saying that they did not listen to the advice of healthcare professionals related to the feeding of their grandchildren and fed them as they believed they should. Many justified feeding infants because of perceived inadequacies of infant formula to satisfy and nourish. Women even reported feeding the infants solid foods, against the wishes of their daughters, who were following the advice of their healthcare providers (Bentley et al., 1999).

Similar findings were reported by Underwood, Pridham, Brown, Clark, and Frazier, et al. (1997) in their qualitative study of low income, inner-city, African-American women. Using focus groups of mothers, grandmothers, and caregivers, ranging in age from 26 to 78 years, the authors sought to determine the typical feeding practices of this community. Infant feeding practices of this population varied significantly from the recommendations of the AAP and the authors stated that many women reported that their feeding practices had been learned from family members and others within their community and that they were also unaware their feeding practices were potentially harmful to their children (Underwood et al., 1997).

The decision to breastfeed has been shown to be significantly influenced by the social support that a mother receives. Kaufman and Hall (1989) reported that 75% of women who breastfed their infant (70.4% of the total sample) cited their husband's support as a reason for the duration of their breastfeeding (Kaufman & Hall, 1989). The sample population was older (*M*=26.9 yrs;

SD=5.1), White (98%), and reported being in a married or stable partnered relationship (90%). Even within this skewed population, compared to the mothers who chose to formula feed, mothers who breastfed were older, had a higher education, a higher status occupation, were non-smokers, and had breastfed previously. These findings were supported by Libbus and Kolostov (1994) who reported the significance of husband or boyfriend support being associated with a mother's intention to breastfeed. In their sample of 69 Medicaid eligible mothers, aged 18 to 36 years (*M*=22.7), along with social support, education was found to be significantly related to intention to breastfeed, with ethnicity and age not being significant (Libbus & Kolostov, 1994). Among a sample of African-American and Latina adolescent mothers, many were noted to report that their own mother was very influential in their decision making process to breastfeed. A small number of these mothers that participated in focus groups also reported that the father of the baby was an influence, and if he was, he was supportive and curious about the breastfeeding (Hannon et al., 2000).

Work by Shepherd et al. (2000) assessed the correspondence of couples' infant feeding attitudes. Similar to previously cited literature, socio-demographics, such as age, education, and marital status were found to positively affect breastfeeding. A significant difference in Shepherd et al.'s (2000) work from previous literature was that partners of breastfeeding women were found to be less knowledgeable about the benefits of breastfeeding and less supportive of statements that breastfeeding was a positive experience for women and infants than their partners (Shepherd et al., 2000). This finding led the

authors to question previous research that shows that partner support is vital in the choice of feeding method. However, the authors never directly questioned the mothers as to the influence of their partner on their feeding decision and only compared couples in the postpartum period after feeding was established. Furthermore, the authors did not fully report the demographics of their sample, therefore not allowing comparison to other groups, limiting the generalizability and usefulness of the research.

There is some evidence that has found that mothers report relying on professionals for advice and not just family and friends. Warren (2005) reports that higher percentages of mothers relied on professional advice for information on infant feeding (63% vs. 58%) and bathing questions (53% vs. 34%), while more reported relying on family and friends for information on soothing and settling infants (48% vs. 31%). Warren also notes that although a majority of the women did report relying on professionals for infant feeding information, there was evidence that approximately 40% of these women were receiving conflicting advice from multiple sources. In a small, quasi-experimental study to evaluate the effects of peer support on breastfeeding duration and exclusivity, Arlotti, Cottrell, Lee and Curtis (1998) also found that women reported receiving support from medical professionals. High percentages of women in both groups (peer counselor or none) reported “received support” from many individuals, including family and friends, with 83% of the women in the peer counselor group and 72% in the control group reporting receiving support from a medical professional. Arlotti et al. did also report that peer support related to breastfeeding during the

early postpartum period was found to lead to higher rates of exclusive breastfeeding, which was associated with longer breastfeeding duration, in their study of low income women.

Social support clearly is identified as a significant variable that influences mothering behaviors, such as feeding (Bentley, et al., 1999; Libbus & Kolostov, 1994; Tarkka, 2003; Warren, 2005). Unfortunately, the empiric literature is lacking studies examining the exact nature of the relationship of social support and mothers' perceptions of their competence. The relationship of maternal infant feeding practices and familial social support is better understood. Within this literature, adolescent mothers are frequently shown to be influenced, both negatively and positively, by the support they receive from their family and friends (Bentley et al., 1999; Dormire, et al., 1988). Further investigation is needed, however, to clearly identify the relationship of social support to perceptions of maternal competence, and thus the influence on infant feeding practices.

Depressive Symptoms and Self-Esteem

Psychological mood (e.g., depressive symptoms) is noted to influence a wide range of maternal and infant outcomes by adversely influencing a women's ability to care for her infant (Logsdon, Wisner, Pinto-Foltz, 2006). The conceptual development of maternal role attainment theory identifies the psychological state of a mother and some personality traits (e.g., presence/absence of depression, self-confidence, and self-concept) as being

basic determinants of a woman's capacity as a mother (Koniak-Griffin, 1993; Mercer, 1981). However, like social support, these variables are not consistently evaluated by researchers. In the reviewed literature that does assess psychological variables, such as depressive symptoms and self-esteem, numerous measures are used by the researchers, making comparisons across studies more difficult. Mercer and Ferketich (1994, 1995) assessed depressive symptoms with the 20-item Center for Epidemiological Studies Depression Scale (CES-D 20), while Fowles (1998) used the Edinburgh Postnatal Depression Scale (EPDS). Cronbach reliability scores for Mercer and Ferketich's (1994, 1995) samples ranged from .85 to .91, with Fowles (1998) reporting that the EPDS has known sensitivity and specificity and a Cronbach's α of .85. For all three studies, depressive symptoms were found to significantly explain some of the variance in the measurement of maternal role attainment/competence (Fowles, 1998; Mercer & Ferketich, 1994, 1995). Fowles (1998) found significant correlations between six measures of maternal role attainment and postpartum depressive symptoms (r = -.22 to -.35; p values ranges from < .05 to < .005). This finding was also supported by work from Tarkka (2003) that found that a mother's state of mind, defined as depression scores, was the strongest single predictor of maternal competence (r =.59, p < .001).

Mercer and Ferketich (1994; 1995) have continually used the CES-D in their studies to assess depressive symptoms at multiple time points. The use of the CES-D is appropriate; given the use over time, and Mercer and Ferketich's (1994, 1995) interest in general depressive symptoms – not postpartum

depression. The use of the CES-D allows for not only the comparison of general depressive symptoms over time, but also allows for further comparison to additional maternal-child research that frequently uses the CES-D for assessment (Lutenbacher, 2002; Sachs, Hall, Lutenbacher, & Rayens, 1999). Fowles' (1998) use of the EPDS limits the generalizability of her work. The Edinburgh Postnatal Depression Scale was developed to screen for postpartum depression and is only validated for the first six weeks postpartum (Cox, Holden, & Sagovsky, 1987). Initial use of the EPDS in the evaluation of maternal depression limits comparison to further research that measures maternal depressive symptoms beyond the immediate postpartum period.

Exploratory, descriptive work has evaluated the relationship of depressive symptoms to mothers reported maternal competence. Among a sample of experienced and inexperienced mothers' no significant differences between measures of role competence were found. For inexperienced mothers, depression was a significant predictor at one month post-partum, explaining 8% of variance in reports of maternal competence (Mercer & Ferketich, 1995). Depressive symptoms was found to be a significant predictor of maternal competence in experienced mothers in the postpartum hospitalization period, explaining only a very small amount of variance (2%) (Mercer & Ferketich, 1995). In earlier work by Mercer and Ferketich (1994), depressive symptoms were found to explain 24% of the variance in competence of women who had high risk pregnancies, compared to 6% of the variance in competence in low risk women. Approximately 56% of the women that were identified as being high risk women

gave birth to premature infants; therefore it is understandable that because of the health status of their infant, more of the high risk women may have reported depressive symptoms (Mercer & Ferketich, 1994).

Similar to the work of Mercer and Ferketich (1994, 1995), Panzarine, Slater, and Sharirps (1995) evaluated the relationship of depressive symptomatology to perceptions of maternal competence among adolescent mothers. They also evaluated the relationship of depression to maternal outcomes/behaviors. The sample for their study consisted of predominately low-income, African-American, adolescent mothers, with a mean age of 15.5 years (range 13-18 years). A majority of this sample (78%) lived at home, and 92% reported having some kind of contact with the father of the infant. Maternal outcomes were assessed using the Nursing Child Assessment Teaching Scales (NCATS) and the Nursing Child Assessment Feeding Scale (NCAFS) at 6 months postpartum. Mothers were evaluated during a teaching interaction with the NCATS. The NCAFS was used by the researchers to assess maternal feeding interaction, such as sensitivity to cues, socioemotional growth fostering, cognitive growth fostering, and response to distress. Depressive symptomatology was measured with the Beck Depression Inventory (BDI). For the purpose of this study, depressive symptoms were categorized as: no symptoms, mild symptoms, and moderate to severe symptoms. The authors reported the BDI to have known reliability and validity, with a Coefficient alpha of .75 for this particular sample (Panzarine et al., 1995).

As noted, the adolescents in this study were categorized into one of three groups of depressive symptoms. Of the 50 adolescent participants, 28 subjects (56%) reported no depressive symptoms, 10 (20%) reported mild symptoms, and 12 subjects (24%) reported moderate to severe symptoms as measured by the BDI. No significant differences were found between the three groups of mothers on age, SES, maternal grandmothers' presence in the household, or the nature of the relationship with the father of the baby. The only difference between the three groups was the grade level of education, with group two (mild symptoms) having a significantly lower grade level than the other groups (Panzarine et al., 1995). Multivariate data analysis, a one-way MANOVA, showed that the mothers in the two groups reporting some level of depressive symptoms had more negative feeding interactions with their infants, than the mothers reporting no depressive symptoms. These mothers also had more negative interactions during the teaching episode, although this finding did not reach statistical significance. Furthermore, the adolescent mothers reporting some level of depressive symptoms also reported less confidence and gratification in their maternal role, compared to the other adolescent mothers (Panzarine et al., 1995).

The strength of this study is seen in the expanded understanding of the relationship of maternal depression and actual observations of maternal-infant interactions. However, the findings from this study should be taken with caution due to the limitations of the study. The cross-sectional data does not allow for a causal relationship to be implied. Whether depression in adolescent mothers is

a function of continued ineffective interactions with their infants, leading to feelings of distress, or if depression initiates the cycle of less rewarding interactions, detachment, avoidance, and thus, further depression remains unclear (Panzarine et al., 1995). To fully understand the relationship of depressive symptoms on maternal outcomes, further longitudinal study is needed (Panzarine et al., 1995).

Similar to the measurement of depressive symptoms, several measures of maternal self-confidence and/or general measures of self-esteem (i.e. self-concept; an overall evaluation of one's worth or value) were used by the researchers to evaluate the psychological state of the mothers in their studies. Mercer and Ferketich (1994, 1995) assessed a mother's individual sense of self-esteem with the Rosenberg Self-Esteem Scale. Tarkka (2003) assessed the construct "self-concept," which appears equivalent to Mercer's measure of self-esteem, with a 10-item Likert-scale questionnaire measuring an individual's level of self-appreciation. Cronbach's α for this scale was reported as .87 (Tarrka, 2003). Tarkka's (2003) work found self-concept as the only background variable that was positively correlated with competence, supporting similar findings from Mercer and Ferketich (1994, 1995), who found self-esteem to be positively correlated to perceptions of MRC at multiple time points. In both studies, self-esteem was found to predict as much as 34% of the variance seen in MRC (Mercer & Ferketich, 1994, 1995). Walker et al. (1986a, 1986b) used the Pharis Self-Confidence Scale, a measure of self-confidence in everyday baby care, as their measure of perceived MRA. According to Walker et al. (1986a, 1986b) this

13-item, 5-point questionnaire measure has a reported internal consistency of .75 to .91 and convergent validity coefficients from .27 to .51 with other parental self-confidence measures. The use of this scale makes comparisons across studies more difficult, even though self-esteem is found to repeatedly have a positive relationship with MRC (Mercer & Ferketich, 1994, 1995; Tarkka, 2003). In addition, the use of a task-specific, self-esteem scale leads to the question of whether measures of maternal competence are actually capturing perceptions of ability and not general feelings of self-esteem.

Findings related to the importance of self-esteem, specific to adolescent mothers, and are comparable to what has previously been reported with adult mothers, were noted by Sadler, Anderson, and Sabatelli (2001). In a descriptive, correlational study of 53 adolescent mothers, who co-resided with their own mothers, self-esteem was found to have strong, positive correlation with parental confidence. Self-esteem was measured using the Pearlin and Schooler Self-Esteem Scale, which was developed from the Rosenberg Self-Esteem Scale. Self-esteem scores were found to be significantly related to total scores of maternal competence (r= .56) (Sadler, et al., 2001). No other contextual variables were associated with the mother's parental competence scores. A further interesting finding was that the maternal grandmother's self-esteem was also positively correlated to her daughter's sense of parental competence. This finding raises the question of how psychosocial variables, such as personal traits like self-esteem, and social support, intersect and influence each other. The authors questioned how much of the adolescent mothers' self-esteem and, thus

sense of parental competence, may have really been influenced by their own mothers', possibly identifying a multi-generational effect of self-esteem. The findings from this study illustrate the need for further investigation into the complex interaction of psychosocial variables that influence adolescent mothers as they assume the tasks and role of a being a mother.

Maternal depression is not only linked to lower perceptions of maternal competence (Mercer & Ferketich, 1994; Panzarine et al., 1995), but also child maltreatment, poor infant cognitive development (Beck, 1998; Chung, McCullum, Elo, Lee, & Culhane, 2004) and unsafe parenting practices, such as not using car seats (McLennan and Kotelchuck, 2000). Research has shown a link between postpartum depression and failure to thrive in developing South Asian countries, even after adjustment for other determinants of poor growth (Patel, DeSouza, & Rodrigues, 2003). The relationship between maternal depression and an infant's physical growth in developed countries is uncertain, however, as the majority of research that assesses outcomes of children of woman with postpartum depression is usually focused on psychological rather than physical outcomes (Rahman, Harrington, & Bunn, 2002). Among American women, more recent work has found that mothers with depressive symptoms, at two and four months postpartum, had reduced odds of continuing to breastfeed, playing with the infant, and talking to the infant. Mothers with depressive symptoms (as measured by the CES-D) did have increased odds of giving cereal, water, and water prior to recommended times, although regression models were not statistically significant (McLearn, Minokovitz, Strobino, Marks, & Hou, 2006).

The role of depression and self-esteem in the development of maternal competence is clearly significant in the reviewed literature (Koniak-Griffin, 1993; Mercer, 1981; Panzarine et al., 1995; Sadler, et al., 2001). There is little evidence regarding the direct effect depressive symptoms and self-esteem may have on mothering behaviors, such as feeding. Only Panzarine and colleagues (1995) evaluated the relationship of depressive scores, feelings of maternal confidence, and infant feeding interaction. The lack of evidence relating maternal competence and psychosocial variables to actual parenting behaviors limits the usefulness of the literature previously discussed. Additional research is needed to further define the complex relationship of maternal psychosocial factors to perceptions of maternal competence, and consequently, parenting practices, such as infant feeding, that may influence infant health.

Summary

The strengths of the theoretical model of maternal role competence and maternal role attainment that are set forth by Mercer (1981, 1985, 2004), Walker et al. (1986b), Secco (2002), and Secco et al. (2002) lie in their holistic approach to evaluating the mothering process. However, much of the reviewed literature, while adding to the conceptual understanding of MRC, lacks clinical relevance and usefulness. Research literature related to the concept of MRC has historically focused attention on MRC as the only outcome variable of interest. Few researchers have acknowledged the possible mediating effect MRC can have between psychosocial predictors and actual maternal-infant outcomes

(Secco et al., 2002). The reviewed literature has historically focused on the identification of innumerable variables that influence perceptions of competence, many of which are not amenable to change. Furthermore, the variation that is seen in the numerous conceptualizations of maternal competence, throughout the literature, leads to confusion about the true nature of the concept. It is unclear if mothers' subjective feelings of competence are actually truly assessing specific feelings of maternal competence or rather more general feelings of overall self-esteem. Research needs to advance to answer the question of whether the perception of maternal competence is an actual variable that directly influences maternal actions, or is it just a term used to explain the cumulative effect of numerous psychosocial factors, such as depressive symptoms, self-esteem, and social support, on mothering behaviors.

Mercer's (1981) and subsequent researchers' (Secco, 2002; Walker et al., 1986a, 1986b) conceptual development of MRC and MRA has been focused on how a mother's skills and interactions in the care of her infant promote the infant's development. This vague conceptualization needs to be expanded to include not only an infant's development, but also his or her growth. Mothering behaviors not only influence the emotional and cognitive development of infants, but also their physical health and wellness. The holistic nature of maternal role attainment theory and the concept of maternal role competence allows for the expansion of understanding beyond infant development, to encompass the whole notion of infant growth and development, making the theory applicable to the investigation of multiple tasks related to mothering, such as feeding, discipline,

play, and even how mothers care for sick children. In addition, the recent conceptualizations (Secco, 2002; Secco et al., 2002; Walker et al., 1986b) that assess the relationship between a woman's perceived competence and performed competence for mothering add to the development of both theoretical and empirical work, supporting the clinical value of this research. The empirical and theoretical literature related to MRC/MRA has not fully answered the question of whether perceptions of competence actually influence clinical infant outcomes. By comparing measures of perceived mothering to performed mothering, clinicians and researchers can identify areas in need of and open to nursing interventions.

Furthermore, the reviewed literature related to maternal role competence is deficient in evaluating varied groups of mothers. Many of the sample populations consisted of older, educated, White women (Flagler, 1988; Fowles, 1998; Mercer & Ferketcih, 1994, 1995; Pridham, Lytton, Chang & Rutledge, 1991; Walker, Crain, & Thompson, 1986a, 1986b). If attempts were made to differentiate between specific groups of mothers, those comparisons were done among primiparous and multiparous mothers, or mothers of varied pregnancy risk status (Mercer & Ferketich, 1994, 1995; Walker et al., 1986a, 1986b). Ethnic minorities and high risk mothers, such as adolescents, were represented in some sample populations, but not in large numbers. Only Secco et al.'s (2002) and Koniak-Griffin and Verzemnieks's (1991) work has investigated the tasks and challenges of maternal role competence specifically in adolescent mothers, despite researchers' continued argument that adolescent mothers are a

population at risk that requires attention. Further studies centered specifically on high-risk groups of mothers, such as adolescents, need to be conducted to differentiate the influence of the variable age, from the influence of SES, education, and social support.

Finally, the review of literature identified several generalizations that can be made about infant feeding practices. In general, older, White, educated women of higher socioeconomic status (SES) are more likely to breastfeed (Barton, 2001; Kaufman & Hall, 1989). Women who breastfeed are often noted to be less likely to initiate solid foods earlier than is recommended by the AAP (Bronner et al., 1999; Winkelstein, 1984). A significant portion of the research supports the conclusion that age and education have a considerable influence on maternal feeding practices. Several studies found that mothers older than 19 to 20 years and with some high school education were more likely to breastfeed (Barton, 2001; Parraga et al., 1988; Solem et al., 1992). Repeatedly, adolescent mothers are shown to lack the knowledge and skills needed to appropriately feed their young children (Bronner et al., 1999; Carruth et al., 1997; Nevling et al., 1997). As a group, adolescent mothers have been shown to be at high risk for inappropriate feeding practices, such as overfeeding and replacing formula or breastmilk with excessive solid foods. The clinical implications of these behaviors (i.e., obesity, failure to thrive) call for the urgent development of clinical interventions that seek to change adolescent mothers' knowledge, attitudes, and skills regarding infant feeding practices. Investigation into how competent a young mother feels in her skills to feed her infant, and the variables that influence

those perceptions of competence, may provide insight into the development of more appropriate clinical interventions that promote healthy infant feeding practices.

Conclusion

The conceptual framework guiding this project (see page 9) is derived from the review of both clinical and theoretical literature and clinical experience with the population of interest. Adolescent mothers are clearly a population of concern and yet their infant feeding practices and factors that influence their feeding practices remain unclear. Extant literature related to maternal role competence and attainment guided the selection of key variables and the proposed relationships among these variables included in the conceptual framework for the proposed project. The theoretical underpinnings of MRC theory that define maternal role competence as a mother's actual skills and interactions in the care of her infant that promote the infant's development (Mercer, 1985) leads to the assumption that clinical outcomes, such as parenting practices, are important, but this is not supported in the literature.

The independent variables selected for study include age, social support, depressive symptoms, and self-esteem. Prior research has established a clear relationship among the age and developmental status of a mother, her level of social support and infant feeding practices (Bronner et al., 1999; Carruth et al., 1997; Kaufman & Hall, 1989; Secco et al., 2002; Secco & Moffatt, 2003). Maternal depressive symptoms has been negatively related to maternal

competence and frequent citation as being related to poor maternal and infant outcomes and inappropriate parenting practices (Beck 1998; Fowles, 1998; Mercer & Ferketich, 1994, 1995; McLean, Minkovitz, Strobino, Marks, & Hou, 2007; McLennan & Kotelchuck, 2000). Evidence exists that maternal depression is associated with poor growth outcomes in infants of mothers living in developing countries, even after adjustment for other determinants of poor growth (Patel et al., 2003). Self-esteem has been found to contribute significantly to the variance in perceptions of maternal role competence and the apparent relationship between positive feelings of self-esteem and self-competence (Mercer & Ferketich, 1994, 1995). Each of these variables is able to be individually assessed and/or has the potential to be modified with clinical intervention. Young maternal age, low levels of social support, high levels of depressive symptoms, and low self-esteem are all hypothesized to negatively influence measures of maternal competence. In addition, it is hypothesized that each psychosocial variable has the capability of influencing the other noted variables. For example, it is hypothesized that high levels of social support can positively influence levels of self-esteem or depressive symptoms.

For the purposes of this study, the variable of maternal competence is considered at two separate levels; the first being identified as an overall, general sense of maternal competence and the second being a task-specific sense of competence for infant feeding. A general sense of maternal competence is defined in terms similar to Mercer (1981) and Walker et al. (1986b) and is a mother's perception of her overall confidence and capability to care for her child.

The variable maternal competence for infant feeding is defined as having the specific range of skill, knowledge, and ability for the task of infant feeding. As previously discussed, infant feeding practices can be viewed as the result of the interaction of mothers' knowledge, attitudes, and skills related to infant feeding. A woman's knowledge, attitudes, and skills are believed to have a reciprocal relationship. For example, a mother's level of knowledge related to infant feeding may influence her level of skill for feeding, or a mother's attitudes (e.g., her ability to accept new information/beliefs) related to infant feeding will influence her knowledge and skills related to feeding.

The overall purpose of this study is to examine the relationship between psychosocial factors and maternal competence for infant feeding in a sample of first-time adolescent mothers. See Figure 1 (page 9). Three research questions guided this study. Each study question had a related hypothesis.

Research question #1: "What is the relationship between maternal psychosocial factors and maternal competence for infant feeding?

Hypothesis: mothers with low levels of depressive symptoms, high levels of self-esteem, and positive reports of social support will have higher task-specific maternal competence, as defined by feeding knowledge, positive attitudes, and appropriate skills related to infant feeding. This hypothesis is decomposed into sub-hypotheses for the purpose of data analysis. For example:

- Depressive symptoms will be negatively correlated with infant feeding knowledge.

- Depressive symptoms will be negatively correlated with attitudes related to infant feeding.
- Depressive symptoms will be negatively correlated with skills related to infant feeding.

Research question # 2: What is the relationship of maternal psychosocial factors and general maternal competence?

Hypothesis: Mothers with low levels of depressive symptoms, high levels of self-esteem, and positive reports of social support would report higher feelings of general maternal competence.

Research question # 3: "What is the relationship between general maternal competence and maternal competence for infant feeding?

Hypothesis: High reports of maternal competence will positively correlate with knowledge, positive attitudes, and appropriate skills related to infant feeding.

Perceptions of competence are hypothesized to be predictive of actual maternal infant feeding practices. Mothers who report positive self-perceptions of general competence are hypothesized to be more likely to feed their children appropriate foods, at the developmentally appropriate time. Mothers assessed as having low competence for infant feeding are hypothesized to have less knowledge of infant feeding practices and less skill in providing their children a balanced and nutritious diet than mothers assessed as highly competent. Poor or inappropriate infant feeding practices, such as the early initiation of solid foods, overfeeding of formula and juices, and the inappropriate use of foods and snacks as behavior modification techniques, would put children at higher risk for

such conditions as failure to thrive, being overweight, and developing dental caries.

CHAPTER III

RESEARCH DESIGN AND METHODS

This chapter presents the methodology used in this research study to investigate the relationship among maternal psychosocial factors, measures of maternal competence, and the infant feeding behaviors of adolescent mothers with infants between six and twelve months of age. The methodology will be presented in the order of: (1) research questions and hypotheses, (2) design of the research study, (3) description of the research setting and sample, (4) measures used for data collection, and (5) data analysis procedures.

Research Questions and Hypotheses

Three research questions guided this study. Each study question had a related hypothesis.

Research question #1: "What is the relationship between maternal psychosocial factors and maternal competence for infant feeding?

Hypothesis: mothers with low levels of depressive symptoms, high levels of self-esteem, and positive reports of social support will have higher task-specific maternal competence, as defined by feeding knowledge, positive attitudes, and appropriate skills related to infant feeding. This hypothesis is decomposed into sub-hypotheses for the purpose of data analysis. For example:

- Depressive symptoms will be negatively correlated with infant feeding knowledge.
- Depressive symptoms will be negatively correlated with attitudes related to infant feeding.
- Depressive symptoms will be negatively correlated with skills related to infant feeding.

Research question # 2: What is the relationship of maternal psychosocial factors and general maternal competence?

Hypothesis: Mothers with low levels of depressive symptoms, high levels of self-esteem, and positive reports of social support would report higher feelings of general maternal competence.

Research question # 3: "What is the relationship between general maternal competence and maternal competence for infant feeding?

Hypothesis: High reports of maternal competence will positively correlate with knowledge, positive attitudes, and appropriate skills related to infant feeding.

Research Design

A descriptive, correlational, cross-sectional design was used for this study. Standardized and PI designed measures were collected from 67 first-time, adolescent mothers on personal attributes of self-esteem, depressive symptoms, social support, knowledge, attitudes, and skills related to infant feeding practices, and actual infant feeding practices.

Setting and Sample

The overall setting of this study was a metropolitan area (Nashville, TN) in the southeastern United States. The sample consisted of first-time adolescent mothers, age 15-22 years old, and their infant children, age 6 months to 12 months. Young women up to the age of 22 years old were included as adolescents to be able to capture young women who were 21 years old when they delivered their infant and may have just turned 22. Both the American Academy of Pediatrics and the National Association of Pediatric Nurse Practitioners consider the age of 21 to be the end of adolescence. The sample was recruited from two sites: (1) the Vanderbilt Pediatric Continuity Clinic, and (2) a Metro Nashville Davidson County Health Department WIC clinic.

Inclusion criteria for this study were: (1) first-time adolescent mother, age 15 to 22 years old, (2) willing and able to provide informed consent or assent, (3) the ability to read, comprehend, and speak English, and (4) having a child between 6 to 12 months old and (5) infant gestational age 30 weeks or greater.

Study exclusion criteria included: (1) inability to provide informed consent, (2) mother unable to read, comprehend, or speak English, (3) having a child with a chronic health or nutritional condition that affects the child's eating behaviors or health status (e.g., cleft lip or palate, Down Syndrome, PKU, Cystic Fibrosis, Prader Willi, and/or Cerebral Palsy), (4) infant gestational age less than 30 weeks and (5) the parent or legal guardian of the adolescent mother either wants to be involved in the study (i.e., participate in the interview with their daughter), provide consent for their daughter to be in the study, or states that they do not

want their daughter to participate. See explanation for exclusion criteria below.

Several factors contributed to the development of the exclusion criteria. Only English speaking families were included in this study because of the difficulties and expense related to translation services. Only first-time mothers were included to control for mothers who have prior experience and knowledge feeding an infant. Age limits on the children were set to allow for a more complete analysis of infant feeding patterns by including children old enough to be eating food and not just breastfed or formula fed. The exclusion of children with health and nutritional conditions that would affect their eating habits and overall health was necessary to control for the numerous confounds that these children would bring to this study. The examples given are all children who require special feeding methods or foods and formulas. It is assumed that parents of these children would have different beliefs and behaviors related to their children, or even unrealistic beliefs and behaviors. So, therefore, they were excluded. Only infants born at 30 weeks gestations or greater are included in the study, to help control for the extreme premature infants who have special feeding issues or requirements.

Adolescents who were underage were excluded if their parent or legal guardian wished to participate in the interview or were against their daughter participating. For this purpose, a waiver of parental consent was asked for and agreed to by the Vanderbilt University Medical Center Institutional Review Board. The reasoning for acceptance of assent only from participants aged 15-17 years old, in lieu of parental consent was: (1) the possible risk associated with parental

contact, (2) the possible absence of parents/ guardians of adolescent mothers from which to obtain consent, (3) minimal risk associated with the study; (4) the developmental capacity of adolescents (14 to 20 years old), (5) legal precedent for this request and (6) the need for more research focused on adolescent subjects. Approval was obtained from both the Vanderbilt University Institutional Review Board and the Metro Nashville Davidson County health Department IRB prior to initiation of any study activities.

Procedures

A power analysis was used to determine sample size. This sample size is ample enough to be able to detect relationships using correlational statistics, at a minimum of 53 subjects, to detect a correlation of .45, even at an alpha level of .01 and power of .80. Correlations of .35 to .55 are seen in the literature related to the variables of interest. This sample size was based on an effect size of .50, a power of .80, and an alpha level of .05 (nquery 5.0).

Prior to the initiation of data collection, approval was sought for this research proposal from the Vanderbilt Institutional Review Board (IRB) and the Metro Nashville IRB. Participants were identified by the PI through the daily clinic log of patients scheduled for appointments at the Vanderbilt Pediatric Continuity Clinic. Mothers who appeared to meet the inclusion criteria noted below were approached by the PI. At the WIC clinic, the PI approached mothers who appeared to have infants in the age range of interest. Informed consent or assent were obtained prior to data collection, after mothers agreed to participate.

All data gathering occurred before or after scheduled well baby checkups or WIC re-certification visits. The PI (SK) was responsible for administering and collecting all of the measures. Data were collected via interviews conducted face to face with the mothers. Mothers were also asked for permission to collect additional data (infant growth data) for use in future studies. These data were collected by chart review of the Vanderbilt STAR panel record and WIC records by the PI. Confidentiality of the parents and children was maintained by marking each group of questionnaires with an identifying code.

Measures

Personal and sociodemographic characteristics.

A PI developed demographic questionnaire to assess age, height and weight, identified ethnic group, marital status, household income level and level of education completed was used to collect descriptive data on the mother. Maternal BMI was calculated from these data by dividing weight in kilograms by height in meters squared, following the guidelines of the National Institute of Health (NIHLB, 1998). Validity of self-report of height and weight has been established previously and correlations between actual height and weight and self-report is high (r = .96) (Johnson & Birch, 1994). Additional descriptive data was also collected in regard to the infant's age, gestational age, and birth weight and length.

Information of child weight and height was gathered from the medical chart, as anthropometric measures are always gathered at well-baby or well-child

visits. BMI is not calculated for children under the age of 2 years, because normative values do not exist for children under the age of 2. For children under the age of 2 appropriate weight for length percentiles are available and will be used for future analysis.

Depressive symptoms.

The 20-item Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977) was used to measure depressive symptoms (see Appendix B). It includes components of depressed mood, feelings of guilt, worthlessness, hopelessness, loneliness, sleep and appetite disturbance, and psychomotor retardation. Respondents are asked to rate each symptom experienced during the prior week on a 4-point scale ranging from *rarely or none of the time* (0) to *most or all of the time* (3). A score is computed by reversing the ratings for the four positive items and then summing the ratings of all items, resulting in scores ranging from zero to 60. A cut-off score of 16 is used to distinguish between highly symptomatic subjects and others (Radloff, 1977). This cutpoint has been used in many other studies (Breslau, 1985; Burns et al., 1990; Hall et al., 1991; Lutenbacher, 1993; Wasserman et al., 1990) and corresponded to the 80th percentile in studies of community samples (Comstock & Helsing, 1976).

Previous studies have included community samples (Hall, 1990; Hall & Farel, 1988; Sachs & Hall, 1991; Radloff, 1977; Schoenbach, Kaplan, Grimson, & Wagner, 1982) and psychiatric patient samples (Ensel, 1986; Radloff, 1977). High internal consistency was reported in these studies. The coefficient alphas ranged from .84 to .90 (Breaslau, 1985; Hall, 1990; Lutenbacher, 1993; Radloff,

1977). Recent use of the CES-D among community based populations of mothers has been justified by the continued reporting of the scale as valid and reliable, without reporting of the specific sample alpha coefficients being calculated (Deal & Holt, 1998; Chung, McCollum, Elo, Lee, & Culhane, 2004).

Evidence for the concurrent validity of the CES-D also has been reported. The scale correlated highly with other self-report depression scales in both community samples and psychiatric patients (Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). CES-D scores differentiated between clinically depressed and nondepressed patients (Radloff, 1977). The CES-D also differentiated between acutely depressed patients and others patients with other psychiatric diagnoses (Weissman et al., 1977). Cronbach's alpha in this sample was .87.

Self-Esteem.

Self-esteem was assessed with the Rosenberg Self-Esteem Scale (RS-E; Rosenberg, 1965), a 10-item measure of global self-esteem (see Appendix B). Respondents are asked to rate each of the items on a 5-point scale from *strongly disagree* (1) to *strongly agree* (5). A summary score is obtained by reversing the ratings for the five negative items and adding them with the five positive items and subtracting 10 so that scores range from zero to 40.

Good internal consistency of the RS-E has been reported in previous research (DeLongis et al., 1988; Rosenberg, 1979). In a sample of married couples, DeLongis et al. (1988) reported a coefficient alpha of .78. Cronbach's alpha in this sample was .77. Previous researchers have found a consistent

negative correlation between the RS-E and depressive symptoms (Burns et al., 1990; Miller et al., 1989; Wasserman et al., 1990). There also has been some consistency in correlations between the RS-E and measures of daily hassles or stress. High scores on the RS-E were inversely related to high stress levels (DeLongis et al., 1988; Miller et al., 1989). These findings support the construct validity of this instrument. Mercer and Ferketich (1995) report Cronbach's alpha coefficients ranging from .84 to .90 in a population of experienced and inexperienced mothers. Further supporting the reliability of using the Rosenberg with adolescent mothers, McVeigh and Smith (2000) reported an alpha coefficient of .85 for the RS-E when used with teenage mothers.

An error was made in the presentation of one of the Rosenberg items during the interview process of this study. Instead of asking the question "I certainly feel useless at times" the question was mistakenly asked as "I certainly feel useful at times." Instead of calculating five positively worded items and five negatively worded items, six items were asked in a positive fashion and four in a negative fashion. The alpha coefficient for the full scale, with the incorrect item, was .77. Had the item been removed, the alpha coefficient would have increased to .79. For the purpose of the analysis, the complete scale score was used, with the slightly lower Cronbach's alpha.

Functional social support.

Functional social support was measured using the Duke-UNC Functional Social Support Questionnaire (FSSQ; Broadhead, Gehlbach, de Gruy, & Kaplan, 1988). This eight item scale assesses two aspects of social support: confidant

or functional support and affective support. It was developed for clinical use in family practice settings and for use in research application to identify the interactions between social support and other determinants of health. The focus of the questions is on the quality, not necessarily the quantity of social support (McDowell & Newell, 1996).

Of the eight items, numbers 1, 2, and 8 address affective support and the remaining five address confidant support (identifying a relationship in which important life concerns can be discussed). Answers on the five-point scale can range from “as much as I would like” to “ much less than I would like” (McDowell & Newell, 1996). A total score is calculated by adding the scores, with higher scores indicating greater functional support. For the purpose of this study, the total scale score was used.

Initial test-retest reliabilities, done in a two-week time period, ranged from 0.50 to 0.77 for all 14 items initially tested on the scale. For the final eight items, item-total correlations were 0.62 for confidant support and 0.64 for affective support (Broadhead, et al., 1988; McDowell & Newell, 1996). The FSSQ has also been shown to correlate with other social support measures (Broadhead et al., 1988), supporting construct validity of the scale. Cronbach’s alpha for the scale ranges from .78 to .89 in studies in the literature that use the scale with mothers (Hall, Gurley, Sachs, & Kryscio, 1991; Hall, Sach, & Rayens, 1998; Sachs, Hall, Lutenbacher, & Rayens, 1999). Cronbach’s alpha in this sample was .84.

Informational and problematic social support related to infant care.

For the purpose of this study two subscales from the Revenson and Schiaffino Social Support Measure were used: informational (5 items) and problematic support (4 items). The total scale was originally designed for use with an adult population of arthritis sufferers and was meant to be used with a partnered couple to measure synchronous support. Revenson and Schiaffino's (1989) original scale was developed with a strong theoretical and empirical framework. The complete original scale has 20 items that tap positive support (16 items) and problematic support (4 items). Alpha coefficients ranged from .66 for problematic interactions to .86 for identification of emotional support in Revenson and Schiaffino's (1989) original testing.

The scale originally asked respondents to think about how their spouse responded to them when they were having pain because of their arthritis. That question was changed to ask the adolescent mothers who they thought of when they needed to talk to or ask advice when they had questions regarding the care of their infant and then how that individual responded to them when they needed help or information. This is a new way to use these subscales, but seems to be a logical application of the original intent of the scale. Higher scores on the informational subscale indicate positive reports of support from the named support person when mothers were seeking advice on how to care for their infants. Higher scores on the problematic subscale indicate more negative responses (i.e, annoyance or unhelpful or upsetting information) from the named support person when mothers were seeking advice on how to care for their

infants. For this population the Cronbach alpha coefficient for the 5 item informational support scale was .69 and the coefficient for the 4 item problematic support scale was .56.

Generalized maternal role competence.

To measure generalized maternal role competence the Parenting Sense of Competence Scale (PSOC) was used. The PSOC was developed in 1977 to measure "self-esteem in the parenting situation, with reference to the subject's own infant" (Gibaud-Wallston, 1977, p. 41). This 17 item scale has two moderately correlated subscales (r = .34 for mothers): Skill/Knolwedge (8 items) and Valuing/Comfort (9 items). The Skill/Knowledge subscale measures parents' perceptions of the degree to which they have acquired the skills and understanding to be a good parent. The Valuing/Comfort subscale assesses the degree to which the individual values parenthood and is comfortable in that role. The subscales can be scored separately or combined for a total score, as was done in this study, with higher scores indicating a higher perception of maternal competence (Gibaud-Wallston, 1977). Gibaud-Wallston (1977) reported numerous findings that support the internal consistency, reliability, and convergent and discriminant validity of the PSOC. The PSOC also has been found to correlate highly with other measures of parental attitudes, such as the shortened form of the Maternal Attitude Scale (MAS) (Gibaud-Wallston, 1977).

The 17 items of the PSOC are rated on a 6 point scale from strongly agree to strongly disagree. Sample questions include "Being a parent is manageable, and any problems are easily solved," and "I honestly believe I have all the skills

necessary to be a good mother to my baby." The PSOC has been used in the literature related to maternal role attainment and competence. Mercer and Ferketich (1994, 1990a, 1990b) have used the PSOC in several studies of mothers and infants and report Cronbach's alpha coefficients ranging from .82 to .87. Sadler, Anderson, and Sabatelli (2001) used the PSOC with a population of African American adolescents and reported a Cronbach's alpha coefficient of .71. Cronbach's alpha in this sample was .73.

Table 1. Psychosocial measures

Variable	Measure	Number of Items	Cronbach's α
Depressive Symptoms	CES-D	20	.87
Self-esteem	Rosenberg	10	.77
Functional Social Support	Duke – UNC	8	.84
Informational Support for Infant Care	Informational Social Support Subscale	5	.69
Problematic Support for Infant Care	Problematic Social Support Subscale	4	.55
General Maternal Competence	Parenting Sense of Competence Scale (PSOC)	17	.73

Task specific maternal role competence.

To assess task-specific maternal role competence, defined as having the specific range of skill, knowledge, and ability for the task of infant feeding, two tools were used. To assess maternal knowledge and attitudes related to infant feeding, the 20 item Infant Feeding Questionnaire (IFQ; Baughcum, Powers, Johnson, Chamberlin, Deeks, Jain, et al., 2001) was used. To assess maternal

skill for infant feeding an author developed Infant Feeding Survey with 24 hour diet recall was used.

The IFQ (Baughcum et al., 2001) is a seven-factor, 20 item scale that assesses maternal attitudes and behaviors related to infant feeding. The IFQ was developed in order to assess contextual factors in child feeding that may be related to childhood overweight. The four subscales of the IFQ that are of interest for this project include: concern about infant undereating or becoming underweight , concern about infant's hunger, awareness of infant hunger and satiety cues, and concern about infant overeating or becoming overweight. Only four of the original seven subscales were used for analysis as the original authors reported they were most significantly associated with maternal and childhood weight status (Baughcum et al., 2001). Scale scores were created by calculating mean scores of the items included on each factor. The complete IFQ was initially piloted with a sample of adult women from diverse socioeconomic backgrounds. These women were assessed not only for their income status, but their Body Mass Index and their child's weight status was also measured, to investigate the relationship of these factors to their attitudes related to infant feeding practices.

Cronbach's alpha coefficients were calculated for each of the factors/subscales of the IFQ. An alpha coefficient of .71 was reported for the four item subscale, concern about infant undereating or becoming underweight, while the second factor, concern about infant's hunger had an alpha of .74 and consisted of three items. The third subscale, awareness of infant's hunger and

satiety cues, consisted of four items and had an alpha coefficient of only .65. The fourth subscale, concern about infant overeating and becoming overweight, consisted of three questions and had a reported Cronbach's of .55. (Baughcum et al, 2001). For the sample of adolescents mothers for this project, the Cronbach's for the four subscales were .77, .73, .47, .46, respectively.

An initial finding from the pilot test of the IFQ with the population of 453 adult mothers was that "regardless of children's weight in the second year of life, obese mothers reported more concern about their infant undereating or becoming underweight" (Baughcum et al., 2001, p. 398). Further examination of this relationship determined that this effect may be primarily related to the association between low SES and maternal obesity. In addition, variations were seen among the women when grouped by income group. A weak association was noted between mothers with a low income and concern about her infant overeating or becoming overweight and the actual overweight status of the infant, while a much stronger association was noted in the high income group of women (Baughcum et al., 2001).

Table 2. Infant feeding questionnaire subscales

Variable	Name	Number of Items	Cronbach's α
Concern about Undereating and for Being at Risk of Underweight	IFQ 1	4	.79
Concern about Hunger	IFQ 2	3	.74
Awareness of Hunger Cues	IFQ 3	4	.46
Concern about Overeating and for Being at Risk for Overweight	IFQ 4	3	.45

The Infant Feeding Survey included questions such as initial type of infant feeding, current type of feeding, reasons for discontinuation of breastfeeding, sources of support, type, number and quantity of feedings, timing of introduction of solid foods, and the quantity of additional non-milk beverages in the infant's diet, including water intake. Additionally, the mothers were asked general knowledge questions related to the timing and introduction of foods for infants in general. Average daily fluid intake of the infants was determined from 24 hour diet recall histories that were obtained from the mothers. Mothers were asked to recall what their infants ate on a typical day, using the past 24 hours for identification of specific fluids and foods. Attempts were made to calculate liquid intake for breastfed infants by asking mothers to weigh their child before and after an episode of breastfeeding, to calculate change in weight by ounces, which would equate to fluid ounce intake of breastmilk. Because of time constraints, no

mothers were able or willing to weight their infant after nursing. Therefore, for purpose of formula or milk intake calculation, only 62 infants were evaluated, excluding the five infants who still were nursing to some degree.

Versions of this questionnaire have been used in two identified studies in which both authors report content validity being established by experts in infant nutrition (Barton, 2001; Solem et al., 1992). The questionnaire was reviewed by a dietician on staff at the Vanderbilt University Medical Center to refine questions to assess 24 hour diet recall. The Director of the WIC clinics also reviewed the questionnaire and provided valuable critique as to how to best pose questions.

Assessment of infant feeding knowledge score.

To specifically assess knowledge related to infant practices among the adolescent mothers, seven questions were asked as part of the infant feeding survey to develop a total score of knowledge related to infant feeding practices. Mothers were questioned as to when the appropriate age was to start an infant on solid food, when one should introduce an infant to eggs, peanut butter, and honey. They were also asked when was an appropriate age to begin table food, introduce cow's milk to an infant, and when to transition an infant from using a bottle to a "sippy cup." As there are few standardized national guidelines as to when exactly foods should be introduced, a range of answers was considered acceptable for each question. For example, the common accepted age by the American Academy of Pediatrics (AAP, 2004) for starting infants on cow's milk is one year of age. Therefore, answers in the range of 11 to 13 months were coded as correct. A question such as "when should a baby start table food" was given a

broader range of choice for a correct answer (7 to 13 months) to allow for the difference in development status of infants. Answers were coded in a correct/incorrect fashion, with appropriate answers being coded a 1 and inappropriate answers being coded 0 and then added to calculate a total score. A high of seven was possible and represented high knowledge related to infant feeding practices. Lower scores represented less knowledge of infant feeding practices.

Assessment of infant feeding skill score.

A total score of infant feeding skill was created. Mothers were questioned about nine specific feeding practices. Mothers were asked as to when they started their infant on solid food, whether cereal was the first food introduced, whether they used a feeder bottle, whether they watched television while feeding her infant, whether their infant drank more than the recommended quantities of juice and water in a day, the quantity of formula or milk in a day, and how she mixed infant formula. Similar to calculating the knowledge score, a range of answers was considered acceptable for some of the questions, such as age of first food (4 to 6 months). Other behaviors were simply coded as yes or no, such as watching TV or use of a feeder bottle. Practices such as the amount of water and juice were determined using national standards that recommend no more than 6 ounces of juice and no more than 8 ounces of water a day for infants between the ages of six to twelve months old (AAP, 2004; www.chop.edu/consumer/index.jsp). Answers were coded in a yes/no fashion, with appropriate answers being coded a 1 and inappropriate answers being

coded 0 and then added to calculate a total score. A high of nine was possible and represented positive or appropriate infant feeding behaviors. Lower scores represented less positive behaviors.

Table 3. Knowledge and practice scores of infant feeding

Name	Number of Items	Cronbach's α
Knowledge score	7	.51
Practice score	9	.44

Data Analysis

Both qualitative and quantitative data were collected for this project. To answer the identified research questions, only quantitative analysis was performed for this project. Quantitative analysis occurred at the univariate, bivariate, and multivariate levels. Univariate statistics were used to describe the participant sample characteristics. Bivariate analysis, in the form of Pearson product moment correlations, was used to evaluate the relationship between continuous variables. To supplement the quantitative analysis, counts were performed of some of the mothers' comments related to feeding and starting of foods. Although not originally planned in the preparation for this study, a decision was made to conduct further analysis using student t-tests to investigate between group differences and exploratory multiple regression equations to further evaluate the relationship among numerous variables. Quantitative

analysis was facilitated with the use of SPSS (13th edition) software. Future qualitative analysis of data will include the content analysis of narrative notes and observations, looking for similar themes and constructs reported by the mothers related to their infant feeding practices and opinions related to being a mother. More details are provided in Chapter IV Findings.

CHAPTER IV

FINDINGS

Introduction

This chapter includes a description of the study sample and the results of the statistical analyses performed to answer the study questions and hypotheses. These results are followed by further bivariate evaluation of the sample, specifically t-tests, to evaluate between group differences related to racial identity, feeding practices, and interview location. An exploratory multivariate analysis of the data also is presented in the form of multiple regression analysis of the study variables of interest.

Sample Characteristics

From March of 2006 until April of 2007, a total of 70 first time adolescent mothers were recruited by the PI from the Vanderbilt Pediatric Continuity Clinic and one of the WIC clinics in Metro Nashville Davidson County. Complete data were obtained on 67 young women and are presented. The majority of participants were recruited from the Vanderbilt Clinic (n=61), with the remainder recruited from a WIC clinic (n=12). Three of the mothers that were interviewed at the WIC clinic, also were patients at the Vanderbilt Clinic.

An overview of maternal characteristics is presented in Table 4. The mean age of the adolescent mothers was 19.5 years. They had, on average, 12 years of education. Over half (65.7%) identified themselves as being of African-

American descent. The majority of mothers had insurance through the state Medicaid program (82%) and lived in households with an annual income under $25,000 (75.8%). Only 22.4% of the adolescent mothers reported that their infant was in daycare. From anecdotal discussion with the young women, many reported keeping their children at home with them, or in their mother's house, which served as an in-home daycare. Of the women that indicated they were working, many reported working at retail positions that offered flexibility of work schedules.

Few of the women reported being married, but almost half (47.8%) identified themselves as dating and/or engaged to be married. Numerous living arrangements were identified by the participants. See Table 4. Almost 15% of the mothers reported living alone with their infant, while 38.9% lived with their own mothers and 25.4% lived with the father of their baby. Of the 31 women who (46.3%) reported living with their boyfriend or partner, 60% reported being with the father of their infant.

Table 4. Maternal characteristics

Maternal Characteristics n=67				
	Mean (SD)	Range	Skewness (SE)	Kurtosis (SE)
Age	19.5 (1.5)	15-22	-.55 (.29)	.42 (.58)
Education	12(1.5)	8-16	-.14 (.29)	.87 (.58)

Race/Ethnicity	**N**	**%**
Black/African American	44	65.7
White	19	28.4
Asian	2	3.0
Other	2	3.0
Medical Insurance		
Tenn Care	55	82.1
Private	10	14.9
No Insurance/Self-Pay	2	3.0
Household Income		
< $10,000	21	31.3
$10,000 – 15,000	12	17.9
$15,001 – 20,000	9	13.4
$20,001 – 25,000	8	11.9
$25,001 – 30,000	4	6.0
$34,001 – 35,000	4	6.0
> $35,000	8	11.9
Marital Dating Status		
Single	31	46.3
Dating/Engaged	32	47.8
Married	4	6.0
Who do you live with?		
Self	10	14.9
My mother	20	29.9
Father of Baby (FOB)	17	25.4
My grandmother	5	7.5
My mother and the FOB	4	6.0
FOB and his mother	6	9.0
Boyfriend (BF)	1	1.5
My mother & my BF	2	3.0
My father & my BF	1	1.5
My father	1	1.5

Body Mass Index (BMI) was calculated from self-reported height and weight for each of the women. BMI values ranged from 17.23 to 49.24, with a mean score of 26.74 (SD 7.3). The majority (52%) of the sample had a BMI greater than 25, with 26.9% of the women having a BMI greater than 30, which would categorize them as obese. See Figure 2 for a depiction of the samples' BMI distribution.

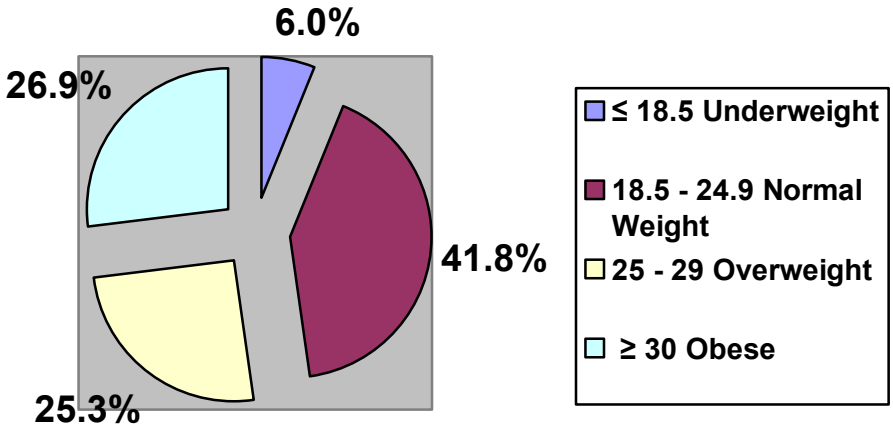

Figure 2. Maternal BMI distribution

Infant profile

The majority of the infants were female (61.2%), products of full term deliveries, and reportedly in excellent health. For those infants that the mothers reported them not being in excellent health, reasons included coughs and colds, being premature, and one mother reported that her infant was too active. The majority (80%) were enrolled in the WIC program. Tables 5 presents the profile of the infants of the adolescent mothers.

Table 5. Infant profile

Infant Profile n=67				
	Mean (SD)	Range	Skewness (SE)	Kurtosis (SE)
Age in months	8.45 (2.3)	5 -13	.254 (.29)	-1.21 (.58)
Gestational Age (in weeks)	39 (2.6)	30-42	-2.0 (.29)	5.0 (.58)

Sex of the Baby	**N**	**%**
Male	27	39.1
Female	42	60.9
Health of the Baby		
Fair	3	4.5
Good	12	17.9
Excellent	52	77.6
WIC		
Yes	53	79.1
No	14	20.9

Overview of Infant Feeding Practices

The scope of infant feeding practices assessed consisted of such things as the initial feeding method (i.e., breastfeeding versus formula feeding), volume of fluid intake, the timing of introduction of secondary or complimentary foods, and the use of feeders and "sippy cups." To provide a context for the presentation of findings, the national recommendations and/or guidelines related to specific practices are presented below in an informational box (see Table 6) followed by study findings.

Table 6. Recommended infant feeding practices

Recommended Infant Feeding Practices

- **Breastfeeding:**
  - Preferred feeding type for all infants, with rare exceptions
  - *Healthy People 2010:* Goal to increase proportion of mothers who breastfeed their infants to:
    - 75% in the early postpartum period
    - 50% at 6 months of age
    - 25% at 1 year of age
- **Daily Intake:**
  - Breastfeeding:
    - 4 to 6 episodes a day for a 6 month old
    - 3 to 4 episodes a day for a 12 month old
  - Formula:
    - 28 - 32 oz. a day for a 6 month old
    - 30 - 32 oz. a day for 7 to 9 month old
    - 24 - 30 oz. a day for a 10 to 12 month old
  - Whole Cow's Milk:
    - No more than 24 oz a day for a 12 month old
    - Low fat milks not recommended under the age of 2 years
  - Juice:
    - No more than 4 to 6 oz. a day & none < 6 months of age
  - Water:
    - ≤ 8 oz. day for an infant aged 6 to 12 months old
  - Infants should naturally begin requiring less formula or breastmilk as secondary foods and juice are introduced,
- **Secondary foods:**
  - Should not initiate until 4 - 6 months of age and with a spoon
  - Start with single grain cereals: introduce new food every 5 – 7 days
    - No specific recommendation for timing of introduction of food groups
    - Common advice of vegetables 1st, fruits 2nd, meats 3rd not supported by literature, but frequently recommended
  - 2 (6 month old) to 4 (12 month old) servings of fruits and vegetables a day are recommended

Sources: (AAP, 2004, 2005; Butte, Cobb, Dwyer, Graney, Heird, & Rickard, 2004; www.chop.edu/consumer/index.jsp; (Li, Zhao, Mokdad, Barker, & Grummer-Strawn, 2003)

Initial infant feeding practice.

About half (n=34; 50.7%) of the mothers interviewed for this study reported attempting to breastfeed their infant. Ten mothers (29.4%) reported continuing to breastfeed their infant up to or past six months of age, with two of these mothers breastfeeding their infants until one year of age and one reporting that she would breastfeed until at least one year of age (her infant was six months old at the time of the interview). When asked why they had stopped nursing prior to their infant being six months of age, frequent responses included: decreased milk production/not enough milk, pain or soreness, and infant fussiness. Reasons reported by mothers who did not attempt to breastfeed included: not being interested in breastfeeding, thinking breastfeeding was "weird," and the mother and/or infant being ill after the delivery. See Table 7 for a complete depiction of initial infant feeding type and length of breastfeeding.

Table 7. Type of initial infant feeding

Type of Initial Infant Feeding N=67		
	N	%
Bottlefed	33	49.3
Breastfed	34	50.7
Length of Breastfeeding		
	N	%
1-2 days	2	5.9
1 -3 weeks	4	11.4
1 – 5 months	18	52.9
6 months +	10	29.4

Daily fluid intake.

An overview of daily fluid intake is presented in Table 8. The daily intake of formula, juice, and water of the infants was examined based on accepted standard amounts. It is noted that the mean age of the infants at the time of interview was 8.45 months (SD 2.3, range 5 to 13 months). Average daily fluid intake of the infants was determined from a 24 hour diet recall obtained from the mother. Mothers were asked to recall what their infants ate on a typical day, using the past 24 hours for identification of specific fluids and foods. The majority (92.5%, n = 62) of the infants were drinking either formula or cow's milk, with a mean daily intake of 31.5 ounces (SD 13, range 6 to 80 oz.). Four percent of the infants (n = 3) were being given low fat cow's milk. One mother reported an atypical daily intake for her infant of only six ounces of cow's milk in a day, stating that her infant was on "strike" as she had stopped breastfeeding the day before, when the infant turned one year of age. The extreme opposite was true of an infant that the mother reported drank 80 ounces of formula a day. This mother reported that she typically gave her infant numerous bottles a day, she also verbalized that she bought significant amounts of extra formula each month, beyond that which was provided by the WIC program. Overall, the majority of infants consuming formula or milk (79%, n = 53) were consuming less than 40 ounces a day, with the largest group (44.8%, n = 30) consuming less than or equal to 24 ounces of formula or milk a day. Attempts to quantify the amount the breastmilk consumed by infants in a feeding, through pre and post feeding weights were unsuccessful, thus only quantities of formula or milk are presented.

Table 8. Amount of formula/milk intake a day by age group

Amount of Formula Intake a Day by Age Group						
	6 mos. old infants		7 to 9 mos. old infants		10 to 12 mos. infants	
Recommended amount of formula	28 to 32 oz.		30 to 32 oz.		24 to 30 oz.	
	6 mos. (n =24)		7 to 9 mos. (n = 21)		10 to 12 mos. (n = 22)	
Actual amount of formula	N	%	N	%	N	%
≤ 24 oz.	10	41.7	11	52.4	8	36.3
25 to 32 oz.	**2**	**8.4**	**2**	**9.5**	**5**	**22.7**
33 to 40 oz.	7	29.1	3	14.3	5	22.7
≥ 40 oz.	3	12.5	3	14.4	3	13.5
NA…Breastfed only	2	8.3	2	9.5	1	4.5

In addition to formula intake, the majority of infants were also drinking fruit juice and water on a daily basis. Almost 45% (n = 30) of the mothers reported that their infants were drinking more than six ounces a day of juice (m=6.6 oz, SD 6.0, range 0 to 32 oz.). From discussion with the mothers, many reported "halving" the amount of juice that their infants drank at one time, by adding water to the bottle. Approximately 21% (n = 14) of the mothers reported giving their infant sips or small amounts of soda, tea, sports drinks, and/or fruit punches. Three mothers (4.5%) reported that their infant drank tea on a daily basis. In addition, two mothers (3%) reported that their infants drank fruit punch or "kool-aid" instead of juice. Refer to Table 9.

Table 9. Infant intake of juice in a day

Amount of Juice a Day n = 67		
Recommended amount:	4 to 6 oz. a day	
	N	%
None	12	17.9
< 4 oz.	4	6
4 to 6 oz	21	31.3
> 6 oz	30	44.8

The average intake of water for the infants, on a daily basis, was 4.6 ounces (SD 5.1), with some infants not drinking any additional water and one drinking as much as 18 ounces a day. Thirty four percent of infants (n = 23) were drinking more than the recommended amount of water. Two mothers reported adding sugar to the water to make it more palatable. Refer to Table 10. Table 11 provides an overview of the average daily amount of formula, juice, and water intake of the infants.

Table 10. Infant intake of water in a day

Amount of Water a Day N = 67		
Recommended amount:	Maximum of 8 oz. a day	
	N	%
≤ to 8 oz	44	65.7
≥ 9 oz	23	34.3

Table 11. Daily liquid Intake in ounces

Amount of Liquid Intake in Ounces (oz.)					
	Recommended amount a day	Mean (SD)	Range	Skewness (SE)	Kurtosis (SE)
Formula or Milk n=62	24 to 32 oz. a day, based on age	31.5 oz. (13.0)	6-80	1.1 (.30)	2.2 (.59)
Juice n=69	≤ 6 oz. a day	6.6 oz.(6.0)	0-32	1.7(.29)	4.4(.58)
Water n=68	≤ 8 oz. a day	4.6 oz.(5.1)	0-18	1.0 (.29)	.17 (.58)

Secondary or complementary foods.

For this sample, the addition of secondary or complementary foods began, for most infants, with the addition of infant cereal to the bottle. Almost 80% (n = 53) of the mothers reported putting cereal in their infant's bottles. A little more than half of the infants (52.8%, n =28) were given cereal in their bottle prior to the recommend minimum age of four months. When asked why they added cereal to their infant's bottles a high proportion of mothers (40.2%, n = 21) responded that their infant was not full on formula alone and therefore was fussy. In addition, numerous mothers (23.9%, n =12) reported adding cereal to the bottle to help the infant sleep longer at nighttime. Only five mothers (2.7%) reported adding cereal to the bottle to help with infant reflux/spitting.

When asked what and when was the first food offered via a spoon, only 15 (22.4%) mothers gave cereal as the first food from the spoon. The majority of mothers (85%, n = 57) did report giving solid food in the recommended ages of four to six months, however, the majority had already given cereal in the bottle. When asked how they knew when their infant was ready for more food than just

formula or breastmilk, 56.7% (n = 38) of the mothers responded that their infants were fussy and crying as if they “were not satisfied”, while 32.8% (n = 22) reported signs of interest in food such as staring, mouthing/chewing behaviors, and reaching for food as signs of readiness. Only five mothers (7.5%) reported that infants are ready for food when they have reached developmental milestones such as sitting. Table 12 provides an overview of the time frames when mothers introduced cereal in the bottle, while Table 13 depicts if cereal was the first food offered to an infant from a spoon. Refer to Table 14 for depiction of the timing of introduction of solid baby food from a spoon.

Table 12. Age when given cereal in the bottle

Age in months when given cereal in the bottle n=53		
Month	N	%
< 4 months	28	52.8
4 to 6 months	**23**	**43.4**
> 6months	2	3.8

Table 13. Cereal as first food offered

Cereal as first offered food from a spoon n=67		
	N	%
No	53	77.6
Yes	15	22.4

Table 14. Age in months when given solid food

Age in months when given solid baby food from a spoon n=67		
Month	N	%
< 4 months	8	11.9
4 to 6 months	**57**	**85.1**
> 6months	2	3

The number of servings of fruits and vegetables that the mothers reported feeding to their infants was evaluated by comparing the amount of daily intake among the infants by age groups. Table 15 depicts the numbers of servings that all infants were being fed. One mother reported that she had not even tried feeding her infant any vegetables because she thought the baby would not like them. Other mothers incorrectly identified macaroni and cheese as a vegetable.

Table 15. Servings of fruits and vegetables a day

Servings of Fruits and Vegetables a Day **One serving equal to one small jar of baby food**		
	N	%
None	12	17.9
1	18	26.9
2	21	31.3
3	8	11.9
4	6	9.0
NA	2	3.0

Given that the infants of these mothers were between the ages of six to 12 months, the number of servings of fruits and vegetables was also evaluated across age groups. Three groups of infants were evaluated, using the age ranges of six months, seven to nine months, and ten to twelve months as the time points to separate the groups. Given national recommendations, the younger infants should have been eating a minimum of one to two servings of fruits and/or vegetables a day. As the infants age closer to one year of age, servings should increase to four servings a day (AAP, 2004; www.chop.edu./consumer/your_child/condition_section_index.jsp). Among the infants that were 6 months of age (n =24), the majority of infants were being given two or more servings of fruits and vegetables a day (54.2%, n = 13). Two infants were not eating anything other than infant cereal and had not been introduced to any other foods. Refer to Table 16.

Of the infants aged seven to nine months old (n = 21), only 14.3% (n =3) of the infants were receiving the recommend amount of fruits and vegetables. Among the ten to twelve month old infants (n = 22), the number that were receiving the recommend number of fruits and vegetables was only 2 (9.1%) Six (27.3%) were not eating any fruits or vegetables a day. Table 15 depicts the total number of servings of fruits and vegetables by age group and reports the minimum recommended number of servings per age group.

Table 16. Servings of fruits and vegetables a day, by age group

Servings of Fruit and Vegetables a Day by Age Group **One serving equal to one small jar of baby food**						
	6 mos. old infants		7 to 9 mos. old infants		10 to 12 mos. infants	
Minimum Recommended # of servings	2		4		4	
	6 mos. (n =24)		7 to 9 mos. (n = 21)		10 to 12 mos. (n = 22)	
Actual number of servings	N	%	N	%	N	%
None	3	12.5	3	14.3	6	27.3
1	6	25.0	6	28.6	6	27.3
2	**10**	**41.7**	6	28.6	5	22.7
3	2	8.3	3	14.3	3	13.6
4	1	4.2	**3**	**14.3**	**2**	**9.1**
NA (not introduced yet)	2	8.3				

Use of bottle, feeders, and sippy cups and feeding location.

The majority of the infants still used bottles, with only six of the 67 (9%) using a cup exclusively. Many of the mothers were just beginning to introduce "sippy" cups to their infants, with the majority (n = 45) of infants having been introduced to them. The majority of infants (79%, n = 31) attempting to use "sippy" cups were first introduced when they were more than 8 months of age. Almost 20% (n = 13) of the mothers also reported using "feeder" bottles, rather than a spoon, to feed their infants. Finally, in response to the question "where does your baby eat," 39 of the mothers (58.2%) reported feeding their infant in either the living room or the bedroom while they watched television.

Results from discussion with the mothers.

Open ended questions were used to obtain further information regarding the diets of the infants. Responses added more specific information regarding the adolescent mothers feeding practices. Aside from simple infant foods of pureed fruits, vegetables, and meats, many of the infants were being fed additional food from the table. Mashed potatoes and macaroni and cheese were noted by the majority (56.7%) of mothers to be foods that they had introduced to their infants. French fries were frequently noted to be given to the infants and a few mothers stated that french fries were a favorite food of their infant. Numerous mothers reported that their infants were eating predominately table food, as long as it could be mashed to a consistency that could be "gummed" by their infant. Several mothers (n = 3) also described how they pre-chewed table food for their infant to then eat. Additional foods that were noted by the mothers included eggs, potato chips, cheese puffs, pizza, peanut butter and crackers, ramen noodles, Vienna sausages, and even crab meat.

Sources of information related to infant feeding practices.

The majority (n = 52, 77.6%) of the adolescent mothers reported relying on themselves, their mothers, or their grandmothers for information regarding how and what to feed their infants. Only eight mothers (11.9 %) reported a healthcare professional as being the most influential person in telling them how to feed their infant. Table 16 depicts the individuals that the adolescent mothers identified as being influential in telling them how to feed their infants.

Table 17. Influential person related to infant feeding

Who was most influential in telling you how to feed your baby? (n = 67)		
	N	%
Self	21	31.3
My mother	16	23.9
My Grandmother	15	22.4
Other Female Relative	3	4.5
Professional (MD/NP/RN)	8	11.9
Father of the baby	4	6.0

Infant Feeding Knowledge Score

To determine the range of knowledge related to infant practices among the adolescent mothers, seven questions were asked to develop a total score of knowledge related to infant feeding practices, as noted in Chapter III on page 90. Answers were coded in a correct/incorrect fashion and then added to calculate a total score. A high of seven was possible and represented high knowledge related to infant feeding practices. Lower scores represented less knowledge of infant feeding practices. For the sake of clarity, scores for the seven individual items are depicted in Table 18 in a correct/incorrect fashion for ease of reading. The distribution of practice scores is shown in Table 19.

Many mothers reported being unaware of information regarding starting foods that could potentially be allergenic or put their children at risk for infection. When asked if they were aware of any information on the timing and introduction of eggs to the diet of an infant, 76% (n=51) reported being unaware. Approximately 64% (n = 43) were unaware of the appropriate time to wait to introduce peanut butter to their infant. Only 43.3% (n=29) were aware of the

potential hazards of introducing an infant under one year of age to honey. Of the mothers that were aware of the risk of honey, very few could actually verbalize the risk for botulism infection. Mothers just reported knowing that you should not give an infant honey.

When asked the question “when should a baby be started on table food,” approximately 35% of the mothers gave an incorrect answer. From discussion with these mothers, many stated that deciding when to give a baby table food was an arbitrary decision by the mother, when she thought that the “infant was ready.” Similar to discussion with the mothers as to why they initially started feeding their infants baby food, the mothers reported giving infants table food when they reached for food and appeared “interested.”

Table 18. Report of individual knowledge questions used to calculate total practice score

Knowledge Score Items (n = 67)				
	Correct answer		Incorrect Answer	
	Frequency	Percentage	Frequency	Percentage
When should you start a baby on baby food? Answer in the range of 4 to 7 months	57	85.1	10	14.9
When should you start eggs? Answer in the range of 6 to 12 months	16	23.9	51	76.1
When should you start peanut butter? Answer "after 2 years of age."	24	35.8	43	64.2
When should you start honey? Answer "after one year of age"	29	43.3	38	56.7
When should you start table food? Answer in the range of 7 to 13 months	43	64.2	24	35.8
When should you start giving a baby cow's milk? Answer in the range of 11 to 13 months	52	77.6	15	22.4
When should a baby stop using a bottle? Answer in the range of 10to 14 months	46	68.7	21	31.3

Table 19. Range of knowledge scores

Knowledge Score Range 0 to 7		
Score	N	Percentage
1	3	4.5
2	8	11.9
3	17	25.4
4	16	23.9
5	9	13.4
6	10	14.9
7	4	6.0

Infant Feeding Practice Score

To determine a score related to the infant feeding practices of the adolescent mothers, nine practices were identified from the responses given by the mothers to the infant feeding questionnaire and used to develop a total score of appropriate infant feeding practices. As noted in Chapter III, on page 91, nine behaviors related to their infant feeding practices were identified from the mothers' responses. The nine identified practices were coded in a positive/negative fashion and added to calculate a total score. A high of nine was possible and represented positive or appropriate infant feeding behaviors. Lower scores represented less positive behaviors. For the sake of clarity, scores for the nine individual items are depicted in Table 20 in a yes/no fashion for ease of reading. The distribution of practice scores is shown in Table 21. Table 22 presents the distribution of both knowledge and practice scores.

Table 20. Report of individual feeding practices used to calculate total practice score

Feeding Practice Score Items (n = 67)				
	YES		NO	
	Frequency	Percentage	Frequency	Percentage
Age 1st food Answer in the correct range of 4 to 6 months	**58**	**86.6**	9	13.4
Was cereal alone the 1st food the baby ate?	**15**	**21.7**	54	78.3
Is a feeder bottle used to feed your baby?	13	19.4	**54**	**80.6**
Do you feed your baby while watching TV	39	58.2	**28**	**41.8**
Does the infant drink ≤ 6 ounces of juice a day?	**37**	**55.2**	30	44.8
Does the infant drink ≤ 8 ounces of water a day?	**23**	**34.3**	44	65.7
Does the infant drink ≤ 32 ounces of formula/milk a day?	**42**	**62.7**	25	37.3
Is the formula or milk prepared correctly?	**49**	**73.1**	18	26.9
Infant is fed 2 or more servings of Fruit/Vegetables a day	**37**	**55.2**	30	44.8

- **bold numbers denote** if the answer is considered to be a positive practice

Table 21. Range of practice scores

Practice Score Possible Range: 0 to 9		
Score	N	Percentage
1	1	1.5
2	1	1.5
3	12	17.9
4	18	26.9
5	10	14.9
6	14	20.9
7	6	9.0
8	5	7.5

Table 22. Knowledge and practice scores of infant feeding

Knowledge and Practice Scores Related to Infant Feeding						
Name	**Items**	**Cronbach's α**	**Mean Score (SD)**	**Range of scores**	**Skewness (SE)**	**Kurtosis (SE)**
Knowledge score	7	.51	4 (1.5)	1 – 7	.15 (.29)	-.64 (.57)
Practice score	9	.44	4.9 (1.6)	1 - 8	.20 (.29)	-.55 (.57)

Assessment of Infant Feeding Attitudes

Assessment of maternal infant attitudes related to infant feeding practices, measured by four subscales (Concern about the infant undereating and/or being at risk for being underweight, Concern about hunger, Awareness of Hunger and Satiety Cues, Concern about the infant overeating and/or being at risk for being overweight) of the Infant Feeding Questionnaire, is presented in Table 23. Less

than 10% of the mothers reported some concern about their infant undereating or being considered underweight. In fact, responses on the second IFQ subscale illustrated that many of the mothers were more concerned about their infant being hungry. A moderate amount of the mothers (41.8%) reported that their infant was not always satisfied by formula or breastmilk alone and needed cereal in his/her bottle to sleep at night and stay full longer. The majority of mothers (97%) considered themselves very sure of their infant's hunger and satiety cues that would be signals as to when an infant needed to be fed and when an infant was full. Less than 5% of the mothers reported that they had some concerns about their infant overeating or becoming overweight.

Table 23. Infant feeding practices subscales of maternal attitudes related to feeding

Measures of Attitudes Related to Infant Feeding						
Name	**Number of Items**	**Cronbach's α**	**Mean Score (SD)**	**Range of scores**	**Skewness (SE)**	**Kurtosis (SE)**
IFQ 1: Concern about Undereating	4	.79	.53 (.83)	0 – 3.5	1.7 (.29)	2.3 (.58)
IFQ 2: Concern about Hunger	3	.74	1.6 (1.3)	0 - 4	.43 (.29)	-1.0 (.58)
IFQ 3: Awareness of Hunger Cues	4	.46	3.8 (.40)	2 – 4	-2.4 (.29)	6.6 (.58)
IFQ 4: Concern about Overeating	3	.45	.52 (.70)	0 – 2.7	1.3 (.29)	.75 (.58)

Assessment of Maternal Psychosocial Factors

Table 24 presents the mothers scores on the psychosocial measures of depressive symptoms, self-esteem, functional social support, informational social support, and problematic social support. The mean score on the CES-D was 14.87 (SD 10.2, range 0 to 41). Using a score of 16 as a cut point for high depressive symptoms (Radloff, 1977), 41.8% of the mothers had scores at or above this point. From discussion with these young women, many reported recent stressors in their life that influenced their response to the CES-D items. For example, one young woman reported that she was in the process of trying to

move out of her family's house, another reported having a "rough week" because her baby had not been sleeping well, and a third reported difficulties related to racial problems at her place of employment. Despite the amount of high depressive symptoms among these women, many reported moderate to high feelings of self-esteem as measured by the Rosenberg Self-Esteem scale (m=33.9, SD 5.8, range 13 - 40). High scores on the Rosenberg Self-Esteem scale indicate high subjective feelings of self-esteem.

The mothers reported high functional social support (m= 3.97, SD .98, range 1.4 – 5). Of the questions on the Duke UNC scale, an item that some mothers reported less positive support was "I get invitations to go out and do things with other people." Other responses that the mothers indicated less positive support were "I get chances to talk to someone about problems at work/school or with my housework and I get chances to talk to someone I trust about my personal and family problems." Although not a part of the main scale, the contextual lead in question was investigated as it identified the person the mother most often went to for advice. Women most often identified their own mothers (n = 40, 59.7%). The grandmothers of the adolescent mothers were next identified as the person they went to for advice (n= 13). Only 26.9 % (n=18) of the mothers reported that the support person they identified offered problematic support as they were seeking advice or information on how to care for their infants. Higher scores on the problematic subscale indicate more negative responses (i.e., annoyance or unhelpful or upsetting information) from the named support person when mothers were seeking advice on how to care for

their infants.

Assessment of the young mothers' general sense of maternal competence, as measured by the Parenting Sense of Competence Scale (PSOC) is also presented in Table 23. Scores ranged from of a low of 53 to a high of 102 (m= 81.4, SD 10.2). Higher total scores indicate a higher perception of maternal competence (Gibaud-Wallston, 1977).

Table 24. Maternal psychosocial measures

Maternal Psychosocial Variables							
Variable	**Measure**	**Items**	**Cronbach's α**	**Mean Score (SD)**	**Range**	**Skewness (SE)**	**Kurtosis (SE)**
Depressive Symptoms	CES-D	20	.87	14.87 (10.2)	0 - 41	.69 (.29)	-.32 (.58)
Self-esteem	Rosenberg	10	.77	33.9 (5.8)	13 - 40	-1.5 (.29)	2.72 (.58)
Functional Social Support	Duke – UNC	8	.85	3.97 (.98)	1.4 - 5	-.91 (.29)	-.11 (.58)
Informational Support for Infant Care	Informational Social Support	5	.69	21.8 (3.7)	11 - 25	-1.1 (.29)	.20 (.580)
Problematic Support	Problematic Social Support	4	.55	7.76 (3.7)	4 - 19	.92 (.29)	.20 (.58)
General Maternal Competence	PSOC	17	.73	81.2 (10.2)	53 - 102	-.24(.29)	-.07 (.58)

Relationship of Variables of Interest in Identified Research Questions

The broad research question that guided the study was, "What is the relationship between maternal psychosocial factors and maternal competence for infant feeding?" This question was used to guide the development of the hypotheses that were developed to direct the analysis. The first, overarching hypothesis related to this question was that mothers with low depressive symptoms, high self-esteem, and positive social support would have higher task-specific maternal competence, as defined by feeding knowledge, positive attitudes, and appropriate skills related to infant feeding. This general hypothesis was decomposed down into sub-hypotheses for the purpose of data analysis. For example:

- Depressive symptoms will be negatively correlated with infant feeding knowledge.
- Depressive symptoms will be negatively correlated with attitudes related to infant feeding.
- Depressive symptoms will be negatively correlated with skills related to infant feeding.

A second research question examined the relationship of maternal psychosocial factors and general maternal competence, as measured by the PSOC. Thus, the second hypothesis directing analysis was that mothers with low depressive symptoms, high self-esteem, and positive social support would report higher feelings of general maternal competence, as assessed by the PSOC. Finally, the relationship of general maternal competence and maternal competence for infant

feeding (task specific maternal competence) was also evaluated. The final hypothesis for analysis was that high maternal competence scores would positively correlate with knowledge, positive attitudes, and appropriate skills related to infant feeding.

Pearson correlations were used to assess the relationship among the psychosocial measures and the outcomes variables of interest: the general measure of maternal role competence (PSOC) and the measures of task specific maternal competence (IFQ subscales and knowledge and practice scores related to infant feeding), which address the first and third research questions. To address the second research question Pearson correlations were used to assess the relationship among the psychosocial measures and the measure of general measure of maternal role competence (PSOC), In addition, correlations were run among the psychosocial measures and such feeding practices as the amount of formula/milk, juice, and water a day that was consumed by an infant. Findings are presented below by the relationship of each psychosocial variable (i.e., depressive symptoms, self-esteem, and social support) to the identified outcome variables of interest (i.e., maternal attitudes, feeding knowledge and skills, and specific feeding practices, PSOC scores). Pertinent correlations are presented in Tables 24, 25, 26 and 27, and are discussed below.

Research Question # 1

Relationship of psychosocial variables to attitudes related to infant feeding

As the level of maternal depressive symptoms increased maternal concern about their infant undereating and/or being underweight increased (r = .29, p< .05), their concern that their infant was hungry and not satisfied with formula or breastmilk alone increased (r = .32, p = .01), and their concern that their child was at risk for overeating and/or being overweight also increased (r = .45, $p \leq .001$). However, there was no significant relationship between mothers depressive symptom scores and their scores on the IFQ subscale that assessed maternal awareness of hunger and satiety cues (r = -12, p= .31). In terms of infant feeding attitudes, as assessed using the IFQ subscales higher depressive symptoms appeared to be associated with more concern of the infant undereating, the infant being hunger, and also concern of the infant overeating, yet there was not a significant relationship between level of maternal depressive symptoms and maternal awareness of hunger and satiety cues.

In terms of infant feeding attitudes, higher self-esteem scores were associated with less concern about their infant undereating and/or being underweight (r = -.30, p= .01), less concern that their infant was hungry and not satisfied with formula or breastmilk alone (r = -24, p = .05), and less concern for considering that their child was at risk for overeating and/or being overweight (r = -.44, $p \leq .001$). As with depressive symptoms, there was no significant relationship between mothers' self-esteem scores and their scores on the IFQ

subscale that assessed maternal awareness of hunger and satiety cues (r = .08, p= .50).

Functional social support scores were found to be significantly related to many of the outcomes variables of interest. Higher scores on the Duke-UNC Functional Social Support Questionnaire (FSSQ) indicate higher levels of functional support. Of the infant feeding subscales, negative correlations were noted between functional support scores and the concern about hunger (r = -.22, p = .07), awareness of hunger and satiety cues (r = - .22, p = .07), and concern about overeating/becoming overweight (r = .26, p = .04) although only the third association was statistically significant. Mothers who reported less concern about their child being hungry, more awareness of hunger and satiety cues and less concern about their infant overeating and being at risk for being overweight, reported more functional support,

In regards to the infant feeding attitudes, the subscale that assessed concern for overeating and becoming overweight was the only one that significantly correlated with problematic support scores (r = .27, p = .03). Maternal concern for the infant overeating and/or being at risk for becoming overweight increased when perceived problematic support, when seeking advice on how to care for the child, also increased.

Informational support was positively correlated with awareness of hunger and satiety cues (r = .40, p ≤ .01) and negatively correlated with concern for the infant overeating and becoming overweight (r = -.34, p = .01). Mothers who reported higher reports of informational support reported more awareness of their

infant's hunger and satiety cues and less concern that their infant was overeating and/or at risk for being overweight. Refer to Table 25 for a full representation of the relationship of maternal psychosocial variables and maternal attitudes related to infant feeding.

Table 25. Psychosocial variables and measures of task specific maternal competence-attitudes

Relationship of Psychosocial Variables to Infant Feeding (Task Specific Maternal Competence: Attitudes)				
	IFQ 1 Concern about Undereating	**IFQ 2 Concern about Hunger**	**IFQ 3 Awareness of Hunger/ Satiety**	**IFQ 4 Concern about Overeating**
CES-D	.29*	.32**	-.12	.45**
Rosenberg	-.30*	-.24*	.08	-.44**
FSSQ	-.15	-.22	.22	-.26*
Problematic Soc. Sup	-.00	.01	-.13	.27*
Informational Soc. Sup	-.15	-.02	.40**	-.34**
PSOC	-.20	-.20	.29*	-.35**

** $p \leq .01$
*$p \leq .05$

Relationship of psychosocial variables to knowledge of infant feeding

Maternal depressive symptoms were found to be the only variable significantly associated with maternal infant feeding knowledge scores. As the level of maternal depressive symptoms increased the maternal knowledge scores related to infant feeding practices decreased (r = -.24, $p < .05$). The level of maternal self-esteem was not significantly correlated to maternal knowledge

scores (r = .06, p= .62). Table 26 depicts the relationship of psychosocial variables to infant feeding knowledge.

Relationship of psychosocial variables to skills related to infant feeding.

A significant negative relationship between maternal depressive symptoms and feeding practice scores was found (r = -.27, p = .03), along with a significant positive relationship between functional support and feeding practice scores (r = .31, p = .01). Mothers with higher reported depressive symptoms had lower total scores on the knowledge of infant feeding scores, while mothers with higher reports of functional support, had higher scores on the knowledge of infant feeding scale. Self-esteem scores were not significantly correlated with maternal practice scores (r = .12, p= .32). No significant relationships were found among problematic and informational support scores and the mothers' practice scores. Refer to Table 26 for a depiction of the relationship of psychosocial variables to infant feeding skills. Figures 3, 4, and 5, on pages 130, 131 and 132, show graphic representations of the pertinent correlations of maternal psychosocial factors and task specific measures (attitudes, knowledge, and skills) of infant feeding.

Table 26. Psychosocial variables and infant feeding knowledge and skill

Relationship of Psychosocial Variables to Infant Feeding (Task-Specific Maternal Competence: Knowledge and Skill)		
	Knowledge of Infant Feeding Practices	**Skills related to Infant Feeding Practices**
CES-D	-.24*	-.27**
Rosenberg	.06	.12
FSSQ	-.12	.31**
Problematic Soc. Sup	-.05	-.06
Informational Soc. Sup	-.16	.18
PSOC	.20	.12

** p ≤ .01
*p ≤ .05

Research Question # 2

Relationship of psychosocial variables and general maternal role competence

Several of the variables of interest were found to correlate significantly with the adolescent mothers' general sense of maternal role competence (i.e., PSOC scores). A negative correlation was found between PSOC scores and maternal depressive symptoms (r = -.66, $p \leq .001$). A significant positive correlation was found between mothers' self-esteem scores and those on the PSOC (r = .54, $p \leq .001$).

Functional social support scores were also found to be significantly related to maternal competence. Higher scores on the Duke-UNC Functional Social Support Questionnaire (FSSQ) indicate higher levels of functional support. A significant positive correlation was found with the PSOC (r = .54, $p \leq .001$) and functional support scores, with mothers that reported receiving high levels of

functional support having higher maternal competence scores. In addition, the relationship between maternal competence scores and problematic support scores was not statistically significant (r = - .18, p = .14), while a positive relationship between maternal role competence scores and informational support scores approached statistical significance (r = .24, p = .06). Refer to Table 27 for further depiction of these relationships. Figure 6 on page 133 shows a graphic representation of the pertinent correlations of maternal psychosocial factors and general maternal competence.

Table 27. Relationship of psychosocial variables and general maternal competence

Relationship of Psychosocial Variables to Parenting Sense of Competence (General Maternal Competence)	
	PSOC
Depressive Symptoms (CES-D)	-.66**
Self-Esteem (Rosenberg)	.55**
Functional Social Support (FSSQ)	.54**
Problematic Social Support	-.18
Informational Social Support	.24

** p ≤ .01

Research Question # 3

Relationship of task specific competence (knowledge, attitudes, and skills) to general maternal role competence

Maternal scores from the measure of general maternal role competence (i.e. the Parenting Sense of Competence Scale) were noted to be significantly associated with only two of the subscales that assessed maternal attitudes related to infant feeding. Specifically, a positive correlation was found between the PSOC and maternal awareness of infant hunger and satiety cues (r =.29, p< .05), and a negative correlation between the PSOC and maternal concern about the infant overeating and/or being overweight (r = -.35, p< *.01).* No significant relationships were found between general maternal competence scores and the mothers' practice and knowledge scores related to infant feeding practices. Figure 7 on pages 133 shows a graphic representation of the pertinent correlations of general maternal competence and task specific measures (attitudes, knowledge, and skills) of infant feeding.

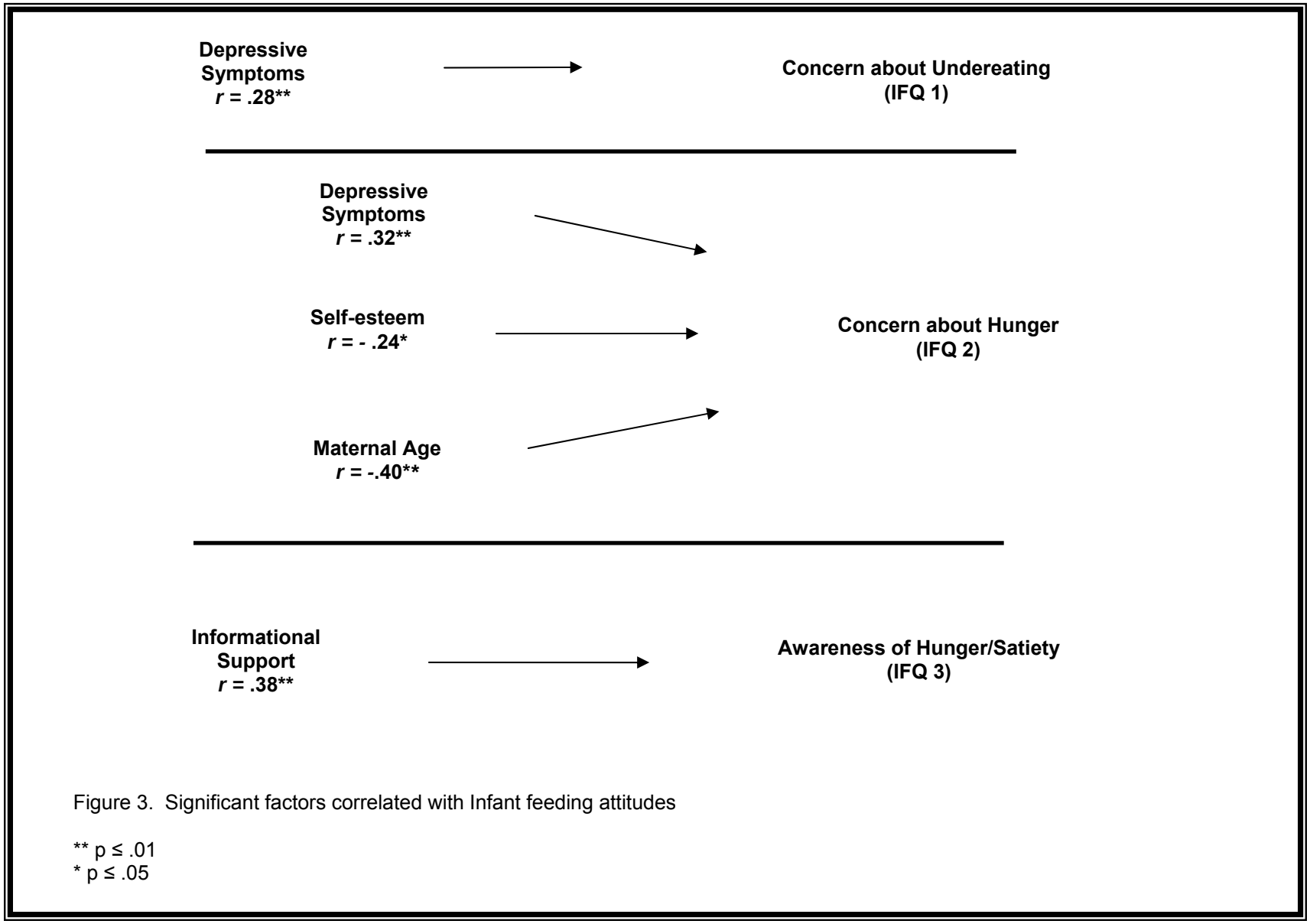

Figure 3. Significant factors correlated with Infant feeding attitudes

** $p \leq .01$
* $p \leq .05$

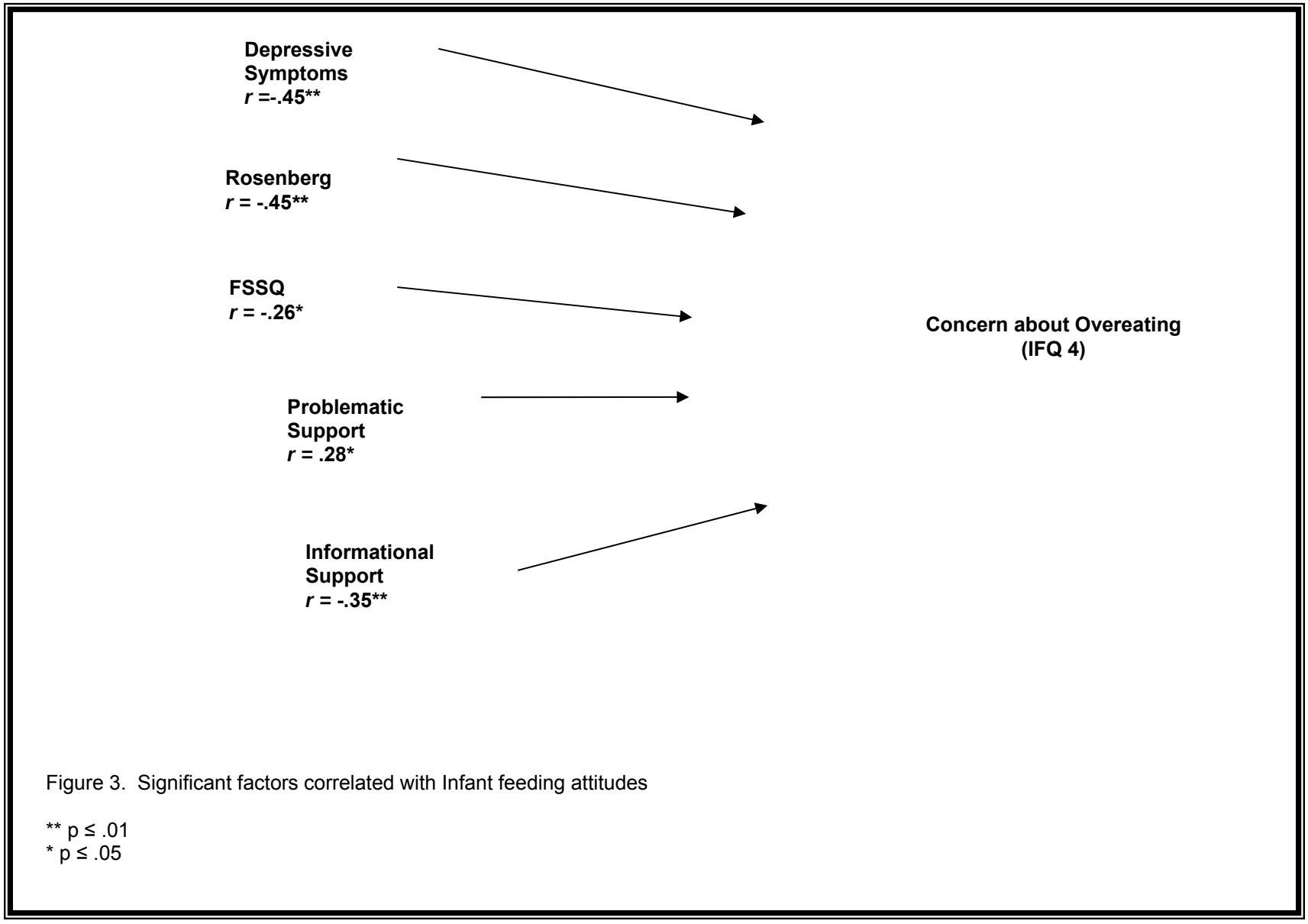

Figure 3. Significant factors correlated with Infant feeding attitudes

** p ≤ .01
* p ≤ .05

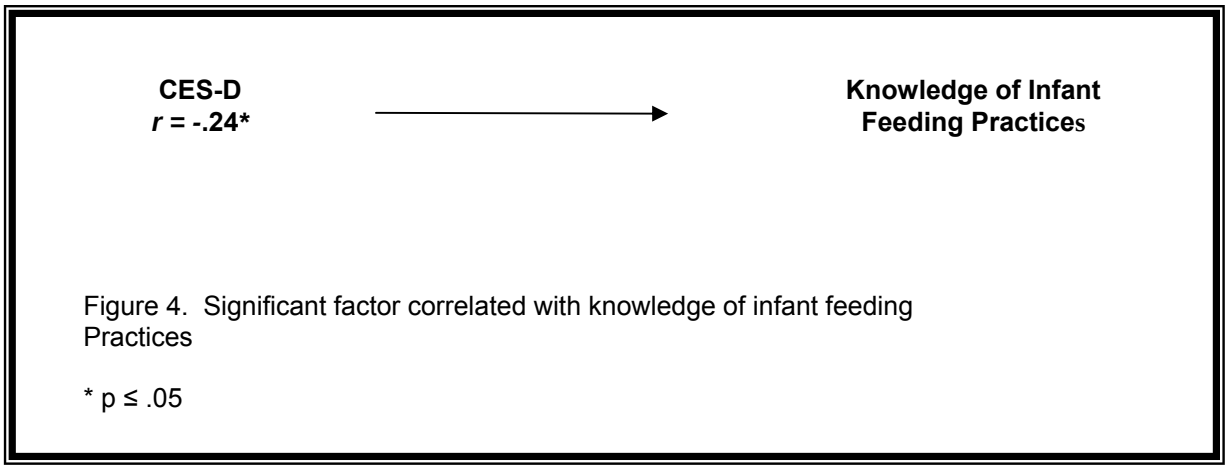

Figure 4. Significant factor correlated with knowledge of infant feeding Practices

* p ≤ .05

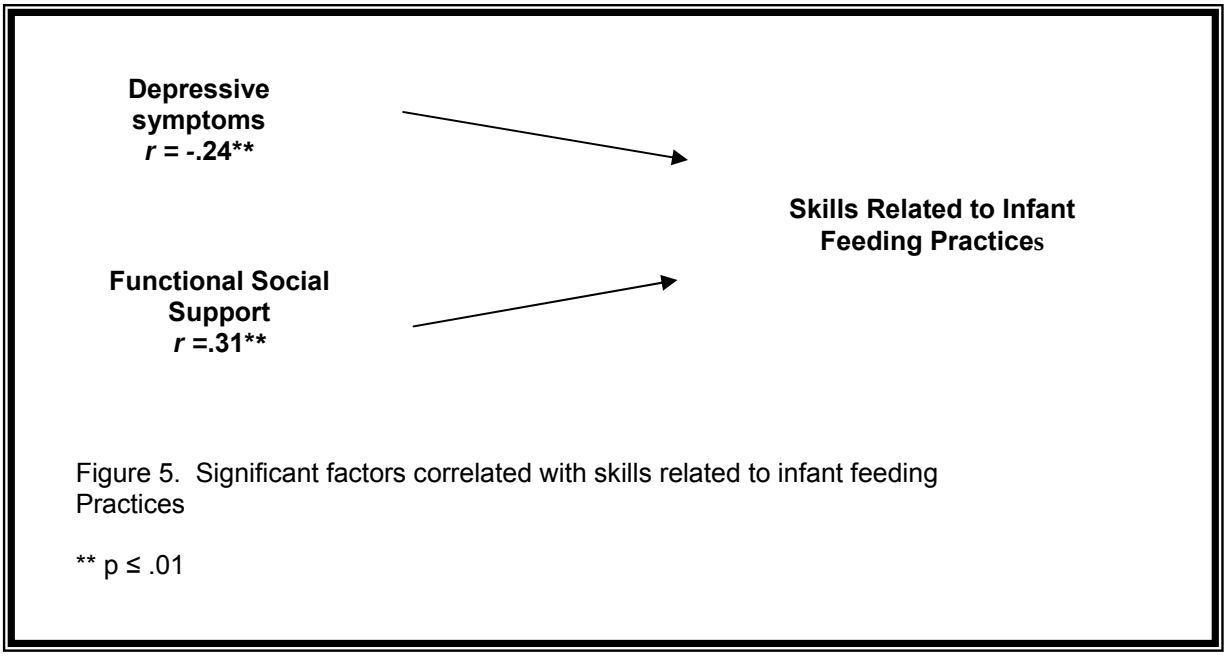

Figure 5. Significant factors correlated with skills related to infant feeding Practices

** p ≤ .01

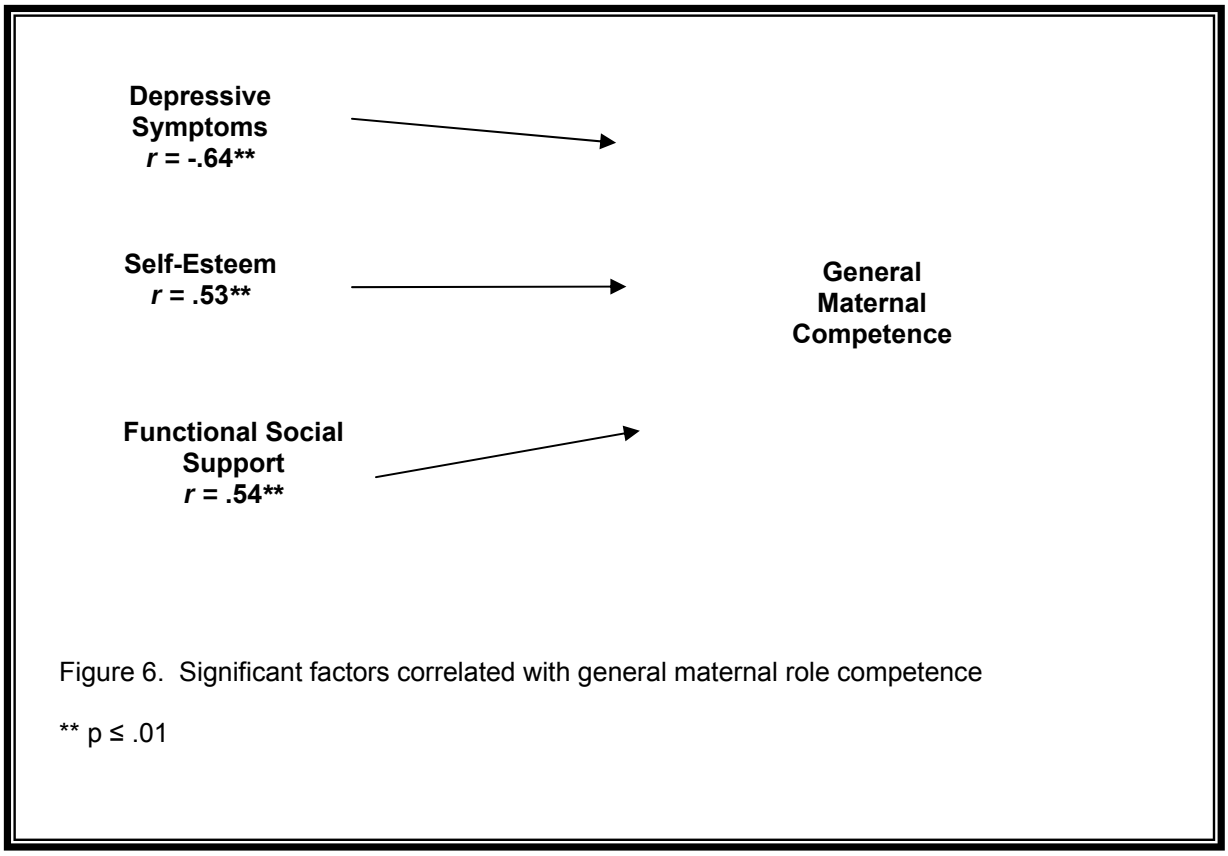

Figure 6. Significant factors correlated with general maternal role competence

** p ≤ .01

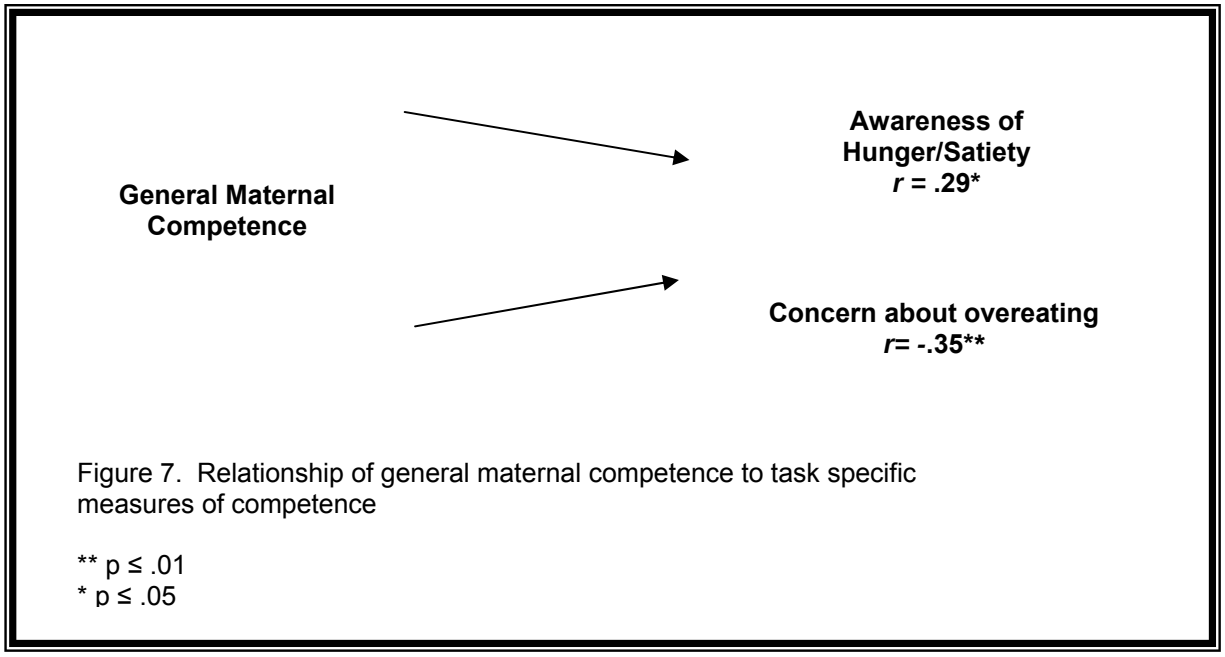

Figure 7. Relationship of general maternal competence to task specific measures of competence

** p ≤ .01
* p ≤ .05

Additional Relationship of Interest

An interesting correlation that was noted was the relationship of maternal Body Mass Index (BMI) and maternal depressive symptoms. Depressive symptoms were negatively associated with BMI values (r =-.26, p = .04). To further examine this relationship, mother's who were underweight and/or obese (i.e., BMI <18.5 or > 30) were excluded and the correlation was re-examined. The significant negative correlation continued to exist between depressive symptoms and BMI (n = 45; r =-.30, p = .04). Finally, in a further attempt to examine the relationship, the 45 mothers included in the sub-analysis were then also compared on racial/ethnic group. When the correlation was re-run and the mothers were split into two groups (i.e., African-American [n= 26] versus non African-American [n= 19], the significant correlation disappeared (r =-.34, p = .09; r =-.31, p = .19), thus possibly revealing that race and/or ethnic background may not be a significant indicator of health in this particular sample.

Relationship to Maternal Age

Tables 28 and 29 present the correlations that were observed between the variable of maternal age and the other variables. The only significant relationship identified was the relationship between maternal age and scores on the IFQ subscale that measured maternal concern for infant hunger. The older a mother was, the less she reported concern that her infant was hungry and not satisfied with formula or breastmilk alone (r = -.41, p = .001). No significant relationships were found between age and any of the psychosocial variables such as

depressive symptom, self-esteem and social support. Refer to Tables 24 and 25.

Table 28. Relationship of maternal age

Relationship of Maternal Age to Psychosocial Variables	
	Age
CES-D	-.14
Rosenberg	.15
FSSQ	.17
Problematic Soc. Sup	-.04
Informational Soc. Sup	-.11
PSOC	.10

** p ≤ .01
*p ≤ .05

Table 29. Relationship of maternal age to variables of interest

Relationship of Maternal Age to Infant Feeding Attitudes and Practices	
	Age
IFQ 1 Concern about Undereating	-.09
IFQ 2 Concern about Hunger	-.41**
IFQ 3 Awareness of Hunger/Satiety	-.18
IFQ 4 Concern about Overeating	-.01
Knowledge Score	.06
Practice Score	.20
Oz. of Formula/milk	.17
Oz. of juice	-.15
Oz. of water	.07

** p ≤ .01
*p ≤ .05

Ancillary Analyses

Analysis of Differences between Racial Groups

To further evaluate the data to determine if there were any between group differences, t-tests were performed. The data were evaluated to see if there were any differences related to the ethnic background of the women. African-American women (n = 44) were compared to non African-American women (n = 23) to see if differences existed. The first notable difference between these women was that African-American women did have significantly higher BMI's (*m*= 28.1) than their non- African-American counterparts (*m* = 24.1) (*t* = 2.57, *df* = 65, $p \leq .01$). In terms of psychosocial variables, the women did not significantly vary between groups. In regard to their infant feeding practice scores, non-African-American women were found to have slightly higher practice scores, though not significantly (*m* = 4.7 vs. 5.2; *t* = -1.9 , *df* = 38.2 , $p \leq .25$). See Table 30 for further representation of the comparison between African-American and non-African-American women.

Table 30. Difference between African-American and Non-African-American women

Between Group Differences of African-American Mothers vs. Non African-American n=67					
Variable	Mean for AA (n = 44)	Mean for non-AA (N= 23)	df	t	P
BMI	28.1	24.1	65	2.6	.01**
CES-D	14.98	14.65	65	0.12	.90
Practice Score	4.7	5.2	38.2	-1.1	.25
Knowledge Score	3.73	4.48	65	-1.9	.06

** p ≤ .01
*p ≤ .05

Analysis of Differences in Women Who Breastfed and Those Who Did Not Breastfed

Women were also evaluated by group based on whether or not they had reported breast feeding. No statistical differences were found between the two groups of women on age (*m* 19.24 vs. 19.71; *t* = -1.3, *df* = 65, p= .19) or on any of psychosocial scores or subsequent infant feeding practices. Although not statistically significant, depressive symptoms appeared to be slightly less in women who had reported breastfeeding (*m* = 13.50) compared to women who had not breastfed (*m* = 16.27) (*t* = 1.1, *df* = 65, p= .27). See Table 31 for full representation of the comparison between women that breastfed and those that did not.

Table 31. Difference between mothers who breastfed or not

Between Group Differences of Mothers that Breastfed (BF) vs. those that did not n=67					
Variable	Mean for BF (n = 34)	Mean for non-BF (n = 33)	df	t	P
BMI	25.8	27.6	65	.98	.33
CES-D	13.50	16.30	65	1.1	.27
Practice Score	4.7	5.0	65	-.61	.54
Knowledge Score	4.12	3.85	65	-.70	.49
Age	19.71	19.24	65	-1.3	.19

** p ≤ .01
*p ≤ .05

Analysis of Specific Infant Feeding Practices

Additional t-tests were run to explore the data to see if there were any differences among the mothers by referenced feeding practices, beyond breastfeeding. All of the feeding practices that were used to develop the practice score were evaluated. Although not statistically significant, two specific feeding practices were found to be important: the amount of water given in a day being less than or greater than eight ounces and watching television while feeding. Differences that were noted included higher depressive symptoms among women who gave greater than eight ounces of water a day (CES-D *m* = 18.04 vs. 13.2; *t* = 1.9, *df* = 65 , p= .07), lower Body Mass Index (BMI *m* = 24.8 vs. 27.8; *t* = -1.9, *df* = 65 , p= .06) among the women that gave more water daily and less informational support (*m* = 20.6 vs. 22.5; *t* = -1.9, *df* = 65 , p= .07) noted among these mothers. See Table 32 for representation of the differences between groups based on the amount of water given.

Table 32. Differences between mothers based on amount of water given in a day

Differences between mothers who gave more than eight ounces of water a day or not n=67					
Variable	Mean for water > 8 oz. a day (n = 22)	Mean for water < 8 oz. a day (N= 44)	df	t	P
CES-D	18.04	13.201	65	1.9	.07
BMI	24.8	27.8	65	-1.9	.06
Informational Social Support	20.6	22.5	33.8	-1.9	.07

The other feeding practice that yielded significant differences was whether or not mothers reported watching television while feeding their infants. Statistically significant differences were noted between the groups of mothers who reported watching television or not while feeding and functional support levels (*m* = 3.8 vs. 4.3; *t* = -2.3, *df* = 65, p= .03). Mothers who reported higher levels of functional social support reported not feeding their infant in front of the television. A significant difference was also noted in maternal age and television watching while feeding, with mothers who were slightly older reporting not watching television while feeding (*m* = 19.2 vs. 19.93; *t* = -2.0, *df* = 65, p= .05). While not statistically significant, depressive symptoms were slightly higher in women who had reported watching television while feeding their infants (*m* = 16.77) compared to women who did not (*m* = 12.21) (*t* = 1.8, *df* = 65, p= .07). See Table 33 for representation of the comparison between mothers who watched television or not and their differences.

Table 33. Difference between mothers and TV watching while feeding

Differences between mothers who watched TV while feeding vs. those that did not n = 67					
Variable	Mean for watching TV (n = 39)	Mean for no TV (N= 28)	df	t	P
CES-D	16.77	12.21	65	1.8	.07
Maternal Age	19.2	19.9	65	-2.0	.05*
Functional social support	3.8	4.3	65	-2.3	.03*

*p ≤ .05

Analysis of Differences between Mothers Based on Interview Location

To evaluate the data to determine if there were any more between group differences of the mothers, the mothers were compared using the location of where they were interviewed. Of the 67 mothers that had complete data, only 12 were interviewed at the WIC clinic. Of those 12, three were also patients at the Vanderbilt clinic. For the purpose of analysis, the nine mothers interviewed at WIC that were not also seen at Vanderbilt were compared using a t-test to evaluate differences. Mothers interviewed at Vanderbilt had higher infant feeding practice scores (*m* = 5.0) compared to the mothers only seen at the WIC clinic (*m* = 3.9) (*t* = 2.0, *df* = 65, p= .05). In addition, the nine mothers were also noted to feed their infants greater amounts of formula in a day than their counterparts interviewed at Vanderbilt (*m* = 39 vs. 30; *t* = -2.0, *df* = 61, p = .05) and reported being slightly less aware of infant hunger and satiety cues (*m* = 3.7 vs. 3.90; *t* = -2.1, *df* = 42.6, p = .04). See table 34 for further representation of the findings.

Table 34. Difference between mothers interviewed at Vanderbilt versus WIC clinic

Between Group Differences of Mothers interviewed At Vanderbilt vs. the WIC clinic N=67					
Variable	Mean for Vanderbilt (n = 58)	Mean for WIC (N= 9)	df	t	P
Practice Score	5.0	3.9	65	2.0	.05*
Awareness of Hunger and Satiety Cues	3.9	3.7	42.6	-2.1	.04*
	Mean for Vanderbilt (n = 54)	Mean for WIC (N= 9)			
Ounces of Formula or Milk a Day	30	39	61	-2.0	.05*

*p ≤ .05

Multivariate Analysis

To further explore the data to identify possible predictive models for maternal attitudes and knowledge related to infant feeding practices, multiple regression analysis was used. Two methods were used to evaluate the regression equations: allowing the computer program to enter all the variables at once and the stepwise method. The pertinent regression equations are presented in Tables 35 – 38 and Tables 39 - 42. All four of the regression equations that were run using the “enter” method were statistically significant, though not all of the variables in the equation remained significant when the equations were run with the variables all entered at the same time. Furthermore,

aside from the first model (predicting maternal concern about infant hunger) the models using the "Enter" method had the highest R^2 values.

Enter method regression models.

Of the variables that were noted to have a significant correlation with maternal concern for infant hunger, only maternal age was a significant variable in the regression equation, accounting for 11% of the variance. Informational social support was the only variable that was significantly related to maternal awareness of infant hunger and satiety cues after analysis, and no variables remained singularly significant in the equation for examining maternal concern about infant overeating or being at risk for overweight. Finally, the regression equation to evaluate the variables that were identified as significantly related to scores of general maternal role competence found that depressive symptoms and functional support were significantly related, accounting for 49% of the variance in maternal role competence.

Table 35. Multiple regression predicting maternal concern for infant hunger

Multiple Regression for Predicting Maternal Concern about Infant Hunger (n = 67) ENTER Method				
Outcome	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Concern about Infant Hunger	CES-D	.03	.02	.25^{+}
	Self-esteem	-.00	.03	-.02
	Maternal Age	-.34	1.0	-.37**

Model R^2 = .11 (F 3, 63 = 2.5)**

** p ≤ .01
$^{+}$ p = .09

Table 36. Multiple regression predicting maternal awareness of infant hunger Cues

Multiple Regression for Predicting Maternal Awareness of Infant Hunger Cues (n = 67) ENTER Method				
Outcome	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Awareness of Hunger	Informational Social support	.04	.01	.35**
	Parenting Sense of Competence (PSOC)	.01	.04	.20

Model R^2 = .19 (F 3, 64 = 7.8)**

** p ≤ .01

Table 37. Multiple regression predicting maternal concern for infant overeating

Multiple Regression for Predicting Maternal Concern about Infant Overeating (n = 67) ENTER Method				
Outcome	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Concern about Overeating	CES-D	2.1	1.1	.23
	Functional Social Support	.08	.10	.11
	Problematic social support	.02	.02	.11
	Informational social support	-.04	.02	-.23^{++}
	Parenting Sense of Competence	-.00	.01	-.03
	Self-Esteem	-.04	.02	-.28^{+}

Model R^2 = .30 (F 5, 61 = 5.2)**

** p ≤ .01
$^{+}$ p = .055; $^{++}$p = .06

Table 38. Multiple regression predicting maternal sense of competence

Multiple Regression for Predicting Parenting Sense of Competence (n = 67) ENTER Method				
Outcome	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Parenting Sense of Competence	CES-D	-.44	.127	-.44**
	Self-esteem	.27	.210	.15
	Functional Social Support	-2.0	1.0	-.22**

Model R^2 = .49 (F 3, 63 = 20.3)**

** p ≤ .01

Step-wise method regression models.

In addition to the above regression analyses, the regression equations were re-evaluated using a step-wise method, to see if a computer model could generate a more predictive model. All variables that were significantly individually correlated to the noted dependent variable were evaluated. In the first model evaluating maternal concern for infant hunger, maternal age was found to explain 17% of the variance and when depressive symptoms were added into the model in the second step, 24% of the variance was explained. In the second model, informational social support was the only variable that was significantly related to maternal awareness of infant hunger and satiety cues after analysis, with the model explaining 15% if the variance. In the first step of the model that evaluated the relationship to maternal concern about overeating, depressive symptoms were found to account for 20% of the variance and when informational support was added to the model in the second variance, R^2 increased to .26. The final model that was evaluated was predicting maternal role competence. In the first step, depressive symptoms accounted for 44% of the variance and when functional social support was added to the model in the second step R^2 increased to .48.

Table 39. Step-wise multiple regression predicting maternal concern for infant hunger

Multiple Regression for Predicting Maternal Concern about Infant Hunger (n = 67) STEP-WISE Method					
Outcome	Model	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Concern about Infant Hunger	1	Maternal Age	-.34	.10	-.41**
Step 1: Model R^2 = .17					
Concern about Infant Hunger	2	Maternal Age	-.34	.10	-.37**
		CES-D	-.34	1.0	.26**
Step 2: Model R^2 = .24 (F 2, 64 = 9.9)**					

** p ≤ .01

Table 40. Step-wise multiple regression predicting maternal awareness of infant hunger cues

Multiple Regression for Predicting Maternal Awareness of Infant Hunger Cues (n = 67) STEP-WISE Method					
Outcome	Model	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Awareness of Hunger Cues	1	Informational Support	.04	.01	.40**

Model R^2 = .15 (F 1, 67 = 12.1) **

** p ≤ .01

Table 41. Step-wise multiple regression predicting maternal concern for infant overeating

Multiple Regression for Predicting Maternal Concern about Infant Overeating (n = 67) STEP-WISE Method					
Outcome	Model	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Concern about Infant Overeating	1	CES-D	.03	.01	.45**
Step 1: Model R^2 = .20					
Concern about Infant Overeating	2	CES-D	.03	.01	-.37**
		Informational Support	-.05	.02	-.26*
Step 2: Model R^2 = .26		(F2, 64 = 11.3)**			

** p ≤ .01
*p < .05

Table 42. Step-wise multiple regression predicting maternal sense of competence

Multiple Regression for Predicting Parenting Sense of Competence (n = 67) STEP-WISE Method					
Outcome	Model	Variables in Models	Regression Coefficients	Standard Error	Standardized Estimates (β)
Parenting Sense of Competence	1	CES-D	-.66	.09	-.66**
Step 1: Model R^2 = .44					
Parenting Sense of Competence	2	CES-D	-.52	.11	-.52**
		Functional Social Support	2.7	1.1	.26*
Step 2: Model R^2 = .48		(F 2, 64 = 27.7)**			

** p ≤ .01
* p < .05

CHAPTER V

DISCUSSION

This chapter presents a summary and discussion of the major findings of this project, within the context of current literature. Strengths and limitations of the study are discussed, followed by a discussion of future considerations for nursing practice, as well as future research. The hypotheses of this study were partially supported.

Infant Feeding Practices

Over half of the mothers in this sample reported attempting to breastfeed their infant. Although this was a greater number than expected (Brownell, et al., 2002; Gabriel et al., 1986), this percentage does not meet *Healthy People 2010* goals that 75% of mothers will breastfeed in the early postpartum period. Only 22% of the women reported breastfeeding beyond six months of age. Mothers often reported decreased milk production/not enough milk, pain or soreness, and infant fussiness as reasons for discontinuing breastfeeding. Further investigation is needed to identify factors and processes that influence young mothers to initiate and maintain breastfeeding.

For the most part, young mothers were giving their infant appropriate amounts of formula and/or milk. However, 13% of the infants were drinking 40 or more ounces of formula or milk a day, along with eating complementary foods.

This is considerably more than the recommended intake and puts these infants at risk for becoming overweight. More concerning was the amount of juice that the infants were consuming. Over 40% of the infants were drinking more than the recommended six ounces of juice a day. Consuming excessive quantities of juice can put infants at risk for nonorganic failure to thrive, short stature, and obesity (Dennison, Rockwell, & Baker, 1997; Smith & Lefshitz, 1994). While a majority of infants were not being given excessive quantities of water, approximately 33% were being given more than eight ounces of water a day, with one infant receiving 18 ounces in one day. A possible supposition is that many mothers may be using water in place of formula or juice to soothe a fussy infant, particularly if they are running low on formula or juice supplies. From clinical experience, this practice is common and dangerous, as too much water can put infants at risk for water intoxication. Further studies should investigate the reason mothers are giving their infants water beyond recommended amounts.

Unlike previous literature that identified adolescent mothers as initiating secondary foods significantly sooner than adult mothers (Carruth et al., 1997; Nevling et al., 1997), the sample in this study tended to introduce foods at times consistent with recommended guidelines. The average age for the introduction of solid food was 4.83 months, which is in the recommended timing of four to six months of age (AAP, 2004). However, 80% of the infants had already received infant cereal in their bottles. Although literature suggests that infant cereal does not contribute to infant sleeping at night (Macknin, Medendorp & Majer, 1989), mothers reported initiating food, especially cereal in the bottle, because of infant

fussiness perceived as “not being full or satisfied” with formula and to help the infants sleep through the night. The design of the questionnaire did not include asking the mothers about how they came to these conclusions, nor determine if the conclusions were accurate. Exploring this aspect of the mother’s decision-making should be included in future studies.

The presentation and amounts of fruits and vegetables in the infants’ diets identified several interesting findings. Vegetables were identified most frequently as the first food offered to infants: however, when fruits were offered first, they tended to be offered at a younger age than vegetables. From the daily count of fruit and vegetable servings, almost 60% of the sample of infants was eating one to two servings of fruits and/or vegetables a day. However, further analysis showed that the percentage of infants not receiving any fruits or vegetables a day slightly decreased with age, even within the short time span of 6 to 12 months of age. From anecdotal discussion with the mothers and the reported diet histories, as the infants aged, their diets began to consist of less fruits and vegetables and more of simple starches, such as mashed potatoes, macaroni and cheese, and other pastas. Many of the mothers reported feeding their infants what they were eating. This trend away from a balanced diet, including fruits and vegetables, may be putting children at risk for being undernourished (i.e., lacking required nutrients in their diet) and possibly at risk for becoming overweight. Some research (Jain, et al., 2001) suggests that mothers of low SES status are proud to be able to buy snacks and treats for their children. Being able to feed a child the amount and types of food he or she wants may fit a cultural perception of

being a good parent for some parents. Further study needs to be done to determine if this trend continues in other groups of infants.

One of the most important findings of this study was the lack of influence that healthcare professionals had in informing and influencing mothers in their decisions related to infant feeding. Only 11.6% of the mothers (n = 8) identified a healthcare professional as being the most influential person in telling them how to feed their infant. Mothers tended to identify family members, especially mothers and grandmothers as being the most influential in telling them how to feed their infants. This finding underscores the importance of the "influential" person in the teaching that occurs at well-infant visits.

Infant Feeding Attitudes

Scores on the subscales of the Infant Feeding Questionnaire (IFQ) measuring mother's attitudes related to infant feeding were not normally distributed and negatively skewed. Most mothers did not appear to be concerned about their infant being at risk for becoming either underweight or overweight. Interestingly, almost all of the mothers (97%) considered themselves aware of their infants' cues related to hunger and satiety.

There appears to be a disconnect between the mothers' immediate concern (infant hunger) and concern for the future (infant weight status, either under or overweight). This disconnect may be a function of adolescent development and the tendency for adolescents to focus on the "here and now" and not be aware of the outcomes related to certain behaviors. However, the

noted concern of hunger could be a simple function of the life priorities of these young mothers. This sample of mothers was predominately low income and food security may be a significant issue for them. The authors of the IFQ (Baughcum et al, 2001) did note a significant relationship between low-income status and maternal concern related to the child being hungry.

Psychosocial Variables

Levels of depressive symptoms and feelings of maternal competence were similar to scores reported in the literature. Approximately 42% of this sample of mothers had CES-D scores greater than 16, indicating high levels of depressive symptoms. Panzarine, Slater, and Sharirps (1995) found a similar percentage (44%) in their study. These findings are consistent with trends in national reports of depressive symptoms among first-time adolescent mothers. Depressive symptoms ranging from 28% to 48% in national samples of young mothers (Deal & Holt, 1998) have been noted. Qualitative data gathered from discussion with the mothers in this study, raises question as to whether the CES-D is assessing depressive symptoms alone or possibly tapping into daily stressors that the mothers are dealing with, such as sleepless nights with a young infant. Future studies would benefit from the addition of a scale assessing common stressors of mothers of young children, such as the Everyday Stress Index (Hall, 1990) to more clearly delineate stress and depressive symptoms in a similar sample.

The mean score on the PSOC (81.2) for the women in this study was

slightly higher than adult samples and a similar adolescent sample. In a study of adult mothers, Mercer and Ferketich (1994, 1995) reported PSOC scores ranging from 76 to 80. In a sample of 53 adolescent African-American mothers, with a mean age of 16.4 years (SD 1.2), Sadler, Anderson, and Sabatelli (2001) noted mean PSOC scores of 72. The difference between scores may be a function of several factors. The mean age of the mothers in Sabatelli et al.'s study was lower than the mothers in this study. The infants in Sabatelli et al.'s study were also younger by several months on average (four to eight month range vs. six to twelve months) as compared to the infants in this study. Prior studies suggest that reported feelings of maternal competence increase over time in inexperienced mothers, noting a significant increase of feelings of competence from the first weeks of parenthood to when the infant is eight months of age (Mercer & Ferketich, 1995; Porter & Hsu, 2003). This association of time with maternal competence may explain the overall high scores that are seen among this sample of mothers with infants aged six to twelve months.

Levels of self-esteem may be predictive of maternal competence (Mercer, 1981; Mercer & Ferketich, 1994; Sadler, Anderson, Sabatelli, 2001). Mothers in this sample tended to report high self-esteem scores. It is unclear why they were so self-assured of themselves and their mothering competence. There may have been some aspect of social desirability to the responses, because all of the interviews were conducted face to face with the principal investigator and in a clinical setting. Further longitudinal work with adolescent mothers that includes assessment of feelings of self-esteem and maternal competence over time (i.e.,

from the birth of the infant forward) would allow for the identification of possible associations of self-esteem, maternal competence and mothering behaviors, particularly infant feeding practices. Qualitative work with first time adolescent mothers may be helpful to clarify the development of young women's sense of competence as a new mother.

Reported levels of social support tended to follow trends noted in the literature (i.e., moderate to high reports of social support), though reports by adolescent mothers may be slightly less than adult women (Sachs, Hall. Lutenbacher, & Rayens, 1999; Dormire, Strauss, & Clarke, 1988). Of particular interest in this sample were the reported levels of problematic support and informational support related to infant care. The majority of mothers reported low problematic support (i.e., annoyance or unhelpful or upsetting information) and high informational support (i.e., positive, helpful reports of support) related to how to care for their infant. This finding raises significant clinical and research questions. Young mothers tend to rely on their mothers and grandmothers for information, report high levels of informational support and low levels of problematic support, yet initiate poor feeding practices. This disconnect between high levels of informational support and poor feeding practices clearly identifies an area in need of further investigation and perhaps clinical intervention. Both researchers and healthcare providers need to identify methods of educating both adolescent mothers and their mothers about healthy feeding practices.

Predictors of Infant Feeding Knowledge, Attitudes, and Skills

Study hypotheses were partially supported. As hypothesized, low depressive symptoms, high self- esteem and high reports of functional social support were associated with high reports of general maternal competence. The level of depressive symptoms was the only variable that had a significant effect on maternal knowledge scores related to infant feeding practices. As depressive symptoms increased maternal infant feeding knowledge scores decreased. This relationship appears logical, given that depression is noted to result in impaired cognitive processes and depressed mothers are noted to often have difficulty with recommended preventative health recommendations (Logsdon, Wisner, & Pinto-Foltz, 2006). It is surprising that the measure of informational support did not have a significant relationship with knowledge for infant feeding scores. Future studies may benefit from a qualitative component to gather more detailed information that would elicit the type of informational support that adolescent mothers seek related to the care of their infant.

Of the four identified maternal attitudes (i.e., Concern about Undereating, Concern about Hunger, Awareness of Hunger/Satiety Cues, Concern about Overeating) related to infant feeding practices that were examined in this study, several relationships were found with the psychosocial variables. Mothers' high maternal depressive symptoms and low maternal self-esteem were associated with maternal concern about the infant undereating. Essentially, the higher a young mothers depressive symptoms and the lower her self- esteem, the more concerned she was that the infant was not eating enough and may be at risk for

being underweight. This finding is logical and expected. Mothers with depressive symptoms may fixate on what their infant eats and be concerned that it is not enough, that their mothering is not sufficient, and higher scores of self-esteem may be protective against these thoughts. A similar relationship was found between the level of depressive symptoms and level of maternal concerns about infant hunger, with higher depressive symptoms and lower self-esteem associated with more maternal concern about infant hunger. In addition, a negative relationship was noted between the mother's age and maternal concern for infant hunger, with older mothers being less concerned about their infant being hungry.

As expected, mothers who reported receiving positive informational support, also reported being aware of their infants' cues as to when they needed to be fed or were full. It appears logical that receiving high levels of informational support would be associated with more positive mothering behaviors and attitudes. However, this assumption is based on another assumption that the information being received is appropriate. In this sample only about 12% of the mothers relied on professionals for advice on how to care for their infants. Most of the women reported receiving recommendations from family members that included inappropriate feeding practices. Given the questionable advice they may have received, it calls into question whether the mothers were appropriately assessing their infants' hunger and satiety cues.

Mothers with higher depressive symptoms and lower self-esteem, maternal competence, functional and informational social support scores were

more concerned about their infant being at risk for overweight. As with the other maternal attitudes related to infant feeding, depressive symptoms appeared to put mothers at risk for disproportionate concern about their child, while self-esteem, social support, and positive feelings of maternal competence (in essence maternal self-esteem) seemed protective against mothers being concerned that their infant was overeating. Further examination of the relationship of maternal depressive symptoms and attitudes related to actual parenting practices is needed in a larger sample of women to assess how these attitudes may possibly serve as a moderator in the relationship of depressive symptoms and parenting practices.

The slightly higher depressive symptoms that were noted among the mothers who did not breastfeed, while not statistically significant, do raise some interesting questions. In developing countries, maternal depression among women who are breastfeeding, has been found to predict poor infant growth (Rahman, Iqbal, Bunn, Lovel, & Harrington, 2004). In developed countries, such as the U.S., there is not enough data to know if a relationship exists among feeding mode (i.e., breastfeeding versus formula feeding) maternal depressive symptoms, and infant growth. However, it is known that formula/bottle fed infants may be more at risk for overfeeding and obesity compared to breastfed infants (Bergmann, et al., 2003; Ebbeling, Pawlak, & Ludwig, 2002; Gillman, 2002). Recent research suggests that women who breastfeed, versus bottle/formula feed, tend to be less controlling regarding child feeding at one year of age. Researchers hypothesize that women who breastfeed develop less controlling

feeding styles that allow infants to learn to self-regulate energy intake and respond to internal appetite cues, putting them at less risk for overeating, thus less risk of becoming overweight (Taveras, Scanlon, Birch, Rifas-Shiman, Rich-Edwards, & Gillman, 2004). Furthermore, young women who make the decision to breastfeed their infant may also have characteristics that are protective of depression. To answer these speculations, additional longitudinal study is needed that assesses young mothers' psychosocial health, feeding attitudes, and infant feeding practices. Ideally, such research would begin prenatally, to evaluate changes over time, before and after the baby is born.

Another interesting finding in this study was the association with higher depressive symptoms and reports of mothers feeding their infant in front of the television. This feeding practice, noted among young women with high depressive symptoms, may be initiating an eating practice that could set the stage for future poor eating practices. Television watching while eating has been noted to be related to increased caloric intake, putting individuals at risk for overeating and becoming overweight (Berkey, Rockett, Field, Gillman, Frazier, Camargo, et al. 2000). In addition, this practice may be another example of mothers with high depressive symptoms not actively engaging with their infants.

The significant relationship between depression and parenting attitudes and behaviors noted in this study is supported in the literature. McLearn and colleagues (2006) found that maternal depressive symptoms at two and four months postpartum were associated with reduced odds of continuing to breastfeed, playing with the infant and talking to the infant. They also reported

that mothers with higher depressive symptoms had increased odds of engaging in less than optimal newborn feeding practices (i.e., giving cereal, water, or juice), although the regression model was not statistically significant. McLennan and Kotelchuck (2000) also found that mothers with higher depressive symptoms were less likely to engage in safety prevention practices, such as using car seats.

A significant difference was noted in the BMI values between those mothers who identified themselves as African-American and those who did not. This finding is consistent with current literature, that is, that African Americans tend to have higher BMIs (Covington et al., 2001; Hedley, et al., 2004) than other ethnic groups. Given this difference between racial groups, one of the most intriguing findings from this study was the negative relationship between maternal depressive symptoms and maternal Body Mass Index. Even though the sample population was significantly African-American; the relationship between BMI and depression was significant for all racial groups. Recent work by Daniels (2005) does note that among a sample of both male and female adolescents, no relationship between self-reported depressive symptoms and BMI is found. However, Daniels evaluated BMI using three categories, based on national pediatric guidelines: normal (under 85th percentile), overweight (greater than 85th percentile and obese (greater than 95th percentile) and compared it to a yes/no question to assess depressive symptoms. Additional analysis identified being female as an important variable that explained a very small amount of variance (R^2 = .05) associated with depressive symptoms, further identifying a need to examine the relationship of BMI and depression. More research is needed to

clarify the relationship that psychosocial factors, such as depression, may have on actual health outcomes, such as BMI.

Study Strengths and Limitations

This study contributes further to the body of knowledge related to infant feeding practices of adolescent mothers. The exploratory data of this study provides an initial examination of the relationship of psychosocial variables (i.e., depressive symptoms, self-esteem, and social support) to the specific parenting practice of infant feeding, which has only been modestly examined in the literature prior to this work. The results of this study indicate that in this sample of predominately low-income, young, first-time mothers, many inappropriate feeding practices were being initiated. In addition, findings suggest that maternal attitudes related to infant feeding are associated with maternal psychosocial factors, specifically maternal depressive symptoms, possibly identifying an area amenable to nursing intervention.

The cross-sectional design limits the ability to make causal relationships. All findings from this study need to be taken as investigational in nature and seen as helping to identify potential relationships that can be investigated in further longitudinal, controlled studies. The convenience sample of adolescent mothers also limits generalizability of the findings. Given the voluntary nature of the sample, it is possible that only mothers with certain characteristics self-selected to be involved in the study. Unfortunately, the design of the study and the limits of data that could be collected did not allow for comparison of the mothers that

did not consent to be in study.

The reliability of some of the tools that were used in this study may also be considered a limitation. The subscales of the Infant Feeding Questionnaire and the Informational and Problematic Social support scales did not have particularly high Cronbach's alpha scores. Given the number of items on the scales (minimum of three to a maximum of five items), the alpha correlations could be considered sufficient, though only minimally so. The Informational and Social Support subscales were being pilot tested to see if they were feasible tools to assess the variables of interest. The knowledge and practice scores were self-created by the investigator and also being pilot tested in this project. Existing questions from the feeding practice interview guideline were dichotomized and combined to form the scale scores. Also, because of the nature of the knowledge questions, it would not be expected that all items on the scale would be well correlated to each other, as many of the questions asked were specific in nature and not necessarily indicative of general feeding knowledge.

Another limitation that could be noted from the characteristics of the sample is the lack of younger adolescent mothers that were available to interview. The predominance of the mothers interviewed were above 18 years of age. Actually, few mothers under 18 years of age were even identified in either clinic. It was not uncommon to identify an infant coming to the Vanderbilt clinic who had a mother that was under 18 years of age; however, it was usually not the mother who brought the infant to the clinic. Grandmothers, aunts, and other female relatives brought the infant while the mother was attending school.

Further studies of adolescent mothers should include younger mothers as they may have their own unique process of mothering. Programs may need to be designed to identify young adolescent mothers in either the prenatal period or immediate postpartum period and attempts to follow these women either through home based programs, or possibly school based programs, would allow for further study of this underserved population.

Clinical Implications

The results of this study, while exploratory in nature, highlight the difficulties that can face adolescent mothers and thus, the healthcare professionals that work with them. Infant feeding practices are influenced by many numerous factors, many of which are not well understood. Healthcare providers need to be aware of the influence that a mother's psychosocial health can have on her behaviors that will not only influence her health, but that of her infant. The findings from this study support the need to better identify and support young mothers with psychosocial health issues, particularly depressive symptoms.

Furthermore, pediatric providers must emphasize the importance of proper infant nutrition for all parents. Pediatric primary healthcare providers are in the ideal setting to intervene and work with families, especially during the numerous well-infant visits that occur in the first year of life. Information regarding infant development and feeding needs to be repeatedly presented to entire families in a variety of formats (i.e., verbal discussion, pamphlets, videos, posters in the office

lobby), in order to support learning. Pediatric healthcare providers should also work collaboratively with women's healthcare providers to provide more anticipatory guidance during pregnancy, promoting the development of healthy feeding practices early.

Future Research

Research must continue to investigate the numerous factors that play a role in the choice of maternal feeding practices, and ultimately the health of children. The state of the science has not reached a point where empirically derived and tested clinical interventions abound. Research needs to continue to provide the knowledge to further develop conceptual understanding of the numerous influences on infant feeding practices. Further understanding of the role that the psychosocial health of a mother can have on the choices she makes in regards to caring for her infant may allow healthcare providers an opportunity to intervene. Future studies in this area would continue the work of this project, expanding it to follow mothers and their infants longitudinally to see if these relationships continue to exist and also have a direct impact on the health of the infant, through their physical growth and development. Further expansion of the work of this project would also include identification and enrollment of young women in a study prenatally to assess and monitor the identified psychosocial variables across the span of pregnancy and through at least the first year of life of the infant. By enrolling women prenatally, the limitation of not identifying younger mothers may be overcome. Also, additional groups of high risk women

need to be evaluated to see if the relationships identified in this study are specific to low-income, first-time adolescent mothers, or could be identified in other groups of women. Additional variables, such as life stressors, should be added to the evaluation of these women, to identify what psychosocial variables have the most influence on actual parenting practices, such as infant feeding. Research should also evaluate the relationship of maternal psychosocial variables, feeding attitudes, knowledge, and skills to the actual outcome of infant growth. Research needs to be able to identify if personal factors of mothers that may influence their decisions about what and how to feed their children do actually affect infant growth. Identifying factors that are malleable to intervention may also help to identify areas that healthcare providers can intervene and promote the development of healthy feeding practices. Finally, this area of investigation would significantly benefit from the addition of qualitative methods to supplement the quantitative findings. Future qualitative work, such as focus groups with young mothers, may help to better understand not only the stressors these mothers face, but also how they develop a sense of themselves as a mother and enact that role.

Appendix A. Tools to Assess Subjective Maternal Role Competence or Similar Construct

Name of Instrument	Purpose	Reported Psychometrics	Used By
Semantic Differential Scale-*Myself as Mother*	To self measure the evaluative dimension of the concept, Myself as Mother High scores indicate positive maternal self-evaluation, identity	Coefficient alphas of .81 to.85 Correlations with mothering behaviors, *r*=.22 to .46	Flagler (1988), Walker et al. (1986a, 1986b), Koniak-Griffin & Verzemnieks (1991), Fowles (1998)
Maternal Attitude Scale (MAS) Subscales: *Period of Initial Adaptation, Maternal Anxiety, Mutuality*	Assesses maternal adaptation, through appropriateness of behavioral response to her infant and her ability to adjust her mothering activities to her infant's needs	Test-retest reliabilities of .69 and .73 for subscales	Flagler (1988), Virden (1988)
Feelings About the Baby (FAB)	Assesses maternal attachment	Cronbach α reliabilities of .51, .65, .64, .61	Mercer (1985)
Gratification in the Mothering Role (GRAT)	Evaluates parents described sources of satisfaction	Cronbach α reliabilities of .80, .78, .78, .77	Mercer (1985)
Interviewer-rated Maternal Behaviors (MABE)	Evaluated desirable mothering behaviors	10 Interviewer Spearman-Brown reliabilities reported for 55 item reliabilities: 35% ≥ .90; 44% ≥ .80; 10% ≥ .70; 7% ≥ .60; 2% = .55; 2% = .48	Mercer (1985)
Self-reported Ways of Handling Irritating Child Behaviors (WHIB)	To discriminate abusive from nonabusive parents	High content validity reported; Construct validity supported b/c tool able to discriminate between abusive and nonabusive parents	Mercer (1985)
Semi-structured interview	To assess women's views and feelings during the process of role attainment	Interrater reliabilities of 87% to 89% agreement on content analysis coding	Mercer (1985)

Name of Instrument	Purpose	Reported Psychometrics	Used By
Parenting Sense of Competence Scale (PSOC)	To assess self-esteem in parenting, measures parents perceived ability to meet situational demands in the parenting situation	Internal consistency scores of .82 to .87	Mercer & Ferketich (1994, 1995) Hermann, Van Cleve, & Levisen, 1998; Percy & McIntyre, 2001; Sadler, Anderson, & Sabatelli, 2001)
Pharis Self-Confidence Scale	Measures self-confidence in everyday baby care	Internal consistency scores of .75 to .91 Validity coefficients of .27 to .51 with other parental self-confidence measures	Walker et al. (1986a, 1986b), Koniak-Griffin & Verzemnieks (1991)
Birthing Questionnaire/ Perceived Competence Scale	Assesses mothers' perceptions of competence in infant feeding and infant care tasks	Cronbach's alpha ranged from .83 to .99	Rutledge & Pridham (1987), Fowles (1998)
Infant Care Questionnaire	Assesses perceived infant care competence	Subscale internal consistency Cronbach alpha coefficients between .70 to .86	Secco et al. (2002)
Parenting Stress Index- *Competence Subscale*	To assess a mother's sense of competences in relation to her role as a parent. The competence subscale relates to the mother's knowledge of how to manage her child's behaviors and comfort in making decisions related to child care	Cronbach alpha of .74	Tarkka (2003)

APPENDIX B

ADOLESCENT INFANT FEEDING QUESTIONNAIRE

Maternal Code: ____/____/____/____ Date: ____/____/____

PART 1: SCREENING and DEMOGRAPHICS

First, I'm going to ask you a few questions about you, your baby, and your life

1. Maternal age: ____/___/ 1a. Is this your first baby? ❑ 0=No ❑ 1=Yes
2. Is your baby between 6 and 12 months old? ❑ 0=No ❑ 1=Yes

2a. Does you baby have any health issues that affect how he/she eats?
❑ 0=No ❑ 1=Yes

2b. If yes, what are they? _____

3. Maternal race or ethnicity – 3a. *Select one*: ☐ Hispanic/Latino
☐ Non-Hispanic/Latino

3b. *Select all that apply*: ☐ Black/African-American ☐ White ☐ American Indian/Alaska Native ☐ Asian ☐ Native Hawaiian/Other Pacific Islander ☐ Other _____

4. What type of medical insurance do you have? *Select Primary Coverage*
☐TennCare/Medicaid ☐ Commercial/private ☐ CHAMPUS
☐ No insurance/self pay ☐ Other _____

5. Highest maternal grade level completed: ☐ Grade school
☐ Some high school: _____what grade are you in? ☐ High school
☐ GED ☐ Some college _____what year?

6. What is your marital/dating status? ❑ 1 = Single ❑ 2 = Married
❑ 3 = Separated ❑ 4 = Divorced ❑ 5 = Widowed ❑ 6 = Dating

7. Does your boyfriend or partner live with you? ❑ 0=No ❑ 1=Yes.

7a. Is he the father of your baby? ❑ 0=No ❑ 1=Yes

8. How many people live in your home? _____ [list their relationships: Father, Mother, Sister, Brother, Husband, Partner, Friend, Child, Boarder, etc.]
_____

End Part 1 *Thank you very much for helping with this project.*
(Continue on to Part 2 if eligible and willing to continue)

PART 2: INTERVIEW

9. Is your household income in the past year: [Show response card #1]
❑ 1=Under $10,000 ❑ 2= $10,001 - $15,000 ❑ 3= $15,001 - 20,000
❑ 4=$20,001 -25,000 ❑ 5= $25,001 - $30,000 ❑ 6= $30,001 - $35,000
❑ 7= > $35,001

10. Is your income, along with any assistance you receive, enough to pay your bills? [Show response card #2]
❑ 1 = No, Never enough ❑ 2 = Some of the time enough
❑ 3 = Most of the time enough ❑ 4 = Yes, Always enough

11. How tall are you? ___(feet) ___ (inches)

12. How much do you weigh? _____(lbs)

13. How would you rate the baby's health? Would you say it is:
❑ 4 = Excellent ❑ 3 = Good ❑ 2 = Fair ❑ 1 = Poor
Please describe any problems the baby seems to have
_____

13a How many times have you had to take your baby to the doctor for sick visits?
_____

14. Is you child in daycare? ❑ 1 = Yes ❑ 2 = No
15. How many hours a day is your baby in daycare? _____
16. Do you supply your baby's food at daycare, or does the daycare supply the food?
❑ 1 = Mom ❑ 2 = Daycare

17. - 36. ***Now I am going to ask you questions about how you have been feeling lately. For each statement that I read, please tell me how you've felt during this past week. Your choices are*** [Show response card #1]

0 = ***Rarely or none of the time (< 1 day)***
1 = ***Some or little of the time (1-2 days)***
2 = ***Occasionally or a moderate amount of time (3-4 days)***
3 = ***Most of the time (5-7 days)***

17. I was bothered by things that usually don't bother me.	0	1	2	3
18. I did not feel like eating; my appetite was poor.	0	1	2	3
19. I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
20. I felt that I was just as good as other people.	0	1	2	3
21. I had trouble keeping my mind on what I was doing.	0	1	2	3
22. I felt depressed.	0	1	2	3
23. I felt everything I did was an effort.	0	1	2	3
24. I felt hopeful about the future.	0	1	2	3
25. I thought my life had been a failure.	0	1	2	3
26. I felt fearful.	0	1	2	3
27. My sleep was restless.	0	1	2	3
28. I was happy.	0	1	2	3
29. I talked less than usual.	0	1	2	3
30. I felt lonely.	0	1	2	3
31. People were unfriendly.	0	1	2	3
32. I enjoyed life.	0	1	2	3
33. I had crying spells.	0	1	2	3
34. I felt sad.	0	1	2	3
35. I felt that people disliked me.	0	1	2	3
36. I could not get going.	0	1	2	3

37.-46. ***Now I am going to ask you questions about how you feel about yourself.*** **[Show response card #2]**
1 = Strongly Disagree 2 = Somewhat Disagree 3 = Not Sure
4 = Somewhat Agree 5 = Strongly Agree

37. I have a positive attitude toward myself.	1	2	3	4	5
38. Sometimes I think I'm no good at all.	1	2	3	4	5

39. I feel that I have a number of good qualities.	1	2	3	4	5
40. I don't feel that I have much to be proud of.	1	2	3	4	5
41. I am able to do things as well as most other people.	1	2	3	4	5
42. I certainly feel useful at times.	1	2	3	4	5
43. I often feel that I am a failure.	1	2	3	4	5
44. I feel that I'm a good person.	1	2	3	4	5
45. I wish I had more respect for myself.	1	2	3	4	5
46. On the whole, I am satisfied with myself.	1	2	3	4	5

47-54 Now I am going to ask you questions about some things that other people do for us or give us that may be helpful or supportive. For each statement that I read, please tell me which spot on the line is closest to your situation. .[**Show response card #3**]

As much as I would like — Much less than I would like

47. I have people who care about what happens to me
* * * * * *

48. I get love and affection
* * * * * *

49. I get chances to talk to someone about problems at work (school) or with my housework
* * * * * *

50. I get chances to talk to someone I trust about my personal and family problems
* * * * * *

51. I get chances to talk about money matters
* * * * * *

52. I get invitations to go out and do things with other people
* * * * * *

53. get useful advice about important things in life
* * * * * *

54. I get help when I'm sick in bed
* * * * * *

55. Now, I want you to think about who you go to most often to talk to or ask advice from when you have questions about how to take care of your baby? Who do you think of? _____

56-64. Now, I am going to ask you to tell me how much your _____ (answer to 48) responded to you in that way when you needed help or information to take care of your baby. [Show response card #4]

1=Not at all 2=Rarely 3=Occasionally 4=Some 5=Very Much

56.	Talked about important decisions with you.	1	2	3	4	5
57.	Gave you information or advice if you wanted it.	1	2	3	4	5
58.	Became annoyed when you didn't accept his advice.	1	2	3	4	5
59.	Told you how she/he solved a similar problem.	1	2	3	4	5
60.	Found it hard to understand the way you felt.	1	2	3	4	5
61.	Referred you to someone who could help you.	1	2	3	4	5
62.	Tried to change the way you were taking care of your baby in a way you didn't like.	1	2	3	4	5
63.	Gave you information or made suggestions that you found unhelpful or upsetting.	1	2	3	4	5
64.	Helped you explore alternatives.	1	2	3	4	5

65-81. Now I am going to ask you some questions about being a mom. Please tell me how much you agree or disagree with each statement. ..[Show response card #5]

1=Strongly disagree 2=Disagree 3=Mildly disagree 4=Mildly agree 5=Agree 6=Strongly Agree

65.	The problems of taking care of a baby are easy to solve once you know how your actions affect your baby, an understanding I have acquired.	1	2	3	4	5	6
66.	Even though being a parent could be rewarding, I am frustrated now while my child is only an infant.	1	2	3	4	5	6
67.	I go to bed the same way I wake up in the morning--- feeling I have not accomplished a whole lot.	1	2	3	4	5	6
68.	I do not know why it is, but sometimes when I'm supposed to be in control, I feel more like the one being manipulated.	1	2	3	4	5	6
69.	My mother was better prepared to be a good mother than I am.	1	2	3	4	5	
70.	I would make a fine model for a new mother to follow in order to learn what she would need to know in order to be a good parent.	1	2	3	4	5	6
71.	Being a parent is manageable, and any problems are easily solved.	1	2	3	4	5	6
72.	A difficult problem in being a parent is not knowing whether you are doing a good job or a bad one.	1	2	3	4	5	6
73.	Sometimes I feel like I'm not getting anything done.	1	2	3	4	5	6
74.	I meet my own personal expectations for expertise in	1	2	3	4	5	6

	caring for my baby.						
75.	If anyone can find the answer to what is troubling my baby, I am the one.	1	2	3	4	5	6
76.	My talents and interests are in other areas, not in being a parent.	1	2	3	4	5	6
77.	Considering how long I've been a mother, I feel thoroughly familiar with this role.	1	2	3	4	5	6
78.	If being a mother of an infant were only more interesting, I would be motivated to do a better job as a parent.	1	2	3	4	5	6
79.	I honestly believe I have all the skills necessary to be a good mother to my baby.	1	2	3	4	5	6
80.	Being a good parent makes me tense and anxious.	1	2	3	4	5	6
81.	Being a good mother is a reward in itself.	1	2	3	4	5	6

82.-93. Now I am going to ask you some questions about how your feed your baby. [Show response card #6]

0=Never 1=Rarely 2=Sometimes 3=Often 4=Always

82.	Do you let him/her eat whenever he/she wanted to?	0	1	2	3	4
83.	Do you worry that he/she was not eating enough?	0	1	2	3	4
84.	Do you allow him/her to eat at set times?	0	1	2	3	4
85.	When he/she gets fussy, is feeding him/her the first thing you would do?	0	1	2	3	4
86.	Do you worry that he/she is eating too much?	0	1	2	3	4
87.	Is it a struggle to get him/her to eat?	0	1	2	3	4
88.	Do you get upset if he/she eats too much?	0	1	2	3	4
89.	To make sure that he/she does not get fussy, do you feed him/her even if you do not think he/she was hungry?	0	1	2	3	4
90.	Do you talk or sing to your child while you feed him/her?	0	1	2	3	4
91.	Do you put infant cereal in his/her bottle so he/she will sleep longer at night?	0	1	2	3	4
92.	When he/she was under 4 months of age, did he/she want more than just formula and/or breastmilk?	0	1	2	3	4
93.	Did you put cereal in his/her bottle so he/she would stay full longer?	0	1	2	3	4

94.-101. *Now I am going to ask you how much you agree or disagree with these statements about your baby..*[Show response card #7]

0=Disagree a lot 1=Disagree a little 2=No strong feelings either way
3=Agree a little 4=Agree a lot

94.	If I do not encourage him/her to eat, then he/she will not eat enough.	0	1	2	3	4
95.	Feeding him/her is the best way to stop his/her fussiness.	0	1	2	3	4

96.	I know when he/she was hungry.	0	1	2	3	4
97.	I am worried that he/she will become underweight.	0	1	2	3	4
98.	I know when he/she is full.	0	1	2	3	4
99.	He/she knows when he/she is hungry.	0	1	2	3	4
100.	I am worried that he/she will become overweight.	0	1	2	3	4
101	He/she knows when he/she is full.	0	1	2	3	4

101.-131. ***Now I am going to ask you more questions about what your baby eats and some general questions about feeding babies.***

Feeding Questionnaire: _____Age of Baby □ male □ female		
102.	Did you breastfeed your baby?	❑ 1 = Yes ❑ 2 = No If yes go to #103
102a.	What are some of the reasons you did not??	Go to #105 after answer
103.	Did you use formula to supplement breastfeeding?	❑ 1 = Yes ❑ 2 = No
104.	How long did you breastfeed?	_____days _____weeks _____months
104a.	Why did you stop breastfeeding?	
105.	What formula is/was your baby on?	
105a.	Who recommended this formula and why?	
106.	Did you ever put cereal in your baby's bottle?	❑ 1 = Yes ❑ 2 = No If no go to #109
107.	How old was your baby when you put cereal in the bottle?	
108.	Why did you put cereal in your babies' bottle? Did your doctor tell you to?	❑ 1 = Yes ❑ 2 = No If yes, go to #109
108a	Who told you to put cereal in the babies' bottle?	
109.	At what age should you start a baby on baby foods (Ex: vegetables, fruits etc)	
110.	How did you know that your baby was ready to eat more than just formula or breastmilk?	
111.	How old was the baby when you first fed him/her solid (baby) food?	
112.	What was the first food your baby ate?	
113.	When did you first feed your baby vegetables?	

114.	When did you first feed your baby fruits?	
115.	When did you first feed your baby meats?	
116.	What other foods have you introduced your baby to? (ask about eggs, peanut butter, honey)	
116a.	When should you start a baby on eggs? Peanut butter? Honey?	_____ _____ _____
117.	Do you use a "feeder" bottle to feed your baby?	❑ 1 = Yes ❑ 2 = No
118.	Does your baby use a pacifier?	❑ 1 = Yes ❑ 2 = No
119.	What stage baby food is your baby on now?	
120.	At what age should babies start eating table foods or the same foods as the family?	
121.	How old was the baby when he/she began to eat table foods?	
122.	When should a baby start drinking cow's milk?	
123.	Does your baby have a favorite food? What is it?	❑ 1 = Yes ❑ 2 = No _____
124.	Does your baby use a bottle?	❑ 1 = Yes ❑ 2 = No
125.	When do you think a baby should stop drinking from a bottle?	
126.	When did he/she switch to a sippy cup or cup?	
127.	Where does your baby eat? Table, in front of TV	
128.	Do you have any concerns about what your baby does or doesn't eat? If so, what are they?	❑ 1 = Yes ❑ 2 = No
129.	Who was the person that was most influential in telling you how to feed your baby, when to start foods?	
130.	If your baby was a preemie (<37 wks), did anyone talk to you specifically about feeding a premature baby, or any special needs that your baby might have in regards to feeding? If yes, who?	❑ 1 = Yes ❑ 2 = No ❑ 3 = NA _____
131.	Are you enrolled in the WIC program? (Ask only if interviewing at VU)	❑ 1 = Yes ❑ 2 = No
132.	Does your child go to Vanderbilt for	❑ 1 = Yes ❑ 2 = No

	his/her well baby check-ups? (Ask only if interviewing at WIC)	

Open-ended questions

1. What do you do as a mom to make sure your child is healthy?

2. Tell me what are the most important things, to you, about being a mother?

3. Is there anything about being a mom or feeding a baby that I did not ask you or that you think would be helpful for me to know?

Questions for 24 Hour Diet Recall

Now, I am going to ask you to try to remember what your baby has eaten in the past 24 hours. I will ask you about specific foods and drinks and the quantity of these that your baby ate or drank.

- Formula or Breastmilk:
  - Formula
    - Type of Formula: _____
    - Quantity and Frequency:_____
    - Additional food in the bottle:_____
    - How do you mix the formula:_____
  - Breastmilk
    - Frequency and length of feedings:_____
    - Weight before and after feed:_____

(if mother willing to)

    - Quantity of breastmilk intake:_____

- Juice/Beverages:
  - Juice
    - Type of Juice/Brand:_____
    - Quantity and Frequency:_____
  - Other Beverages: Ask what type (i.e., Juice, Pediasure, colas, teas, sports drinks etc.)
    - Type of Beverage/Brand:_____
    - Quantity and Frequency:_____
    - Type of Beverage/Brand:_____
    - Quantity and Frequency:_____
    - Type of Beverage/Brand:_____
    - Quantity and Frequency:_____

- Water
  - Quantity and Frequency:_____

- Baby and Table Food
  - Breakfast:
    - Jar vs. Table Food:_____
    - Brand:_____
    - Type of Jar: glass/plastic, stage:_____
    - Quantity:_____
      _____
    - Liquids at this meal: _____
  - Lunch
    - Jar vs. Table Food:_____
    - Brand:_____
    - Type of Jar: glass/plastic, stage:_____
    - Quantity:_____
      _____
    - Liquids at this meal: _____
  - Dinner
    - Jar vs. Table Food:_____
    - Brand:_____
    - Type of Jar: glass/plastic, stage:_____
    - Quantity:_____
      _____
    - Liquids at this meal: _____
  - Snacks:
    - Jar vs. Table Food:_____
    - Brand:_____
    - Type of Jar: glass/plastic, stage:_____
    - Quantity:_____
      _____
    - Liquids at this meal: _____

Thank you very much for helping with this project

REFERENCES

Allison, D. B., Zannolli, R., & Narayan, K. M. V. (1999). The direct health care costs of obesity in the United States. *American Journal of Public Health, 89*, 1194-1199.

American Academy of Pediatrics, Committee on Nutrition (2004). *Pediatric Nutrition Handbook* (5th ed.) Evanston, IL: American Academy of Pediatrics.

American Academy of Pediatrics, Policy Statement. (2005). Breastfeeding and the use of human milk [Electronic version]. *Pediatrics, 115*, 496-506.

American Academy of Pediatrics, Policy Statement. (2003). Prevention of pediatric overweight and obesity [Electronic version]. *Pediatrics, 112*, 424-430.

Arlotti, J. P., Cottrell, B. H., Lee, S. H., & Curtin, J. J., (1998). Breastfeeding among low-income women with and without peer support. *Journal of Community Health Nursing, 15*, 163-178.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.

Barton, S. J. (2001). Infant feeding practices of low-income rural mothers. *Maternal Child Nursing, 26*, 93-97.

Baughcum, A. E., Burklow, K. A., Deeks, C. M., Powers, S. W., & Whitaker, R. C. (1998). Maternal feeding practices and childhood obesity: A focus group study of low-income mothers. *Archives of Pediatrics & Adolescent Medicine, 152*, 1010-1014.

Baughcum, A.E., Powers, S.W., Johnson, S.B., Chamberlin, L. A., Deeks, C.M., Jain, A., et al., (2001). Maternal feeding practices and beliefs and their relationship to overweight . *Developmental and Behavioral Pediatrics, 22,* 391 – 408.

Beck, C. T. (1998). The effects of postpartum depression on child development: A meta-analysis. *Archives of Psychiatric Nursing, 12*, 12-20.

Bentley, M., Gavin, L., Black, M. M., & Teti, L. (1999). Infant feeding practices of low-income, African-American, adolescent mothers: An ecological, mutigenerational perspective. *Social Science & Medicine, 49*, 1085-1100.

Berkey, C. S., Rockett, H. R. H., Field, A. E., Gillman, M. W., Frazier, A. L., Camargo, C. A., et al. (2000). Activity, dietary intake, and weight changes in a longitudinal study of preadolescent and adolescent boys and girls. *Pediatrics, 105*, e56-64.

Bergmann, K. E., Bergmann, R. L., von Kries, R., Böhm, O., Richter, R., Dudenhausen, J. W., et al., (2003). Early determinants of childhood overweight and adiposity in a birth cohort study: Role of breastfeeding. *International Journal of Obesity, 27*, 162-172.

Betz, C. L. (2000). Childhood obesity: Nursing prevention and intervention are needed. *Journal of Pediatric Nursing, 15*, 135-136.

Birch, L. L. & Fisher, J. O. (1998). Home and videotape Intervention delays early complementary feeding among adolescent mothers. *Pediatrics, 101*(supplement), 539-549.

Black, M. M., Siegel, E. H., Abel, Y, & Bentley, M. E.(2001). Development of eating behaviors among children and adolescents. *Pediatrics, 107*, e67.

Bonuck, K. A. & Kahn, R. (2002). Prolonged bottle use and its association with iron deficiency anemia and overweight: A preliminary study. *Clinical Pediatrics, 41*, 603-607.

Bornstein, M.H. & Putnick, D. L. (2007). Chronological age, cognitions, and practices in European American mothers: A multivariate study of parenting. *Developmental Psychology, 43,* 850 -864.

Bowman, K. G. (2005). Postpartum Learning Needs. *Journal of Obstetric, Gynecological, and Neonatal Nursing, 34*, 438-443.

Breslau, N. (1985). Depressive symptoms, major depressions, and generalized anxiety: A comparison of self-reports on CES-D and results from diagnostic interviews. *Psychiatry Research 15,* 219-229.

Broadhead, W. E., Gehlbacj, S. H., De Gruy, F. V., & Kaplan, B. H. (1988). The Duke-UNC functional social support questionnaire. *Medical Care, 26*, 709- 723.

Bronner, Y. L., Gross, S. M., Caulfield, L., Bentley, M. E., Kessler, L., Jensen, J., et al., (1999). Early introduction of solid foods among urban African-American participants in WIC. *Journal of the American Dietetic Association, 99*, 457-461.

Brownell, K., Hutton, L., Harton, J., & Dabrow, S. (2002). Barriers to breastfeeding among African-American adolescent mothers. *Clinical Pediatrics, 41*, 669-673.

Burns, E. I., Doremus, P.C., & Potter, M. B. (1990). Value of health, incidence of depression, and level of self-esteem in low-income mothers of pre-school children. *Issues in Comprehensive Pediatric Nursing, 13* (3), 141-153.

Burton, B. T., Foster, W. R., Hirsch, J., & Van Itallie, T. B. (1985). Health implications of obesity: A NIH consensus development conference. *International Journal of Obesity, 9*, 155-169.

Carruth, B. R., Nevling, W., Skinner, J. (1997). Developmental and food profiles of infants born to adolescent and adult mothers. *Journal of Adolescent Health, 20*, 434-441.

Centers for Disease Control and Prevention (2003a). Prevalence of overweight Among Children and Adolescents: United States, 1999-2000. Retrieved November 8, 2003, from http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overwght99.htm.

Centers for Disease Control and Prevention (2003b). BMI for children and teens. Retrieved March 27, 2004, from http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm.

Childrens' Hospital of Philadelphia. www.chop.edu/consumer/index.jsp.

Chung, E. K., McCollum,, K. F., Elo, I. T., Lee, H., J., & Culhane, J. F. (2004). Maternal depressive symptoms and infant health practices among low-income women. *Pediatrics, 113*, e523-529.

Comstock, G.W., & Helsing, K.J. (1976). Symptoms of depression in two communities. *Psychological Medicine, 6*, 551-563.

Covington, C. Y., Cybulski, M. J., Davis, T. L., Duca, G. E., Farrell, E. B., Kasgorgis, M. L., et al., (2001). Kids on the move: Preventing obesity among urban children. *American Journal of Nursing, 101*, 73-82.

Cox, J., Holden, J., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry, 150*, 782-786.

Cooley, C. H. (1902). The social self-1. The meaning of "I." *In Human Nature and the Social Order* (pp 136-178). Charles Scribner's Sons: New York.

Daniels, J. (2005). Weight and weight concern: Are they associated with reported depressive symptoms in adolescent mothers? *Journal of Pediatric Health Care, 19*, 33-41.

Deal, L.W., & Holt, V.L. (1998). Young maternal age and depressive symptoms: Results from the 1988 National maternal and infant health survey. *American Journal of Public Health, 88*, 266-270.

DeLongis, A., Coyne, J. C., Dakof, G., Folkman, S., & Lazarus, R. S. (1982). Relationship of daily hassles, uplifts, and major life events to health status. *Health Psychology, I,* 119-136.

Dennis, C. L. (2002). Breastfeeding initiation and duration: A 1990 – 2000 literature review. *Journal of Obstetric, Gynecological, and Neonatal Nursing*, *31*, 12-32.

Dennison, B. A., Rockwell, H. L., & Baker, S. L. (1997). Consumption by preschool-aged children is associated with short stature and obesity. *Pediatrics, 99*, 15-22.

Dennison, B. A., Rockwell, H. L., & Baker, S. L. (1998). Fruit and vegetable intake in young children. *Journal of the American College of Nutrition, 17*, 371-378.

Devaney, B., Ziegler, P., Pac, S., Karwe, V., & Barr, S. I. (2004). Nutrient intakes of infants and toddlers. *Journal of the American Dietetic Association, 104*, (Suppl 1), S14-S21.

Dormire, S. L., Strauss, S. S., & Clarke, B. A. (1988). Social support and adaptation to the parent role in first-time adolescent mothers. *Journal of Obstetric, Gynecological, and Neonatal Nursing, July-August*, 327-337.

Ebbeling, C. B., Pawlak, D. B., & Ludwig, D. S. (2002). Childhood obesity: Public-health crisis, common sense cure. *Lancet, 360*, 473-482.

Ensel, W. M. (1986). Measuring depression: The CES-D Scale. In N. Lin, A. Dean, & W. M. Ensel (Eds.), *Social support, life evens, and depression* (pp. 51-70). New York: Academic Press.

Erikson, E. H. (1963). *Childhood and Society*. New York: W.W. Norton & Co.

Flagler, S. (1988). Maternal role competence. *Western Journal of Nursing Research, 10*, 274-290.

Fox, M., Pac, S., Devaney, B., & Jankowski, L. (2004). Feeding infants and toddlers study: What foods are infants and toddlers eating? *Journal of the American Dietetic Association, 104*, S22-S30.

Fowles, E. R. (1998). The relationship between maternal role attainment and postpartum depression. *Health Care for Women International, 19*, 83-94.

Gabriel A., Gabriel, K. R., & Lawrence, R. A., (1986). Cultural values and biomedical knowledge: Choices in infant feeding, analysis of a survey. *Social Science & Medicine, 5*, 501-509.

Gibaud-Wallston, J. (1977). Self-esteem and situational stress: Factors related to sense of competence in new parents. Doctoral dissertation in Psychology, George Peabody College for Teachers, Nashville, TN.

Gillman, M. W. (2002). Breast-feeding and obesity. *The Journal of Pediatrics, 141,* 749-750.

Hall, L. A. (1990). Prevalence and correlates of depressive symptoms in mothers of young children. *Public Health Nursing, 7*, 71-79.

Hall, L. A., & Farel, A. M. (1988). Maternal stresses and depressive symptoms: Correlates of behavior problems in young children. *Nursing Research, 37,* 156-161.

Hall, L. A., Gurley, D., Sachs, B., & Kryscio, R. J. (1991). Psychosocial predictors of maternal depressive symptoms, parenting attitudes, and child behavior in single-parent families. *Nursing Research, 40,* 214-220.

Hall, L.A., Sachs, B., & Rayens, M.K., (1998). Mothers potential for child abuse: The roles of childhood abuse and social resources. *Nursing Research, 47,* 87-95.

Hall, W. A., Shearer, K., Mogan, J., & Berkowitz, J. (2002). Weighing preterm infants before and after breastfeeding: Does it increase maternal confidence and competence? *Maternal Child Nursing, 27*, 318-327.

Hamilton, J. E., Martin, J. A., & Sutton, P. D. (2004). Births: Preliminary data for 2003. *National Vital Statistics Report, 53*, 1-18.

Hannon, P. R., Willis, S. K., Bishop-Townsend, V., Martinez, I. M., & Scrimshaw, S. C. (2000). African-American and Latina adolescent mothers' infant feeding decisions and breastfeeding practices: A qualitative study. *Journal of Adolescent Health, 26*, 399-407.

Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., & Flegal, K. M. (2004). Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *Journal of the American Medical Association, 291*, 2847-2850.

Heinig, M. J., Follett, J. R., Ishii, K. D., Kavanagh-Prochaska, K., Cohen, R., & Panchula, J. (2006). .Barriers to compliance with infant-feeding recommendations among low-income women. *Journal of Human Lactation, 22,* 27-38.

Herrmann, M. M., Van Cleve, L., Levisen, L. (1998). Parenting competence, social support, and self-esteem in teen mothers case managed by public health nurses. *Public Health Nursing, 15*, 432-439.

Hodes, M., Jones, C., & Davies, H. (1996). Cross-cultural differences in maternal evaluation of children's body shapes. *International Journal of Eating Disorders, 19*, 257-263.

Jain, A., Sherman, S. N., Chamberlin, L. A., Carter, Y., Powers, S. W., & Whitaker, R. C. (2001). Why don't low-income mothers worry about their preschoolers being overweight? *Pediatrics, 107*, 1138-1146.

Johnson S. L. & Birch, L. L. (1994). Parents' and children's adiposity and eating style. *Pediatrics, 94*, 653-661.

Kannan, S., Carruth, B. R., & Skinner, J. (1999). Cultural influences on infant feeding beliefs of mothers. *Journal of the American Dietetic Association, 99*, 88-90.

Kaufman, K. J. & Hall, L. A. (1989). Influences of the social network on choice and duration of breast-feeding in mothers of preterm infants. *Research in Nursing & Health, 12*, 149-159.

Koniak-Griffin, D (1993). Maternal role attainment. Image: *Journal of Nursing Scholarship, 25*, 257-261.

Koniak-Griffin, D., Logsdon, M. C., Hines-Martin, V., & Turner, C.C. (2006). Contemporary mothering in a diverse society. Journal of *Issues in Comprehensive Pediatric Nursing, 35*, 671-678.

Koniak-Griffin, D. & Verzemnieks, I. (1991). Effects of nursing intervention on adolescents' maternal role attainment. *Issues in Comprehensive Pediatric Nursing, 14*, 121-138.

Knauth, D. G. (2000). Predictors of parental sense of competence for the couple during the transition to parenthood. *Research in Nursing & Health, 23*, 496-509.

Landers, S. (2003). Maximizing the benefits of human milk feeding for the preterm infant. *Pediatric Annals, 32*, 298-306.

Lesser, J., Koniak-Griffin, D., & Anderson, N. L. R., (1999). Depressed adolescent mothers' perceptions of their own maternal role. *Issues in Mental Health Nursing, 20*, 131-149.

Li, R., Zhao, Z., Mokdad, A., Barker, L., & Grummer-Strawn, L. (2003). Maternal influences on child health: Preconception, prenatal, and early childhood. *Pediatrics, 111*, 1198-1201.

Libbus, M. K., & Kolostov, L. S. (1994). Perceptions of breastfeeding and infant feeding choices in a group of low-income mid-Missouri women. *Journal of Human Lactation, 10*, 17-23.

Logsdon, M.C., Wisner, K. L., Pinto-Foltz, M. D. (2006). The impact of postpartum depression on mothering. *Journal of Obstetric Gynecological and Neonatal Nursing;35,* 652-658.

Losch, M., Dungy, C. I., Russell, D., & Dusdieker, L. B. (1995). Impact of attitudes on maternal decisions regarding infant feeding. *The Journal of Pediatrics, 126*, 507-514.

Lutenbacher, M. (1993, February). *Psychometric examination of a measure of depressive symptoms: A secondary analysis.* Paper presented at the Annual Meeting o the Southern Nursing Research Society, Birmingham, AL.

Lutenbacher, M. (2002). Relationships between psychosocial factors and abusive parenting attitudes in low-income single mothers. *Nursing Research, 51*, 158-167.

MacKenzie, N. R. (2000). Childhood obesity: Strategies for prevention. *Pediatric Nursing, 26*, 527-530.

Macknin, M.L., Medendorp, S.V., & Maier, M.C. (1989). Infant sleep and bedtime cereal. *Archives of Pediatrics and Adolescent Medicine. 143*, 1066 – 1068.

Martin, J. A., Hamilton, B. E., Ventura, S. J., Menacker, F., Park, M. M., & Sutton, P. D. (2002). Births: Final data for 2001. *National Vital Statistics Report, 51*, 1-25.

McDowell, I., & Newell, C. (Eds.). (1996). *Measuring Health: A guide to rating scales and questionnaires.* New York: Oxford University.

McLearn, K. T., Minkovitz, C. S., Strobino, D. M., Marks, E., & Hou, W. (2006). The timing of maternal depressive symptoms and mothers' parenting practices with young children: Implications for pediatric practice. *Pediatrics, 118*, e174- e 175.

McLennan, J.D. & Kotelchuck, M. (2000). Parental prevention practices for young children in the context of maternal depression. *Pediatrics, 105,* 1090-1094.

McVeigh, C., & Smith, M. (2000). A comparison of adult and teenage mother's self-esteem and satisfaction with social support. *Midwifery, 16*, 269-276.

Mead, G. H. (1934). The self. In C.W. Morris (Ed.). *Mind, Self, and Society* (pp 135-200). University of Chicago Press: Chicago.

Mercer, R. T. (1981). A theoretical framework for studying factors that impact on the maternal role. *Nursing Research, 30*, 73-77.

Mercer, R. T. (1985). The process of maternal role attainment over the first year. *Nursing Research, 34*, 198-204.

Mercer, R. T. (1986). The relationship of developmental variables to maternal behavior. *Research in Nursing & Health, 9*, 25-33.

Mercer, R. T. (2004). Becoming a mother versus maternal role attainment. *Journal of Nursing Scholarship, 36*, 226-232.

Mercer, R. T. & Ferketich, S. L. (1994). Predictors of maternal role competence by risk status. *Nursing Research, 43*, 38-43.

Mercer, R. T. & Ferketich, S. L. (1995). Experienced and inexperienced mothers' maternal competence during infancy. *Research in Nursing & Health, 18*, 333-343.

Mercer, R. T. & Walker, L. O. (2006). A review of nursing interventions to foster becoming a mother. *JOGNN,35,* 568-582.

Miller, K. J., Gleaves, D. H., Hirsch, T. G., Green, B. A., Snow, A. C., & Corbett, C. C. (1998). Comparisons of body image dimensions by race/ethnicity and gender in a university population. *American Journal of Eating Disorders, 27*, 310-316.

Miller, P., Kreitman, N. B., & Ingham, J. G. (1989). Self-esteem, life stress, and psychiatric disorder. *Journal of Affective Disorders, 17,* 65-75.

MMWR. (2003). First reports evaluating the effectiveness of strategies for preventing violence: Early childhood home visitation and firearm laws. *MMWR, 52*, 1-9.

National Institute of Health, National Heart, Lung, and Blood Institute. (1998). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults-the evidence report. *Obesity Research, 6(suppl 2),* 51S.

Nevling, W., Carruth, B. R., Skinner, J. D. (1997). How do socioeconomic status and age influence infant food patterns? *Journal of the American Dietetic Association, 97*, 418-420.

Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA, 295*, 1549 – 1555.

Panzarine, S., Slater, E., & Sharips. (1995). Coping, social support, and depressive symptoms in adolescent mothers. *Journal of Adolescent Health, 17*, 113-119.

Pajares (2002). Overview of social cognitive theory and self-efficacy. Retrieved November, 15, 2002, from http://www.emory.edu/EDUCATION/mfp/eff.html.

Parraga, I. M., Weber, M. A., Engel, A., Reeb, K. G., & Lerner, E. (1988). Feeding patterns of urban black infants. *Journal of the American Dietetic Association, 88*, 796-800.

Patel, V. DeSouza, N., Rodriques, M. (2003). Postnatal depression and infant growth and development in low income countries: A cohort study from Goa, India. *Archives of Disease in Childhood, 88*, 34-37.

Percy, M.S., & McIntyre, L. (2001). Using touchpoints to promote parental self-competence in low-income, minority, pregnant, and parenting teen mothers. *Journal of Pediatric Nursing, 16,* 180- 186.

Piscano, J. C., Lichter, H., Ritter, J., & Siegal, A. P. (1978). An attempt at prevention of obesity in infancy. *Pediatrics, 61*, 360-364.

Porter,C. L. & Hsu, H.C. (2003). First-time mothers' perceptions of efficacy during the transition to motherhood: links to infant temperament. *Journal of Family Psychology,17*, 54-64.

Pridham, K. F., Lytton, D., Chang, A. S., Rutledge, D. (1991). Early postpartum transition: Progress in maternal identity and role attainment. *Research in Nursing and Health, 14,* 21-31.

Pridham, K., Saxe, R., & Limbo R. (2004). Feeding issues for mothers of very low-birth weight premature infants through the first year. *Journal of Perinatal Nursing, 18*, 161-169.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, I,* 385-401.

Rahman, A., Harrington, R., & Bunn, J. (2002). Can maternal depression increase infant risk of illness and growth impairment in developing countries? *Child Care, Health, & Development, 28*, 51-56.

Revenson, T.A. Schiaffino, K. M., Majerovitz, S.D., & Gibofsky, A. (1991). Social support as a double-edged sword: The relation of positive and problematic support to depression among rheumatoid arthritis patients. *Social Science and Medicine, 33,* 807-813.

Ritchie, S. K. (2002). Primary care of the premature infant discharged from the neonatal intensive care unit. *Maternal Child Nursing, 27*, 76-85.

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, NJ: Princeton University Press.

Rosenberg, M. (1979). *Conceiving the self.* New York: Basic.

Rubin, R. (1967). Attainment of the maternal role: Part I processes. *Nursing Research, 16*, 237-245.

Rutledge, D. L. & Pridham, K. F. (1987). Postpartum mothers' perceptions of competence for infant care. *JOGNN, May-June*, 185-194.

Sachs, B., & Hall, L.A. (1991). Maladaptive mother-child relationships: A pilot study. *Public Health Nursing, 8,* 226-233.

Sachs, B., Hall, L., Lutenbacher, M., & Rayens, M. K. (1999). Potential for abusive parenting by rural mothers with low-birth-weight children. Image-*The Journal of Nursing Scholarship, 31*, 21-25.

Sadler, L. S., Anderson, S. A., & Sabatelli, R. M. (2001). Parental competence among African American adolescent mothers and grandmothers. *Journal of Pediatric Nursing, 16,* 217-233.

Savage, J. S., Fisher, J. O., & Birch, L.L. (2007). Parental influence on eating behavior: Conception to adolescence. *Journal of Law, Medicine, & Ethics Spring*, 22 – 34.

Schoenbach, V. J., Kaplan, B. H., Grimson, R.C., & Wagner, E.H. (1982). Use of symptom scale to study the prevalence of a depressive syndrome in your adolescents. *American Journal of Epidemiology, 116,* 791-800.

Secco, M. L., (2002). The infant care questionnaire: Assessment of reliability and validity in a sample of healthy mothers. *Journal of Nursing Measurement, 10,* 97-110.

Secco, M. L. & Moffatt, M. E., (2003). Situational, maternal, and infant influences on parenting stress among adolescent mothers. *Issues Comprehensive Pediatric Nursing, 26*,103-22.

Secco, M. L., Ateah, C., Woodgate, R., & Moffatt, M. E. K. (2002). Perceived and performed infant care competence of younger and older adolescent mothers. *Issues in Comprehensive Nursing, 25*, 97-112.

Shepherd, C. K., Power, K. G., & Carter, H. (2000). Examining the correspondence of breastfeeding and bottle-feeding couples' infant feeding attitudes. *Journal of Advanced Nursing, 31*, 651-660.

Skinner, J. D., Ziegler, P., Pac, S., Devaney, B. (2004). Meal and snack patterns of infants and toddlers. *Journal of the American Dietetic Association, 104*, (Suppl 1), S65-S70.

Smith, M. M. & Lifshitz, F. (1994). Excess fruit juice consumption as a contributing factor in nonorganic failure to thrive. *Pediatrics, 93*, 438-443.

Solem, B. J., Norr, K. F., & Gallo, A. M. (1992). Infant feeding practices of low-income mothers. *Journal of Pediatric Health, 6*, 54-59.

Spear, H. J., (2006). Breastfeeding behaviors and experiences of adolescent mothers. *Maternal Child Nursing, 31*, 106–113.

Spieker. S. J. & Bensley, L. (1994). Roles of living arrangements and grandmother social support in adolescent mothering and infant attachment. *Developmental Psychology, 30*, 102-111.

Tarkka, M. T. (2003). Predictors of maternal competence by first-time mothers when the child is 8 months old. *Journal of Advanced Nursing, 41*, 233-240.

Taveras, E. M., Scanlon, K.S., Nirch, I., Rifas-Shiman, S. L., Rich-Edwards, J.L., & Gillman, M. (2004). Association of breastfeeding with maternal control of infant feeding at age 1 year. *Pediatrics, 114*, e577-e583.

Tennessee Department of Health. http://health.state.tn.us/newsreleases/031006.htm. Retrieved February 9, 2008.

Underwood, S., Pridham, K., Brown, L., Clark, T., Frazier, W., Limbo, R., et al., (1997). Infant feeding practices of low-income African American women in a central city community. *Journal of Community Health, 14*, 189-205.

U.S. Department of Health and Human Services (2000, November). *Healthy People 2010*: Understanding and Improving Health (2nd ed.) Washington, D.C.: U.S. Government Printing Office.

Valente, A. M., Strong, W., & Sinaiko, A. R. (2001). Obesity and insulin resistance in young people. *American Heart Journal, 142*, 440-444.

Virden, S. F. (1988). The relationship between infant feeding method and maternal role adjustment. *Journal of Nurse-Midwifery, 33,* 3135.

Walker, L. O., Crain, H., & Thompson, E. (1986a). Maternal role attainment and identity in the postpartum period: Stability and change. *Nursing Research, 35*, 68-71.

Walker, L. O., Crain, H., & Thompson, E. (1986b). Mothering behavior and maternal role attainment during the postpartum period. *Nursing Research, 35*, 352-355.

Walker, L. O. & Montgomery, E. (1994). Maternal identity and role attainment: Long-term relations to children's development. *Nursing Research, 43*, 105-110.

Warren, P.T., (2005). First-time mothers: Social support and confidence in infant care. *Journal of Advanced Nursing, 50,* 479- 488.

Wasserman, G., Rauh, V. A., Brunellis, S. A., Garcia-Castro, M., & Necos, B. (1990). Psychosocial attributes and life experiences of disadvantaged minority mothers: Age and ethnic variations. *Child Development, 61,* 566-580.

Weissman, M., Sholomskas, D., Pottenger, M., Prusoff, B., & Locke, B. Z. (1977). Assessing depressive symptoms in five psychiatric populations: A validation study. *American Journal of Epidemiology, 106,* 203-214.

Winkelstein, M. L. (1984). Overfeeding in infancy: The early introduction of solid foods. *Pediatric Nursing, May-June*, 205-208.