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**EXPLORING FACTORS ASSOCIATED WITH
LOW-INCOME MOTHERS' INFANT FEEDING CHOICES**

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EXPLORING FACTORS ASSOCIATED WITH
LOW-INCOME MOTHERS' INFANT FEEDING CHOICES

By

Allison Churilla

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Park, Recreation and Tourism Resources

2003

ABSTRACT

EXPLORING FACTORS ASSOCIATED WITH LOW-INCOME MOTHERS' INFANT FEEDING CHOICES

By

Allison Churilla

The purpose of this study was to explore infant feeding choices in the context of external influence from individuals and groups in mothers' social networks, adjustment to and perceptions of their own maternal and sexual femininity during and after pregnancy, orientation toward specific feeding methods, and socio-demographic and cultural factors. The sample for this study was composed of 200 women that participated in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in two urban areas of Michigan during the months of June and July 2003. Primary data was collected from questionnaires administered to WIC clients and secondary data on WIC clients was made available from the WIC Division of the Michigan Department of Community Health. Two regression models were proposed that predicted mothers' infant feeding behavior on (1) discourses of maternal and sexual femininity and (2) authority of other individuals. On both models, mothers' belief in the benefits of breastfeeding was the strongest statistically significant predictor of breastfeeding percentage. Two other beliefs were statistically significant negative predictors on both models: belief that breastfeeding limits lifestyle habits and belief that breastfeeding is painful. Implications for practice suggest heightened attention to mothers' needs and desires; implications for future research focus on further refining existing scales and employing qualitative methods to further explore these results.

ACKNOWLEDGEMENTS

It is with deep gratitude that I thank my academic advisor, Dr. Dwayne Baker, for allowing me to spread my wings on this project. This project required him to embark on a journey outside his typical area of interest. With some certainty, I would also venture to guess that, on some occasions, this journey carried him outside his typical comfort zone as well. Under these circumstances, there are few individuals that would have embraced this project with such vigor and invested such time, resources and care into my academic career. Moreover, it is a rare faculty member that takes such effort to cultivate a personal relationship with their student based on respect and genuine interest in life outside the classroom. It was a stroke of luck that I crossed paths with such a faculty member and it is this relationship that I will value long after this project has been completed.

From the beginning of this project, Dr. Baker recognized the strengths that several colleagues could contribute to the project and made great efforts to help me develop relationships with other experts in the fields of sociology, medicine, and nutrition. On this note, I also extend great thanks to the three faculty members that agreed to serve on my master's thesis committee. Dr. Linda Blum, associate professor in the Department of Sociology at the University of New Hampshire, was asked to serve on the committee based on her extensive work on the topic of infant feeding from a sociological perspective. Dr. Blum's thoughtful attention to the development of the proposal and final product was invaluable, as she challenged me to critically examine my own assumptions about sociological research, infant feeding, race and ethnicity, and class.

I also extend warm thanks to Dr. Margot Kurtz, professor in the Department of Family and Community Medicine at Michigan State University, who agreed to serve on my thesis committee despite her great geographical distance from the United States for a large portion of the project. Dr. Kurtz offered great strength to my project in several ways, not least of which was her intense knowledge of quantitative methods and her empirical understanding of women's breast-feeding experiences in relation to breast cancer. Moreover, Dr. Kurtz was a source of endless support and encouragement throughout the project, which contributed greatly toward my ability to face project challenges and ultimately complete this project.

My final committee member, Dr. Beth Olson, assistant professor in the Department of Food Science and Human Nutrition at Michigan State University, was a considerable resource in this project. It was Dr. Olson's interest in infant feeding that first ignited my interest in this topic. Dr. Olson's passion for the topic was obvious and she possessed great knowledge of and experience working with administrators, staff and participants in the Michigan WIC program. Dr. Olson was also a rich resource for identifying the latest research on this topic and she was constantly on the watch for literature that would add dimension to my own research. I am incredibly grateful for her periodic correspondence throughout the project and for her willingness to meet with me, at short notice no less, when I was confronted with specific challenges or opportunities.

The financial support provided for this project was an incredibly generous contribution to the process and completion of this study. For this, particular thanks are directed to Karen Shirer of Michigan State University Extension, Family and Consumer

Sciences. This support allowed greater access to resources for the study that enhanced the breadth of the project.

In addition to the support I received from members of my thesis committee and the financial support I received, I was privileged to work with several individuals “in the field” that were committed to the success of the project. These individuals included Diane Ayers, Pat Benton, Lynette Biery, Kathy Daly-Koziel, Dr. Kobra Eghtedary, Nancy Erickson, Kathy Koss, Diane Revitte, LeeAnne Roman, David Sachau, and office staff and nutritionists at participating WIC clinics in the Kent County Health Department and the Detroit City Health Department. I would like to express particular gratitude to Monica Smith, WIC coordinator at the Kent County Health Department, for her dedication to this project. It was my pleasure to work with an individual that demonstrated such passion for her work and for the people she works with.

In my days spent in Room 17, I was lucky to work with individuals that also demonstrated this passion and commitment. I am so grateful for the unending support offered by Ariel Rodriguez, whose care and good humor added great warmth to Room 17. The friendship we developed over two years of sharing an office space is an invaluable outcome of my time at Michigan State. I am also thankful for the camaraderie of other students in the department that, over my two years in the department, challenged me to grow as a student and as a person.

Lastly, there are several people that deserve particular thanks for their support not only in this project, but in all aspects of my life. I was blessed with strong support from friends and family, which helped in ways they will never fully know. My very good friend, Rob Palmer, was the person that let me talk, grumble, cry and laugh—often in the

wee hours of the morning—and never let me lose sight of the important things in this process and in life. He was a true friend for this entire journey, struggled alongside me, and shares this accomplishment with me. My brother, Jesse Churilla, has taught me a great deal about having fun with life and was the person that helped me enjoy myself in this process with our visit in April and our occasional conversations over the telephone. And very special thanks go to my parents, Doug and Jean Churilla, who have always made me feel like I am one of the most important and special people in the world. My mom listened through countless telephone conversations to the challenges and successes of the project and, regardless of how I felt before talking to my mom, I always felt better after our conversations. My dad gave me the best advice of anyone throughout the duration of this project, which made all the difference in my ability to embrace challenges of the project. My dad never ended a telephone conversation with me without asking, “Is there anything you need from us?” Their patience through my struggles and pride in my accomplishments is my ultimate reward.

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Chapter 1

INTRODUCTION

Infant feeding is a socially situated phenomenon, wherein mothers' choices may be complex decisions that draw on medical knowledge, standards of responsible motherhood, and social expectations of feminine sexuality. In the context of these social expectations of women and mothers, infant feeding choices may be complex decisions that are associated with expectations and support from family members, friends, health professionals, and other social actors. For mothers making choices about infant feeding, social expectations may also influence their perceived attractiveness, their ability to adjust to motherhood and the new baby and, as a consequence, their orientation toward methods of infant feeding. As a result, the amount of "choice" mothers exercise in their infant feeding decisions may be inseparable from the social contexts in which mothers make their decisions (Carter, 1995).

Racial, ethnic, and class-based factors may also shape and add dimension to the social contexts in which mothers make choices about infant feeding. Infant feeding choices and experiences may assume vastly different meanings across these categories and, as a result, choices about infant feeding may be closely bound to issues of class respectability, cultural norms, medical expectations, and historical precedent (Beal, Kuhlthau, & Perrin, 2003; Blum, 1999; Weller & Dungy, 1986).

In this sense, mothers' infant feeding "choices" may be largely guided by factors that are external to the mother-infant dyad. At best, these choices are shaped by these factors; at the extreme, these choices are constrained by social and cultural expectations. Therefore, in exploring these constructs, "the goal ought not to be the separation of this

particular decision from its surrounding social variables in order to make it an unconstrained one; infant-feeding decisions are necessarily and productively connected to a host of other choices and constraints” (Law, 2000, p. 445). As indicated, these choices and constraints may include perceived expectations of others, adjustment to motherhood in the context of maternal and sexual expectations of femininity, personal beliefs about feeding methods, and racial, ethnic, and class-based factors.

Accordingly, the purpose of this study was to explore infant feeding choices in the context of external influence from individuals and groups in mothers’ social networks, adjustment to and perceptions of their own maternal and sexual femininity during and after pregnancy, orientation toward specific feeding methods, and socio-demographic and cultural factors.

The Discursive Field of Infant Feeding

This study drew on Foucault’s theories of discourse, power and the construction of knowledge to explore how medical, maternal and sexual expectations are translated into ways of knowing and understanding practices of infant feeding. Foucault commences his discussion of authority with the concept of discourse, or the ways that individuals and institutions speak about a particular topic (Foucault, 1978/1990, 1984). Based on the variety of perspectives from which individuals and institutions may view a particular topic, it is possible for multiple discourses to exist on the topic that overlap and reinforce one another, or diverge and compete with one another. These multiple discourses constitute a discursive field.

Drawing on Foucault, Carter (1995, p. 29) argues that infant feeding can be interpreted as a discursive field that encompasses “discourses concerned with femininity,

sexuality, mothering, class, race and gender relations.” This breadth of discourses presents mothers with multiple ways of interpreting methods of infant feeding. These ways of understanding infant feeding may be translated into bodies of knowledge surrounding the topic of infant feeding, wherein individuals and the institutions in which they are invested may construct bodies of knowledge that follow from the ways the topic is discussed. Accordingly, Foucault defines discourse in the context of power, wherein beliefs and meanings may be constructed to convey authority (Foucault, 1977/1995, 1978/1990, 1984).

Following from this theoretical framework, the current study aimed to investigate infant feeding behavior in the Foucaultian context of two discourses of femininity—maternal and sexual—and their intersections with race, education, and orientations toward and away from breastfeeding and formula feeding. Further, based on the potential authority conveyed by individuals and institutions in mothers’ social networks, this investigation examined the individuals and systems of external influence that were associated with mothers’ feeding behaviors.

Sources of External Influence

The influence of actors external to the mother-infant dyad on mothers’ infant feeding choices may vary by source, perceived expectations of each source, and the degree to which mothers value these perceived opinions. Research has identified a range of influential actors and supportive contacts in mothers’ infant feeding choices (Giugliani, Caiaffa, Vogelhut, Witter, & Perman, 1994; Humphreys, Thompson, & Miner, 1998; Janke, 1994; Jones, 1986, 1987; Matich & Sims, 1992). In order to distinguish sources of social support by their relationship with the mother, sources of

support and influence may be grouped into family and friends, professional sources, and community. These categories correspond with contexts of the ecological model of breastfeeding developed by Tiedje et al. (2002), which was constructed to explore the influence of external environments on mothers' infant feeding choices.

Expectations of mothers' infant feeding choices may be communicated directly, perhaps most notably by the healthcare delivery system, or indirectly through community norms and societal expectations. Between these extremes, expectations may also be expressed by social actors in the form of encouraging suggestions, biting remarks, or indifferent comments about mothers' infant feeding practices. In this context of direct and indirect expectations, mothers' perceptions of others' expectations may be accurate or inaccurate representations of how others feel. Nonetheless, perceptions may be powerful influences on mothers' orientations toward methods of infant feeding and subsequent infant feeding choices (Janke, 1994).

As one of the most immediate contexts of mothers' external environments, family and friends may exert influence on mothers' infant feeding choices in both supportive and constraining capacities (Grossman, Fitzsimmons, Larsen-Alexander, Sachs, & Harter, 1990; Guttman & Zimmerman, 2000; Matich & Sims, 1992). Family influences on mothers' infant feeding choices may be particularly important because these individuals may be most likely to provide emotional support in mothers' decision-making processes and tangible support in the household (Grossman et al., 1990). In particular, the baby's father may be particularly influential in shaping mothers' orientations toward feeding methods and, as a result, health professionals have been overwhelmingly encouraged to include the father in breastfeeding promotional efforts.

For mothers whose social network relies on extended family and friends, emotional and tangible support for mothers' infant feeding choices may be provided in different, and yet equally supportive, capacities. These social networks may be particularly characteristic of African-American and Latin-American working-class mothers, constructed on values of "community-based independence," reciprocity, and shared child-rearing (Blum & Deussen, 1996; Dominguez & Watkins, 2003). In this function, family and friends may offer mothers the opportunity to make infant feeding choices in the context of encouraging and supportive environments.

While these social networks may be supportive, they may also—at the same time—discourage or constrain mothers' choices about feeding methods. Dominguez and Watkins (2003, p. 119) describe the potential tensions that can arise among mothers' family and friends network as "a constant negotiation—yielding resources, but not without significant conflict." In addition to providing support, therefore, friends have also been cited as one of the most potentially disapproving sources of support for breastfeeding, particularly by expressing concern about mothers' ability to maintain their social lifestyle (Guttman & Zimmerman, 2000). As well, family members have also been cited as a source of breastfeeding discouragement when they are at least partially responsible for care of the infant (Guttman & Zimmerman, 2000). As a result, in attempting to negotiate support and constraints from family and friends, mothers may limit their own infant feeding choices out of consideration of factors related to convenience, freedom, and shared childcare with family and friends.

Perhaps one of the most direct social actors in influencing mothers' infant feeding choices has been the healthcare delivery system in the United States. This institution has

been explicit about advising mothers on the advantages of breastfeeding. At an individual level, health professionals may counsel mothers on the superior infant health and nutrition benefits of breastfeeding. On a larger scale, the medical community and health professionals have partnered with federal departments to promote breastfeeding as a national health objective. In 1979, the United States Department of Health and Human Services (HHS) instigated a national planning process labeled the Healthy People initiative to improve public health and medicine. At ten-year intervals, the initiative identifies health objectives and reports outcomes (U.S. Department of Health and Human Services, 2000; U.S. Department of Health and Human Services (HHS), 1979, 1990, 2000a). Objectives of the most recent report, *Healthy People 2010*, aim for 75 percent breastfeeding rate among mothers in the early postpartum period, 50 percent continuing to breastfeed at six months, and 25 percent continuing to breastfeed at one year (U.S. Department of Health and Human Services (HHS), 2000a, 2000b). Each of these goals targets a sizeable increase in breastfeeding from 1998 baseline rates.

In order to achieve this goals and other goals related to infant health and nutrition, the U.S. Department of Health and Human Services (HHS) and the Food and Nutrition Service (FNS) began co-hosting biannual meetings of the Breastfeeding Promotion Consortium (BPC) in 1990. These meetings provide leaders of over 25 health professional associations, breastfeeding advocacy groups and Federal agencies an opportunity to exchange ideas and work collaboratively to increase rates of breastfeeding in the United States to those recommended by *Healthy People 2010* (Food and Nutrition Service (FNS), 2003).

Professional advice on the advantages of breastfeeding has often been confined to discussions about infant health and development at the neglect of other considerations in mothers' infant feeding choices (Blum, 1999). Notably, this professional advice advocating breastfeeding may also be confined to mothers that engage in behaviors and possess characteristics that indicate responsible motherhood. Indeed, some women may be advised to not to breastfeed when breastmilk may threaten infant health, as in the case of "women who use illicit drugs, who have active, untreated tuberculosis, or who test positive for HIV, as well as those who use certain prescribed drugs" (U.S. Department of Health and Human Services (HHS), 2000a, p. 16-47). In these circumstances, Blum (1999) is explicit in highlighting medical contraindications that conflate characteristics associated with unsafe breastmilk with racial, ethnic and class-based assumptions about reliable mothers. Blum (1999, p. 142) cautions that, in light of recent emphasis on diverse approaches to breastfeeding promotion in the healthcare delivery system, an approach that treats groups of mothers as suspect may function "punitively by flattening ambiguous facts" such as race, ethnicity and class. As a result, in defining public health objectives, some mothers may be categorized according to class-based and culturally-situated expectations of responsible, and irresponsible, motherhood.

Along these lines, a second objective of *Healthy People 2010* emphasizes breastfeeding promotion among groups with exceptionally low rates of breastfeeding initiation and duration. According to the report, "increasing the rate of breastfeeding, particularly among low-income and certain racial and ethnic populations less likely to begin breastfeeding in the hospital or to sustain it throughout the infant's first year, is an important public health goal" (U.S. Department of Health and Human Services (HHS),

2000a, p. 16-47). In its intention, this objective aims to increase infant and maternal health among populations determined to be at particular risk. However, such an objective has the potential to be “both controlling and helpful” by developing greater resources for support that are sensitive to cultural and class-based differences and, at the same time, carefully monitoring and guiding infant feeding practices among these populations (Blum, 1999, p. 141).

Researchers have noted that expectations of family and friends, professional sources, and community may interact in varying, overlapping, and competing capacities to provide support or exercise influence on mothers’ decisions (Carter, 1995; Tiedje et al., 2002). Perhaps most notably, professional recommendations regarding infant feeding have often been aligned with societal beliefs about responsible motherhood. Research suggests that many mothers are aware of and believe in the superior infant health benefits of breastfeeding (Brownell, Hutton, Hartman, & Dabrow, 2002; Gabriel, Gabriel, & Lawrence, 1986; Schmied & Lupton, 2001). This may suggest that social constructions of responsible motherhood are necessarily tied to medical recommendations and expert advice. Wall (2001, p. 593) concurs, arguing that motherhood encompasses “not only notions of the naturalness and purity of breastfeeding and breast milk but also the scientific and medical colonization of reproduction and child rearing.”

Maternal and Sexual Discourses of Femininity

However, this medical model of motherhood, with its emphasis on infant health and nutrition, may overlook or oversimplify the importance of other factors that may influence mothers’ infant feeding choices. For some women, the infant feeding decision may induce conflict between expectations of the medically conscientious mother and the

sexually attractive woman (Stearns, 1999; Young, 1990). Each set of social expectations calls for the emergence of a different set of feminine characteristics. Accordingly, social expectations of the medical mother portray a woman that is nurturing and responsive to the needs of her child. Further, this woman is a resource for the healthy development of her children and therefore subscribes to the medical model of “breast is best.”

Even among mothers that subscribe to the superior health benefits of breastfeeding, a large portion of mothers nonetheless decide not to initiate breastfeeding or stop breastfeeding prior to professional recommendations. One reason for this apparent discrepancy may be that breastfeeding, particularly in the presence of others or in public, may be a context in which expectations of the maternal body conflict with expectations of the sexual body (Stearns, 1999). Social expectations of the feminine sexual body portray a woman that is sexually alluring and physically attractive to her partner and to others. In a culture that sexualizes breasts, breastfeeding may introduce an alternative approach toward breasts that is not sexual, but rather is nurturing and life-giving. Young (1990, p. 197) describes mothers’ resulting infant feeding choices as “divided,” wherein women are forced “to identify with one or another image of womanly power—the nurturing, competent, selfless mother, always sacrificing, the soul of goodness; or the fiery, voluptuous vamp with the power of attraction, leading victims down the road of pleasure, sin, and danger.”

In the presence of potentially conflicting social expectations of mothers and women, mothers’ attitudes toward their body and motherhood may be shaped. Maclean (1990, p. 3) explains, “Women’s beliefs, attitudes, and experiences do not develop in isolation. They reflect not only a woman’s unique personality and preferences but also

the social forces and viewpoints that are a part of the world in which she lives.” Further, socially guided attitudes may orient mothers toward or away from specific methods of infant feeding. Diverse, and potentially competing, social expectations of the maternally nurturing woman, the medically conscientious woman, and the sexually attractive woman may shape mothers’ preferences for specific infant feeding methods. As a result, mothers’ beliefs and their infant feeding choices may reference a medical model of motherhood, while at the same time taking account of sexual expectations of femininity. Therefore, although women’s beliefs are often assumed to be highly personal, they are also situated within a social context of potentially conflicting norms and expectations about mothers and women.

The interaction of social expectations of women and mothers may influence mothers’ infant feeding choices in constraining and liberating capacities. As mothers make choices about methods of infant feeding, mothers’ decisions necessarily take place in environmental contexts of social support and influence, expectations of maternal responsibility, and accepted norms of sexual femininity. Examining how these contexts interact with mothers’ orientations toward infant feeding and how they subsequently influence mothers’ infant feeding choices may provide insight into the discursive field of infant feeding.

As Blum (1999) and others have indicated, discussions of infant feeding must necessarily account for class-based and culturally-situated expectations of motherhood (Grossman, Larsen-Alexander, Fitzsimmons, & Cordero, 1989; Jacobson, Jacobson, & Frye, 1991; Kurinij, Shiono, & Rhoads, 1988; Li, Fridinger, & Grummer-Strawn, 2002; Weller & Dungy, 1986). Low income women and specific groups of racial and ethnic

minority women may be placed with a different set of expectations from external social actors and the wider community. As a result, these populations may orient themselves toward and away from feeding methods in culturally and historically specific ways. Understanding the processes that guide and shape mothers' choices, with specific sensitivity to demographic and cultural characteristics, might add to understandings of the discursive field of infant feeding as well.

Study Purpose and Objectives

Because infant feeding choices are made in these social contexts, the purpose of this study was to explore factors associated with infant feeding behavior among low-income women. Four objectives guided this study.

Objective 1. The first objective of this study described overall characteristics of a sample of postpartum, low-income mothers from two urban areas in Michigan and compared these characteristics by urban location. One major provider of services for these populations is the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). This program provides food assistance and educational services to low-income pregnant women, breastfeeding and non-breastfeeding mothers, infants, and children that are determined to be at nutrition risk. Because low income and specific racial and ethnic groups have been targeted as a national priority for improving public health, mothers that participate in the WIC program may be particularly prone to racially- and class-situated influences in their infant feeding choices. This study therefore drew its sample from clients of this program in two major metropolitan areas of Michigan.

At the federal level, WIC is administered by the Food and Nutrition Service (FNS) of the United States Department of Agriculture. As a federal program, Congress

appropriated \$4.687 billion to the WIC program for the 2003 fiscal year, which the FNS dispenses to states to provide WIC program services (Food and Nutrition Service (FNS), 2003). Services include nutrition counseling and referrals to health care providers and other social services. WIC participants may also receive food benefits, which are distributed through monthly vouchers that allow participants to purchase specified foods that are high in protein, calcium, iron, and vitamins A and C. Program eligibility is based on income guidelines, state residency, and acknowledged “nutritional risk,” including medically-related risks or diet-related risks as determined by a qualified health professional (Food and Nutrition Service (FNS), 2003). However, WIC is not an entitlement program and WIC benefits may not be available to all eligible applicants. As a result, guidelines have been established to prioritize applicants based on their level of nutrition risk.

Although WIC provides formula to participants that choose not to breastfeed, WIC has historically supported breastfeeding through federal legislation that requires breastfeeding promotion and authorizes enhanced benefits for breastfeeding mothers (Food and Nutrition Service (FNS), 2003). When the program officially became permanent in 1975, federal legislation allowed breastfeeding mothers to participate in WIC through one year postpartum, whereas non-breastfeeding mothers were eligible through six months postpartum. Congress placed increased emphasis on WIC’s breastfeeding promotion efforts in 1989 through legislation that called for standards of breastfeeding promotion at the federal and state level. These standards required states to designate administrative staff for breastfeeding support and allocate a specified amount of their budget toward breastfeeding promotion. In recent years, Congress has also

required the USDA to develop a national breastfeeding promotion plan and has authorized states to use food funds for the purchase or rental of breastpumps.

Of the \$4.687 billion appropriated to the WIC program for the 2003 fiscal year, Michigan was allocated over \$128 million in federal grants for WIC program administration, nutrition services, and food benefits (Food and Nutrition Service (FNS), 2003). In 2002, Michigan's WIC Division provided services and benefits to over 200,000 women, infants, and children (FNS, 2003; MDCH, 2003). There are 50 WIC agencies throughout the state, each of which manages several WIC clinics throughout the area. Study participants for the current investigation were recruited from clinics managed by WIC agencies in two major metropolitan areas of Michigan: Kent County and Detroit.

Objective 2. The second objective of this study was to test the measurement reliability of scales and subscales of two instruments developed to measure aspects of motherhood and infant feeding among this sample of WIC participants. Sampling methods used to test the reliability of these scales may have limited the applicability of the scales to more diverse sample populations. As a result, this objective provided an initial step toward exploring reliability of the scales among a diverse sample of low income women.

The first scale, the Maternal Adjustment and Attitudes Questionnaire (Kumar, Robson, & Smith, 1984), contains five subscales that measure maternal confidence and adjustment to aspects of the maternal role, including Body Image, Somatic Symptoms, Marital Relationship, Attitudes to Sex, and Attitudes to Pregnancy/Motherhood and the Baby. The original instrument was tested among two samples of women clients at antenatal clinics in London; the majority of women in these samples were married or

stably cohabiting with the baby's father (Kumar et al., 1984). For the current investigation, marital status among the sample may be more diverse and may add to the reliability of other scales that do not rely on a marital or cohabiting status. Consistent with the purpose of this study, two subscales were selected from the instrument to be tested among this sample in order to explore mothers' perceptions of their own sexual attractiveness and maternal femininity: body image and attitudes toward motherhood and the baby.

The second instrument, the Breastfeeding Attrition Prediction Tool (Janke, 1994) contains four scales that measure predictors of breastfeeding duration: Positive Sentiment toward Breastfeeding, Negative Sentiment toward Breastfeeding, Social and Professional Support, and Breastfeeding Control. The instrument was originally tested among a convenience sample of 201 breastfeeding women, the majority of whom were white, married, had obtained schooling beyond high school, and were middle- to upper-income (Janke, 1994, p. 101). Similar to this sample, the sample for the current investigation was relatively homogenous with respect to income, as one criterion of WIC eligibility is low income. However, the sample that was drawn for the current study was considerably more diverse with respect to all other characteristics, particularly with reference to race, marital status, and education. Thus, the current investigation tested measurement reliability of the Positive and Negative Breastfeeding Sentiment Scales in order to extract categories of mothers' beliefs about infant feeding methods.

Objective 3. The third objective of this study examined the extent to which mothers' infant feeding behavior was influenced by sources of influence external to the mother-infant dyad. Because research suggests that infant feeding behavior may be

moderated by other factors such as race/ethnicity (Baranowski et al., 1983; Blum, 1999; Park, Meier, & Song, 2003), and mothers' personal orientations toward feeding methods (Li et al., 2002; Losch, Dungy, Russell, & Dusdieker, 1995), these characteristics were included as control variables in this model of mothers' infant feeding choices.

For this model, mothers' infant feeding behaviors was examined in relation to three systems of external influence: family and friends, the healthcare delivery system, and community sources. Measurement of these characteristics drew on the format of Janke's (1994) Social and Professional Support Scale to explore external systems of influence on mothers' choices.

Objective 4. The fourth objective examined the extent to which infant feeding behavior is predicted by mothers' perceptions of sexual and maternal femininity. Two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984) were used to measure mothers' perceptions of their body and mothers' adjustment to motherhood and the mothering role. These subscales were labeled Body Image and Maternal Attitudes toward Motherhood and the Baby, respectively.

Chapter 2 explores the literature related to mothers' infant feeding behavior, including sources of external influence, discourses of femininity, and socio-demographic and cultural characteristics that may interact with these factors.

Chapter 2

LITERATURE REVIEW

Foucault's theories of the construction of knowledge and power provide an appropriate approach to exploring how social expectations of mothers and women are translated into ways of knowing and understanding practices of infant feeding. For Foucault (1978/1990), discourses are central to the construction of knowledge and are expressed in the ways individuals speak about a particular topic. Based on the diverse perspectives from which individuals and institutions approach specific topics, multiple discourses may exist surrounding one topic. These discourses need not be complementary and, in fact, Foucault explains the evolution of discourses on a topic as divergent. Accordingly, "it is not simply in terms of a continual extension that we must speak of this discursive growth; it should be seen rather as a dispersion of centers from which discourses emanated, a diversification of their forms, and the complex deployment of the network connecting them" (Foucault, 1978/1990, p. 34). As will be discussed, research on discourses particular to the topic of infant feeding has indicated that there may be multiple and divergent discourses surrounding the topic that add complexity to mothers' feeding behaviors.

The existence of several discourses on a unique topic constitutes a discursive field, which Carter (1995) discusses with particular reference to infant feeding. According to Carter (1995), infant feeding can be interpreted as a discursive field that references multiple, and potentially competing, discourses on the topic. Theorists have aimed to identify a range of discourses surrounding the topic of infant feeding, including discourses of risk, religion, ethics, law, sexuality, and maternity (Law, 2000; Maher,

1992; Nadesan & Sotirin, 1998; Traina, 2000; Young, 1990), two discourses particular to expectations of femininity have been empirically examined in their relationship with infant feeding beliefs and behavior.

Maternal Femininity

Expectations of women as mothers are one context in which women may make decisions about how to feed their infant. Murphy (2000) reported that mothers may feel considerable guilt when, after acknowledging the superior infant health benefits of breastfeeding, they nonetheless decide to introduce formula to the infant. In interviews with thirty-six first-time mothers, Murphy (2000) cited the potential conflation of breastfeeding with constructions of responsible motherhood, concluding that among her study sample the “subsequent decision to introduce formula milk raised questions about their identities as ‘good mothers’” (Murphy, 2000, p. 303).

Further, Murphy (2000) points to this finding as an indication of the strength of the medical field in guiding discourse on maternal femininity. Wall (2001) added to this finding in her content analysis of informational materials on infant feeding made available to expectant and postpartum mothers in Canada. Results of this study indicated that informational material presented health and nutrition information in tandem with messages about responsible, caring and generous motherhood. However, as the research of Schmied and Lupton (Schmied & Lupton, 2001) suggests, not all mothers experience motherhood and infant feeding in this connected and harmonious manner. For these mothers, the researchers concluded that the practice of breastfeeding was experienced instead as a constraint to mothers’ feelings of independence and autonomy.

Indeed, women's transition into motherhood may introduce new obligations that require heightened attention to the needs of the infant, which Arafat et al. (1981) have suggested may occur at the expense of mothers' relationships with other members of their social networks. According to these researchers, the apparent incongruence between the maternal role and mothers' relationships with other individuals may have implications for mothers' infant feeding behavior. In particular, the researchers suggested that mother-partner attachment may be stronger among mothers that choose to formula feed, while the mother-infant attachment may be stronger among mothers that choose to breastfeed (Arafat et al., 1981). However, other research has contradicted the assumption that motherhood necessarily extracts from mothers' ability to engage in extended social networks. Rather, this research has concluded that it is this social network that defines motherhood in specific contexts.

Most notably, Stack (1975/1997) and others (Dominguez & Watkins, 2003; Kaplan, 1997) have added dimension to these constructions of motherhood by layering race and ethnicity on interpretations of the maternal role. In Stack's (1975/1997) ethnographic study of African-American families in an urban community, Stack recounted constructions of motherhood as largely reliant on extended social networks of family and friends throughout the community. In this sense, the maternal role was encompassed in a range of social actors in the mothers' social network and mothering responsibilities were shared throughout this community of kin and friends.

Kaplan's (1997) ethnographic research focused specifically on African-American teenage mothers and their constructions of motherhood. For many of the African-American teenage mothers in her study, Kaplan (1997) noted that motherhood was a

means of gaining some degree of control over their lives. She explains, “All of the teen mothers thought motherhood would bring them love and happiness. Some believed motherhood gave them middle-class stability. Others though it gave them a focus in their lives, providing them with a sense of belonging and, perhaps, the means to find what they so urgently needed—security and protection” (Kaplan, 1997, p. 181).

Contrary to Stack’s (1975/1997) conclusions, however, Kaplan (1997) reported that members of these mothers’ extended social networks typically exhibited disapproval of teenage motherhood. Dominguez and Watkins (2003) reported similar potential for kin-based conflict based on their interviews with five African-American and five Latin-American mothers. In particular, although the researchers cited family and friends as potential resources for social support and mobility among African-American and Latin-American mothers, Dominguez and Watkins (2003, p. 121) also noted that these relationships held the potential for unpredictability, irregularity, interference, and exploitation.

Following from this line of ethnographic and qualitative research on constructions of motherhood, Blum (1999) and Blum and Deussen (1996) focused on infant feeding behavior in the context of culturally-based constructions of motherhood. In interviews conducted with 27 white and 26 black middle-class and working-class mothers, these researchers concluded that mothers’ conceptions of responsible and respectable motherhood may vary by class and racial background (Blum, 1999; Blum & Deussen, 1996). In particular, Blum (1999) noted that constructions of motherhood among African-American mothers relied on values of independence, shared parenting with other social supports, and reciprocity. Conversely, Blum (1999) described greater emphasis on the

presence of a male partner to establish a sense of credibility among white, working class mothers.

Based on the work of these several researchers, it may be deduced that the complexity of motherhood is necessarily bound to racial and ethnic interpretations and experiences of motherhood. Based on the work of Blum (1999) and Blum and Deussen (1996), which is specific to the topic of infant feeding, it may also be theorized that constructions of motherhood, as they intersect with race, may be associated with infant feeding behavior and experiences.

Sexual Femininity

Yalom (1997) and Traina (2000), among others (Schmied & Lupton, 2001; Shaw, 2003; Young, 1990), have theorized that women's roles as mothers, wives and partners, patients, co-workers and academic peers may situate women at the intersection of numerous expectations about women's breasts. Transmitted through individuals and institutions in mothers' social networks, mothers' beliefs about the function of breasts may play an important role in mothers' infant feeding behavior (Jones, 1987; Stearns, 1999). In particular, the literature suggests that mothers' beliefs about the function and symbolic character of women's breasts may influence mothers' orientation toward or away from breastfeeding, particularly in the context of sexual and maternal constructions of breasts (Jones, 1987; Stearns, 1999). According to Stearns (1999) and others (Jones, 1987; Young, 1990), within this dichotomy of beliefs about the functions of women's breasts, one category of beliefs centers on the sexual breast as a symbol of women's attractiveness. The other category of beliefs focuses on the maternal breast as a symbol of nurturance and natural motherhood. The apparent contradiction between these two

categories of beliefs has led several researchers to explore the relationship between these beliefs and mothers' infant feeding behavior. The research findings of these studies have consistently indicated that mothers' preference for formula feeding may be related to sexualized constructions of women's breasts (Jones, 1987; Maehr, Lizarraga, Wingard, & Felice, 1993; Stearns, 1999).

Stearns' (1999) conclusions suggest that mothers' awareness of the sexual symbolism of women's breasts may be particularly heightened when breastfeeding in public or in the immediate presence of others. In interviews with 51 breastfeeding mothers, Stearns noted that mothers attempted to exercise particular discretion when breastfeeding in public and negotiated these feedings by ensuring that their bodies, and particularly their breasts, were carefully concealed throughout the feeding. Discretion was also important in situations where male family members, acquaintances, and strangers were present. Based on her results, Stearns (1999, p. 321) argued that "women actively create the good maternal body before an audience that is more familiar and comfortable with the sexualized breast than the nurturing breast. The construction of the good maternal body involves constant vigilance to how the breastfeeding is viewed by others." Similarly, in their exploration of women's experiences breastfeeding in public, Sheeshka et al. (2001) noted mothers' feelings of vulnerability while breastfeeding publicly at shopping malls and in restaurants. Sheeshka et al. (2001) reported that mothers in this study attempted to negotiate these feelings using similar means as the mothers in Stearns' (1999) study.

Both of these studies further explored the presence of other supportive individuals as potential mediators of mothers' feelings of vulnerability. In light of potentially

constraining beliefs about the female body, Stearns concluded that many women enjoyed experiences of breastfeeding in contexts where they felt greater control over their surroundings and in situations where they perceived greater support and familiarity with other individuals present. Sheeshka et al. (2001) reported similar conclusions but hastened to add that mothers' support was derived more particularly from the presence of other supportive women.

However, Jones (1987) research suggested that mothers' perceptions of male partners' beliefs about the function of breasts may also be influential in mothers' feeding behavior. However, Jones (1987) added complexity to this relationship by suggesting that women's beliefs about breasts, and perceptions of their partner's beliefs, may be class-based. Based on interviews with 1525 women in a postpartum unit, Jones (1987, p. 83) reported that working-class women were more likely to believe that breasts were markers of feminine sexuality and attractiveness. Across categories of class, women in this study also perceived that their male partners possessed similar beliefs to their own (Jones, 1987). Following this study, however, there has been a relative scarcity of additional research exploring the relationship of class with sexual beliefs.

Age has been studied more extensively as a factor associated with mothers' beliefs about their breasts and reasons for selecting particular feeding methods. In particular, adolescent mothers' infant feeding behavior has been compared with adult mothers' infant feeding behavior, with particular emphasis on describing differences in reasons for infant feeding choices between these two age groups (Baisch, Fox, Whitten, & Pajewski, 1989; Brownell et al., 2002; Grossman et al., 1989; Maehr et al., 1993; Robinson, Hunt, Pope, & Garner, 1993). Overall, researchers' conclusions have

suggested that the developmental stage of adolescence may cause young mothers to be particularly influenced by their own beliefs about sexualized breasts and body image.

Following from these conclusions, researchers have conjectured that adolescent mothers' greater propensity to formula feed may be related to their attention to social norms regarding feminine body image and the sexual symbolism of women's breasts (Brownell et al., 2002; Grossman et al., 1989; Maehr et al., 1993; Robinson et al., 1993). For example, Robinson et al. (1993) surveyed 84 adolescent WIC participants to describe attitudinal characteristics of breastfeeding and formula feeding adolescent mothers. Although the study was largely descriptive, results indicated that approximately one-third (n = 29) of the eighty-four study participants agreed with the statement, "Breastfeeding makes your breasts sag," and thirty-six respondents agreed with the statement, "I would feel embarrassed if someone saw me breastfeed" (Robinson et al., 1993, p. 1312). As a result, the researchers reasoned that adolescents may be particularly susceptible to sexualized social beliefs about women's bodies. Adolescents' tendency to view breasts as sexual was also cited in a study conducted by Maehr et al. (1993), who reported that more adult expectant mothers cited convenience and naturalness as reasons for their decision to initiate breastfeeding. The researchers suggested that, due to their stage in development, "the teen mother may indeed not yet view her breasts as a natural means for infant feeding" (Maehr et al., 1993, p. 456). Rather, adolescent mothers may be particularly prone to view breasts as sexual rather than maternal.

The sum of research presented above surrounding maternal and sexual femininity suggests multiple ways of understanding breastfeeding in the context of knowledge about functions of women's breasts and responsible motherhood. Across both discourses of

femininity, researchers cited mothers' social networks as key factors in constructing expectations of maternal and sexual femininity. From this line of research, several researchers have suggested that members of these social networks and the institutions in which they are invested may add further dimension to mothers' feeding decisions (Giugliani et al., 1994; Guttman & Zimmerman, 2000; Humphreys et al., 1998; Matich & Sims, 1992). In particular, it has been conjectured that mothers' infant feeding behavior may be shaped by expectations of external actors that support and enforce the authority of various discourses of femininity and various bodies of knowledge surrounding infant feeding. Indeed, Foucault defines these bodies of knowledge in the context of power, wherein facts, beliefs and meanings are constructed to convey authority and influence (1977/1995; 1978/1990; 1984). In line with this research, additional studies have focused specifically on members of these social networks and their influence on mothers' feeding behavior.

Sources of External Influence

Research has identified a range of potential actors that may exert influence upon mothers' infant feeding choices. These sources may be categorized by their relationship with the mother, as actors' viewpoints and degrees of influence may depend on the type of social relationship each maintains with the mother.

The ecological model of breastfeeding developed by Tiedje et al. (2002) provides a model for categorizing social actors according to their relationship with the mother. The model relies on a human ecology perspective, which locates the individual in the context of external systems of influence that operate on the individual and on one another (Tiedje et al., 2002). These systems are often illustrated as concentric circles, wherein the

individual is placed at the center of several compounding external systems. Applying such an approach to the field of breastfeeding, the researchers situate the mother-infant dyad at the center of the model surrounded by four external contexts that exert influence on mothers' infant feeding choices and experiences. These four external contexts are family, the healthcare delivery system, community, and the societal/cultural context. For the current study, three contexts of the ecological model of breastfeeding were used to categorize potential actors in mothers' infant feeding decisions: family and friends, the healthcare delivery system, and community sources.

Identifying Social Actors. Early studies on external social actors focused primarily on identifying sources of external influence in mothers' infant feeding behaviors. In several of these initial studies, results indicated that mothers may be reluctant to attribute their infant feeding behaviors to any external actors. In particular, Arafat, Allen and Fox (1981) asked mothers to identify individuals that decided how her infant would be fed and whose advice was important in their initial infant feeding decision. Respondents indicated that, for the most part, the initial infant feeding decision was made by the mother alone with minimal external influence (Arafat et al., 1981). Similarly, Jones (1987) asked mothers to provide reasons for initiating their chosen method of infant feeding. Less than 6% of respondents attributed any part of their decision to the influence of their husband, friends and relatives, and medical and nursing staff (Jones, 1987). However, the results of a study conducted by Bevan, Mosley, Lobach and Solimano (1984) indicate that this apparent reluctance to attribute infant feeding behavior to external actors may be moderated by mothers' chosen method of feeding,

wherein mothers that chose to formula feed were more likely to cite “no one” was influential in their decision.

The Baby's Father. Despite indications that mothers' infant feeding choices are made independently, several studies discuss the role of the baby's father in influencing mothers' infant feeding behaviors. The influence of the baby's father was even suggested in the above studies that attributed little influence to external actors. In comparing mothers' emotional relationship with their partner to mothers' infant feeding behavior, Arafat, Allen and Fox (1981) suggested that formula feeding mothers may report greater emotional attachment with their partner than breastfeeding mothers. As well, in exploring the mothers' perceptions of partners' preferences, Jones (1987) noted that mothers' infant feeding preferences were typically aligned with the baby's father if he was reported to have a definite preference. In particular, women that chose not to initiate breastfeeding indicated more partners with perceived preferences for formula feeding, no preference, or unknown preference (Jones, 1987). In an earlier study, Bevan et al. (1984) cited similar results among mothers in their sample.

To examine actual preferences of the baby's father in relation to intended feeding method, Freed, Fraley and Schanler (1992) surveyed 258 middle- to upper-income expectant fathers. Their instrument asked fathers to respond to attitudinal items about perceived advantages and disadvantages of breastfeeding, including nutrition, bonding, breastfeeding in public, and factors related to respectable motherhood. Further, the instrument was unique in addressing fathers' attitudes toward potential effects on the sexual relationship and partners' concerns about the mother's figure. Fathers that indicated their partners' intention to formula feed were reported to have greater concerns

about breastfeeding not being natural, being bad for breasts, causing their partner to be less attractive, and interfering with sex (Freed et al., 1992). Taken together, the results of this study and those above suggest that there may be an association between partners' preferences and mothers' intended feeding behavior.

Additional research has attested to the influence of partners' preferences on mothers' actual infant feeding behavior. In their study of 200 breastfeeding and formula feeding mothers, Giugliani et al. (1994) reported that, regardless of demographic variables, partners' preferences were important in mothers' initiation of breastfeeding. Similarly, in interviews conducted with 133 mothers and their significant others, Kessler, Gielen, Diener-West and Paige (1995, p. 103) reported that 79% of mothers interviewed selected the baby's father as their significant other, or the person whose opinions "mattered the most to her" in her infant feeding choices. The preferences of mothers' selected significant other were significantly related to respondents' intention to breastfeed, and intention mediated mothers' initiation and continuation of breastfeeding (Kessler et al., 1995). The results of a study conducted by Whelan and Lupton (1998) among a sample of low income, breastfeeding women were similar, wherein continuation of breastfeeding was associated with partners' positive or neutral breastfeeding preferences. Based on these results, partners' preference for breastfeeding may be a significant factor in mothers' decision to initiate and continue breastfeeding.

Further research has shifted focus from partner's preferences to partner's support, particularly in relation to mothers' intended feeding behaviors. In attempting to predict mothers' intention to breastfeed, Matich and Sims (1992) explored three categories of support provided by the baby's father in relation to mothers' intention to breastfeed:

tangible, emotional and informational. Across all three categories of support, mothers that intended to breastfeed indicated greater support from the baby's father than mothers that intended to formula feed (Matich & Sims, 1992). Two of these categories of support were significant in a longitudinal study of mothers' interpersonal relationships and feeding choices conducted by Isabella and Isabella (1994). These researchers reported that across all sources of social support, mothers indicated receiving the greatest emotional and instrumental support in their feeding choices from their partner. Conversely, informational support was strongest from doctors and nurses (Isabella & Isabella, 1994).

Nonetheless, a study conducted by Humphreys, Thompson and Miner (1998) suggests that the baby's father may indeed be an influential source of informational support. In their study of 1,001 low-income, expectant mothers, Humphreys et al. (1998) reported that hearing about breastfeeding benefits from a range of sources (the baby's father, family members, and lactation consultants) was positively associated with intention to breastfeed. After controlling for previous breastfeeding experience, however, only the relationship between informational support from the baby's father and intention to breastfeed remained constant across groups (Humphreys et al., 1998). Mothers' intention to breastfeed may therefore necessarily rely on all three types of support from the baby's father: emotional, tangible and informational.

In addition to influencing mothers' intention to breastfeed, support from the baby's father has been explored in relation to breastfeeding duration with mixed results. Isabella and Isabella (1994) indicated that mothers who expressed greater satisfaction with support they received from the baby's father also continued to breastfeed their infant for longer periods of time. However, in the development of the Breastfeeding Attrition

Prediction Tool (Janke, 1994), support from the baby's father failed to load at the 0.30 level on Social and Professional Support Scale. Results from these two analyses suggest an elusive relationship between support from the baby's father and breastfeeding duration.

Other Family and Friends. The influence of other family and friends on mothers' infant feeding behaviors is supported in the literature. Dix (1991) indicated that support from family and friends was one of the most influential factors in mothers' selection of either feeding method. Giugliani et al. (1994, p. 161) developed similar conclusions in their study of social support among breastfeeding and formula feeding mothers. The researchers added that the influence of family and friends on mothers' feeding decisions held constant across demographic and cultural factors such that "decisions about infant feeding are a function of familial and group attitudes, regardless of maternal age, ethnic group, educational level, and marital status."

Mothers' degree of perceived support from family and friends may vary by mothers' infant feeding behavior. In particular, several studies indicate that breastfeeding mothers report greater support from family and friends than formula feeding mothers. Grossman et al. (1990) noted the breastfeeding mothers received greater support from the grand(mother) and friends than formula feeding mothers. Examining the influence of these two sources on breastfeeding duration, Whelan and Lupton (1998) reported that continuation of breastfeeding was positively associated with support from these sources.

However, while the above research suggests that the influence of family and friends may be positive, Guttman and Zimmerman's (2000) study of 154 predominantly low income mothers indicated positive support was more characteristic only among

mothers that chose to breastfeed. Their results suggested that friends may be one of the most disapproving sources of social support for breastfeeding, particularly by expressing concern about mothers' ability to maintain their social lifestyle. Family members were also cited as a source of breastfeeding discouragement when the family member was at least partially responsible for care of the infant (Guttman & Zimmerman, 2000).

Healthcare Delivery System. As an authority on infant and maternal health, the healthcare delivery system and medical discourses on femininity may exercise particular influence on mothers' infant feeding behavior. On a national level, breastfeeding has been promoted by the medical community, health professionals, and federal departments to promote breastfeeding as a national health objective. The Healthy People initiative, which commenced in 1979 as a national planning scheme to improve public health and medicine, espouses maternal and infant health as a major national health objective (U.S. Department of Health and Human Services (HHS), 1979, 1990, 2000a). Each report has underscored the importance of breastfeeding for infant health outcomes and objectives of the most recent report, *Healthy People 2010*, aim for 75% breastfeeding rate among mothers in the early postpartum period (an 11% increase from 1998), 50% continuing to breastfeed at six months (a 21% increase from 1998), and 25% continuing to breastfeed at one year (a 9% increase from 1998) (U.S. Department of Health and Human Services (HHS), 2000a, p. 16-46).

These goals have been adopted by the healthcare delivery system, which may maintain contact with mothers during prenatal care and education, the delivery, and postpartum care and counseling. Nonetheless, despite potentially numerous contacts during pregnancy and in the postpartum period, several studies indicate that the influence

of health professionals on mothers' decision to initiate breastfeeding may be minimal. In interviews with 81 recent postpartum women at an urban hospital, Dix (1991) concluded that the influence of health professionals on respondents' decision to initiate breastfeeding or bottle feeding was not as strong as the respondent's family and other social influences. This result has been supported by several other studies examining social support and influence of actors in the healthcare delivery system on mothers' initial feeding decision (Giugliani et al., 1994; Sullivan & Jones, 1986).

In order to test this relationship, further research on the healthcare delivery system has moved in the direction of categorizing support provided by health professionals in relation to mothers' infant feeding behavior. In particular, studies have focused specifically on informational support provided by health professionals and mothers' subsequent decisions. Using this approach, Isabella and Isabella's (1994) longitudinal study of mothers' interpersonal relationships and feeding choices concluded that, indeed, informational support was strongest from mothers' doctors and nurses. Mothers' attendance in classes also provided women with greater emotional and informational support and was a predictor of mothers' intention to breastfeed (Matich & Sims, 1992).

To examine whether the relationship between informational support and intention to breastfeed translates into actual behavior, McLeod, Pullon and Cookson (McLeod, Pullon, & Cookson, 2002) administered surveys to 490 expectant mothers just prior to delivery, which asked them two questions related to informational support and guidance they received or desired. Almost one-third of these women (31%) believed that they needed more information about breastfeeding. Results of data analysis indicated that

women that expressed a need for greater informational support were less likely to be breastfeeding at six to ten weeks postpartum (McLeod et al., 2002).

In response to the apparent influence of informational support on infant feeding choices, some health care providers and clinics have implemented peer support programs to enhance mothers' social support network. Several researchers have employed experimental design to evaluate the effectiveness of these programs on aspects of infant feeding choices, particularly with reference to initiation and duration of breastfeeding. Most of these program evaluations indicated that participation in peer support programs increased rates of breastfeeding initiation and duration, and may have enhanced women's ability to reach their infant feeding goals (Dennis, Hodnett, Gallop, & Chalmer, 2002; Pugh, Milligan, & Brown, 2001; Quarles, Williams, Hoyle, Brimeyer, & Williams, 1994; Schafer, Vogel, Viegas, & Hausafus, 1998; Shaw & Kaczorowski, 1999). Thus, although the general influence of the healthcare delivery system on mothers' infant feeding behavior may be minimal in the context of other social actors (Dix, 1991; Giugliani et al., 1994; Sullivan & Jones, 1986), the particular provision of informational support by health providers may be influential.

Community Sources. Community expectations of mothers' feeding behavior may be expressed in a number of public outlets, including general public places, work and school, and through the media. In general public places, Guttman and Zimmerman (2000) suggested that mothers' perceptions of community norms may affect initiation and duration of breastfeeding. Study participants were asked about to recall experiences when they witnessed other women breastfeed in public; of the women that had witnessed such an event, half of all breastfeeding mothers and 40% of formula feeding mothers perceived

negative public reactions to the breastfeeding mother. Among the breastfeeding mothers, the researchers speculated that the apparent discrepancy between personal feelings toward the experience and perceived social norms may cause breastfeeding to be a constrained experience for these mothers, particularly in public (Guttman & Zimmerman, 2000).

To examine actual public attitudes toward breastfeeding, Li, Fridinger and Grummer-Strawn (2002) analyzed 12 items related to breastfeeding that appeared on the Healthstyles 2000 national mail survey. Surveys were administered to men and women and asked study participants to indicate their perceptions of mothers' ability to maintain their lifestyle while breastfeeding, appropriateness of breastfeeding in public, proper age at which to wean a baby, and potential physical complications for the mother. Negative public perceptions were greatest on issues of mothers' ability to maintain her lifestyle (45% agreed that breastfeeding mothers must give up too many lifestyle habits), breastfeeding in public (27% felt that breastfeeding in public was embarrassing for the mother), and appropriate age to wean the infant (31% believed babies should be fed cereal or baby food by 3 months; 31% felt that one-year-old children should not be breastfed by their mother) (Li et al., 2002). Results indicate that mothers' infant feeding choices may be made in the context of potentially constraining public perceptions of breastfeeding.

On a different level of community influence, several researchers have examined the specific context of the workplace in relation to mothers' feeding behavior. Similar to the approach above, Seijts (2002) explored public perceptions of organizational attractiveness based on policies and accommodations made to breastfeeding mothers.

Organizations that made accommodations to breastfeeding mothers were perceived as more attractive and more fair; study participants also indicated that they would be more likely to apply to and accept jobs from organizations perceived as more accommodating (Seijts, 2002). Nonetheless, employers' perception of value added to their organization through such measures may be less favorable. In their sample of 85 employers and their attitudes toward breastfeeding, Libbus and Bullock (2002) reported that although employers tended to be willing to facilitate an environment open to breastfeeding, many also indicated that they saw little value added to their organization through providing such accommodations. Further, a large percentage of the employers indicated they had not had experience with breastfeeding and, hence, had not personally made accommodations to breastfeeding mothers in the workplace.

The results of this study suggest that workplace supervisors may be willing to accommodate breastfeeding mothers, but that actual workplace accommodations may still be lacking. As a result of this workplace environment, Lindberg (1996) theorized that social expectations of the good mother and qualities of the productive worker may induce role conflict for breastfeeding mothers. Lindberg's analysis of secondary data indicated that mothers were more likely to wean their infant during the month they commenced working. Among mothers that entered employment, women employed in part-time positions were more likely to breastfeed and to continue to breastfeed through employment than women employed in full-time positions (Lindberg, 1996). Thus, the literature suggests that there may be a constraining relationship between maternal employment and breastfeeding, potentially influence mothers' initial and subsequent

feeding behaviors. This relationship may or may not hold for mothers' school environment, which was not discussed in the above studies.

Interacting Factors. Several studies have explored the effects of mothers' demographic and cultural characteristics on sources of external influence. Grossman, Fitzsimmons, Larsen-Alexander, Sachs and Harter (1990) interviewed 220 new mothers to describe and compare characteristics of low and upper income mothers that chose to breastfeed or formula feed. Overall, breastfeeding mothers reported greater support in their infant feeding decision from all sources, including the baby's father, their mother, friends, health professionals, books and television, and advocacy/education groups. By income, the social support patterns of low income breastfeeding mothers more closely resembled upper income breastfeeding mothers—who reported greater social support from all sources—than low income formula feeding mothers (Grossman et al., 1990).

Similarly, ethnicity has been explored in relation to mothers' social support networks. Baranowski et al. (1983) explored the relationship between breastfeeding initiation and sources of social support across three ethnic groups: African-American, Mexican-American, and Anglo-American. Results indicated that the most important source predicting African-American mothers' decision to initiate breastfeeding was a close friend. Among Mexican-American mothers, the (grand)mother was most important and among Anglo-American mothers, the male partner predicted most of the variance (Baranowski et al., 1983). These results suggest the potential influence of specific demographic and cultural values in identifying sources of external influence and predicting mothers' infant feeding behavior.

In sum, the above literature suggests a range of discourses on femininity that may be transmitted through various social actors, and which may influence mothers' infant feeding behavior. The apparent overlap between and contention among discourses of femininity—both maternal and sexual—suggests that mothers' infant feeding choices may exist at the intersection of personal beliefs, discourses of femininity, and socio-demographic factors (Blum, 1999; Blum & Deussen, 1996; Carter, 1995; Kaplan, 1997; Maher, 1992; Murphy, 2000; Stearns, 1999). Adding to this picture, the influence of external actors and the institutions in which they are invested may also influence mothers' feeding behavior (Baranowski et al., 1983; Giugliani et al., 1994; Grossman et al., 1990; Grossman et al., 1989; Guttman & Zimmerman, 2000; Humphreys et al., 1998; Janke, 1994; Matich & Sims, 1992). Based on this line of research, the ways in which these discourses and actors interact with one another to predict mothers' feeding behavior formed the focus of the current investigation. To this end, Chapter 3 outlines study participants, instrumentation, and procedure that aided in the accomplishment of the four study objectives outlined in Chapter 1.

Chapter 3

METHODS

Study Purpose

To review, the purpose of this study was to explore factors associated with infant feeding choices among low-income women. In particular, this study aimed to accomplish four research objectives. First, this study intended to describe characteristics of a sample of women that participated in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in two urban areas in Michigan and aimed to explore how these characteristics compared across geographic location.

Second, this study was designed to test measurement reliability of two subscales of the Maternal Adjustment and Attitudes Questionnaire (Kumar et al., 1984) and two scales of the Breastfeeding Attrition Prediction Tool (Janke, 1994) among this sample of WIC participants. Two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire were selected for this objective: Attitudes toward Motherhood and the Baby and Body Image (Kumar et al., 1984). The Negative Breastfeeding Sentiment and Positive Breastfeeding Sentiment Scales from Janke's (1994) Breastfeeding Attrition Prediction Tool were also assessed for this study objective.

Lastly, this study was designed to examine the extent to which mothers' infant feeding behavior was influenced by social contexts in which mothers made their feeding choices. Two models were developed to predict infant feeding behavior on the basis of two social contexts. The first model, which formed the third objective of the current investigation, aimed to explore mothers' infant feeding behavior in relation to individuals/groups in the mother's social sphere. For this objective, three systems of

external influence were examined: family and friends, the healthcare delivery system, and community sources.

The fourth research objective aimed to explore mothers' infant feeding choices in relation to maternal attitudes toward motherhood and the baby and maternal body image. These constructs were used to operationalize mothers' perceptions of maternal and sexual femininity. Both models of mothers' infant feeding behaviors necessarily included factors of race/ethnicity, education, and mothers' beliefs about infant feeding methods as control variables.

Study Participants

The sample for this study was drawn from women that participated in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in two urban areas of Michigan during the months of June and July 2003. Questionnaires were administered to WIC participants that met the eligibility criterion and indicated a willingness to participate in the study. Eligibility to participate was determined by the amount of time since the woman's last live birth. In particular, women were considered eligible if they had delivered a live birth within the previous three months. This time period was selected following conversations with WIC administrators from the Michigan WIC Division, who indicated that although they advised exclusive breastfeeding for a period longer than three months, they acknowledged introduction of solids typically occurred among their clients by six months postpartum.

The study aimed for a sample of 100-200 study participants from each location. In order to establish a sampling frame for distributing surveys to WIC clinics in each urban location, WIC client figures were obtained from the Kent County Health Department and

Detroit Health Department that reported the total number of active WIC clients in April/May 2003 by clinic. These figures accounted for all WIC participants with active enrollment in the specified month, including pregnant women, breastfeeding and non-breastfeeding postpartum mothers, infants, and children. Based on these figures, a sampling frame was established to distribute surveys proportionally by the number of active WIC clients at each clinic and within each WIC agency (urban location). The sampling frame for both urban locations is presented in Table 1.

Table 1: Sampling Frame by WIC Agency and Clinic

	April/May 2003 Count ^A	Proportion of Total WIC Client Group	Surveys Distributed
Kent County Health Dept.	16,378	39.6%	200
Clinic K1	2,879	7.0%	35
Clinic K2	5,152	12.5%	63
Clinic K3	670	1.6%	8
Clinic K4	2,343	5.7%	29
Clinic K5	2,375	5.7%	29
Clinic K6	591	1.4%	7
Clinic K7	2,368	5.7%	29
Detroit City Health Dept.	24,964	60.4%	315
Clinic D1	3,092	7.5%	38
Clinic D2	3,655	8.8%	44
Clinic D3	3,716	9.0%	56
Clinic D4	2,185	5.3%	27
Clinic D5	3,095	7.5%	38
Clinic D6	3,379	8.2%	41
Clinic D7	2,291	5.5%	28
Clinic D8	1,673	4.0%	20
Clinic D9	1,878	4.5%	23
Both Locations	41,342	100.0%	515

^A All women, infants and children with active enrollment in WIC in the specified month

Although the study aimed for a sample of 100-200 study participants from each location, larger quantities of questionnaires were distributed to WIC clinics to account for incomplete questionnaires or refusal to participate. As indicated in Table 1, 200

questionnaires were distributed to Kent County WIC clinics and 315 questionnaires were distributed to Detroit clinics. Initial survey administration procedures dictated that these questionnaires be administered to clients at the sixteen participating WIC clinics for a period of three weeks commencing in mid-June 2003. This decision was made following discussions with staff at each location, who indicated that three weeks would be an appropriate length of time to recruit the desired number of study participants from each location. However, after three weeks of survey administration, it was determined through conversations with WIC administrators at each urban location that an additional four weeks of questionnaire administration was needed to obtain the desired number of completed questionnaires.

Study Design and Procedure

Data analysis for the current investigation involved the merging of two sets of data on study participants' feeding behavior. The primary data set contained data collected from questionnaires administered to WIC clients at sixteen clinics throughout Kent County and Detroit. The secondary data set was extracted from WIC participant records maintained by the WIC Division of the Michigan Department of Community Health (MDCH). This data set contained all active WIC participants enrolled in the sixteen participating clinics as of June 24, 2003. Primary and secondary data sets were merged using WIC identification numbers, which are unique family numbers assigned to women and their children in order to maintain participant records at the local and state level. This required that study participants write their WIC identification number, and no other identifiers, on the cover of their questionnaire in order to match the corresponding secondary data record. A detailed description of data collection procedures follows,

including primary data collection procedures by urban location and details on the secondary data extraction.

Primary Data Collection. Questionnaires were administered to clients at seven clinics managed by the Kent County Health Department and nine clinics that operated under the Detroit City Health Department for a period of seven weeks in June and July 2003. The target sample size for the study was 100-200 study participants from each location to facilitate comparison between locations and draw conclusions about the sample. Following discussions with staff at each location, three weeks was determined to be an appropriate length of time to recruit the desired number of study participants. However, based on the number of completed surveys collected following three weeks of survey administration, a cooperative decision was made with WIC administrators at each site to extend the data collection timeline by four additional weeks.

Discussions with staff at each location determined procedure for administering questionnaires to WIC clients. Separate administration procedures were constructed for each location to maximize the researcher's use of available resources and to minimize strain on WIC staff. As a result, procedures for administering questionnaires differed between the Kent County Health Department WIC Agency and the Detroit City Health Department WIC Agency. Questionnaire administration procedures for each location are described in detail below.

Surveys were administered to clients at seven WIC clinics managed by the Kent County Health Department. Following discussions with staff at this location, it was decided that questionnaires would be administered to WIC clients by members of the Breastfeeding Subcommittee of the Kent County Health Department WIC Agency. This

subcommittee was composed of twelve members that counseled women at clinics throughout the Kent County WIC Agency. The group was selected to administer the survey based on two considerations. First, the subcommittee indicated particular interest in information that can be gleaned from the study and was therefore willing to commit resources to the project. This also minimized strain on other WIC clinic staff. Second, following several grammatical revisions of the instrument, WIC staff remained uncertain about study participants' ability to read and understand portions of the questionnaire. As a result, the Breastfeeding Subcommittee volunteered time to assist in distributing questionnaires to WIC clients that met study criteria. Members of the committee approached potential study participants while they were waiting for their scheduled appointment to offer eligible women the opportunity to participate in the study.

Questionnaires were also administered to WIC clients at nine clinics managed by the Detroit City Health Department. The procedure for administering surveys in this second study location differed slightly from Kent County distribution procedures. Following discussions with WIC coordinators and nutritionists in this department, it was decided that eligible study participants would be offered the opportunity to participate in the study by WIC clinic clerks. This group of WIC staff was been selected to distribute questionnaires because WIC clients were required to make contact with this individual upon checking in and before leaving the clinic. As a result, staff felt these individuals could efficiently recruit study participants during the clinic check-in process. Upon checking in the with clinic clerk, WIC clients were asked to complete necessary internal paperwork to maintain their WIC certification. After completing this paperwork and

returning forms to the clinic clerk, eligible WIC participants were offered the opportunity to participate in the study.

WIC staff at both locations were instructed to recruit study participants from all WIC clients that met eligibility criteria for the study. Eligibility to participate was determined by the amount of time since the woman's last live birth. In particular, women were considered eligible if they had delivered a live birth within the previous three months. This time period was been selected following conversations with WIC administrators from the Michigan WIC Division, who indicated that they advise exclusive breastfeeding through a longer period of time but acknowledge introduction of solids typically occurs by six months. Further, although previous research has extended this period of time to a maximum of twelve months postpartum (Bevan et al., 1984), a shorter time period was chosen for this study to enhance women's ability to recall information from their third trimester of pregnancy, since their baby was born, and at the time of survey administration. In an attempt to obtain a sample of clients that resembled the diversity of WIC populations at each clinic, no other selection criteria was set (i.e., age, race/ethnicity, etc.).

Informed consent was obtained from study participants at all sites. During their initial explanation of the project, WIC staff at each location informed clients that their participation in the study was completely voluntary and that their decision to participate or not to participate would not affect the services and/or benefits they received from the WIC program. Women that agreed to participate were be asked to read, sign and return a consent form that outlined the purpose of the study, rights as a study participant, incentives, and potential risks and benefits of participating. An additional copy of the

consent form was made available for study participants' records. After returning a signed consent form, study participants were asked to complete their questionnaire in the clinic waiting area while they were waiting for their scheduled appointment. Questionnaires were expected to take approximately twenty minutes to complete. WIC staff that administered the questionnaires at each location indicated that the questionnaire typically took at least this amount of time to complete.

As an incentive for participating in the study, participants were offered the opportunity to be entered into a drawing for one of eight \$25 gift certificates to a local grocery store. Participants that were interested in being included in this drawing were asked to provide their contact information on a separate card included with the questionnaire. The card was clipped to the front of the questionnaire in a manner that allowed the study participant to detach their contact information from their completed questionnaire. Contact information was not recorded on any data set and was only maintained in hard copy. Following the incentive drawing, all prize entry forms were destroyed.

In order to protect the confidentiality of respondents' information, study participants were asked to place their completed questionnaires and prize drawing entry slips in a clearly marked, locked box in the clinic waiting room. WIC staff was instructed to place signed consent forms in the same collection box. Questionnaires, prize entry drawing slips, and consent forms were collected from WIC clinics by the researcher at intervals throughout the seven weeks of survey administration and upon completion of the study.

Secondary Data Collection. Respondents were asked to write their WIC identification number, a unique number assigned to each WIC client and known only to WIC administrative staff and the client, on the cover of their survey. This number was used to match an extraction of secondary data from records maintained by the Michigan WIC Division to respondents' answers. Once the primary and secondary data sets were linked, the WIC identification number was removed from the data set and a unique identification number was assigned for each respondent. The code sheet of WIC identification numbers and the new identification numbers remained locked in a secure location and were destroyed upon the completion of the study.

Study Instrument

This study collected primary data from questionnaires administered to WIC clients and drew on secondary data from the WIC Division of the MDCH to accomplish the four study objectives. In particular, primary and secondary data were used to explore characteristics that described the study sample and to assess the degree to which the sample was representative of other WIC clients at the same urban location, to compare across geographic location, to test measurement reliability of several existing scales and subscales included in the questionnaire, and to predict mothers' infant feeding behavior based on her social contexts.

To accomplish these objectives, the questionnaire included measures of respondents' current infant feeding behavior, systems of external influence, body image during pregnancy, attitudes toward motherhood and the baby since the baby was born, beliefs about breastfeeding, and socio-demographic characteristics. Measurement of each

set of characteristics is described below, followed by a discussion of the secondary data that was obtained from the WIC Division of the MDCH.

Current Infant Feeding Behavior. Mothers' current infant feeding behavior was calculated as a breastfeeding percentage, wherein the number of times respondents currently fed their infant breastmilk in a typical day was divided by the total number of times they fed their infant in a typical day. Based on this equation, breastfeeding percentage may range from zero (0% breastfeeding) to one (100% or exclusive breastfeeding). In models predicting infant feeding behavior for objectives 3 and 4 of the investigation, breastfeeding percentage functioned as the dependent variable in data analysis.

In response to research that suggests that the experience of pumping breastmilk may influence mothers' beliefs and infant feeding behavior (Blum, 1999), respondents were asked to distinguish between how many times they feed their infant pumped breastmilk in a typical day and how many times they feed their infant breastmilk from the breast in a typical day. These measures were collapsed into one in the computation of breastfeeding percentage. However, where applicable, results on mothers' use of a breast pump and frequency of pumping breastmilk are reported in Chapter 4.

Also related to computation of the breastfeeding percentage, it was decided that the current investigation would be limited to an examination of two feeding methods: breastfeeding and formula feeding. This decision was made based on conversations with WIC staff and administrators, wherein it was concluded that the sample of mothers for the current study was intentionally limited to three months postpartum to involve women that had not yet introduced solid foods. However, for the purpose of comprehensively

exploring mothers' feeding behaviors, study respondents were asked whether they had fed their baby anything other than breastmilk or formula. This characteristic was explored as a descriptive characteristic only, and was not included as an independent variable predicting breastfeeding percentage.

Several other characteristics of mothers' infant feeding behavior were also measured and reported for descriptive purposes. Timing of mothers' initial infant feeding decision was explored by asking respondents to indicate when they first made their decision to or not to breastfeed. Five response categories were offered to respondents: "before I became pregnant," "in the first 3 months of my pregnancy," "in the second 3 months of my pregnancy," "in the third 3 months of my pregnancy," and "after my baby was born." These five categories were later collapsed into three in order to facilitate comparisons using Chi-Square analysis. These three categories included before pregnancy, during pregnancy, and after birth.

Initiation of breastfeeding was measured by respondents' answer to the question: "Have you ever—at any time—fed your baby breastmilk?" Respondents that answered in the affirmative were considered to have initiated breastfeeding, whereas respondents that indicated "no" were considered not to have initiated breastfeeding. Additionally, WIC secondary data was available on mothers' initiation of formula feeding for a portion of the study sample. This characteristic will be described in greater detail below.

Lastly, duration of breastfeeding was measured as the number of weeks between the infant's date of birth and the time at which the infant was weaned from breastmilk. If the infant was still breastfeeding at the time of survey administration, duration of breastfeeding was calculated as the amount of time between the infant's date of birth and

the completion of the current investigation (dated as August 22, 2003). There were three collapsed categories of breastfeeding duration that encompassed 0 through 10 days, 11 through 31 days, and longer than one month. Most often, mothers that were still breastfeeding at the time they completed the survey were computed as having breastfed longer than one month.

Systems of External Influence. The format of the Social and Professional Support Scale of the Breastfeeding Attrition Prediction Tool (Janke, 1994) was used to measure the influence of external actors in respondents' infant feeding choices. Development and testing of this tool, in addition to a comparison with other tools in the literature, is described in detail in Appendix A. The scale measured respondents' perceptions of others' expectations and the value respondents place on others' opinions on three systems of external influence: family and friends, the healthcare delivery system, and community sources.

The influence measure was computed as a product of two separate measures on the same source of influence: mother's perception of a breastfeeding expectation from each source and mother's motivation to comply with their opinions. Perception of a breastfeeding expectation was measured by asking respondents to rate their level of agreement with the following statement: "When I first decided how to feed my baby, these people thought that I should definitely breastfeed by baby..." Motivation was measured by asking respondents to indicate their level of agreement with the statement: "I value these people's opinions on how I should feed my baby..." On both measures, respondents were presented with a five-point Likert scale that ranged from strongly disagree to strongly agree, with an option to select "don't know or does not apply."

Janke (1994) suggested computing the influence score for each source of external influence as a product of the expectation score and the value score. According to Janke's method of computation, respondents were presented with response categories that ranged from strongly disagree (coded as a 1) to strongly agree (coded as a 5). The influence of each source could therefore range from 1 to 25, indicating degrees of support for or discouragement of breastfeeding.

Alternatively, for the current investigation, coding on the expectation and value scores for each source of external influence differed in order to compute an influence score that suggested strength and direction of infant feeding influence toward breastfeeding or toward formula feeding. Therefore, expectation ranged from strongly disagree (coded as a -2) to strongly agree (coded as a 2) to indicate the source's expectation toward formula feeding or toward breastfeeding. The expectation score was then multiplied by the value score (coded from 1 to 5) to indicate the degree to which the respondent valued the source's perceived orientation toward breastfeeding or toward formula feeding. Based on this computation, influence scores for each source could range from -10 (strong influence in the direction of formula feeding) to +10 (strong influence in the direction of breastfeeding).

The original Social and Professional Support Scale contained twelve potential sources of influence. Five sources from the original instrument were directly translated onto the questionnaire for the current study. Four additional sources from the original instrument were translated onto the questionnaire, but were collapsed into categories on the current instrument. In particular, Janke's (1994) original sources of "other relatives" and "my sister" were embedded in "my family" for the current study. Additionally, "the

baby's doctor" and "my doctor" were collapsed on the current instrument to read "my doctor(s)." Following discussions with WIC administrators and staff, the last three sources from the original instrument were determined to be considerably broad for the purposes of this study. In particular, it was determined that "my childbirth educator" and "La Leche League" should instead be made specific to this population of WIC clients by including two items specific to the WIC program: "WIC staff" and "Breastfeeding Peer Counselors." The last item, "people important to me," was removed owing to its vague detail about the relationship of these individuals to the mother.

As a result, other sources that were included on the current instrument that were developed following discussions with WIC administrators and staff and review of social support and influence literature (Dennis & Faux, 1999; Dusdieker, Booth, Seals, & Ekwo, 1985; Humphreys et al., 1998; Janke, 1994; Matich & Sims, 1992). In total, fourteen sources were included in the questionnaire. Six sources were originally placed in the family and friends system of external influence, including the baby's father*, my mother*, my mother-in-law*, my family, my best friend*, and my other friends. Following discussions with an expert panel, one additional source was placed in this group that was originally placed in the healthcare delivery system of influence. This source, Breastfeeding Peer Counselors, was relocated to the family and friends system of external influence owing to the personal, peer-type relationship developed between breastfeeding peer counselors and mothers. This relationship was also maintained in the literature (Arlotti, Cottrell, Lee, & Curtin, 1998; Dennis et al., 2002; Pugh et al., 2001), thereby supporting the decision to move the source. The healthcare delivery system was

* Item translated directly from the Social and Professional Support Scale of the Breastfeeding Attrition Prediction Tool (Janke, 1994).

measured in three items: my doctor(s), my midwife*, and WIC staff. Lastly, the community sources system of external influence included four sources: other people at my school, other people at my work, my community, and people in public places.

Mean scores of each system of external influence were computed by taking the mean of influence scores for all sources in the system. Mean scores for each system of external influence functioned as a separate independent variable predicting mothers' infant feeding behavior for study objectives 3 and 4.

Maternal Body Image. Maternal body image was measured using the Body Image subscale of Kumar et al.'s Maternal Adjustment and Maternal Attitudes Scale (1984). An in-depth review of the development of this instrument and a comparison to other scales in the literature is located in Appendix A. To summarize, the subscale contains twelve items that ask respondents to consider aspects of their body image during their third trimester of pregnancy. Sample items include: "I have liked the shape of my body," "I have felt attractive," and "I have felt proud of my appearance." Response categories were based on a five-point Likert scale that ranged from strongly disagree (coded as a 1) to strongly agree (coded as a 5). In order to extract factors of body image, this subscale was factor analyzed as part of study objective 2. Mean scores for each factor of body image were computed by taking the mean item ranking of all items included in the extracted factor. Subsequently, factors of body image were analyzed as independent variables in data analysis for study objectives 3 and 4.

Maternal Attitudes toward Motherhood and the Baby. The Attitudes toward Motherhood and the Baby subscale of the Maternal Adjustment and Maternal Attitudes Scale (Kumar et al., 1984) was used to measure respondents' orientation toward

motherhood and the maternal role. Once again, a detailed description of the development of this instrument and a comparison with other scales in the literature is located in Appendix A. As an overview, this subscale contains twelve items that ask respondents about their attitudes toward pregnancy, motherhood, and their baby since their baby was born. Example items include: “I have been wondering whether my baby will be healthy and normal,” “I have been worrying that I might not be a good mother,” and “The thought of having more children has appealed to me.” Response categories were based on a five-point Likert scale that ranged from strongly disagree (coded as a 1) to strongly agree (coded as a 5). As with the Body Image subscale, items on the current subscale were factor analyzed to extract factors of attitudes toward motherhood and the baby. Mean scores were then computed by factor by taking the mean of item ratings of all items that loaded on the factor. Mean factor scores were used as independent variables in predicting mothers’ infant feeding behavior for study objectives 3 and 4.

Beliefs about Breastfeeding. Two additional scales of the Breastfeeding Attrition Prediction Tool (Janke, 1994) measured respondents’ beliefs about breastfeeding: the Positive Breastfeeding Sentiment Scale and the Negative Breastfeeding Sentiment Scale. These subscales measured respondents’ beliefs in the advantages and the disadvantages of breastfeeding. A detailed description of instrument development and a comparison with other instruments in the literature can be found in Appendix A.

On the original instrument, respondents’ beliefs were one of two components measuring respondents’ attitudes toward breastfeeding. In particular, attitude was a product of two measures: belief and outcome evaluation. Belief was measured by asking respondents to indicate their level of agreement with each of 29 statements about

advantages and disadvantages of breastfeeding. Janke (1994) measured outcome evaluation by asking respondents to rate the importance of each advantage or disadvantage in choosing a feeding method. For example, a matched belief and outcome evaluation pairing from the instrument included “Breastfeeding is more convenient than formula feeding” (belief) and “Using a feeding method that is convenient is important to me” (outcome evaluation). Both items were rated on Likert-type scales that ranged from strongly disagree to strongly agree. The product of two complimentary measures formed the respondent’s attitude on the item; the sum of all attitudinal items on each subscale indicated the respondent’s positive or negative breastfeeding sentiment score. A higher score on either scale indicated greater positive or negative breastfeeding sentiment.

The Positive and Negative Breastfeeding Sentiment Scales contained a total of 29 belief items related to the advantages and disadvantages of breastfeeding and 29 corresponding outcome evaluation items. One additional item was added to the instrument in response to literature that suggests women encounter significant constraints to breastfeeding in places outside of their homes, including work, school and public places (Blum, 1999; Chezem, Montgomery, & Fortman, 1997; Stearns, 1999). This additional item on the questionnaire read, “It is difficult to find places to breastfeed outside your home.”

Although Janke (1994) suggested the use of both sets of questions for the attitudinal measure, a decision was made to include only belief items on the instrument for the current study. This decision was based on the researcher’s primary focus on maternal beliefs about breastfeeding as they relate to one outcome: current breastfeeding

behavior. Other intended outcomes, although potentially influential in mothers' feeding decisions, were outside the focus of the current study.

As a result, fourteen items were included on the instrument for the current investigation related to positive breastfeeding sentiment. An additional sixteen items were included on the instrument related to negative breastfeeding sentiment. Response categories on the breastfeeding sentiment items were consistent with the original instrument developed by Janke (1994). Respondents could respond to each statement based on a scale that ranged from strongly disagree (coded with a 1) to strongly agree (coded with a 5). The fourteen items on positive breastfeeding sentiment and sixteen items on negative breastfeeding sentiment were factor analyzed separately to extract factors related specifically to advantages and disadvantages of breastfeeding. Mean scores for each factor of positive breastfeeding sentiment and negative breastfeeding sentiment were calculated by taking the mean of item ratings of all items that loaded on the factor. Mean factor scores on positive and negative breastfeeding beliefs were then entered as predictors of infant feeding behavior in subsequent data analysis.

Socio-Demographic Characteristics. Several items on the questionnaire addressed respondents' socio-demographic characteristics: age, race/ethnicity, education, marital status, and current employment/student status. Although several of these variables were available from the secondary data set, these variables were included on the questionnaire to supplement secondary socio-demographic and household information maintained by the WIC Division of the MDCH.

Secondary Data. The Michigan WIC Division of the MDCH agreed to make secondary data available that could be linked with respondents' questionnaire answers

using their WIC identification number. The process of secondary data extraction required that desired fields be extracted on a specified date to encompass all active WIC clients enrolled at a specific point in time. Based on the original timeline that anticipated three weeks of survey administration, data was extracted on the complete active WIC client group enrolled at the sixteen clinics as of June 24, 2003. The extraction was completed by administrators at the Michigan WIC Division of the MDCH, who then made the data set available for the current investigation. The only identifier linking the primary and secondary data sets was the WIC identification number.

Data maintained by the WIC Division of the MDCH was collected from enrollment paperwork and self-reported health history forms that WIC participants are required to complete to enroll in the program and maintain WIC certification. There are three points at which women are required to complete paperwork to maintain certification. These data collection points correspond to the three categories of women eligible to participate in the WIC program: pregnant, breastfeeding postpartum, and non-breastfeeding postpartum. Accordingly, health history forms are required of each woman WIC participant at each of the following time intervals throughout their WIC certification period: during pregnancy, immediately postpartum, and six months postpartum.

During pregnancy, the Pregnant Woman's Health History asks WIC participants to provide information on socio-demographic characteristics of the expectant mother, characteristics associated with the expectant mother's prenatal care, environmental conditions, family resources, and alcohol and tobacco use. If the woman continues her certification after birth, she is required to complete the Postpartum Woman's Health History during her first visit after giving birth. This initial visit is most often scheduled

during the first two weeks postpartum. The health history for this six-month period of postpartum certification asks women for information similar to the Pregnant Woman's Health History, but also asks women to provide information about their baby's health and their infant feeding practices. Non-breastfeeding mothers can maintain certification for as long as six months. WIC participants that continue to breastfeed through six months are eligible to extend their WIC certification to one year and are required to complete a Six-Month Recertification Health History.

As a result, the secondary data set maintained by the WIC Division contains temporal records of clients' health, infant and child health, environmental factors, and demographic characteristics. Data extracted for the current investigation contained only the most recent characteristics of WIC participants and not temporal characteristics associated with changing behaviors.

Four secondary data sets were extracted for the current investigation that contained data on mothers, infants and children active at each WIC participating clinic in each urban location. The first two sets of secondary data contained information on expectant mothers and mothers with active enrollment in WIC by urban location. Information contained in these data sets represented the most recent information on the client and was based on the most recent health history form completed to maintain certification.

The second two sets of secondary data made available for the current study contained information on active infant and child participants at each clinic in each urban location. Health histories for these two groups of eligible WIC participants are completed by the guardian to establish the infant's or child's WIC certification. The WIC Infant

Health History asks the guardian to provide information on their infant's race/ethnicity, method of infant feeding and eating history, infant's overall health, parents' physical and mental health, and environment conditions. Infants and children may be certified for up to one year; children are eligible to participate through age five. For the purposes of this study, information on children was excluded from data analysis. Accordingly, secondary data on infants was merged with corresponding secondary data on mothers.

Table 2 outlines the measures extracted from WIC Division data sets and indicates which instruments collected these measures.

Table 2: WIC Secondary Data Extraction: Measures and Original Instruments

	Pregnant Woman's Health History	Postpartum Woman's Health History	Six-Month Recertification Health History	WIC Infant Health History	Other
WIC Characteristics					
WIC identification number					X
WIC agency					X
WIC clinic					X
Type of WIC certification					X
Original certification date					X
Socio-Demographic Measures					
Race/Ethnicity (mother)	X	X	X		
Race/Ethnicity (infant)				X	
Date of birth (mother)	X	X	X		
Date of birth (most recent infant)		X		X	
Gender (infant)				X	
Marital status	X	X	X		
Education	X	X	X		
Household size					X
Household income					X
Participation in Other Support Programs					
Medicaid					X
Family Independence Program					X
Food Stamps					X
Characteristics of Prenatal Care					
Initiation of prenatal care	X	X			
Location of prenatal care	X	X		X	
Payment for prenatal care	X	X			
Infant Feeding Behaviors					
Initiation of breastfeeding				X	
Initiation of formula feeding				X	
Current breastfeeding status	X		X	X	
Duration of breastfeeding				X	

In order to accomplish the objectives of this study, primary data collected from questionnaires administered to WIC clients and secondary data maintained by the Michigan WIC Division of the MDCH were merged to gain greater information on the

study sample. Primary and secondary data was merged based on WIC identification numbers, which participants were asked to record on the cover of their questionnaire. Once the data sets were merged, characteristics of the mother were matched on several fields to ensure consistency between information contained in the primary data set and that contained in the secondary data set. In the event of specific inconsistencies between primary and secondary characteristics, data was defaulted to one characteristic or the other based on the nature of the characteristic. Specifically, if the characteristic was a static characteristic, or one that does not change over time, the characteristic defaulted to the secondary data set. This decision was based on the assumption that the WIC Division maintains accurate records of participants' static information, including race/ethnicity, date of birth, and infant gender.

Alternatively, if the characteristic was a dynamic characteristic, or one that may change over time, data was defaulted to the primary data set. This decision was based on the timing of data collection for primary and secondary data. In particular, dynamic variables contained in the primary data set gave a more recent representation of study participants' characteristics on those characteristics with the potential to change. As previously described, secondary data on WIC participants is collected at three time intervals and may reflect information that was dated from up to six months prior to the date of survey completion.

After merging the primary and secondary data sets and checking for inconsistencies, the study sample was explored in relation to the larger group of WIC clients at the same location to determine the degree to which the study sample was representative of other WIC clients. For this exploration, the larger WIC client group was

divided into two based on potential eligibility to have participated in the study. Using these three groups for comparison (the study sample, the eligible WIC client group, and the ineligible WIC client group), the current study explored the extent to which study results could potentially explain other WIC clients at each urban location. Following these comparisons, data analysis was conducted to explore the four study objectives that guided the study.

Study Objective 1: Sample Description and Comparison. The first objective of this study aimed to describe characteristics of the sample and to compare across geographic location. The following characteristics were examined for this objective: socio-demographic characteristics, participation in other maternal-child support programs, factors associated with prenatal care, infant feeding behavior, beliefs about breastfeeding, systems of external influence, maternal body image, and attitudes toward motherhood and the baby. For these comparisons, characteristics were defaulted to the primary or secondary data set based on type of characteristic: static (defaulted to the secondary data set) or dynamic (defaulted to the primary data set). This procedure was described previously. Additionally, where applicable, comparisons were made between the larger eligible WIC client groups by urban location to determine whether differences between the study samples would be expected based on differences between the larger WIC client groups.

Study Objective 2: Measurement Reliability of Existing Instrumentation. The second objective of this investigation was directed at testing measurement reliability of existing subscales measuring maternal body image and attitudes toward motherhood and the baby, and an existing scale measuring maternal beliefs about breastfeeding among

this sample of WIC participants. Two subscales of the Maternal Adjustment and Maternal Attitudes (Kumar et al., 1984) and two scales of the Breastfeeding Attrition Prediction Tool (Janke, 1994) were examined using exploratory factor analysis. On these scales and subscales, exploratory factor analysis was used to determine whether the measurement model could be improved by developing subscales that potentially reflect sub-factors of breastfeeding beliefs, maternal body image, and attitudes toward motherhood and the baby.

For this analysis, criteria were established that dictated circumstances under which specific items of each subscale or scale were retained or removed from the factor structure. These criteria were based on magnitude of factor loading and cross-loading on two factors. In particular, items that failed to load at a level of 0.30 or higher were removed from the factor structure. As well, items that loaded on more than one factor simultaneously were examined for two characteristics. If the difference between the factor loadings was greater than 0.05, the item was clustered on the factor on which its factor loading was greatest. However, prior to placing the item on this factor, the item was examined for its theoretical fit with other items on the factor.

Based on these criteria, factors of each construct were extracted. Items that loaded on each factor were analyzed for common themes to explore conceptual fit with other items that loaded on the factor. In order to be consistent with previous research in the areas of body image, maternal adjustment, and beliefs about breastfeeding, themes were gleaned from the items based on a review of relevant literature on these constructs. Relying on previous literature, factors were labeled according to the common themes that ran throughout the items that loaded on the factor. This analysis extracted several factors

for each construct, which were used in subsequent regression analyses as outlined in Objectives 3 and 4 below.

Study Objective 3: Predicting Mothers' Infant Feeding Behavior on Systems of External Influence. The third objective of this study aimed to predict respondents' current infant feeding behavior on systems of external influence. The original proposed regression model predicted current infant feeding behavior, measured as a breastfeeding percentage, on three systems of external influence (family and friends, the healthcare delivery system, and community sources) and their interactions. In addition, three other independent variables were included in the regression model to control for respondents' race/ethnicity, education, and beliefs about breastfeeding. In order to control for these variables, it was decided that stepwise regression would be used and these fields were entered into the regression model at the outset. The proposed model is presented as Figure 1.

Figure 1: Proposed Regression Model 'A' Predicting Current Infant Feeding Behavior on Systems of External Influence

$$\text{IFB} = a + b_1 (R) + b_2 (E) + b_3 (\text{BBF}) + b_4 (\text{FF}) + b_5 (\text{HDS}) + b_6 (\text{CS}) + b_7 (\text{FF} \cdot \text{HDS}) + b_8 (\text{FF} \cdot \text{CS}) + b_9 (\text{HDS} \cdot \text{CS}) + b_{10} (\text{FF} \cdot \text{HDS} \cdot \text{CS}) + e$$

Where:

IFB = Current Infant Feeding Behavior

R = Race

E = Education

BBF = Beliefs about Breastfeeding

FF = Family and Friends (System of External Influence)

HDS = Healthcare Delivery System (System of External Influence)

CS = Community Sources (System of External Influence)

a = Intercept

b_x = Average change in infant feeding behavior associated with one unit change in the independent variable, holding all other independent variables constant

e = Error

Following data collection, the proposed model was revised based on limited response to items measuring mothers' perceived expectations of and valued place on community sources. In particular, a large portion of the study sample indicated "don't know or does not apply" on these items, thereby impeding computation of an influence score for each of these four sources. In the revised model, the influence of the community sources system of influence and its interactions were removed from the proposed model. The revised regression model for this study objective appears in Chapter 4.

Measurement of each variable has been described in some detail previously. Briefly, the dependent variable was measured as a breastfeeding percentage and

computed as the number of times the infant was fed breastmilk in a typical day divided by the number of total feedings in a typical day. Socio-demographic control variables were recoded into three dummy variables that measured race/ethnicity on the basis of Black/African-American or not Black/African-American, education on the basis of obtaining a high school degree (or the equivalent) or obtaining less than a 12th grade education, and another education variable that measured obtaining some college education or no college-level education. Two positive breastfeeding sentiment factors and three negative breastfeeding sentiment factors, in addition to one solitary item related to negative breastfeeding sentiment, were measured as separate mean scores of all items that loaded on the factor. Lastly, mean scores were computed for each system of external influence based on influence scores for each individual/group in the specified system. Variables were entered for the regression model in the order presented in Figure 1 using stepwise procedures.

After results had been obtained for the predicted regression model, independent variables in regression equation were tested for the presence of multicollinearity according to the procedure outlined by Lewis-Beck (1980). High multicollinearity exists when an independent variable is highly correlated with one or more independent variables in the predicted regression equation. As discussed by Lewis-Beck (1980), the presence of high multicollinearity threatens to reduce the reliability of parameter estimates in the obtained regression equation. Although examination of the bivariate correlations between each set of independent variables has the potential to suggest the presence of multicollinearity, Lewis-Beck (1980) recommends regressing each independent variable on all other independent variables to investigate the amount of

variance explained. Using this procedure, high multicollinearity can be detected if the adjusted R^2 obtained for any of the models approached 1.00. This result would indicate the presence of a strong correlation between the (in)dependent variable and one or more independent variables.

For the current investigation, in the event that high multicollinearity was detected, the “offending” variable was removed from the original regression model as recommended by Lewis-Beck (1980). However, as this procedure risks specification error in the revised model, Lewis-Beck (1980) recommends running a separate regression model on the offending variable(s). This process for investigating multicollinearity and resolving issues with high multicollinearity was applied for the current study objective and for the predicted regression model outlined in Study Objective 4.

Study Objective 4: Predicting Mothers’ Infant Feeding Behavior on Maternal Body Image and Attitudes toward Motherhood. The fourth objective of this study aimed to predict respondents’ current infant feeding behavior based on maternal body image and attitudes toward motherhood. Current infant feeding behavior, measured as a breastfeeding percentage, was regressed on these two constructs. In addition, three other independent variables were included in the regression model to control for respondents’ race, education, and beliefs about breastfeeding. Using stepwise regression, the control variables were entered into the regression model first, followed by body image factors and factors related to attitudes toward motherhood and the baby. Measurement of the dependent variable and control variables was described previously in Study Objective 3. For the introduction of body image and attitudes toward motherhood and the baby into the regression model, mean scores were computed for each extracted factor of these

subscales. In total, two factors related to body image and four factors related to attitudes toward motherhood, in addition to one solitary item on the attitudes toward motherhood construct, were entered into the regression model. Stepwise regression was used and the regression model for this objective is presented in Figure 2.

Figure 2: Proposed Regression Model 'B' Predicting Current Infant Feeding Behavior on Body Image and Attitudes toward Motherhood and the Baby

$\text{IFB} = a + b_1 (R) + b_2 (E) + b_3 (\text{BBF}) + b_4 (\text{BI}) + b_5 (\text{AM}) + b_6 (\text{BI} \cdot \text{AM}) + e$ <p><i>Where:</i></p> <p>IFB = Current Infant Feeding Behavior</p> <p>R = Race</p> <p>E = Education</p> <p>BBF = Beliefs about Breastfeeding</p> <p>BI = Maternal Body Image</p> <p>AM = Attitudes toward Motherhood and the Baby</p> <p>a = Intercept</p> <p>b_x = Average change in infant feeding behavior associated with one unit change in the independent variable, holding all other independent variables constant</p> <p>e = Error</p>
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Based on the number of factors extracted from each of the Body Image subscale and the Attitudes toward Motherhood and the Baby subscale, the decision was made to exclude their interactions from the regression model. In particular, the sample size for the current study was not sufficiently large to allow the number of interactions possible between seven factors. As a result, the regression model presented in Figure 2 was revised to remove interactions between body image and attitudes toward motherhood and the baby. After running the proposed regression model, independent variables were

inspected for high multicollinearity using the procedure outlined for Study Objective 3.
Results of this and other data analysis procedures are presented in the subsequent chapter.

Chapter 4

RESULTS

The purpose of this study was to explore factors associated with infant feeding choices among low-income women. In accordance with the study purpose, questionnaires were distributed to seven clinics in Kent County, Michigan, and nine clinics in Detroit, Michigan, that administered the Special Supplemental Nutrition Program for Women, Infants and Children. In order to distribute and administer questionnaires proportionally by clinic size at each of the sixteen WIC clinics, the sampling frame for the study was based on the total number of WIC participants served at participating clinics in each location during the month of April/May 2003. These figures included all active women, infants and children enrolled in the WIC program during the specified month.

Based on April/May 2003 figures, 60.4% of all WIC participants were clients of Detroit clinics and 39.6% were participants in Kent County clinics. Relying on this distribution of participants by urban location, 315 questionnaires were delivered to the Detroit City Health Department in packets proportional to clinic size and 200 questionnaires were delivered to the Kent County Health Department to be distributed proportionally by clinic size. An additional 25 questionnaires were included in each delivery to account for unusable surveys due to incompleteness or refusal.

Dates of administration at each location spanned from June 16 through August 1, 2003, which constituted seven weeks of questionnaire administration. The study aimed to recruit approximately 100-200 participants from each study location and, based on April/May 2003 client counts, a smaller proportion of Kent County study participants was expected. However, proportions of surveys obtained from each urban location

differed from expected proportions. In total, 229 completed questionnaires were collected across both locations, wherein 119 completed questionnaires were collected from WIC participants in Kent County clinics (52.0%) and 110 questionnaires were collected from WIC participants in clinics in Detroit (48.0%). Contrary to expected proportions, study participants in Kent County constituted a larger segment of the study sample than study participants from Detroit. This result may be partially explained by questionnaire distribution, administration and external management procedures, which differed between the Kent County Health Department and the Detroit City Health Department based on WIC staff resources. Expected and obtained study samples by WIC agency and clinic are displayed in Table 3. Also presented in Table 3 are June 2003 figures on women with active enrollment in WIC, categorized by potential eligibility to participate and ineligibility to participate in the study.

Table 3: Expected and Obtained Study Sample by WIC Agency and Clinic

	Sampling Frame			Study Sample			WIC Client Group		
	April/May 2003 Count ^A	Proportion (Expected)	Surveys Distributed	Proportion (Obtained)	Eligible ^C Surveys Collected	Ineligible Surveys Collected	June 2003 Count ^B	Eligible ^C Study Participants	Ineligible Study Participants
Kent County Health Dept.	16,378	39.6%	200	52.0%	106	13	3,606	888	2,640
Clinic K1	2,879	7.0%	35	9.0%	14	4	547	137	396
Clinic K2	5,152	12.5%	63	9.0%	17	1	1,190	294	879
Clinic K3	670	1.6%	8	4.5%	9	0	139	22	108
Clinic K4	2,343	5.7%	29	3.5%	7	0	518	119	392
Clinic K5	2,375	5.7%	29	4.0%	8	0	553	154	391
Clinic K6	591	1.4%	7	2.5%	5	0	127	39	83
Clinic K7	2,368	5.7%	29	12.9%	23	3	532	123	386
Clinic Unknown	*****	*****	*****	13.9%	23	5	*****	*****	5
Detroit City Health Dept.	24,964	60.4%	315	48.0%	94	16	5,362	1,510	3,807
Clinic D1	3,092	7.5%	38	7.0%	14	0	610	172	428
Clinic D2	3,655	8.8%	44	2.5%	5	0	981	312	669
Clinic D3	3,716	9.0%	56	9.5%	17	2	826	251	564
Clinic D4	2,185	5.3%	27	8.5%	11	1	390	108	271
Clinic D5	3,095	7.5%	38	8.5%	15	2	699	132	555
Clinic D6	3,379	8.2%	41	8.5%	7	10	753	224	523
Clinic D7	2,291	5.5%	28	8.0%	15	1	442	104	330
Clinic D8	1,673	4.0%	20	2.5%	5	0	352	103	249
Clinic D9	1,878	4.5%	23	0.0%	0	0	309	104	205
Clinic Unknown	*****	*****	*****	*****	*****	*****	*****	*****	13
Both Locations	41,342	100.0%	515	100.0%	200	29	8,968	2,398	6,447

^A All women, infants and children with active enrollment in WIC in the specified month

^B Only women with active enrollment in WIC in the specified month

^C Eligibility criterion: mothers that had given birth to a live infant in the previous 3 months

Eligibility to participate in the study was determined by the time elapsed since the mother's last live birth. Mothers that were up to three months postpartum were eligible to participate. As indicated in Table 3, 29 respondents in the study sample were excluded from subsequent data analysis due to ineligibility to participate in the study. Among this group of ineligible study participants, 28 respondents were more than three months postpartum (13 from Kent County and 15 from Detroit) and an additional respondent from Detroit did not provide information on the infant's date of birth. The secondary data set was consulted on this characteristic, but information on this infant's date of birth was not available on the secondary data set either. As a result, data analysis was conducted on primary data obtained from the questionnaires completed by of 200 postpartum WIC participants. This data set was composed of 106 respondents from Kent County clinics and 94 respondents from Detroit clinics.

Also outlined in Table 3 are figures on the larger WIC client group at each urban location, which were based on an extraction of June 2003 active WIC participants at the seven clinics in Kent County and nine clinics in Detroit. The figures outline active women WIC participants at each clinic, above and beyond the study sample, that were either eligible to participate or ineligible to participate in the study. These figures do not include infants and children enrolled at the sixteen participating clinics. As Table 4 indicates, there were 888 active WIC participants in Kent County and 1,510 active WIC participants in Detroit that were potentially eligible to participate in the study. According to these figures, the eligible WIC client group at Kent County composed 37.0% of eligible study participants while Detroit composed 63.0%. This reiterates the

discrepancies between surveys expected from each urban location and eligible surveys obtained from Kent County (52.0%) and Detroit (48.0%).

Initial analysis on the eligible study sample compared characteristics of the study sample with those of the larger group of WIC clients in each urban location, labeled the WIC client group. Comparisons were performed to explore the degree to which the study sample was representative of other eligible study participants at each location and to investigate whether these characteristics were similar to the larger group of ineligible study participants as well. For this analysis, women WIC clients were categorized into two groups based on eligibility to participate in the study, as specified in Table 3. Resulting comparisons examined characteristics of women at each urban location across three groups: the eligible study sample, WIC client group eligible study participants, and WIC client group ineligible study participants. Similarities and differences across the three groups were explored on four categories of characteristics: socio-demographic characteristics, participation in other support programs, factors associated with prenatal care, and infant feeding behaviors.

Comparisons were performed by urban location because of (1) differences in proportionality between the obtained study sample (52.0% from Kent County; 48.0% from Detroit) and the expected study sample (39.6% from Kent County; 60.4% from Detroit) and (2) differences in socio-demographic composition of WIC participants in each urban location. Chi-square analyses were performed to compare the eligible study sample, the eligible WIC client group, and the ineligible WIC clients group on categorical characteristics. Additionally, interval-level data was compared across these

three groups using analysis of variance. Results of all three categories of Kent County comparisons are reported first, followed by comparisons on Detroit groups.

Kent County Study Sample

As discussed, the Kent County study sample included 106 women. This group was compared with two Kent County WIC client groups that did not participate in the study. These groups were categorized by eligibility to participate in the study, wherein 888 Kent County WIC clients were eligible and 2,640 were ineligible. Comparisons were first made across these three groups on socio-demographic characteristics, wherein differences between the three groups were statistically significant on four of the characteristics. For the purpose of reporting results, the Kent County study sample may be abbreviated as “SSK,” the eligible WIC client group as “EK,” and the ineligible WIC client group as “IK.” Results of comparisons on socio-demographic characteristics are outlined in Table 4.

Table 4: Comparison of Kent County Study Participants and Eligible and Ineligible WIC Client Groups on Socio-Demographic Characteristics

	Kent County Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Race/Ethnicity *	105	-----	888	-----	2,640	-----
Black/African-American	23	21.9%	218	24.5%	535	20.3%
White/Non-Hispanic	66	62.9%	458	51.6%	1,427	54.1%
Hispanic/Latina	14	13.3%	174	19.6%	583	22.1%
Other	2	1.9%	38	4.3%	95	3.6%
Age (in years) ^A	24.9 (Mean)	5.6 (SD)	25.6 (Mean)	5.7 (SD)	25.1 (Mean)	5.6 (SD)
Marital Status	105	-----	887	-----	2,614	-----
Married	40	38.1%	350	39.5%	915	35.0%
Not married	65	61.9%	537	60.5%	1,699	65.0%
Education Level ***	105	-----	879	-----	2,611	-----
Less than 12 th grade, no diploma	25	23.8%	307	34.9%	1,019	39.0%
High school degree or GED	29	27.6%	341	38.8%	899	34.4%
Some college, no degree	36	34.3%	194	22.1%	558	21.4%
College degree or higher	15	14.3%	37	4.2%	135	5.2%
Infant Gender	106	-----	888	-----	997	-----
Male	56	52.8%	443	49.9%	511	51.3%
Female	50	47.2%	445	50.1%	486	48.7%
Infant Race/Ethnicity ***	28	-----	888	-----	996	-----
Black/African-American	6	21.4%	271	30.5%	248	24.9%
White/Non-Hispanic	17	60.7%	372	41.9%	459	46.1%
Hispanic/Latina	2	7.1%	208	23.4%	250	25.1%
Other	3	10.7%	37	4.2%	39	3.9%
Infant Age (in months) ^B ***	2.3 (Mean)	1.0 (SD)	4.1 (Mean)	1.0 (SD)	8.1 (Mean)	2.2 (SD)

^A Study Sample, n=105; Eligible WIC Client Group, n=888; Ineligible WIC Client Group, n=2,640

^B Study Sample, n=106; Eligible WIC Client Group, n=888; Ineligible WIC Client Group, n=997

* p < 0.05

*** p < 0.001

The racial/ethnic distribution of each group was compared and across all three groups, the largest proportion of each was White/Non-Hispanic (SSK=62.9%; EK=51.6%; IK=54.1%), with rather sizeable proportions of Black/African-American participants (SSK=21.9%; EK=24.5%; IK=20.3%) and Hispanic/Latina participants (SSK=13.3%; EK=19.6%; IK=22.1%). Differences between the racial/ethnic distributions of the three groups were statistically significant ($\chi^2=15.065$, $df=6$, $p=0.020$) and analysis of the adjusted standardized residuals suggested that there were two notable differences across the three groups. The first difference existed between the eligible WIC client group and the ineligible WIC client group on proportion of Black/African-American WIC participants, wherein the eligible WIC client group was composed of a larger percentage of Black/African-American WIC participants (24.5%) than the ineligible WIC client group (20.3%). The second difference existed between the study sample and the ineligible WIC client group on proportion of Hispanic/Latina women, wherein the sample did not contain as large a portion of Hispanic/Latina study participants (13.3%) as the ineligible WIC client group (22.1%). For the primary objective of these comparisons, which focused on the degree to which the study sample was representative of the eligible WIC client group, neither of these differences was of considerable concern. However, these results suggest that the study sample and the eligible WIC client group were not representative of the ineligible WIC client group on this characteristic, limiting the ability to generalize subsequent analysis of the study sample to the overall WIC client group.

A second characteristic that was statistically different across the three Kent County groups was education level obtained ($\chi^2=39.773$, $df=6$, $p=0.000$). Adjusted

standardized residuals were computed and compared to investigate where the differences between the three groups existed. Results of this analysis suggested that the study sample was composed of a considerably greater proportion of women with at least some college education (48.6%) than the two WIC client groups, while the eligible WIC client group contained a greater proportion of women with a high school degree or the equivalent (38.8%) than the study sample or the ineligible WIC client group. Lastly, the ineligible WIC client group possessed a greater proportion of women with less than a 12th grade education (39.0%) than the other two groups. These results indicate that the study sample was, to a large extent, more educated than the larger eligible WIC client group or other ineligible WIC participants at the same location.

Differences in education level obtained between the Kent County study sample and the WIC client groups may have resulted from the study methodology, which relied on a self-administered questionnaire written only in English to collect primary data on study participants. Additionally, WIC staff was available in a limited capacity for assisting study participants in completing the questionnaire. This required that potential study participants were able to read written English and that they were able to independently read and understand questionnaire items. As a result, potential study participants' ability to participate in the study may have been limited by their level of education obtained.

Differences in marital status across the three Kent County groups were not statistically significant, but did approach statistical significance ($\chi^2=5.862$, $df=2$, $p=0.053$). Across all three groups, the majority of WIC participants in all three groups were not married (SSK=61.9%; EK=60.5%; IK=65.0%), which included women that

were never married, divorced or separated, and widowed. Analysis of the adjusted standardized residuals indicated that these differences approached significance between the two WIC client groups. In particular, more women in the eligible WIC client group were married (39.5%) than in the ineligible WIC client group, where more women were not married (65.0%).

Similarly, differences in mean age of women in each group approached statistical significance, where mean age among the Kent County study sample was 24.9 years of age (SD=5.6), 25.6 years of age among the eligible WIC client group (SD=5.7), and 25.1 years of age among the ineligible WIC client group (SD=5.6). The minimum age across all three groups was 14.1 years of age, which was characteristic of a woman in the ineligible WIC client group. Maximum age was 49.0 years old and belonged to a woman in the eligible WIC client group. Analysis of variance indicated that differences in mean age were not statistically significant across the three groups ($F=2.422$, $df=3,632$, $p=0.089$), but that differences approached statistical significance. As with marital status, this difference that approached statistical significance existed between the eligible and ineligible WIC client groups.

Three socio-demographic characteristics of mothers' infants were also compared and differences between the Kent County study sample and the two Kent County WIC client groups were statistically significant on two. For these comparisons, pregnant women were necessarily excluded from analysis and the ineligible WIC client group was reduced by approximately 1,600 women due to inability to describe characteristics of an unborn infant.

Infant gender was distributed similarly across all three groups and, as would be expected, proportions in each group approached approximately 50.0% of each gender. The study sample was composed of slightly more women with male infants (52.8%), as was the ineligible WIC client group (51.3%). The eligible WIC client group was almost evenly distributed, with 49.9% of women having male infants. Differences between the three groups were not statistically significant ($\chi^2=0.549$, $df=2$, $p=0.760$).

On the two other infant characteristics analyzed (race/ethnicity and age), both were significantly different between the groups even at $\alpha=0.05$. However, both of these results should be interpreted cautiously for distinct reasons, as described following each result.

Differences between groups on racial/ethnic distribution of infants were statistically significant ($\chi^2=16.329$, $df=6$, $p=0.760$) and, as indicated, this result should be interpreted cautiously. Infants' race/ethnicity was only available from the secondary data set, as it was not collected on the questionnaire administered to WIC clients. Because primary data was linked with secondary data on a smaller portion of the sample, secondary information on infants' race/ethnicity was available on a considerably smaller group. As a result, information on infants' race/ethnicity was severely limited among the Kent County study sample. Analysis of the adjusted standardized residuals indicated that the eligible WIC client group contained a smaller proportion of White/Non-Hispanic infants (EK=41.9%) than the other two groups (SSK=60.7%; IK=46.1%) and a larger proportion of Black/African-American infants (30.5%) than the ineligible WIC client group (24.9%). However, to reiterate, these results should be interpreted cautiously due to the small portion of the study sample accounted for on this characteristic ($n=28$).

Lastly, analysis of variance on mean infant age indicated that differences were statistically significant ($F=1,626.222$, $df=1,990$, $p=0.000$). Multiple comparisons were run on this characteristic using Tukey HSD tests, which showed that differences were significant between each of the three. However, this result may be at least partially related to the time at which data was collected on women in each group. The study sample and the eligible WIC client group were composed of women that had given birth only after March 1, 2003, whereas the mothers in the ineligible WIC client group may have given birth anytime between July 1, 2002 and February 28, 2002. As a result, the mean infant age among the ineligible WIC client group (8.1 months old) was considerably larger than the mean age of the other two groups. Additionally, mothers in the study sample were typically administered questionnaires on their first visit to their WIC clinic following childbirth. This appointment was generally scheduled within the first two weeks of the infant's date of birth, thereby lowering the mean age of infants in the study sample. As a result, although there were significant differences on mean infant age between the three groups, these differences were largely the result of timing of primary and secondary data collection.

Next, a group of comparisons was performed on WIC clients' participation in three other types of support programs administered by the Family Independence Agency for low-income mothers and their children. These programs included Medicaid, the Family Independence Program (FIP), and the Food Stamps Program. These programs provide assistance for pregnant and postpartum women with dependent children in the three forms: medical coverage, cash assistance, and food vouchers, respectively. Table 5 outlines participation in each of these programs by comparison group.

Table 5: Comparison of Kent County Study Participants and Eligible and Ineligible WIC Client Groups on Participation in Other Support Programs

	Kent County Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Medicaid ***	83	-----	888	-----	2,635	-----
Medicaid participant	53	63.9%	650	73.2%	1,520	57.7%
Not a Medicaid participant	30	36.1%	238	26.8%	1,115	42.3%
FIP ***	83	-----	888	-----	2,635	-----
FIP participant	11	13.3%	189	21.3%	268	10.2%
Not an FIP participant	72	86.7%	699	78.7%	2,367	89.8%
Food Stamps ***	83	-----	888	-----	2,635	-----
Food Stamps participant	24	28.9%	339	38.2%	651	24.7%
Not a Food Stamps participant	59	71.1%	549	61.8%	1,984	75.3%
Overall Participation ***	83	-----	888	-----	2,635	-----
Participant in 0 programs	30	36.1%	227	25.6%	1,068	40.5%
Participant in 1 program	28	33.7%	318	35.8%	946	35.9%
Participant in 2 programs	15	18.1%	169	19.0%	370	14.0%
Participant in 3 programs	10	12.0%	174	19.6%	251	9.5%

*** p < 0.001

As indicated in Table 5, the program with the greatest proportion of participation across all three groups was Medicaid (SSK=63.9%; EK=73.2%; IK=57.7%) with smaller proportions participating in the Family Independence Program (SSK=13.3%; EK=21.3%; IK=10.2%) and the Food Stamps Program (SSK=28.9%; EK=38.2%; IK=24.7%). There were statistically significant differences between the groups on participation in each of these programs (Medicaid: $\chi^2=67.779$, $df=2$, $p=0.000$; FIP: $\chi^2=72.632$, $df=2$, $p=0.000$; Food Stamps: $\chi^2=59.645$, $df=2$, $p=0.000$). Once again, results should be interpreted with caution, as 26 women in the study sample were excluded from analysis due to lack of secondary information. However, analysis of the standardized adjusted residuals on each

of these significant differences indicated that the differences existed between the eligible and ineligible WIC client groups, wherein greater proportions of women in the eligible WIC client group participated in each of the three programs (Medicaid: 73.2%; FIP: 21.3%; Food Stamps: 38.2%) than women in the ineligible WIC client group (Medicaid: 57.7%; FIP: 10.2%; Food Stamps: 24.7%).

The greatest proportion of women in each group participated in no more than one of the three support programs. In particular, 69.8% of the Kent County study sample participated in one or less programs, 61.4% of the eligible WIC client group participated in one or fewer programs, and 76.4% of the ineligible WIC client group participated in no more than one of the three support programs. There were statistically significant differences in proportions of mothers' overall participation in any or all of the three support programs and these differences existed between the eligible WIC client group and the ineligible WIC client group. In particular, greater proportions of the eligible WIC client group participated in two or more support programs (38.6%), whereas a greater percentage of the ineligible WIC client group participated in no support programs (40.5%). There were no considerable differences between the Kent County study sample and these other two groups on overall program participation.

A third group of comparisons focusing on factors related to prenatal care was run on the Kent County groups. Three factors were examined for this group of comparisons: initiation of prenatal care, location of prenatal care, and payment for prenatal care. As above, 26 women in the study sample were excluded from analysis due to lack of secondary information. Results of comparisons on the study sample that participated in the current investigation (n=83) and the two WIC client groups are presented in Table 6.

Table 6: Comparison of Kent County Study Participants and Eligible and Ineligible WIC Client Groups on Characteristics of Prenatal Care

	Kent County Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Initiation of Prenatal Care ***	83	-----	888	-----	2,635	-----
1 st trimester	70	84.3%	757	85.2%	1,976	75.0%
2 nd or 3 rd trimester	8	9.6%	120	13.5%	237	9.0%
No Prenatal Care/Unknown	5	6.0%	11	1.2%	422	16.0%
Location of Prenatal Care ***	82	-----	879	-----	2,590	-----
Hospital or health department clinic	9	11.0%	146	16.6%	359	13.9%
Private doctor's office/HMO	62	75.6%	670	76.2%	1,771	68.4%
Not going yet/Unknown	11	13.4%	63	7.2%	460	17.8%
Payment for Prenatal Care ***	82	-----	877	-----	2,587	-----
Health insurance	10	12.2%	138	15.7%	392	15.2%
HMO	4	4.9%	15	1.7%	49	1.9%
Medicaid	63	76.8%	703	80.2%	1,808	69.9%
Other	5	6.1%	21	2.4%	338	13.1%

*** p < 0.001

As outlined in Table 6, the largest proportion of women in each group initiated prenatal care during the first trimester of pregnancy (SSK=84.3%; EK=85.2%; IK=75.0%) and most received prenatal care in a private doctor's office or health maintenance organization (HMO) (SSK=75.6%; EK=80.2%; IK=69.9%). Following from results presented in Table 6, which indicated that large proportions of all three groups were Medicaid participants, the largest percentage of each of the three groups paid for prenatal care with Medicaid (SSK=76.8%; EK=80.2%; IK=69.9%).

However, there were statistically significant differences between the eligible WIC client group and the ineligible WIC client group on all three of these characteristics. Further exploration of these differences suggested that larger proportions of the eligible

WIC client group initiated prenatal care during the first trimester or the second or third trimester (98.7%), whereas a considerably larger percentage of the ineligible WIC client group had not initiated prenatal care or did not know when prenatal care was initiated (16.0%). These differences mirror the differences between the eligible WIC client group and ineligible WIC client group on location of prenatal care, wherein a greater proportion of the ineligible WIC client group had not gone to prenatal care or went to an unspecified location (17.8%). Finally, the eligible WIC client group possessed a greater proportion of women that paid for prenatal care with Medicaid (80.2%). Payment for prenatal care was the only characteristic on which the Kent County study sample differed significantly from the other two groups. On this characteristic, a greater percentage of women in the study sample paid for prenatal care with an HMO (4.9%) than the other two groups (EK=1.7%; IK=1.9%).

The last group of comparisons made on the three Kent County groups focused on mothers' infant feeding behaviors. For this group of comparisons, four characteristics were explored, including initiation of breastfeeding, initiation of formula feeding, current breastfeeding status, and duration of breastfeeding. Results of these comparisons are presented in Table 7.

Table 7: Comparison of Kent County Study Participants and Eligible and Ineligible WIC Client Groups on Infant Feeding Characteristics

	Kent County Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Breastfeeding Status ***	106	-----	888	-----	2,640	-----
Currently breastfeeding	56	52.8%	309	34.8%	390	14.8%
Not currently breastfeeding	50	47.2%	579	65.2%	2,250	85.2%
Initiation of Breastfeeding ***	105	-----	888	-----	673	-----
Initiated breastfeeding	69	65.7%	516	58.1%	673	67.5%
Did not initiate breastfeeding	36	34.3%	372	41.9%	324	32.5%
Initiation of Formula Feeding ***	28	-----	888	-----	996	-----
Initiated formula feeding	15	53.6%	765	86.1%	865	86.8%
Did not initiate formula feeding	13	46.4%	123	13.9%	131	14.0%
Duration of Breastfeeding ***	105	-----	888	-----	997	-----
0 – 10 days	44	41.9%	609	68.6%	463	46.4%
11 – 31 days	4	3.8%	211	23.8%	176	17.7%
Longer than 1 month	57	54.3%	68	7.7%	358	35.9%

*** p < 0.001

Differences between the three Kent County groups were significant on all four infant feeding behaviors examined. Initiation of breastfeeding included all mothers that had ever breastfed their baby and across all three groups, the majority of mothers had attempted to breastfeed their baby at least once (SSK=65.7%; EK=58.1%; IK=67.5%). However, there were statistically significant differences between the three groups on initiation of breastfeeding ($\chi^2=18.123$, $df=2$, $p=0.000$) and these differences existed between the eligible and ineligible WIC client groups. In particular, the eligible WIC client group had a smaller percentage of women that had not initiated breastfeeding

(41.9%) and the ineligible WIC client group had a larger percentage of women that had initiated breastfeeding (67.5%).

Initiation of formula feeding was also significantly different between the three groups ($\chi^2=25.111$, $df=2$, $p=0.000$), with the study sample possessing a larger percentage of women that had not initiated formula feeding (46.4%) than the other two groups. However, as discussed previously, this result should be interpreted cautiously due to the small portion of study participants ($n=28$) that were accounted for in this statistic. Because information was not available for the remaining 78 study participants in the Kent County study sample, this statistic may not represent actual proportions of the study sample that had initiated formula feeding. As a result, differences between the study sample and the two WIC client groups may not have been as pronounced as the statistic depicted.

The Kent County study sample possessed a large percentage of mothers that were currently breastfeeding (52.8%), while percentages of mothers that were currently breastfeeding in the other two groups were considerably smaller (EK=34.8%; IK=14.8%). As expected, based on these proportions, current breastfeeding status differed significantly between all three groups ($\chi^2=230.038$, $df=2$, $p=0.000$), which may have been related to the distribution procedure for administering questionnaires in Kent County. In this urban location, the Kent County WIC Breastfeeding Subcommittee volunteered to administer questionnaires to WIC clients at the seven participant clinics. Based on their orientation toward breastfeeding, members of this group may have knowingly or unknowingly recruited more mothers that were currently breastfeeding.

Moreover, this result may have also been related to the mean age of infants in each group (as outlined in Table 5), which was youngest among the study sample and oldest among the ineligible WIC client group. Further analysis of the relationship between infant age and current breastfeeding status within and between these three groups indicated that, indeed, differences in current breastfeeding status were largely a function of infant age. The three groups used for comparisons were categorized into six by whether they were currently breastfeeding or not currently breastfeeding. Analysis of variance was used to compare these six groups on infant age, which indicated that differences in mean infant ages across the six groups were statistically significant ($F=755.090$, $df=1,990$, $p=0.000$).

The Tukey HSD was applied to this data in order to investigate the location of differences between the six groups. There were not statistically significant differences between mean infant ages of mothers that were currently breastfeeding and mothers that were not currently breastfeeding in the study sample. Similarly, mean infant ages between the mothers in the eligible WIC client group that were currently breastfeeding and not currently breastfeeding were not statistically significant. However, there were significant differences on all other pair-wise comparisons, indicating that infant age may have interacted with current breastfeeding status to produce significant differences between the Kent County study sample, eligible WIC client group, and ineligible WIC client group.

Lastly, breastfeeding duration was compared across the three groups and differences were statistically significant ($\chi^2=263.680$, $df=4$, $p=0.000$). In particular, analysis of the adjusted standardized residuals indicated that there was a larger

percentage of women in the eligible WIC client group that breastfed for one month or less (62.3%), whereas the study sample contained a considerably larger proportion of women that breastfed for longer than one month (54.3%). However, this figure may have been inflated due to the method established for the current study for computing breastfeeding duration. If the mother was still breastfeeding at the time of survey administration, she was considered to be breastfeeding through the completion of the current study and this may have inflated the percentage of women in the study sample that breastfed longer than one month. As a result, differences between the study sample and the other two WIC client groups may have been less pronounced than the depiction in Table 7.

Detroit Study Sample

The Detroit study sample was composed of 94 eligible study participants. The comparable group of WIC clients in Detroit, labeled the eligible WIC client group, was composed of 1,510 women. The other group of women clients at the nine participating Detroit clinics that were ineligible to participate in the study was composed of 3,807 women. As with the Kent County study sample, comparisons were run between the study sample, the eligible WIC client group, and the ineligible WIC client group on four categories of characteristics: socio-demographic characteristics, participation in other support programs, factors related to prenatal care, and infant feeding behaviors. For the purpose of reporting results, the Detroit study sample may be abbreviated as “SSD,” the eligible Detroit WIC client group as “ED,” and the ineligible Detroit WIC client group as “ID.” Results are reported in the tables that follow.

Table 8: Comparison of Detroit Study Participants and Eligible and Ineligible WIC Client Groups on Socio-Demographic Characteristics

	Detroit Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Race/Ethnicity	89	-----	1,510	-----	3,805	-----
Black/African-American	77	86.5%	1,356	89.8%	3,408	89.6%
White/Non-Hispanic	4	4.5%	57	3.8%	148	3.9%
Hispanic/Latina	4	4.5%	52	3.4%	130	3.4%
Other	4	4.5%	45	3.0%	119	3.1%
Age (in years) ^A	24.8 (Mean)	6.0 (SD)	26.0 (Mean)	5.8 (SD)	26.1 (Mean)	6.0 (SD)
Marital Status	90	-----	1,483	-----	3,717	-----
Married	15	16.7%	277	18.7%	730	19.6%
Not married	75	83.3%	1,206	81.3%	2,987	80.4%
Education Level *	90	-----	1,505	-----	3,788	-----
Less than 12 th grade, no diploma	22	24.4%	505	33.6%	1,255	33.1%
High school degree or GED	35	38.9%	614	40.8%	1,662	43.9%
Some college, no degree	27	30.0%	328	21.8%	751	19.8%
College degree or higher	6	6.7%	58	3.9%	120	3.2%
Infant Gender	94	-----	1,510	-----	1,560	-----
Male	53	56.4%	725	48.0%	788	50.5%
Female	41	43.6%	785	52.0%	772	49.5%
Infant Race/Ethnicity *	35	-----	1,510	-----	1,549	-----
Black/African-American	30	85.7%	1,364	90.3%	1,350	87.2%
White/Non-Hispanic	2	5.7%	41	2.7%	62	4.0%
Hispanic/Latina	3	8.6%	52	3.4%	56	3.6%
Other	0	0.0%	53	3.5%	81	5.2%
Infant Age (in months) ^{B ***}	2.9 (Mean)	0.9 (SD)	4.2 (Mean)	0.9 (SD)	7.8 (Mean)	2.4 (SD)

^A Study Sample, n=88; Eligible WIC Client Group, n=1,150; Ineligible WIC Client Group, n=3,805

^B Study Sample, n=94; Eligible WIC Client Group, n=1,150; Ineligible WIC Client Group, n=1,561

* p < 0.05

*** p < 0.001

Overall, the entire Detroit WIC client group was considerably larger than the Kent County WIC client group and was composed of 5,318 pregnant and postpartum women (up to twelve months postpartum). As previously described, pregnant women and women over three months postpartum were filtered out of the eligible WIC client group and were grouped together in an ineligible WIC client group that was composed of 3,807 women. The eligible WIC client group was considerably smaller and consisted of 1,510 women. Ninety-four eligible study participants were recruited from Detroit that made up the Detroit study sample.

By far, the largest proportion of all three Detroit groups was Black/African-American (SSD=86.5%; ED=89.8%; ID=89.6%). Small percentages of each of the three groups were White/Non-Hispanic (SSD=4.5%; ED=3.8%; ID=3.9%), Hispanic/Latina (SSD=4.5%; ED=3.4%; ID=3.4%), and other races/ethnicities (SSD=4.5%; ED=3.0%; ID=3.1%). Racial/ethnic distributions of all three groups were similar and differences were not statistically significant across the three groups on this characteristic.

As with Kent County, the Detroit study sample possessed significantly greater proportions of women with higher levels of education ($\chi^2=15.178$, $df=6$, $p=0.019$). Across all three groups, the largest percentage of each group had earned a high school degree or the equivalent (SSD=38.9%; ED=40.8%; ID=43.9%), with considerable portions of each group obtaining less than a 12th grade education (SSD=24.4%; ED=33.6%; ID=33.1%). Differences between the three groups existed between the study sample and the WIC client groups on proportion that had obtained at least some college-level education, wherein the study sample possessed considerably larger proportions of

mothers that had some college (30.0%) or a college degree or higher (6.7%) than either of the WIC client groups from Detroit.

As with Kent County, a large percentage of the Detroit WIC clients were unmarried across all three groups (SSD=83.3%; ED=81.3%; ID=80.4%). Differences on this characteristic were not statistically significant between the three groups ($\chi^2=1.042$, $df=2$, $p=0.594$). Mothers' mean age was slightly older among the Detroit WIC client groups at 26.0 years of age for the eligible WIC client group ($SD=5.8$) and 26.1 years of age for the ineligible WIC client group ($SD=6.0$), compared to the mean age of 24.8 for the study sample ($SD=6.0$). Once again, however, differences on this characteristic were not statistically significant across the three groups ($F=1.866$, $df=5,402$, $p=0.155$).

Three characteristics of mothers' infants were compared as well, including infant gender, infant race/ethnicity, and infant age. As would be expected, differences between the Detroit study sample and the two WIC client groups were not statistically significant on infant gender ($\chi^2=3.757$, $df=2$, $p=0.153$). Although differences between the three groups were statistically significant on infant race/ethnicity ($\chi^2=14.467$, $df=6$, $p=0.025$), this result should be treated with extreme caution due to very limited information on infant race/ethnicity among the study sample. In particular, information on infant race/ethnicity was only available on 35 study participants' infants, which was considerably smaller than the total number of eligible study participants in the Detroit study sample ($n=94$).

The final characteristic on mothers' infants, infant age, was significantly different between the three groups ($F=1,624.853$, $df=3,164$, $p=0.000$). Based on the results of post hoc tests, it was found that differences in mean infant age were significant between all

pairs of the three groups. In particular, the study sample had a mean infant age that was significantly younger than both WIC client groups, while the ineligible WIC client group had a mean infant age that was significantly older than the eligible WIC client group and the study sample.

Two assumptions of analysis of variance were violated on this comparison, including homogeneity of variances and equal sample size. Although violations of the assumptions of analysis of variance can be made with relatively minor consequence, the combination of these two violations can produce results that are less robust (Howell, 2002). In this event, Howell (2002) recommends decreasing the degrees of freedom considerably in order to obtain a more conservative critical value. Using this procedure and limiting the degrees of freedom to 1 for the numerator and denominator, it was concluded that the F-statistic for this comparison was sufficiently large to compensate for violation of these two assumptions. As a result, mean infant age was significantly different between all three groups.

Next, using secondary data obtained from the Michigan WIC Division, comparisons were performed to investigate differences in participation in other maternal-child support programs across the three groups. As previously described, data was available on participation three programs available to low-income mothers and their children: (1) Medicaid, a medical assistance program, (2) the Family Independence Program (FIP), a cash assistance program, and (3) the Food Stamps Program, a food assistance program. Data was available on a portion of the Detroit study sample (n=58) to compare with characteristics of the eligible WIC client groups in this location. Based on the small portion of the study sample represented in these statistics, the presence or

absence of significant differences between the study sample and other WIC clients should be treated with caution. Results of these comparisons on program participation are presented in Table 9

Table 9: Comparison of Detroit Study Participants and Eligible and Ineligible WIC Client Groups on Participation in Other Support Programs

	Detroit Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Medicaid ***	58	-----	1,510	-----	3,794	-----
Medicaid participant	38	65.5%	998	66.1%	2,269	59.8%
Not a Medicaid participant	20	34.5%	512	33.9%	1,525	40.2%
FIP ***	58	-----	1,510	-----	3,794	-----
FIP participant	17	29.3%	427	28.3%	799	21.1%
Not an FIP participant	41	70.7%	1,083	71.7%	2,995	78.9%
Food Stamps ***	58	-----	1,510	-----	3,794	-----
Food Stamps participant	23	39.7%	622	41.2%	1,291	34.0%
Not a Food Stamps participant	35	60.3%	888	58.8%	2,503	66.0%
Overall Participation ***	58	-----	1,510	-----	3,794	-----
Participant in 0 programs	20	34.5%	506	33.5%	1,482	39.1%
Participant in 1 program	15	25.9%	373	24.7%	1,029	27.1%
Participant in 2 programs	6	10.3%	219	14.5%	519	13.7%
Participant in 3 programs	17	29.3%	412	27.3%	764	20.1%

*** p < 0.001

Results presented in Table 9 indicate that the largest proportions of the Detroit three groups participated in Medicaid (SSD=65.5%; ED=66.1%; ID=59.8%), followed by participation in the Food Stamps Program (SSD=38.7%; ED=41.2%; ID=34.0%) and the Family Independence Program (SSD=29.3%; ED=28.3%; ID=21.1%). Although participation was significantly different between the three groups on all three programs, these differences existed primarily between the eligible WIC client group and the

ineligible WIC client group. Indeed, the only program on which the Detroit study sample differed from either of the WIC client groups was the Family Independence Program ($\chi^2=24.354$, $df=2$, $p=0.000$), where the study sample contained a greater proportion of participants that were enrolled in the program than the ineligible WIC client group.

There were also statistically significant differences between the study sample and the WIC client groups on overall program participation ($\chi^2=38.599$, $df=6$, $p=0.000$). In particular, a larger proportion of the Detroit study sample (29.3%) participated in all three support programs than the ineligible WIC client group (20.1%). Additionally, differences were significant between the eligible WIC client group and the ineligible WIC client group in the proportion of women participating in none of the programs. Specifically, a greater percentage of the ineligible WIC client group were not enrolled in any of the three support programs (39.1%) than the eligible WIC client group (33.5%).

Comparisons were made on other characteristics available from the secondary data set related to mothers' prenatal care. Three characteristics of prenatal care were examined: initiation, location, and payment. As with other characteristics contained solely in the secondary data set, information was available for only a portion of the Detroit study sample. As a result, slight cautions should be exercised in assessing the degree to which the study sample is representative of other WIC clients based on these characteristics. Results of these comparisons are presented in Table 10.

Table 10: Comparison of Detroit Study Participants and Eligible and Ineligible WIC Client Groups on Characteristics of Prenatal Care

	Detroit Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Initiation of Prenatal Care ***	58	-----	1,510	-----	3,794	-----
1 st trimester	43	74.1%	1,033	68.4%	2,779	73.2%
2 nd or 3 rd trimester	12	20.7%	404	26.8%	745	19.6%
No Prenatal Care/Unknown	3	5.2%	73	4.8%	270	7.1%
Location of Prenatal Care **	58	-----	1,489	-----	3,718	-----
Hospital or health department clinic	44	75.9%	894	60.0%	2,231	60.0%
Private doctor's office/HMO	10	17.2%	514	34.5%	1,206	32.4%
Not going yet/Unknown	4	6.9%	81	5.4%	281	7.6%
Payment for Prenatal Care ***	58	-----	1,484	-----	3,717	-----
Health insurance	24	41.4%	402	27.1%	1,216	32.7%
HMO	5	8.6%	213	14.4%	607	16.3%
Medicaid	25	43.1%	792	53.4%	1,626	43.7%
Other	4	6.9%	77	5.2%	268	7.2%

** p < 0.01

*** p < 0.001

All characteristics associated with prenatal care were significantly different between the three Detroit comparison groups. Differences were significant between all three groups on the first characteristic: initiation of prenatal care ($\chi^2=37.726$, $df=4$, $p=0.000$). Initiation of prenatal care commenced significantly earlier for a larger proportion of the Detroit study sample (74.1%) than the eligible WIC client group (68.4%). Alternatively, the eligible WIC client group had a greater proportion of women that initiated prenatal care in the second or third trimester, compared to 20.7% of the study sample and 19.6% of the ineligible WIC client group.

The second characteristic associated with prenatal care, location of prenatal care, was also significantly different between the Detroit study sample and the two WIC client

groups ($\chi^2=15.011$, $df=4$, $p=0.005$). In particular, a significantly greater proportion of the study sample received prenatal care from a hospital or health department clinic (75.9%) than either of the WIC client groups (ED=60.0%; ID=60.0%). Conversely, much larger proportions of the WIC client groups received prenatal care from a private doctor's office or HMO (ED=34.5%; ID=32.4%) than the Detroit study sample (75.9%). Payment for these prenatal care visits also differed significantly ($\chi^2=45.023$, $df=6$, $p=0.000$), wherein a larger percentage of the Detroit study sample paid for prenatal care with private insurance (41.4%) than the WIC client groups (ED=27.1%; ID=32.7%). Alternatively, these groups had greater proportions of women that paid for prenatal care with an HMO (ED=14.4%; ID=16.3%) or, in the case of the eligible WIC client group, paid for prenatal care with Medicaid (53.4%).

Finally, comparisons were made on the Detroit sample and its corresponding WIC client groups on infant feeding behavior. For these comparisons, data was available on four characteristics and results of these comparisons are presented in Table 11.

Table 11: Comparison of Detroit Study Participants and Eligible and Ineligible WIC Client Groups on Infant Feeding Characteristics

	Detroit Eligible Study Sample		Eligible WIC Client Group		Ineligible WIC Client Group	
	Count	Percent	Count	Percent	Count	Percent
Breastfeeding Status ***	94	-----	1,510	-----	3,807	-----
Currently breastfeeding	22	23.4%	294	19.5%	489	12.8%
Not currently breastfeeding	72	76.6%	1,216	80.5%	3,318	87.2%
Initiation of Breastfeeding ***	93	-----	1,510	-----	1,561	-----
Initiated breastfeeding	44	47.3%	491	32.5%	744	47.7%
Did not initiate breastfeeding	49	52.7%	1,019	67.5%	817	52.3%
Initiation of Formula Feeding *	35	-----	1,510	-----	1,549	-----
Initiated formula feeding	26	74.3%	1,341	88.8%	1,392	89.9%
Did not initiate formula feeding	9	25.7%	169	11.2%	157	10.1%
Duration of Breastfeeding ***	88	-----	1,510	-----	1,560	-----
0 – 10 days	58	65.9%	1,236	81.9%	1,027	65.8%
11 – 31 days	8	9.1%	228	15.1%	213	13.7%
Longer than 1 month	22	25.0%	46	3.0%	320	20.5%

* $p < 0.05$

*** $p < 0.001$

As indicated in Table 11, there were significant differences between the three groups on all four infant feeding behaviors. Initiation of two types of infant feeding (breastfeeding and formula feeding) were compared across the three groups. Initiation of breastfeeding was significantly different ($\chi^2=74.992$, $df=2$, $p=0.000$), and these differences were present between the eligible WIC client group and the other two comparison groups. Percentages reported in Table 12 indicate that the WIC client group possessed a significantly smaller proportion of women that had ever breastfed (32.5%) than the other two groups (SSD=47.3%; ID=47.7%). Initiation of formula feeding was significantly different at a more conservative alpha level ($\chi^2=9.010$, $df=2$, $p=0.011$),

wherein a smaller percentage of the study sample had ever initiated formula feeding (74.3%) than either of the WIC client groups (ED=88.8%; ID=89.9%). It should be noted that this statistic was computed on slightly over one-third of the total Detroit study sample for whom data was available at the time of the study. As a result, these differences should be interpreted with some caution. Consistent with these results, a significantly larger proportion of the eligible WIC client group breastfed for the shortest duration of time, or zero to ten days (81.9%). Conversely, larger percentages of the Detroit study sample (25.0%) and the ineligible WIC client group (20.5%) breastfed longer than one month.

A significantly larger proportion of the Detroit study sample was currently breastfeeding (23.4%) than the other two WIC client groups (ED=19.5%; ID=12.8%) ($\chi^2=42.969$, $df=2$, $p=0.000$). As in the Kent County comparisons, it was suspected that this result was related to differences in mean infant age across the three groups, which gradually increased from the Detroit study sample to the eligible WIC client group to the ineligible WIC client group. Six groups were categorized by current breastfeeding status (currently breastfeeding or not currently breastfeeding) and comparison group (study sample, eligible WIC client group, or ineligible WIC client group). Analysis of variance was used to compare these six groups on infant age to investigate the role of this characteristic in apparent differences between the original three comparison groups. Results of this analysis indicated that mean infant ages across the three groups were statistically significant ($F=744.793$, $df=3,164$, $p=0.000$), suggesting the mediating influence of mean infant age on the apparent differences in current breastfeeding status between the three comparison groups. Indeed, subsequent results of a post hoc test to

identify the location of these differences indicated that mean age differed between the three comparison groups but, for the most part, was not statistically different within the comparison groups. The only exception to these results was mean age on the ineligible WIC client group, where mean infant age significantly differed within the group as well.

Having explored the degree to which each location's study sample represented the population of WIC participants at these two urban locations, results of the four research objectives that guided this study are presented in the subsections below.

Study Objective 1:

Comparison by Urban Location

The first objective of this study was to describe the study sample of postpartum WIC participants and to compare these characteristics across two urban areas in Michigan. Primary data from administered questionnaires and secondary data from Michigan WIC Division were analyzed for this objective, which included measurements of socio-demographic characteristics, prenatal care factors, characteristics of mothers' infant feeding choices, beliefs about breastfeeding, sources of external influence, maternal body image, and attitudes toward motherhood and the baby.

Secondary data was available on Kent County and Detroit WIC client groups on a selection of these characteristics, which permitted exploration of potential differences between the larger groups of eligible study participants at each location. Where data was available, comparisons were made between WIC client groups in tandem with comparisons on study samples from each location. Results of these analyses are discussed where applicable.

Primary data on respondents' race/ethnicity, age of mother and infant, infant gender, marital status, education level, employment status, and student status was analyzed and compared across urban location. Secondary data obtained from Michigan WIC Division was used to confirm consistency between respondents' questionnaire answers and the secondary data client profile on four of these variables: race/ethnicity, age, marital status, and education level. Specific inconsistencies between characteristics on the primary and secondary data sets were defaulted to the primary data characteristic on dynamic characteristics (marital status and education level) and to the secondary data characteristic on static characteristics (race/ethnicity, infant gender, and ages of mother and infant). This procedure was described in Chapter 3.

Descriptive statistics were calculated for the overall sample and for study samples by urban location. Table 12 outlines characteristics of the sample overall, as well as comparisons between the two study locations. Statistically significant differences between the Kent County sample and the Detroit sample on specific characteristics are marked with asterisks that identify level of significance.

Table 12: Comparison of Study Participants by WIC Agency on Socio-Demographic Characteristics

	Overall Sample		Kent County Sample		Detroit Sample	
	Count	Percent	Count	Percent	Count	Percent
Race/Ethnicity ***	194	-----	105	-----	89	-----
Black/African-American	100	51.5%	23	21.9%	77	86.5%
White/Non-Hispanic	70	36.1%	66	62.9%	4	4.5%
Hispanic/Latina	18	9.3%	14	13.3%	4	4.5%
Other	6	3.1%	2	1.9%	4	4.5%
Age (in years) ^A	24.9 (Mean)	5.7 (SD)	24.9 (Mean)	5.6 (SD)	24.8 (Mean)	6.0 (SD)
Marital Status **	195	-----	105	-----	90	-----
Married	55	28.2%	40	38.1%	15	16.7%
Not married	140	71.8%	65	61.9%	75	83.3%
Education Level	195	-----	105	-----	90	-----
Less than 12 th grade, no diploma	47	24.1%	25	23.8%	22	24.4%
High school degree or GED	64	32.8%	29	27.6%	35	38.9%
Some college, no degree	63	32.3%	36	34.3%	27	30.0%
College degree or higher	21	10.8%	15	14.3%	6	6.7%
Employment Status	173	-----	93	-----	80	-----
Employed before and after birth	39	22.5%	26	28.0%	13	16.3%
Employed only before birth	58	33.5%	26	28.0%	32	40.0%
Employed only after birth	6	3.5%	3	3.2%	3	3.2%
Not employed before or after birth	70	40.5%	38	40.9%	32	40.0%
Student Status	154	-----	81	-----	73	-----
Attended before and after birth	16	10.4%	6	7.4%	10	13.7%
Attended only before birth	25	16.2%	11	13.6%	14	19.2%
Attended only after birth	3	1.9%	2	2.5%	1	1.4%
Did not attend before or after birth	110	71.4%	62	76.5%	48	65.8%

^A Overall Sample, n=193; Kent County Sample, n=105; Detroit Sample, n=88

^B Overall Sample, n=200; Kent County Sample, n=106; Detroit Sample, n=94

** p < 0.01

*** p < 0.001

(Table 12 continued on next page)

Table 12 (Continued): Comparison of Study Participants by WIC Agency on Socio-Demographic Characteristics

	Overall Sample		Kent County Sample		Detroit Sample	
	Count	Percent	Count	Percent	Count	Percent
Infant Gender	200	-----	106	-----	94	-----
Male	109	54.5%	56	52.8%	53	56.4%
Female	91	45.5%	50	47.2%	41	43.6%
Infant Race/Ethnicity ***	63	-----	28	-----	35	-----
Black/African-American	36	57.1%	6	21.4%	30	85.7%
White/Non-Hispanic	19	30.2%	17	60.7%	2	5.7%
Hispanic/Latina	5	7.9%	2	7.1%	3	8.6%
Other	3	4.8%	3	10.7%	0	0.0%
Infant Age (in months) ^B ***	2.5 (Mean)	1.0 (SD)	2.3 (Mean)	1.0 (SD)	2.9 (Mean)	0.9 (SD)

^A Overall Sample, n=193; Kent County Sample, n=105; Detroit Sample, n=88

^B Overall Sample, n=200; Kent County Sample, n=106; Detroit Sample, n=94

** p < 0.01

*** p < 0.001

As indicated in Table 12, differences between the Kent County sample and the Detroit sample were statistically significant on two socio-demographic characteristics associated specifically with the mother: race/ethnicity ($\chi^2=89.586$, $df=3$, $p=0.000$) and marital status ($\chi^2=10.989$, $df=1$, $p=0.001$; correction for continuity: $\chi^2=9.956$, $df=1$, $p=0.002$). Among the overall sample, large proportions were Black/African-American (51.5%) and White/Non-Hispanic (35.6%). After dividing the sample by WIC agency, results indicated that there were statistically significant differences between participants' race/ethnicity at the two urban locations ($\chi^2=89.586$, $df=3$, $p=0.000$). The racial/ethnic distribution of the Kent County sample was predominantly White/Non-Hispanic (62.9%), but the sample also possessed substantial proportions of Black/African-American WIC participants (21.9%) and Hispanic/Latina WIC participants (13.3%). Conversely, the

Detroit sample was considerably more homogenous, wherein 86.5% of the sample was Black/African-American.

Because secondary data was available on the WIC client group at each urban location, comparisons were made between the Kent County and Detroit WIC client groups to determine whether racial/ethnic differences between the two samples would be expected based on differences between the larger groups of eligible non-participants at each location. Indeed, there were statistically significant differences between the two WIC client groups on this characteristic ($\chi^2=1,115.147$, $df=3$, $p=0.000$) and, similar to the Detroit study sample, this result was likely based on the large proportion of Black/African-American WIC participants (89.8%) in the Detroit WIC client group.

Marital status also differed significantly between the Kent County and Detroit study samples. Among the overall sample, the majority of study participants were not married (71.8%) and, after splitting the overall sample by urban location, this characteristic was also present in the two smaller study samples. In particular, the Kent County study sample was composed of 61.9% women that were not married and the Detroit study sample was 83.3% unmarried. Despite finding that both samples were composed largely of women that were not married, however, there were statistically significant differences between the Kent County sample and the Detroit sample on this characteristic ($\chi^2=10.989$, $df=1$, $p=0.001$; correction for continuity: $\chi^2=9.956$, $df=1$, $p=0.002$). As presented in Table 7, although both study samples were largely composed of women that were not married, the Detroit sample contained a larger percentage of unmarried women than the Kent County sample. This difference was also present between the larger WIC client groups from each urban location ($\chi^2=123.186$, $df=1$,

$p=0.000$; correction for continuity: $\chi^2=122.120$, $df=1$, $p=0.000$), wherein 81.3% of the Detroit WIC client group was not married, as opposed to 60.5% of the Kent County WIC client group.

Socio-demographic characteristics associated with the mother that were not significantly different between the Kent County and Detroit samples included age ($t=0.088$, $df=191$, $p=0.930$), education level ($\chi^2=4.771$, $df=3$, $p=0.189$), employment status ($\chi^2=4.517$, $df=3$, $p=0.211$), and student status ($\chi^2=3.068$, $df=3$, $p=0.381$). Mean age of the overall sample of mothers was 24.9 years old ($SD=5.7$) with a minimum age of 15.6 and a maximum age of 42.2. Mean ages of mothers in each urban location were similar to the overall mean age, with a mean age of 24.9 among the Kent County sample ($SD=5.6$) and 24.8 among the Detroit sample ($SD=6.0$). A t-test was performed to compare study samples from each urban location by age. This comparison confirmed that no statistically significant differences existed between the Kent County sample and the Detroit sample ($t=0.088$, $df=191$, $p=0.930$). A comparison conducted between the WIC client groups at each location corroborated with this result ($t=-1.486$, $df=2,396$, $p=0.137$), indicating that no statistically significant differences in mean age would be expected between clients from each urban location.

The overall sample of study participants was relatively well-educated, with 75.9% of study participants having obtained at least a high school degree (or its equivalent). By urban location, there were no statistically significant differences between the Kent County sample and the Detroit sample on this characteristic ($\chi^2=4.771$, $df=3$, $p=0.189$). Similarly, comparisons between the WIC client groups at each location indicated that these larger groups were not significantly different on education level obtained

($\chi^2=1.058$, $df=3$, $p=0.787$). However, referring to results presented earlier, comparisons between the study sample from each location and the corresponding WIC client group suggested that the study sample from each location had obtained higher levels of education than the larger WIC client group. This difference in education level was statistically significant between the Kent County sample and its larger WIC client group ($\chi^2=30.559$, $df=3$, $p=0.000$) and approached statistical significance between the Detroit sample and its larger WIC client group ($\chi^2=6.453$, $df=3$, $p=0.092$). Thus, although the Kent County and Detroit study samples did not differ significantly on education level obtained, these samples had obtained higher levels of education than each of their corresponding WIC client groups.

The remaining two characteristics related specifically to the mothers that were not significantly different between the Kent County and Detroit study samples were employment status and student status. Although the largest proportion of the overall sample was not employed before or after birth (40.5%), substantial proportions of the overall sample were employed only before birth (33.5%) or were employed before and after birth (22.5%). This result was similar on student status among the overall sample, where the majority of study participants did not attend school before or after birth (71.4%) and smaller percentages attended school only before birth (16.2%) or attended school before and after birth (10.4%). Only small percentages of the overall study sample initiated employment (3.5%) or started attending school after birth (1.9%).

Similarly, study samples by urban location were composed primarily of women that were not employed or did not attend school before or after birth. Among the Kent County sample, 40.9% were not employed before or after birth with sizeable portions

employed only before birth (28.0%) or employed before and after birth (28.0%). Distribution on this characteristic was similar among the Detroit sample, where 40.0% of Detroit study participants were employed only before birth. There were no statistically significant differences between the Kent County sample and the Detroit sample on employment status ($\chi^2=4.517$, $df=3$, $p=0.211$). Differences between the samples were not statistically significant on student status either ($\chi^2=3.068$, $df=3$, $p=0.381$). Secondary data was not available on these characteristics among the larger WIC client groups, limiting the ability to compare the results of comparisons between the study samples to potential differences between the larger WIC client groups.

Several socio-demographic characteristics of mothers' infants were also compared by urban location, including infant gender, race/ethnicity, and age. Of these three characteristics, two were significantly different between the Kent County sample and the Detroit sample. As might be expected, infant gender distribution was similar between the two urban locations, wherein 52.8% of the Kent County sample had male infants and 56.4% of the Detroit sample had male infants. However, there were differences between the distribution of infant race/ethnicity by urban location and the mean age of infants between the WIC agencies.

Concurrent with the statistically significant differences in mothers' race/ethnicity by urban location, compositions of infant race/ethnicity by urban location were significantly different ($\chi^2=30.643$, $df=3$, $p=0.000$). As expected based on racial/ethnic distributions of mothers by urban location, a greater proportion of infants in the Detroit study sample were Black/African-American (85.7%), whereas a greater proportion of infants in the Kent County study sample were White/Non-Hispanic (60.7%). These

differences were also present in comparisons between the eligible WIC client groups from each urban location, suggesting that these differences should be expected. However, based on the small portion of study respondents' infants described by this characteristic (n=63), figures presented on this characteristic for the study samples did not account for infant race/ethnicity on the majority of study participants. Lastly, infant age was also statistically different between the study samples by urban location ($t=-4.311$, $df=198$, $p=0.000$). Based on comparisons of this characteristic between the two eligible WIC client groups, this difference was expected.

Relying on information contained in the secondary data set, comparisons were made by urban location on mothers' participation in other maternal-child support programs. As previously described, WIC maintains records on clients' participation in three support programs: Medicaid (medical assistance), FIP (cash assistance), and Food Stamps (nutrition assistance). Although secondary information on these characteristics was not available on all study participants, Table 13 presents results on the portion of the study sample for which secondary data existed.

Table 13: Comparison of Study Participants by WIC Agency on Participation in Other Support Programs

	Overall		Kent County Sample		Detroit Sample	
	Count	Percent	Count	Percent	Count	Percent
Medicaid	141	-----	83	-----	58	-----
Medicaid participant	91	64.5%	53	63.9%	38	65.5%
Not a Medicaid participant	50	35.5%	30	36.1%	20	34.5%
FIP *	141	-----	83	-----	58	-----
FIP participant	28	19.9%	11	13.3%	17	29.3%
Not an FIP participant	113	80.1%	72	86.7%	41	70.7%
Food Stamps	141	-----	83	-----	58	-----
Food Stamps participant	47	33.3%	24	28.9%	23	39.7%
Not a Food Stamps participant	91	66.7%	59	71.1%	35	60.3%
Overall Participation	141	-----	83	-----	58	-----
Participant in 0 programs	50	35.5%	30	36.1%	20	34.5%
Participant in 1 program	43	30.5%	28	33.7%	15	25.9%
Participant in 2 programs	21	14.9%	15	18.1%	6	10.3%
Participant in 3 programs	27	19.1%	10	12.0%	7	29.3%

* p < 0.05

Comparisons on participation in other maternal-child support programs yielded few statistically significant differences. The Kent County and Detroit study samples did not differ statistically on participation in Medicaid, Food Stamps, or overall program participation count. However, there were statistically significant differences between the two study samples on participation in FIP ($\chi^2=5.531$, $df=1$, $p=0.019$; correction for continuity: $\chi^2=4.568$, $df=1$, $p=0.033$), wherein a greater proportion of the Detroit study sample participated in this cash assistance program (29.3%) than the Kent County sample (13.3%). This difference by urban location was supported by a comparison of the eligible Kent County WIC client group and the eligible Detroit WIC client group, wherein

differences between the two larger groups on participation in FIP were also statistically significant ($\chi^2=14.330$, $df=1$, $p=0.000$; correction for continuity: $\chi^2=13.996$, $df=1$, $p=0.000$). However, statistically significant differences between the eligible WIC client groups were also found on participation in Medicaid ($\chi^2=13.134$, $df=1$, $p=0.000$; correction for continuity: $\chi^2=12.806$, $df=1$, $p=0.000$) and overall program participation count ($\chi^2=56.118$, $df=3$, $p=0.000$).

Several characteristics associated with study participants' pregnancy, particularly factors related to prenatal care, were available for analysis from secondary data. These factors included timing of initiation of prenatal care, location of prenatal care, and payment for prenatal care. Analysis was limited on these characteristics because secondary data was only available on a portion of survey respondents. Nonetheless, results are reported in Table 14 to convey general characteristics of prenatal care among a reduced portion of the study sample.

Table 14: Comparison of Study Participants by WIC Agency on Characteristics of Prenatal Care

	Overall Sample		Kent County Sample		Detroit Sample	
	Count	Percent	Count	Percent	Count	Percent
Initiation of Prenatal Care	141	-----	83	-----	58	-----
1 st trimester	113	80.1%	70	84.3%	43	74.1%
2 nd or 3 rd trimester	20	14.2%	8	9.6%	12	20.7%
No Prenatal Care/Unknown	8	5.7%	5	6.0%	3	5.2%
Location of Prenatal Care ***	140	-----	82	-----	58	-----
Hospital or health department clinic	53	37.9%	9	11.0%	44	75.9%
Private doctor's office/HMO	72	51.4%	62	75.6%	10	17.2%
No prenatal care/Unknown	15	10.7%	11	13.4%	4	6.9%
Payment for Prenatal Care ***	140	-----	82	-----	58	-----
Health insurance	34	24.3%	10	12.2%	24	41.4%
HMO	9	6.4%	4	4.9%	5	8.6%
Medicaid	88	62.9%	63	76.8%	25	43.1%
Other	9	6.4%	5	6.1%	4	6.9%

*** p < 0.001

For both study samples by urban location, the majority of mothers initiated prenatal care in the first trimester of pregnancy (Kent County: 84.3%; Detroit: 74.1%). A slightly larger proportion of the Detroit study sample initiated prenatal care in the second or third trimester (20.7%), but differences between the two study samples by urban location were not statistically significant ($\chi^2=3.426$, $df=2$, $p=0.180$).

However, differences were statistically significant between the two study samples on the other two characteristics of prenatal care: location of prenatal care ($\chi^2=61.632$, $df=2$, $p=0.000$) and payment for prenatal care ($\chi^2=18.835$, $df=3$, $p=0.000$). Within the Detroit study sample, a greater proportion received prenatal care in a hospital or health department clinic (75.9%) and paid for prenatal care with health insurance (41.4%) than

the Kent County study sample. Alternatively, within the Kent County study sample, a larger percentage of the sample received prenatal care in a private doctor's office or health maintenance organization (75.6%) and paid for prenatal care with Medicaid (76.8%) than that Detroit study sample.

Next, primary data collected on infant age and gender, mothers' current and previous breastfeeding and formula feeding practices, timing of the initial infant feeding decision, and introduction of other foods were analyzed by urban location. Secondary data obtained from Michigan WIC Division was used to confirm consistency between respondents' questionnaire answers and the secondary data client profile on five of these variables: infant gender, infant age, initiation of breastfeeding, current breastfeeding status, and duration of breastfeeding (if stopped). Specific inconsistencies between characteristics on the primary and secondary data sets were defaulted to the primary data characteristic on dynamic characteristics (characteristics associated with infant feeding) and to the secondary data characteristic on static characteristics (infant gender and age). This procedure was described in Chapter 3. Information on initiation of formula use was also available in the secondary data set and was analyzed for this set of comparisons as well. As with other factors only available in the secondary data set, analysis was limited by the number of questionnaire respondents for whom secondary data was available.

Descriptive statistics were calculated on the characteristics outlined above for the overall sample and for study samples by urban location. Table 15 outlines characteristics of the sample overall, as well as comparisons between the two study locations.

Table 15: Comparison of Study Participants by WIC Agency on Infant Feeding Characteristics

	Overall		Kent County Sample		Detroit Sample	
	Count	%	Count	%	Count	%
Timing of Feeding Decision **	196	-----	104	-----	92	-----
Before pregnancy	82	41.8%	54	51.9%	28	30.4%
During pregnancy	58	29.6%	29	27.9%	29	31.5%
After birth	56	28.6%	21	20.2%	35	38.0%
Breastfeeding Status *	200	-----	106	-----	94	-----
Currently breastfeeding	78	39.0%	56	52.8%	22	23.4%
Not currently breastfeeding	122	61.0%	50	47.2%	72	76.6%
Breastfeeding Percentage ***	26.3% (Mn)	0.40 (SD)	37.7% (Mn)	0.45 (SD)	13.4% (Mn)	0.28 (SD)
Initiation of Breastfeeding *	198	-----	105	-----	93	-----
Initiated breastfeeding	113	57.1%	69	65.7%	44	47.3%
<i>Had used a breast pump</i>	65	58.6%	42	61.8%	23	53.5%
<i>Had never used a breast pump</i>	46	41.4%	26	38.2%	20	46.5%
Did not initiate breastfeeding	85	42.9%	36	34.3%	49	52.7%
Initiation of Formula Feeding	63	-----	28	-----	35	-----
Initiated formula feeding	41	65.1%	15	53.6%	26	74.3%
Did not initiate formula feeding	22	34.9%	13	46.4%	9	25.7%
Introduction of Other Foods *	189	-----	101	-----	88	-----
Introduced other foods	19	10.1%	5	5.0%	14	15.9%
Did not introduce other foods	170	89.9%	96	95.0%	74	84.1%
Duration of Breastfeeding ***	193	-----	105	-----	88	-----
0 – 10 days	102	52.8%	44	41.9%	58	65.9%
11 – 31 days	12	6.2%	4	3.8%	8	9.1%
Longer than 1 month	79	40.9%	57	54.3%	22	25.0%
Previous Breastfeeding Experience	108	-----	59	-----	49	-----
Initiated breastfeeding with other children	52	49.1%	32	54.2%	21	42.9%
Did not previously initiate breastfeeding	55	50.9%	27	45.8%	28	57.1%
Infant Age (in months) ***	2.5 (Mn)	1.0 (SD)	2.3 (Mn)	1.0 (SD)	2.9 (Mn)	0.9 (SD)

* p < 0.05

** p < 0.01

*** p < 0.001

Of the nine infant feeding behaviors compared by urban location, differences were statistically significant between Kent County and Detroit on six characteristics. Characteristics were similar by urban location on use of a breast pump ($\chi^2=0.744$, $df=1$, $p=0.389$), initiation of formula feeding ($\chi^2=2.937$, $df=1$, $p=0.087$), and previous breastfeeding experience ($\chi^2=1.387$, $df=2$, $p=0.239$). Information on initiation of formula feeding was limited by the portion of the study sample for which data was available. Of the 63 study participants for whom data was available, 65.1% of the overall sample had initiated formula feeding. Initiation of formula feeding was not significantly different between the eligible Kent County WIC client group and the eligible Detroit WIC client group ($\chi^2=3.698$, $df=1$, $p=0.054$; correction for continuity: $\chi^2=3.453$, $df=1$, $p=0.063$), but differences between the larger eligible WIC client groups approached statistical significance

Among women that initiated breastfeeding, slightly over half of the overall study sample (58.6%) had used a breast pump at least once. Further exploration of this characteristic indicated that 23.9% of the 113 women that had initiated breastfeeding typically fed their baby pumped breastmilk at least once per week. Secondary data on use of a breast pump was not available to explore this characteristic among other WIC clients at each urban location.

Study participants' previous experience breastfeeding was assessed in an item asking the respondent to indicate whether she had breastfed any of her other children, if applicable. Of the 108 study participants with other children, less than half of the overall sample had initiated breastfeeding with their other children (49.1%). To explore the

relationship of this characteristic with initiation of breastfeeding and current breastfeeding status, Chi-square analysis was performed comparing these characteristics with previous breastfeeding experience. Indeed, differences were significant on both comparisons. Among women with previous breastfeeding experience, a larger proportion of women had initiated breastfeeding with their most recent infant (83.0%) than mothers that did not (17.0%) ($\chi^2=24.335$, $df=1$, $p=0.000$; correction for continuity: $\chi^2=22.441$, $df=1$, $p=0.000$). Similarly, among women with previous breastfeeding experience, a larger proportion of the overall study sample was currently breastfeeding (62.3%) than mothers that were not currently breastfeeding (37.7%) ($\chi^2=21.888$, $df=1$, $p=0.000$; correction for continuity: $\chi^2=20.087$, $df=1$, $p=0.000$).

Both of these characteristics, initiation of breastfeeding and current breastfeeding status, were statistically different by urban location. Initiation of breastfeeding was much greater among the Kent County sample (65.7%) than among the Detroit sample (47.3%) ($\chi^2=6.817$, $df=1$, $p=0.009$; correction for continuity: $\chi^2=6.087$, $df=1$, $p=0.014$). Breastfeeding status was also significantly different by urban location ($\chi^2=18.133$, $df=1$, $p=0.000$; correction for continuity: $\chi^2=16.917$, $df=1$, $p=0.000$), where 52.8% of the Kent County study sample was currently breastfeeding compared with 23.4% of the Detroit sample. Consistent with the above result suggesting differences between the Kent County and Detroit study samples on current breastfeeding status, differences by urban location were also statistically significant on breastfeeding percentage ($F=4.588$, $df=176.491$, $p=0.000$).

Comparisons were performed on the larger WIC client groups, which indicated the presence of statistically significant differences between the eligible Kent County WIC

client group and the eligible Detroit WIC client group on initiation of breastfeeding ($\chi^2=150.340$, $df=1$, $p=0.000$; correction for continuity: $\chi^2=149.292$, $df=1$, $p=0.000$) and current breastfeeding status ($\chi^2=69.787$, $df=1$, $p=0.000$; correction for continuity: $\chi^2=68.976$, $df=1$, $p=0.000$). Based on these results, differences on these characteristics by urban location were expected.

Timing of the initial infant decision was made before pregnancy for a greater proportion of the Kent County study sample (51.9%) than the Detroit study sample (30.4%) ($\chi^2=11.051$, $df=2$, $p=0.004$). Based on previously reported differences between these two groups on current breastfeeding status, this result was explored by comparing timing of the infant feeding decision by current breastfeeding status. Analysis of these characteristics indicated statistically significant differences ($\chi^2=18.126$, $df=2$, $p=0.000$), wherein a greater proportion of mothers that were currently breastfeeding made their decision to breastfeed before (49.4%) or during pregnancy (39.0%) than mothers that were not currently breastfeeding. Conversely, a greater percentage of mothers that were not currently breastfeeding made their initial infant feeding decision after birth (39.5%) than mothers that were currently breastfeeding.

Differences in whether mothers had introduced other foods to the infant were statistically significant by urban location ($\chi^2=6.246$, $df=1$, $p=0.012$). In particular, a greater percentage of the Detroit sample had introduced other foods (15.9%) than the Kent County sample (5.0%). However, based on statistically significant differences between the mean infant ages by urban location, this result was further explored for a potential mediating influence of infant age on the introduction of other foods. Four groups were formed by urban location and introduction of other foods, which were then

compared on mean infant age using analysis of variance. Results indicated that there were statistically significant differences between the four groups on mean infant age ($F=13.452$, $df=188$, $p=0.000$). The Tukey HSD was applied to this data in order to investigate the location of differences between the four groups. Differences were not significant between mothers that had introduced other foods and those that had not in each urban location, suggesting that differences in introduction of other foods were more likely linked to differences in infant age between the urban locations.

In addition to exploring and comparing infant feeding behaviors by urban location, comparisons were conducted on beliefs about breastfeeding, sources of social influence, body image, and attitudes toward motherhood. To measure beliefs about breastfeeding, two scales of the Breastfeeding Attrition Prediction Tool (Janke, 1994) were included on the questionnaire. The Positive Breastfeeding Sentiment Scale was composed of fourteen items that measured mothers' beliefs in the advantages of breastfeeding, while the Negative Breastfeeding Sentiment Scale was composed of sixteen items that measured mothers' beliefs in the disadvantages of breastfeeding. All items were rated on a five-point Likert scale that ranged from strongly disagree (rated with a 1) to strongly agree (rated with a 5). Table 16 displays mean ratings of each item by scale, including rank of the item among all items on the positive or negative scale.

Table 16: Overall Mean Item Ratings and Rankings on Scales of the Breastfeeding Attrition Prediction Tool (Janke, 1994)

	Rank	Mean ^A	S.D.
Positive Breastfeeding Sentiment Scale			
Breastmilk is healthy for the baby.	1	4.60	0.70
Breastfeeding is natural.	2	4.36	0.76
Breastfeeding is best for the baby.	3	4.26	0.88
Breastmilk is more nutritious than infant formula.	4	4.25	0.89
Breastfeeding helps you bond with your baby.	5	4.12	0.89
Breastfeeding makes you closer to your baby.	6	4.01	1.02
Breastfeeding is more economical than formula feeding.	7	3.68	1.02
Breastfeeding is personally satisfying.	8	3.57	1.07
Breastfeeding is more convenient than formula feeding.	9	3.44	1.28
Infant formula can cause constipation.	10	3.25	0.83
Infant formula can cause allergies.	11	3.06	1.05
Formula fed babies are more fussy than breastfed babies.	12	2.90	0.89
Formula fed babies tend to get sick.	13	2.75	0.99
Formula fed babies tend to be overweight.	14	2.53	0.85
Negative Breastfeeding Sentiment Scale			
Formula feeding gives you more freedom.	1	3.71	0.93
Formula feeding is easier than breastfeeding.	2	3.66	1.05
It is embarrassing to breastfeed in public.	3	3.58	1.11
Breastfeeding is more time consuming than formula feeding.	4	3.56	1.06
Breastfeeding is painful.	5	3.54	1.06
Formula feeding lets the father become close to the baby.	6	3.53	0.97
No one else can help feed the baby when you breastfeed.	7	3.48	1.22
Breastfeeding makes returning to work difficult.	8	3.42	0.96
When you breastfeed you never know if the baby gets enough milk.	9	3.41	1.05
Breastfeeding makes your breasts sag.	10	3.33	1.02
It is difficult to find places to breastfeed outside your home.	11	3.32	1.01
Mothers who formula feed get more rest than breastfeeding mothers.	12	3.29	1.03
Mothers who formula feed get back into shape sooner.	13	3.19	1.20
Breastfeeding ties you down.	14	3.19	0.99
Formula fed babies are easier to satisfy than breastfed babies.	15	3.13	0.95
Breastfeeding is messy.	16	3.12	1.13

^A Mean rating based on a five-point Likert scale (1=strongly disagree, 5=strongly agree)

As indicated in Table 16, mean ratings on most items of the Positive Breastfeeding Sentiment Scale were neutral (rated with a 3) or higher. Mean ratings for each item ranged from 2.53, indicating slight overall disagreement, to 4.60, suggesting

strong agreement. Among the top-ranked items, there was strong agreement with items related to infant health and nutrition benefits of breastfeeding and enhancement of mother-child bonding. Further, there was relatively small variation in respondents' answers among these top-ranked items.

Only three items on the Positive Breastfeeding Sentiment Scale received mean ratings that indicated slight overall disagreement. The first item, "Formula fed babies are more fussy than breastfed babies," had a mean rating of 2.90 (Rank: 12, SD=0.89), or just under a mean neutral rating on the item. The second item read, "Formula fed babies tend to get sick" (Rank: 13, Mean=2.75, SD=0.99) and the third item with a mean rating that in slight disagreement stated, "Formula fed babies tend to be overweight" (Rank: 14, Mean=2.53, SD=0.85). There was relatively small variation in respondents' answers on all three of these items. Further, all of these items seemed to be related to mothers' assessment formula feeding as having negligible risk to infant health.

Mean ratings of items on the Negative Breastfeeding Sentiment Scale were more uniformly in slight agreement across all items. In particular, all items had mean ratings over 3, which would indicate a neutral sentiment to the item, but no items received a mean rating larger than 4, which would suggest agreement with the item. Top-ranked items on this scale seemed to suggest slight agreement with the greater freedom afforded formula feeding mothers. Items that ranked toward the bottom of the list suggested slightly less agreement with difficulties associated with the practice of breastfeeding and impacts on the mother's health and well-being.

Comparisons were made by urban location on the thirty items related to positive and negative breastfeeding sentiment. Differences between mean scores on each of these

items were statistically significant on seven items, which included six positive breastfeeding sentiment items and one negative breastfeeding sentiment item. Items that possessed statistically significant mean scores by urban location are outlined in Table 17.

Table 17: Statistically Significant Differences on Positive and Negative Beliefs about Breastfeeding by WIC Agency

	Kent County Study Sample		Detroit Study Sample	
	Mean ^A	S.D.	Mean ^A	S.D.
Positive Breastfeeding Sentiment Scale				
Breastmilk is healthy for the baby. <i>(t=2.342, df=145.692, p=0.021)</i>	4.71	0.556	4.47	0.822
Breastmilk is more nutritious than infant formula. <i>(t=2.540, df=180, p=0.012)</i>	4.40	0.812	4.07	0.949
Breastfeeding helps you bond with your baby. <i>(t=2.417, df=182, p=0.017)</i>	4.27	0.771	3.95	0.987
Breastfeeding is more economical than formula feeding. <i>(t=3.083, df=180, p=0.002)</i>	3.89	1.016	3.44	0.985
Breastfeeding is personally satisfying. <i>(t=3.260, df=178, p=0.001)</i>	3.81	0.976	3.30	1.107
Infant formula can cause allergies. <i>(t=-2.124, df=162.782, p=0.035)</i>	2.91	0.963	3.24	1.122
Negative Breastfeeding Sentiment Scale				
No one else can help feed the baby when you breastfeed. <i>(t=-3.152, df=183.925, p=0.002)</i>	3.22	1.274	3.77	1.097

^A Mean rating based on a five-point Likert scale (1=strongly disagree, 5=strongly agree)

Results of comparisons by urban location on the thirty breastfeeding items suggested a greater degree of positive breastfeeding sentiment among the Kent County study sample. Among the six positive breastfeeding sentiment items with statistically significant differences, mean ratings of the Kent County sample were significantly higher, or in stronger agreement with the positive breastfeeding items, than the mean ratings of the Detroit sample on all but one item. This one item, which stated “Infant formula can cause allergies,” had a higher mean score among the Detroit study sample (Mean=3.24, S.D.=1.122). The Detroit study sample was also in stronger overall

agreement with the one statistically significant negative breastfeeding sentiment item, which read “No one else can help feed the baby when you breastfeed” (Mean=3.77, S.D.=1.097).

Another set of comparisons were performed by study location on sources of external influence in the infant feeding decision. Results of these comparisons are outlined in Table 18.

Table 18: Mean Item Ratings on Sources of External Influence

	Mean ^A	S.D.
Family and Friends	3.423	3.688
My baby’s father	3.910	5.591
My mother	4.091	4.691
My mother-in-law	3.636	4.042
My family	3.281	4.332
My best friend	2.832	4.323
My other friends	2.635	3.791
Breastfeeding Peer Counselors	5.091	4.654
Healthcare Delivery System	5.343	4.367
My doctor’s	5.525	4.576
My wife	4.872	4.969
WIC Staff	6.071	3.871
Community Sources	2.196	3.439
Other people at my school	1.318	3.163
Other people at my work	2.163	4.029
My community	1.771	3.666
People in public places	1.275	3.013

^A Mean rating ranges from -10 (strong influence in the direction of formula feeding) to +10 (strong influence in the direction of breastfeeding)

Among individual sources of influence, the (grand)mother was the strongest influence in the direction of breastfeeding (Mean=4.091, SD=4.691). On systems of influence, the healthcare delivery system was the strongest influence in the direction of breastfeeding (Mean=5.343, SD=4.367). Differences between the Kent County study

sample and the Detroit study sample were statistically significant on two individual sources: my family ($t=2.886$, $df=137$, $p=0.005$) and my best friend ($t=2.210$, $df=129$, $p=0.029$). On both of these sources, Kent County study participants indicated a stronger mean influence of both of these sources in the direction of breastfeeding.

Additional comparisons were performed on the study samples by urban location on two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984): Body Image and Attitudes toward Motherhood and the Baby. Table 19 displays items and mean ratings for each subscale, including item rank among the twelve items. Each item was measured using a five-point Likert scale that ranged from strongly disagree (rated with a 1) to strongly agree (rated with a 5).

Table 19: Overall Mean Item Ratings and Rankings on Subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar, Robson and Smith, 1984)

	Rank	Mean ^c	S.D.
Body Image Subscale^A			
I felt that my face was attractive.	1	3.34	1.12
I felt proud of my appearance.	2	3.22	1.25
I felt that I had gained too much weight.	3	3.14	1.30
I felt attractive.	4	3.08	1.14
I felt that my breasts were attractive.	5	3.06	1.11
I liked the shape of my body.	6	2.95	1.21
My body felt awkward and clumsy.	7	2.89	1.21
I felt that my body was soft and cuddly.	8	2.89	1.14
I felt that my breasts were too big.	9	2.76	1.21
I felt that my complexion was poor.	10	2.64	1.71
I felt that my breasts were too small.	11	1.92	0.83
I felt that my body smelled bad.	12	1.58	0.76
Attitudes toward Motherhood and the Baby Subscale^B			
I have felt proud of being a mother.	1	4.65	0.67
I have enjoyed caring for my baby's needs.	2	4.61	0.64
I have enjoyed feeding my baby.	3	4.44	0.63
I have been feeling happy that I have a baby.	4	4.32	0.84
I have been wondering whether my baby will be healthy/normal.	5	3.24	1.14
I have had enough time for myself.	6	2.91	1.08
The thought of having more children appeals to me.	7	2.46	1.40
I have felt that life has been more difficult since the baby was born.	8	2.44	1.15
I have been worrying that I might not be a good mother.	9	1.99	1.07
I have worried about accidentally hurting my baby.	10	1.88	1.07
I have felt disappointed with motherhood.	11	1.59	0.71
I have regretted having the baby.	12	1.32	0.59

^A Subscale items began "During my last 3 months of pregnancy..."

^B Subscale items began "Since my baby was born..."

^C Mean rating based on a five-point Likert scale (1=strongly disagree, 5=strongly agree)

As indicated in Table 19, respondents indicated stronger agreement with the body image items that suggested a positive perception of one's body. Only one item related to negative body perception ranked near the top of the list, which stated "I felt that I had gained too much weight" (Rank: 3, Mean=3.13, SD=1.30). Similarly, mothers in the study sample were in stronger agreement with items that were positively oriented toward

motherhood. Once again, only one item that had a negative orientation ranked near the top of the list of items: “I have been wondering whether my baby will be healthy and normal” (Rank: 5, Mean=3.24, SD=1.15).

Comparisons were performed by urban location on the twelve body image items and the twelve maternal attitudes items. There were four statistically significant differences on the body image items and two statistically significant differences on the maternal attitudes, which are displayed in Table 20.

Table 20: Statistically Significant Differences on Body Image Items and Attitudes toward Motherhood and the Baby Items by WIC Agency

	Kent County Study Sample		Detroit Study Sample	
	Mean ^C	S.D.	Mean ^C	S.D.
Body Image Subscale ^A				
I felt that my face was attractive. (<i>t</i> =-2.045, <i>df</i> =165.391, <i>p</i> =0.042)	3.18	1.016	3.52	1.207
I felt attractive. (<i>t</i> =-2.038, <i>df</i> =177, <i>p</i> =0.043)	2.92	1.098	3.26	1.173
I felt that my complexion was poor. (<i>t</i> =-2.016, <i>df</i> =177, <i>p</i> =0.045)	2.81	1.129	2.46	1.191
I felt that my body smelled bad. (<i>t</i> =-1.998, <i>df</i> =178, <i>p</i> =0.047)	1.68	0.762	1.46	0.749
Attitudes toward Motherhood and the Baby Subscale ^B				
I have been feeling happy that I have a baby. (<i>t</i> =-2.375, <i>df</i> =181, <i>p</i> =0.019)	4.45	0.791	4.16	0.866
The thought of having more children appeals to me. (<i>t</i> =2.047, <i>df</i> =178.765, <i>p</i> =0.042)	2.66	1.470	2.24	1.283

^A Subscale items began “During my last 3 months of pregnancy...”

^B Subscale items began “Since my baby was born...”

^C Mean rating based on a five-point Likert scale (1=strongly disagree, 5=strongly agree)

As indicated in Table 20, the Detroit study sample indicated greater overall agreement with body image items that were positively oriented and were in greater overall disagreement with body image items that suggested negative body image. In particular, the Detroit study sample possessed a greater mean score on two positively

worded body image items: “I felt that my face was attractive” (Mean=3.52, SD=1.21) and “I felt attractive” (Mean=2.92, SD=3.26). Further, although both study samples by urban location indicated overall disagreement with items that indicated negative body image, mean scores for Kent County on two of these items was significantly lower than the Detroit sample: “I felt that my complexion was poor” (Mean=2.81, SD=1.13) and “I felt that my body smelled bad” (Mean=1.68, SD=0.76).

Alternatively, the Kent County study sample indicated stronger overall agreement with two items that were positively oriented toward motherhood than the Detroit sample. The first of these items, “I have been feeling happy that I have a baby,” possessed strong agreement from both study samples. However, the Kent County study sample indicated greater overall agreement with the statement, with a smaller level of variance among study participants’ rating on this item (Mean=4.45, SD=0.79). Both study samples by urban location indicated slight disagreement with the statement “The thought of having more children appeals to me;” however, the Detroit sample was in stronger disagreement with the statement (Mean=2.24, SD=1.28) than the Kent County sample.

For the subsequent study objective, items from the above two subscales, in addition to the beliefs about breastfeeding items, were assessed for measurement reliability using exploratory factor analysis.

Study Objective 2:

Assessment of Measurement Reliability

The second objective of the study was to test measurement reliability of two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984) and two scales of the Breastfeeding Attrition Prediction Tool (Janke, 1994)

among this sample of WIC participants. All items were phrased in the form of a statement; respondents were asked to respond based on a five-point Likert scale (1=strongly disagree, 5=strongly agree). Respondents' answers were inspected for patterned responses to ensure that respondents did not indicate the same answer for all thirty items on the Breastfeeding Attrition Prediction Tool, or on all twelve items on each subscale of the Maternal Adjustment and Maternal Attitudes Questionnaire. Respondents that answered any set of items with patterned responses were removed from data analysis for that scale only. After checking for patterned responses on each of these scales and subscales, exploratory factor analysis was performed in order to determine whether sub-factors of each concept could better explain positive and negative breastfeeding sentiment, body image, and attitudes toward motherhood and the baby.

Breastfeeding Attrition Prediction Tool. Construct validity of each scale was assessed separately using exploratory factor analysis. In particular, principal components analysis was performed in order to extract one set of sub-factors related to positive breastfeeding sentiment and a separate set of sub-factors related to negative breastfeeding sentiment. First, the group of fourteen items on the Positive Breastfeeding Sentiment Scale was factor analyzed using principal components analysis, which extracted two factors with eigenvalues greater than one in the unrotated component matrix. To encourage extraction of theoretically interpretable factors, a rotated component matrix was produced using varimax rotation. Using this process, items separated into two factors that focused on the advantages of breastfeeding and the disadvantages of formula feeding. Items that clustered under each factor are outlined in Table 21.

Table 21: Items and Item Statistics for Factored Subscales of the Positive Breastfeeding Sentiment Scale (Janke, 1994)

	Rotated Factor Loading	Cronbach's Alpha
Factor I: Belief in the benefits of breastfeeding		0.874
Breastfeeding is best for the baby.	0.854	
Breastmilk is healthy for the baby.	0.818	
Breastfeeding helps you bond with your baby.	0.772	
Breastfeeding is natural.	0.757	
Breastmilk is more nutritious than infant formula.	0.727	
Breastfeeding makes you closer to your baby.	0.674	
Breastfeeding is more convenient than formula feeding.	0.554	
Breastfeeding is personally satisfying.	0.543	
Breastfeeding is more economical than formula feeding.	0.511	
Factor II: Belief in the infant health risks of formula feeding		0.752
Formula fed babies tend to be overweight.	0.732	
Formula fed babies are more fussy than breastfed babies.	0.690	
Infant formula can cause constipation.	0.685	
Infant formula can cause allergies.	0.683	
Formula fed babies tend to get sick.	0.681	

Overall, the two factors presented in Table 21 explained 52.1% of the variance in positive breastfeeding sentiment. The first factor had an eigenvalue 5.104, which explained 36.5% of the variance. The second factor had an eigenvalue of 2.196 and explained 15.7% of the variance. Based on the criteria established for removing items from the factor structure, all of the items were retained. In particular, all items loaded at a level of 0.30 or higher and only one item cross-loaded on both factors. This item, “Breastfeeding is more economical than formula feeding,” had a factor loading of 0.511 on the first factor and 0.407 on the second factor. Because the difference between the two factor loadings was greater than 0.05 and the item had a better theoretical fit with Factor I, this item was placed on the first factor.

In total, Factor I contained nine items with rotated factor loadings ranging from 0.511 to 0.854. The Cronbach's alpha coefficient was 0.874. These items seemed to relate to mothers' belief in the advantages of breastfeeding, including infant health, the mother-infant relationship, personal satisfaction, and practical considerations. As a result, this factor was labeled "Belief in the benefits of breastfeeding."

Factor II contained five items with rotated factor loadings ranging from 0.681 to 0.732. The Cronbach's alpha coefficient was 0.752. Items in this factor appeared to relate to the disadvantages of formula feeding, including infant health risks and effect of formula feeding on the infant's emotional disposition. Items in this category were therefore grouped under the label of "Belief in the infant health risks of formula feeding."

The Negative Breastfeeding Sentiment Scale (Janke, 1994) contained sixteen items that measured mothers' beliefs in the disadvantages of breastfeeding. Exploratory factor analysis was performed on these sixteen items to assess construct validity. In particular, principal component analysis was performed, which extracted four factors with eigenvalues greater than one in the unrotated component matrix. To encourage extraction of theoretically interpretable factors, a rotated component matrix was produced using varimax rotation. Using this process, items separated into four factors that focused on the advantages of breastfeeding and the disadvantages of formula feeding. Items that clustered under each factor are outlined in Table 22.

Table 22: Items and Item Statistics for Factored Subscales of the Negative Breastfeeding Sentiment Scale (Janke, 1994)

	Rotated Factor Loading	Cronbach's Alpha
Factor I: Belief that breastfeeding limits lifestyle habits		0.739
Mothers who FF get more rest than breastfeeding mothers.	0.751	
Mothers who FF get back into shape sooner.	0.655	
When you BF you never know if the baby gets enough milk.	0.602	
Breastfeeding makes returning to work difficult.	0.536	
Breastfeeding is more time consuming than formula feeding.	0.517	
Formula fed babies are easier to satisfy than breastfed babies.	0.510	
Factor II: Belief that the breastfeeding mother is fully responsible for infant feeding		0.614
Formula feeding is easier than breastfeeding.	0.637	
Breastfeeding makes your breasts sag.	0.567	
It is embarrassing to breastfeed in public.	0.551	
Formula feeding gives you more freedom.	0.538	
No one else can help you feed the baby when you breastfeed.	0.533	
Formula feeding lets the father become close to the baby. ^A	-----	
Factor III: Belief that it is difficult to breastfeed outside the home		0.634
Breastfeeding is messy.	0.798	
Breastfeeding ties you down.	0.661	
It is difficult to find places to breastfeed outside your home.	0.490	
Factor IV: Belief that it is painful to breastfeed		-----
Breastfeeding is painful.	0.699	

^A Item originally loaded on Factor III at 0.426

Overall, the four factors presented in Table 22 explained 49.2% of the variance in negative breastfeeding sentiment. The first factor had an eigenvalue 4.096, which explained 25.6% of the variance. The second factor had an eigenvalue of 1.426 and explained 8.9% of the variance. The third factor explained 7.7% of the variance in negative breastfeeding sentiment and had an eigenvalue of 1.235. Lastly, although the

fourth factor only contained one item, its eigenvalue was 1.119 and the factor explained 7.0% of the variance in negative breastfeeding sentiment. Because this item explained a considerable portion of the variance, the item was included in subsequent data analysis as a separate characteristic

Following principal components analysis on the negative breastfeeding sentiment items, two items warranted further exploration. One item cross-loaded on two factors: “No one else can help feed the baby when you breastfeed.” The factor loading of this item was 0.533 on Factor II, whereas the factor loaded at -0.541 on Factor IV. According to the criteria set for placing items, this item did not place definitively in either factor (as the difference between the items was not greater than 0.05). A decision was made to retain the item in Factor II on the basis of its better theoretical placement with items on Factor II. A second item, “Formula feeding lets the father become closer to the baby,” originally loaded on Factor III. However, due to its relatively low factor loading (0.426) and incongruence with the other three items in the factor, the item was placed in Factor II where it appeared to have a better conceptual fit.

Consequently, in order to test the reliability of this and other factors of the Negative Breastfeeding Sentiment Scale, Cronbach’s alpha was computed for each factor. The Cronbach’s alpha coefficient for Factor I was 0.739. This factor contained six items with factor loadings that ranged from 0.510 to 0.751. Items in the factor related to the impacts of mothers’ decision to breastfeed on her ability to maintain characteristics of her lifestyle. As a result, this factor was labeled “Belief that breastfeeding limits lifestyle habits.”

Factor II included six items with factor loadings that ranged from 0.533 to 0.637. Cronbach's alpha coefficient for this factor was 0.614. Items on this factor related to the belief that burdens of and responsibilities for breastfeeding were borne exclusively by the mother. This category of beliefs was therefore labeled "Belief that the breastfeeding mother is fully responsible for infant feeding."

Lastly, Factor III contained three items with factor loadings between 0.490 and 0.798. Cronbach's alpha coefficient for the factor was 0.634. Measurement reliability of this factor was explored, which indicated that the Cronbach's alpha coefficient could be increased to 0.675 with the removal of one item: "It is difficult to find places to breastfeed outside your home." However, it was decided that the increase in Cronbach's alpha coefficient was minimal compared to the theoretical removal of the item. In particular, as the three items on Factor III related to issues of breastfeeding in public or outside the home, this item was retained. Accordingly, these three items were grouped under the label "Belief that it is difficult to breastfeed outside the home."

The two factors that were extracted from the Positive Breastfeeding Sentiment Scale and the three factors that were extracted from the Negative Breastfeeding Sentiment Scale, in addition to the fourth solitary item about breastfeeding as painful, were used in subsequent analysis predicting mothers' infant feeding behavior.

Maternal Adjustment and Maternal Attitudes Questionnaire. Construct validity of two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire were investigated using exploratory factor analysis. Subscales were factor analyzed separately in order to extract sub-factors related to the two distinct concepts. The first subscale, Body Image, contained twelve items that related to mothers' perceptions of their body.

Principal components analysis was performed on these twelve items, which extracted two factors with eigenvalues greater than one. In order to aid in the interpretability of the two factors, principal components analysis was performed with varimax rotation. This resulted in two factors that related to positive perceptions of one’s body and negative perceptions of one’s body. The factor structure is presented in Table 23.

Table 23: Items and Item Statistics for Factored Subscales of the Body Image Subscale ^A (Kumar, Robson and Smith, 1984)

	Rotated Factor Loading	Cronbach’s Alpha
Factor I: Positive perceptions of one’s body		0.856
I liked the shape of my body.	0.840	
I felt attractive.	0.798	
I felt proud of my appearance.	0.789	
I felt that my face was attractive.	0.694	
I felt that my breasts were attractive.	0.671	
I felt that my body was soft and cuddly.	0.646	
<i>I felt that I had gained too much weight.</i>	-0.519	
Factor II: Negative perceptions of one’s body		0.516
I felt that my breasts were too small.	0.744	
I felt that my body smelled bad.	0.681	
My body felt awkward and clumsy.	0.513	
I felt that my complexion was poor.	0.504	

^A Subscale items began “During my last 3 months of pregnancy...”

Ital: Item subsequently removed from factor structure

The two factors presented in Table 23 accounted for 48.6% of the variance in body image. The eigenvalue for Factor I was 4.218, which explained 35.1% of the variance. This factor contained seven items with factor loadings that ranged from -0.519 to 0.840. A Cronbach’s alpha coefficient was calculated for the seven items ($\alpha=0.849$); further computations of Cronbach’s alpha coefficient on a reduced set of items indicated

that the reliability coefficient could be increased by removing “I felt that I had gained too much weight.” This item was removed from the factor structure based on this result, in addition to lacking conceptual fit with the remaining items. Review of the remaining items suggested that items in Factor I related to positive body image; as a result, this factor was labeled “Positive perceptions of one’s body.”

An additional 13.4% of the variance in body image was explained by Factor II, which had an eigenvalue of 1.611. Cronbach’s alpha for this factor was 0.516, which was maximized by retaining all four items that loaded on this factor. Items that loaded on this factor suggested greater negativity toward one’s body; accordingly, Factor II was labeled “Negative perceptions of one’s body.”

Of the twelve items entered for analysis, one item did not load on either factor: “I felt that my breasts were too big.” However, two other items in the subscale addressed breast size (“I felt that my breasts were too small” and “I felt that my breasts were attractive”) and, as a result, this factor was removed from the factor structure and subsequent analysis.

The other subscale of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984) that was factor analyzed for the current study objective was the Attitudes toward Motherhood and the Baby subscale. This subscale also contained twelve items, which were factor analyzed using principal components analysis. This analysis extracted five factors with eigenvalues greater than one. Principal components analysis with varimax rotation was performed to produce factors with greater decipherability. Results of this analysis are outlined in Table 24.

Table 24: Items and Item Statistics for Factored Subscales of the Attitudes toward Motherhood and the Baby Subscale [^] (Kumar, Robson and Smith, 1984)

	Rotated Factor Loading	Cronbach's Alpha
Factor I: Personal satisfaction with motherhood		0.764
I have regretted having the baby.	0.776	
I have felt proud of being a mother.	0.762	
I have felt disappointed with motherhood.	0.685	
I have been feeling happy that I have a baby.	0.626	
Factor II: Positive experiences with caring for the baby		0.757
I have enjoyed feeding my baby.	0.856	
I have enjoyed caring for my baby's needs.	0.835	
Factor III: Worries about being a responsible mother		0.495
I have been worrying that I might not be a good mother.	0.742	
I have been wondering whether my baby will be healthy/normal.	0.663	
I have worried about accidentally hurting my baby.	0.581	
Factor IV: Worries about impacts of motherhood on lifestyle habits		0.524
I have had enough time for myself.	0.892	
I have felt that life has been more difficult since the baby was born.	0.643	
Factor V: Thought of having more children appealing		-----
The thought of having more children appeals to me.	0.899	

[^] Subscale items began "Since my baby was born..."

Ital: Item subsequently removed from factor structure

As indicated in Table 24, the twelve items of the Attitudes toward Motherhood and the Baby subscale loaded on five factors. Overall, the factor structure explained 68.1% of the variance in this construct. Factor I had an eigenvalue of 3.505, which explained 29.2% of the variance. Factor loadings ranged from 0.626 to 0.726. The Cronbach's alpha coefficient for the four items that loaded on this factor was 0.764.

Based on similar themes between these four items, this factor was labeled “Personal satisfaction with motherhood.”

Factor II had an eigenvalue of 1.290, which accounted for 10.8% of the variance in attitudes toward motherhood and the baby. The two items loaded on this factor had factor loadings of 0.835 and 0.836, and the reliability coefficient for these items was 0.757. As both items related to mothers’ experiences with taking care of the new baby, this factor was labeled “Positive experiences with caring for the baby.”

The third factor extracted from the twelve items accounted for 10.0% of the variance in the construct and had an eigenvalue of 1.205. Three items loaded on this factor and based on the themes of the three items, the factor was labeled “Worries about being a responsible mother.” Factor loadings of the three factors ranged from 0.581 to 0.742; Cronbach’s alpha coefficient for the three factors was 0.495.

Factor IV contained two items that related to mothers’ concerns about her own routines, with factor loadings of 0.643 and 0.892. These two items explained 9.5% of the variance in attitudes toward motherhood and the baby and had an eigenvalue of 1.139. Cronbach’s alpha coefficient for the factor was 0.525. As indicated, the items related to the perceived impact of motherhood on mothers’ lifestyle. As a result, this factor was labeled “Worries about impacts of motherhood on lifestyle habits.”

The final factor only contained one item: “The thought of having more children appeals to me.” The factor loading on this item was 0.899, which had an eigenvalue of 1.036 and explained 8.6% of the variance in the construct. Based on the amount of variance explained by this item, the item was included as a distinct variable in subsequent data analysis along with the four other factors extracted on this construct.

Study Objective 3:

Predicting Infant Feeding Behavior by Systems of External Influence

The third objective of this study was to predict infant feeding behavior on the basis of three systems of external influence: family and friends, the healthcare delivery system, and community sources. A regression model was hypothesized that predicted percentage of breastfeeding on three control variables and three systems of external influence. The three control variables included race/ethnicity, education, and beliefs about breastfeeding. As indicated, the three systems of social influence included family and friends, the healthcare delivery system, and community sources. The regression model predicting breastfeeding percentage on these characteristics was outlined in Chapter 3.

The regression model was developed to predict infant feeding behavior. For the model, infant feeding behavior was measured as a breastfeeding percentage. In particular, mothers' total number of feedings in a typical day was calculated as a sum of the number of times the infant was fed formula, pumped breastmilk, and breastmilk from the breast in a typical day. Next, mothers' total number of feedings of breastmilk was calculated as a sum of the number of times the infant was fed both pumped breastmilk and breastmilk from the breast in a typical day. Breastfeeding percentage was computed as the number of breastfeedings in a typical day divided by the number of total feedings in a typical day. As a result, breastfeeding percentage could range from zero (no breastfeeding) to one (exclusive breastfeeding).

To predict this dependent variable, twelve independent variables were entered into a predictive model using stepwise regression. In order to control for socio-

demographic characteristics and beliefs about breastfeeding, these characteristics the foremost to be entered into the model. Race/ethnicity was the first of these characteristics to be entered into the regression model. For the purposes of entering a categorical variable into the predictive model, a dummy variable was created that measured race/ethnicity. Because Black/African-American respondents composed the largest proportion of the study sample, the race/ethnicity dummy variable was defined as Black/African-American (coded as a 1) or not Black/African-American (coded as a 0).

Education level obtained was recoded into two dummy variables for the regression model. The first dummy variable indicated whether the respondent had obtained a high school degree or the equivalent (coded as a 1) or had obtained less than a 12th grade education (coded as a 0). The second dummy variable indicated whether the respondent had obtained any level of college education (coded as a 1) or had not obtained any level of college education (coded as a 0). These two variables were entered into the regression model following race/ethnicity in the order discussed above.

The fourth through ninth variables entered into the regression model were beliefs about breastfeeding. As outlined in results presented above, five factors and one solitary item related to positive and negative aspects of breastfeeding were extracted from existing scales on positive and negative breastfeeding sentiment. Factor scores were computed by taking the mean of all items that loaded on the factor. In the event that the respondent did not respond to specific items on the factor, the mean factor score was computed as the mean of all items on the factor that were answered.

Factor scores were entered into the regression model in order of highest reliability coefficient. As a result, factors were entered in the following order: (1) Belief in the

benefits of breastfeeding ($\alpha=0.874$), (2) Belief in the infant health risks of formula feeding ($\alpha=0.752$), (3) Belief that breastfeeding limits lifestyle habits ($\alpha=0.739$), (4) Belief that it is difficult to breastfeed outside the home ($\alpha=0.634$), (5) Belief that the breastfeeding mother is fully responsible for breastfeeding ($\alpha=0.614$), (6) Belief that it is painful to breastfeed (one-item α not applicable).

After controlling for socio-demographic characteristics and beliefs about breastfeeding, three additional variables and four interaction variables were entered into the regression model as predictors of breastfeeding percentage. The first set of variables included the family and friends system of influence, the healthcare delivery system of influence, and community sources system of influence. Each system was composed of a collection of individuals and groups. The family and friends system consisted of seven individuals/groups that included the baby's father, the (grand)mother, the (grand)mother-in-law, the family, the best friend, other friends, and Breastfeeding Peer Counselors. The healthcare delivery system contained three groups: doctor(s), the midwife, and WIC staff. Lastly, community sources encompassed four groups that included other people at school, other people at work, the community, and people in public places.

Influence scores were computed for each individual/group as a product of perceived expectation and value, wherein a score of -10 indicated a very strong influence in the direction of formula feeding and a score of +10 suggested a very strong influence in the direction of breastfeeding. Using these influence scores, mean scores were computed on each system of external influence by taking the mean of the influence scores for the individuals/groups in that system. In the event that the respondent skipped any individuals/groups or indicated "Don't know or does not apply," the mean score for the

system of external influence was computed as a mean of all items that were answered. So long as the study participant indicated influence from at least one individual/group in the system, a mean score was computed for that system of external influence. Mean score for the family and friends system of influence was 3.423 (SD=3.68), 5.34 for the healthcare delivery system of influence (SD=4.36), and 2.20 for community sources system of influence (SD=3.44).

Mean scores for the three systems of external influence (family and friends, the healthcare delivery system, and community sources) were entered into the regression model, respectively. In addition, interaction variables between these three variables were entered into the regression model to account for potential relationships between each of these measures. Interaction between each set of variables was computed as a product of the mean scores of each system of external influence. These variables were computed for the interaction between (1) the family and friends system and the healthcare delivery system, (2) the family and friends system and the community sources system, (3) the healthcare delivery system and the community sources system, and (4) all three systems. Interaction variables were entered into the regression model in the order presented.

Before running the regression model, a correlation matrix was constructed of the dependent variable and independent variables entered into the regression model to examine the strength and direction of relationships amongst the variables. The correlation matrix is presented as Table 25.

Table 25: Zero Order Correlation Matrix of Dependent and Independent Variables in Regression Model A

	1	2	3	4	5	6	7	8	9	10	11	12	13
1) Breastfeeding percentage	1.00 177												
2) Race/ethnicity: Black/African-American	-0.285 171	1.00 175											
3) Education: High school degree	-0.109 172	-0.130 175	1.00 176										
4) Education: Some college	0.185 172	-0.007 175	-0.479 176	1.00 176									
5) Belief (+): Benefits	0.488 173	-0.223 170	-0.122 171	0.230 171	1.00 176								
6) Belief (+): Formula health risks	0.225 171	0.106 169	-0.184 170	0.158 170	0.284 173	1.00 174							
7) Belief (-): Lifestyle	0.066 170	-0.047 168	-0.020 169	0.178 169	0.273 173	0.084 172	1.00 173						
8) Belief (-): Public feedings	0.054 166	-0.104 164	-0.026 165	0.071 165	0.220 169	0.111 169	0.512 169	1.00 169					
9) Belief (-): Responsibility	-0.168 172	-0.043 170	0.100 171	0.044 171	0.070 174	-0.053 174	0.490 173	0.378 169	1.00 175				
10) Belief (-): Painful	-0.163 163	0.091 161	0.054 162	-0.096 162	-0.028 166	0.001 166	0.221 165	0.056 163	0.104 166	1.00 166			
11) Influence: Family and Friends	0.376 161	-0.124 159	-0.156 160	0.136 160	0.543 162	0.002 162	0.146 161	0.161 159	0.006 163	-0.020 155	1.00 164		
12) Influence: Healthcare Delivery	0.294 149	0.039 147	-0.177 148	0.107 148	0.511 150	0.121 150	0.188 148	0.173 148	-0.033 150	0.022 143	0.591 149	1.00 152	
13) Influence: Community Sources	0.067 62	-0.004 61	-0.217 61	0.278 61	0.314 63	0.276 63	0.121 62	0.161 62	0.077 63	-0.065 60	0.448 63	0.482 62	1.00 63

■ Correlation significant at the 0.01 level

Bold: Correlation significant at the 0.001 level

As indicated in Table 25, breastfeeding percentage was significantly correlated with eight of the independent variables. Of these eight statistically significant correlations, all correlation coefficients indicated that relationships were in the expected direction based on previous research (Grossman et al., 1989; Kurinij et al., 1988; Park et al., 2003; Pugh et al., 2001; Schwartz, Popkin, Tognetti, & Zohoori, 1995). Specifically, there was a negative relationship between breastfeeding percentage and race/ethnicity, indicating that Black/African-American mothers in the sample typically had lower breastfeeding percentages. As well, breastfeeding percentage was negatively associated with two factors related to negative breastfeeding sentiment. Positive associations existed between breastfeeding percentage and two factors related to positive breastfeeding sentiment and influence from two systems of external influence: family and friends and the healthcare delivery system.

Among systems of external influence, bivariate associations were statistically significant between each pair of systems. The strength of relationships of each of these pairs was moderate, wherein the correlation coefficient for family and friends and the healthcare delivery system was 0.591 ($p=0.000$), family and friends and community sources was 0.448 ($p=0.000$), and the healthcare delivery system and community sources was 0.482 ($p=0.000$). The strengths of these relationships between pairs of systems supported the decision to include interactions between each system as independent variables in the regression model.

However, based on the results presented in Table 25, the decision was made to remove community sources system of external influence on the basis of its pair-wise match with other variables in the correlation matrix. In particular, lack of responses from

study participants severely limited the potential sample size for the proposed regression model, which had a minimum pair-wise match of 61 study participants on specific independent variables. Because the inclusion of this variable in the regression model would have limited sample size for the analysis, the community sources system of influence and its interactions were removed from the proposed model. The revised proposed model is presented in Figure 3.

Figure 3: Revised Regression Model A

$$\text{IFB} = a + b_1 (R) + b_2 (E) + b_3 (\text{BBF}) + b_4 (\text{FF}) + b_5 (\text{HDS}) + b_6 (\text{FF} \cdot \text{HDS}) + e$$

Where:

IFB = Current Infant Feeding Behavior

R = Race

E = Education

BBF = Beliefs about Breastfeeding

FF = Family and Friends (System of External Influence)

HDS = Healthcare Delivery System (System of External Influence)

a = Intercept

b_x = Average change in infant feeding behavior associated with one unit change in the independent variable, holding all other independent variables constant

e = Error

Following an exploration of the relationships between the proposed dependent and independent variables, the proposed regression model was constructed using stepwise regression. As outlined, variables were entered to control for socio-demographic characteristics and beliefs about breastfeeding first, followed by systems of external

influence and their interactions. Table 26 displays results of stepwise multiple regression analysis on breastfeeding percentage.

Table 26: Results of Stepwise Regression Analysis Predicting Breastfeeding Percentage on Systems of External Influence

		a	Variable 1	Variable 2	Variable 3	Variable 4	Adj. R ²
			Belief (+): Benefits	Belief (-): Responsibility	Belief (-): Painful	Belief (-): Lifestyle	
Model 1	B	-1.09	0.343				0.255
	β		0.505				
Model 2	B	-0.54	0.352	-0.167			0.301
	β		0.519	-0.237			
Model 3	B	-0.36	0.345	-0.150	-0.058		0.317
	β		0.509	-0.213	-0.147		
Model 4	B	-0.37	0.317	-0.201	-0.072	0.109	0.333
	β		0.467	-0.285	-0.184	0.174	

As indicated, there were four independent variables were statistically significant in forecasting breastfeeding percentage: belief in the benefits of breastfeeding, belief that the breastfeeding mother is fully responsible for infant feeding, belief that breastfeeding is painful, and belief that breastfeeding limits lifestyle habits. The adjusted R² for the model presented was 0.333, indicating that 33.3% of the variance in breastfeeding percentage was explained by the four significant predictors.

Three of the beliefs variables predicted breastfeeding percentage in the expected direction. In particular, belief in the benefits of breastfeeding was a positive predictor of breastfeeding percentage, indicating that a stronger belief in breastfeeding benefits predicted higher breastfeeding percentage. Based on the β coefficients, this variable was the strongest predictor of breastfeeding percentage in the final regression equation ($\beta=0.467$). Similarly, belief that the breastfeeding mother is fully responsible for infant

feeding and belief that breastfeeding is painful were related to breastfeeding percentage in the expected direction. Both were negative predictors of infant feeding behavior, suggesting that stronger beliefs in these disadvantages of breastfeeding would predict lower breastfeeding percentages.

However, the final statistically significant predictor of breastfeeding percentage was not in the anticipated direction. This variable, the belief that breastfeeding limits lifestyle habits, was expected to have predict breastfeeding percentage in a negative direction. That is, the stronger the mother's belief in limitations on her lifestyle, the lower her predicted breastfeeding percentage. However, this variable had a positive coefficient in the final model ($\beta=0.174$; $B=0.109$), indicating that the opposite relationship was suggested by the data.

All four statistically significant predictors were factors of beliefs about breastfeeding, suggesting the role of mothers' beliefs in predicting infant feeding behavior. However, based on research suggesting the influence of external sources on infant feeding behavior (Matich & Sims, 1992), it was expected that at least one of the two systems of external influence (family and friends or the healthcare delivery system) or their interaction would be a significant predictor of infant feeding behavior. To further explore this result, the proposed regression model was tested for multicollinearity to examine whether any of the independent variables were perfectly correlated with one or a combination of other independent variables. The recommended method for testing variables for multicollinearity is to regress each independent variable on the remaining independent variables and to inspect the adjusted R^2 of each model for its proximity to 1.0 (Lewis-Beck, 1980). Using this method for testing multicollinearity, the model

predicting family and friends system of influence had the highest adjusted R^2 at 0.839. In the event of close proximity to 1.0, Lewis-Beck (1980) recommends proposing two alternative models, one of which discards the offending variable and the other of which regresses the dependent variable on the discarded variable.

Family and friends was removed from the original regression model and analysis yielded the same results as presented in Table 26. Additionally, an alternative regression model was proposed that removed the six variables associated with beliefs about breastfeeding, as these variables composed the majority of significant predictors of the family and friends system of influence. For this model, socio-demographic variables were retained to control for differences in race/ethnicity and education level obtained. The three independent variables measuring family and friends system of external influence, the healthcare delivery system of external influence, and their interaction were entered in the alternative regression model. Results of regression analysis on the alternative proposed model are presented in Table 27.

Table 27: Results of Stepwise Regression Analysis Predicting Breastfeeding Percentage on Systems of External Influence (Alternative Model)

		a	Variable 1	Variable 2	Adj. R^2
			Family and Friends System of External Influence	Race/Ethnicity: Black/African-American	
Model 1	B	0.168	0.043		0.133
	β		0.372		
Model 2	B	0.249	0.040	-0.160	0.162
	β		0.348	-0.190	

The alternative regression model was more consistent with literature that emphasizes the influence of family and friends (Dix, 1991; Guttman & Zimmerman, 2000) and race/ethnicity (Baranowski et al., 1983; Blum, 1999; Oyeku, 2003; Park et al.,

2003; Weller & Dungy, 1986) on mothers' feeding behaviors. This regression model possessed two statistically significant predictors of breastfeeding percentage, which included one variable associated with systems of external influence. Indeed, after removing variables related to breastfeeding beliefs from the proposed model, the family and friends system of external influence was a statistically significant predictor of infant feeding behavior. In particular, according to the final regression equation, a one point increase in mean influence from family and friends predicted a 4% increase in breastfeeding percentage when race/ethnicity was held constant.

As well, race/ethnicity was a significant predictor in the alternative regression equation. In particular, being Black/African-American predicted a 16% decrease in breastfeeding percentage when the family and friends system of external influence was held constant.

However, this alternative model explained considerably less of the variation in breastfeeding percentage than the original proposed model. The adjusted R^2 for the alternative model was 0.162, suggesting that 16.2% of the variance in breastfeeding percentage was explained by these two predictors. As indicated on the original model, 33.3% of the variance in breastfeeding percentage was explained by one positive and three negative beliefs about breastfeeding. This suggests that the original model had a better overall fit with the data, and also that the socio-demographic variables need to be considered in concert with systems of external influence.

Study Objective 4:

Predicting Infant Feeding Behavior by Body Image and Attitudes toward Motherhood

The fourth and final objective of the current investigation was to predict infant feeding behavior by mothers' positive and negative perceptions of their bodies and by adjustment to motherhood and the mothering role. A regression model was hypothesized that predicted percentage of breastfeeding on the same three control variables as presented above, in addition to two independent variables and their interaction. These two independent variables, as indicated, included body image and attitudes toward motherhood and the baby. The regression model predicting breastfeeding percentage on these characteristics was outlined in Chapter 3.

The structure of the proposed model resembled that proposed for the third objective. For the model, the dependent variable was measured as breastfeeding percentage. Computation of the percentage was described above; to review, the percentage was a proportion of total times the infant was fed breastmilk in a typical day divided by the total times the infant was fed in a typical day. Again, because it was a proportion, this number could range from zero (no breastfeeding) to one (exclusive breastfeeding). Additionally, several variables were entered into the model at the outset to control for race/ethnicity, education level obtained, and beliefs about breastfeeding. Computation of these variables was described when they were initially introduced in the third study objective.

Six independent variables and one solitary item followed the control variables into the predicted regression equation. The first two of these independent variables were factors extracted from the Body Image subscale in the second study objective. These

factors included positive perception of one's body and negative perception of one's body. The next four independent variables were factors extracted from the Attitudes toward Motherhood and the Baby subscale in the second study objective. Factors extracted from this subscale included personal satisfaction with motherhood, positive experiences with caring for the baby, worries about being a responsible mother, and worries about impacts of motherhood on lifestyle habits. An additional item from this subscale failed to load on any of the four factors and was included in the regression model as a separate variable: "The thought of having more children appeals to me." Items on each subscale were rated on a five-point Likert scale that ranged from strongly disagree (coded as a 1) to strongly agree (coded as a 5). Mean scores were computed for each of the factors by taking the mean of item ratings that comprised each factor.

A correlation matrix was constructed of the dependent variable and all independent variables entered into the regression model to examine the strength and direction of relationships between the variables. As correlations were presented among control variables in Table 25, Table 28 presents the correlation matrix on variables that were unique to the fourth study objective.

Table 28: Zero Order Correlation Matrix of Dependent and Independent Variables in Regression Model B

	1	2	3	4	5	6	7	8	9	10
11) Body Image: Positive Perception	-0.113 166	0.093 165	0.011 166	0.019 166	0.001 168	-0.009 169	0.125 168	-0.021 165	0.158 169	-0.196 161
12) Body Image: Negative Perception	-0.007 165	-0.103 165	0.032 166	-0.057 166	-0.138 167	0.112 168	-0.169 167	-0.114 164	-0.184 168	-0.167 160
13) Motherhood: Personal satisfaction	0.064 165	-0.009 166	0.033 167	-0.049 167	-0.015 167	-0.071 167	0.016 166	-0.013 164	-0.132 167	-0.121 159
14) Motherhood: Positive experiences	0.084 165	-0.101 165	-0.049 166	0.181 166	0.204 167	-0.104 168	0.231 167	0.191 165	0.272 168	0.015 160
15) Motherhood: Worries – responsibility	-0.172 167	0.015 167	0.115 168	-0.172 168	-0.234 169	0.040 169	-0.081 168	-0.169 166	0.026 169	0.069 161
16) Motherhood: Worries – lifestyle	-0.031 166	-0.015 166	0.061 167	-0.118 167	-0.175 168	0.022 169	-0.088 168	-0.095 166	-0.090 169	0.025 161
17) Motherhood: More children appealing	0.093 162	-0.204 164	0.089 165	0.104 165	0.053 164	-0.200 165	0.182 164	0.055 162	0.181 165	0.107 157

■ Correlation significant at the 0.01 level

Italics: Correlation significant at the 0.001 level

(Table 28 continued on next page)

Following an exploration of the relationships between the proposed dependent and independent variables, the proposed regression model was constructed using stepwise regression. As outlined, variables were entered to control for socio-demographic characteristics and beliefs about breastfeeding first, followed by body image factors and factors of attitudes toward motherhood and the baby. Table 29 displays results of stepwise multiple regression analysis on breastfeeding percentage.

Table 29: Results of Stepwise Regression Analysis Predicting Breastfeeding Percentage on Body Image and Attitudes toward Motherhood and the Baby

		a	Variable 1 Belief (+): Benefits	Variable 2 Belief (-): Painful	Variable 3 Race/Ethnic: Black/A-A	Variable 4 Belief (-): Responsibility	Adj. R ²
Model 1	B	-1.12	0.347				0.279
	β		0.533				
Model 2	B	-0.87	0.348	-0.071			0.308
	β		0.534	-0.185			
Model 3	B	-0.71	0.321	-0.066	-0.137		0.330
	β		0.494	-0.172	-0.166		
Model 4	B	-0.42	0.330	-0.057	-0.136	-0.103	0.347
	β		0.507	-0.149	-0.164	-0.147	

As indicated in Table 29, the predicted model explained 34.7% of the variance in breastfeeding percentage. There were four statistically significant predictors of breastfeeding percentage in this model: belief in the benefits of breastfeeding, belief that breastfeeding is painful, race/ethnicity (Black/African-American), and belief that the breastfeeding mother is fully responsible for infant feeding. All significant predictors forecasted breastfeeding percentage in the expected direction. That is, belief in the benefits of breastfeeding was a positive predictor of breastfeeding percentage. In the final model predicting breastfeeding percentage, a one unit increase in mean belief in the

benefits of breastfeeding was predicted to increase breastfeeding percentage by 33.0%, holding all other independent variables constant.

The other three variables were negative predictors of breastfeeding percentage, including two negative breastfeeding sentiment factors and race/ethnicity. In particular, the belief that breastfeeding is painful predicted a 5.7% decrease in breastfeeding percentage with every one unit increase in mean rating of the belief, when all other predictors were held constant. The other negative breastfeeding sentiment factor, belief that the breastfeeding mother is fully responsible for infant feeding, predicted a 10.3% decrease in breastfeeding percentage for every one unit increase in mean rating of the belief. Lastly, race/ethnicity was a significant predictor of the dependent variable and was negatively related to breastfeeding percentage such that being Black/African-American predicted a 13.6% decrease in breastfeeding percentage, holding all other variables constant.

As results of Study Objective 3 suggested, beliefs about breastfeeding were once again significant predictors of mothers' infant feeding behavior. However, once again, the final regression equation obtained did not contain any significant predictors of breastfeeding percentage by the factors related to body image or attitudes toward motherhood and the baby, as hypothesized for the fourth study objective. Independent variables were investigated for multicollinearity by regressing each independent variable on the remaining independent variables. Using this method advised by Lewis-Beck (1980), multicollinearity was not detected among any of the independent variables. In particular, the maximum adjusted R^2 was 0.381 (obtained when belief that breastfeeding limits lifestyle habits was regressed on all independent variables), which was not in close

enough proximity to 1.0 to suggest the presence of multicollinearity. Therefore, to explore the exclusion of body image and attitudes toward motherhood and the baby from the final regression equation, an alternative regression model was proposed that removed beliefs about breastfeeding from the predicted model. This alternative model retained all control variables, including race/ethnicity and two education variables. The model also included the two body image factors, four attitudes toward motherhood and the baby factors, and one solitary item related to the appeal of having more children. Results of regression analysis on this alternative model are presented in Table 30.

Table 30: Results of Stepwise Regression Analysis Predicting Breastfeeding Percentage on Body Image and Attitudes toward Motherhood and the Baby (Alternative Model)

		a	Variable 1	Variable 2	Variable 3	Adj. R ²
			Race/Ethnicity: Black/African-American	Motherhood: Worries – Responsible Mother	Education: Some college	
Model 1	B	0.41	-0.250			0.087
	β		-0.305			
Model 2	B	0.667	-0.250	-0.109		0.124
	β		-0.304	-0.206		
Model 3	B	0.567	-0.251	-0.093	0.128	0.142
	β		-0.305	-0.176	0.156	

The final alternative regression model had three statistically significant predictors of breastfeeding percentage, as outlined in Table 30. Among these three predictors, two independent variables were demographics and the final predictor was one factor of attitudes toward motherhood and the baby: worries about being a responsible mother. On this factor, a one point increase in mean rating on the factor predicted a 9.3% decrease in breastfeeding percentage, holding all other variables constant. The other two significant predictors, race/ethnicity and some college education, were both associated with

breastfeeding percentage in the direction that would be predicted. That is, being Black/African-American predicted a 25.1% decrease in breastfeeding percentage while having obtained at least some college level education predicted a 12.8% increase in breastfeeding percentage.

Once again, the alternative regression equation explained a considerably smaller amount of the variance in breastfeeding percentage than the original regression equation, wherein the above alternative regression equation had an adjusted R^2 of 0.142 (explaining 14.2% of the variance). Compared to the adjusted R^2 of the original regression equation for the current study objective of 0.347, the alternative equation explained a great deal less of the variance in the dependent variable. This result suggests the potential for specification error in predicting breastfeeding percentage if mothers' beliefs about breastfeeding are excluded from the prediction model. A detailed discussion of this and other results of data analysis follow in Chapter 5.

Chapter 5

DISCUSSION

The purpose of the current investigation was to explore low-income mothers' infant feeding behavior in the context of multiple discourses on femininity and multiple contexts of external influence. The study relied on Foucaultian theory to examine these relationships, in which infant feeding was argued as a discursive field that encompassed numerous ways of understanding infant feeding choice and referenced the authority of multiple systems of external influence. In order to explore these associations, four research objectives guided the study, which were explored using primary data obtained from questionnaires administered to WIC clients at sixteen urban WIC clinics and secondary data obtained from the WIC Division of the Michigan Department of Community Health.

To provide a description of the study sample, the first research objective of the study characterized the overall study sample on several characteristics related to infant feeding and other study-related factors and compared these characteristics by urban location. Based on initial discussions with WIC administrators at the state and local level, it was ascertained that differences existed between WIC participants from Kent County and Detroit on two characteristics in particular: racial/ethnic composition and breastfeeding rates of each WIC agency. Hence, differences in the study sample by urban location on these two characteristics were expected prior to data collection. Nonetheless, in order to develop models for predicting infant feeding behavior among low-income women across urban locations, the first study objective compared the study sample by urban location to aid in subsequent study objectives.

A series of characteristics were compared between Kent County WIC participants and Detroit WIC participants, including race/ethnicity and infant feeding behavior, with the understanding that the study samples would most likely differ on these, and potentially other, characteristics. Indeed, racial/ethnic composition and infant feeding behaviors were significantly different between study participants from these two communities. In particular, the Detroit study sample was composed primarily of Black/African-American study participants, consistent with racial/ethnic composition of other clients at the same location. Further, characteristics associated with breastfeeding were significantly different between study participants in the two communities, wherein larger proportions of study participants from Kent County had initiated breastfeeding and were currently breastfeeding. These differences were partially substantiated by differences between the study samples on breastfeeding beliefs, on which Kent County study participants indicated stronger agreement with positive breastfeeding sentiment beliefs and the Detroit study participants indicated stronger agreement with negative breastfeeding sentiment beliefs. Thus, as expected, results of the first study objective suggested there were several significant differences between study samples by urban location. In order to account for these differences in the subsequent predictive models, characteristics that were statistically different between study participants in the two urban locations, and that were suggested by previous literature to be influential in predicting feeding behavior, were included in the regression models as independent variables.

The second study objective aimed to assess measurement reliability of two scales of the Breastfeeding Attrition Prediction Tool (Janke, 1994) and two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984) using

exploratory factor analysis. As the original instruments had been tested among study samples that differed on several characteristics from the study sample for the current study, this objective attempted to extract sub-factors from the original scales that could increasingly aid in predicting infant feeding behavior among low-income populations. It was hoped that sub-factors would emerge that might be more meaningful to the topic of infant feeding among low-income populations.

Factor analysis on the Positive Breastfeeding Sentiment Scale extracted two factors related to positive breastfeeding sentiment, one of which related to the advantages of breastfeeding and the other of which related to the disadvantages of formula feeding. On this scale then, items clustered into positively-worded items and negatively-worded items. A considerable proportion of the variance in positive breastfeeding sentiment was explained by these two factors, of which a large portion was explained by mothers' beliefs in the benefits of breastfeeding alone. This factor was also a strong predictor of breastfeeding percentage in subsequent regression analyses, suggesting that mothers' beliefs in various benefits of breastfeeding may be significant in predicting feeding behavior.

Factor analysis of the Negative Breastfeeding Sentiment Scale extracted three factors and one solitary item, which explained a large portion of the variance in negative breastfeeding sentiment. Interestingly, the factors extracted on this scale seemed to relate to mothers' conflict with dominant constructions of motherhood in the context of their feeding decisions. Dominant discourses of maternal femininity, as theorized by multiple academics (Blum, 1993; Traina, 2000; Wall, 2001; Young, 1990) and conveyed in the empirical work of several researchers (Bialeschki & Michener, 1994; Blum, 1999; Blum

& Deussen, 1996; Murphy, 2000; Schmied & Lupton, 2001), may be constructed to emphasize characteristics of generosity, nurturance, and concern for the well-being of others. The three factors and one solitary item extracted from the Negative Breastfeeding Sentiment Scale (Janke, 1994) appear to indicate a degree of incompatibility between these dominant constructions of motherhood and mothers' ability to conform to those expectations in the context of infant feeding.

For example, consistent with literature suggesting the constraining aspects of breastfeeding on mothers' lifestyle behaviors (Dennis & Faux, 1999; Guttman & Zimmerman, 2000; Li et al., 2002), one of the factors extracted from this scale contained a range of items related to limits on mothers' lifestyle habits. Although dominant constructions of motherhood may devalue mothers' entitlement to an identity external to motherhood and a lifestyle external to the family (Bialeschki & Michener, 1994; Freysinger, 1994; Kelly & Kelly, 1994; Shaw, 1985, 1992), this factor indicates the potential constraints and contradictions inherent in such a limited view of motherhood. As indicated, other factors extracted on this scale were thematically similar to this first factor in addressing mothers' conflict with dominant discourses of maternal femininity.

On the Negative Breastfeeding Sentiment Scale, it is also worthwhile to note that one additional item was developed and tested that read, "It is difficult to find places to breastfeed outside your home." The decision to develop and include this item in data collection was based on literature that suggested breastfeeding in public may influence mothers' decisions about infant feeding and experiences of infant feeding (Sheeshka et al., 2001; Stearns, 1999). In factor analysis, the item had a relatively small factor loading; however, this item loaded on a factor that was subsequently labeled "Belief that it is

difficult to breastfeed outside the home,” suggesting that the addition of this item may have improved reliability of the instrument. Based on this result, it may be advisable for future research to explore the inclusion of this item to assess the contribution of the item to measurement reliability of the instrument.

Factor analysis on the two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984) extracted two factors related to body image that focused on positive perception of one’s body and negative perception of one’s body. Once again, items on each factor clustered into positively-worded items and negatively-worded items related to body image. This result, mirrored in the item patterns on factors extracted on the Positive Breastfeeding Sentiment Scale, indicates that combining positively- and negatively-worded items on one scale may be problematic in attempting to extract factors of these constructs. More specifically, in employing factor analysis to extract sub-factors of positive breastfeeding sentiment and body image, the intention was to extract themes related to meanings—further analysis and potential revision of these items may be advisable.

Factor analysis of items related to attitudes toward motherhood extracted a greater number of factors that clustered by conceptually interpretable themes and one solitary item related to mothers’ orientation toward having more children. Among the extracted factors of this scale, two related to mothers’ satisfaction with her maternal role: “Personal satisfaction with motherhood” and “Positive experiences caring for the baby.” These factors were consistent with maternalist conceptions of motherhood and infant feeding (Blum, 1999). Two other factors extracted from this subscale suggested constraining aspects of the maternal role, including “Worries about being a responsible mother” and

“Worries about impacts of motherhood on lifestyle habits,” which mirrored themes expressed in the factors extracted from the Negative Breastfeeding Sentiment Scale. Additionally, similar themes have emerged in previous empirical research relating mothers’ infant feeding experiences to dominant constructions of motherhood (Blum, 1999; Blum & Deussen, 1996; Murphy, 2000).

Following factor analysis, extracted factors were used in subsequent regression analysis to predict infant feeding behavior by (1) systems of external influence and (2) body image and attitudes toward motherhood and the baby. The theoretical framework of the current investigation drew upon Foucaultian theory to investigate the translation of discourses of maternal and sexual femininity into mothers’ feeding behaviors. Following from these discourses, the Foucaultian perspective of the current study situated knowledge in the context of power, wherein diverse ways of knowing and understanding infant feeding were conjectured to convey authority of individuals and institutions. Based on mothers’ perceptions of this authority, it was suggested that the viewpoints of actors external to the mother-infant dyad may convey authority to the extent that mothers’ infant feeding behavior was associated with the expectations of these individuals. To explore these theoretical relationships, two regression models were proposed that predicted mothers’ feeding behavior on discourses of femininity and external authority.

However, based on the results of both regression analyses, significant predictors of breastfeeding percentage were neither discourses of maternal femininity or sexual femininity, nor were systems of external influence significant predictors of feeding behavior. On the contrary, results indicated that significant predictors of mothers’ infant feeding behavior were primarily positive and negative beliefs about breastfeeding. More

specifically, on both models predicting breastfeeding percentage, belief in the benefits of breastfeeding was the strongest predictor of the dependent variable. In particular, stronger belief in the benefits of breastfeeding predicted a larger breastfeeding percentage. The strength of this characteristic in predicting infant feeding behaviors has been supported by previous empirical research (Jones, 1986, 1987; Losch et al., 1995).

Two other beliefs about breastfeeding were significant predictors of breastfeeding percentage on both models and both were negatively associated with the dependent variable. These negative breastfeeding sentiment factors, the belief that the mother is fully responsible for infant feeding and the belief that breastfeeding is painful, were both negatively associated with breastfeeding percentage. Literature supports the significance of these predictors, suggesting that mothers' concerns about themselves and their lifestyles are important, although potentially overlooked, factors in mothers' decisions about their infant feeding behaviors (Arafat et al., 1981; Murphy, 2000). Further, as indicated, such factors related to negative breastfeeding sentiment seemed to relate to dominant constructions of motherhood in the context of infant feeding behavior. Therefore, although these factors were categorized as negative beliefs about breastfeeding, they may suggest that discourses of maternal femininity were in fact significantly associated with mothers' feeding behavior.

Consistent with the literature (Baisch et al., 1989; Baranowski et al., 1983; Park et al., 2003), infant feeding behavior had a negative correlation with race/ethnicity such that lower breastfeeding percentage was associated with being Black/African-American. This was also a significant predictor of infant feeding behavior in the second regression equation predicting feeding behavior on maternal body image and attitudes toward

motherhood and the baby, wherein being Black/African-American was a negative predictor of breastfeeding percentage. Based on the differences between the Kent County study sample and the Detroit study sample on both of these characteristics, it is likely that differences in breastfeeding rates between the larger WIC client groups at each location are at least partially related to the differences in racial/ethnic composition at each location.

The combination of positive and negative predictors of infant feeding behavior on both regression models supports the Foucaultian contention that discourses and bodies of knowledge on infant feeding are not necessarily complementary. Quantitative exploration of such concepts provided a unique approach to Foucaultian theory; relying on quantitative methodology, this approach yielded several findings that support his theoretical framework. Indeed, although mothers' belief in the benefits of breastfeeding was a significant positive predictor of breastfeeding percentage, mothers' understandings of the limitations of breastfeeding on personal lifestyle and independence indicate that some bodies of knowledge surrounding breastfeeding, motherhood, and independence may be contradictory and constraining. Foucaultian theory supports such a divergence of bodies of knowledge surrounding a topic, specifically with reference to the diversity of individuals and institutions that espouse these bodies of knowledge. This is a particularly relevant finding in relation to the authority of the medical institution in constructing knowledge on the topic of breastfeeding. As an authority on medical knowledge of infant health, the finding suggests the necessity of medical programs that not only promote these benefits of breastfeeding, but also acknowledge and give credence to mothers' concerns about the limitations of breastfeeding.

Managerial Recommendations

Following from this, managerial implications of the current investigation strongly emphasize critical evaluation of personal and institutional assumptions about responsible motherhood. Across two unique models of breastfeeding percentage, three beliefs about breastfeeding were consistently significant predictors of this characteristic. The first, belief in the benefits of breastfeeding, was the strongest predictor of greater breastfeeding percentage on both models. Beliefs associated with this factor related to beliefs in the infant health benefits of breastfeeding, greater bonding between the mother and the infant, personal satisfaction with the experience of breastfeeding, and the convenience of breastfeeding. As a strong predictor of greater breastfeeding percentage, fostering beliefs in these potential benefits of breastfeeding may have the potential to increase the proportion of feedings that mothers select to breastfeed their infants rather than formula feed their infants. However, previous empirical research on this belief has indicated that typically this belief is strong even among mothers that decide not to initiate breastfeeding (Brownell et al., 2002; Gabriel et al., 1986; Schmied & Lupton, 2001). Thus, it may be advisable for healthcare initiatives to redirect a portion of their efforts in a direction with some promise for fostering greater understanding between the messages of the healthcare delivery system and the needs of mothers.

If the healthcare delivery system is to continue to promote the benefits of breastfeeding to its clients, it may be useful to note that, for the current investigation, belief in the benefits of breastfeeding was strongly correlated with the influence of family and friends, the healthcare delivery system, and community sources. This result suggests that, in addition to the healthcare delivery system as a staunch promoter of breastfeeding

and positive breastfeeding sentiment, two other resources exist for promoting positive beliefs about breastfeeding. In particular, involvement of family and friends whose opinions are valued by the mother during prenatal and postpartum care may promote positive breastfeeding sentiment among family, friends, and the mother. This tactic for increasing breastfeeding initiation and duration has been recommended in numerous studies, particularly with reference to the baby's father (Humphreys et al., 1998; Isabella & Isabella, 1994; Matich & Sims, 1992). However, in developing approaches to involving these individuals, equal emphasis and consideration should be placed on the recruiting and involving the range of individuals that are most significant to the mother. These individuals may or may not include the baby's father and, based on research that suggests greater reliance on social networks of friends and extended family among minority populations (Blum, 1999; Blum & Deussen, 1996; Dominguez & Watkins, 2003), efforts to involve family and friends should be sensitive to involving not only the baby's father, but also the (grand)mother, close friends, and extended family members.

Two other beliefs about breastfeeding were also consistently significant predictors of breastfeeding percentage in the opposite direction. Stronger agreement with two beliefs, the belief that the breastfeeding mother is fully responsible for infant feeding and the belief that breastfeeding is painful, predicted lower breastfeeding percentage. Items on these beliefs related to mothers' exclusive responsibility for breastfeeding, burdens of breastfeeding on the mother, and mothers' experiences of physical discomfort while breastfeeding. Consistent throughout all of these items was a focus on the needs and desires of the mother, wherein the items suggested that mothers' needs and desires were in opposition to breastfeeding the infant. These results suggest a promising direction for

future healthcare initiatives aimed at promoting infant and maternal health, most notably through the affirmation of mothers' needs and wants in her infant feeding decisions.

In order to alleviate mothers' negative sentiment toward breastfeeding in the context of constraints on her own needs and desires, it may be advisable for healthcare delivery professionals to coach new mothers on the benefits of breastfeeding that are exclusive to the mother. In particular, fostering greater belief in the benefits of breastfeeding might reference the benefits derived from breastfeeding that are exclusive to the mother. Two practical considerations, convenience and economic advantages, were associated with a belief in the benefits of breastfeeding. The economic advantages of breastfeeding has relatively exclusive benefits for the mother; however, acknowledging that the WIC program provides free formula to non-breastfeeding mothers, it may be challenging to promote the financial benefits of breastfeeding to mothers that participate in this program and who would not be required to pay for formula in any case. Nonetheless, the strength of mothers' beliefs in the benefits of breastfeeding in predicting infant feeding behavior suggests that it may be advisable to counsel mothers on the practical benefits of breastfeeding as exclusive to the mother. In the specific context of WIC participants, it may be important to focus on the advantage of convenience over economics.

Additional emphasis on the exclusive benefits to the mother may focus on emotional motivations, including personal satisfaction and closeness to the infant. Indeed, an unscientific review of informational materials provided to mothers at both of the participating WIC agencies indicated that this approach is emphasized. However, it should be noted that these benefits are closely bound to constructions of motherhood that

equate maternal satisfaction with attending to the needs of others, which, as noted, may conflict with mothers' concern for their own needs and desires. If the emotional benefits are promoted delicately, that is, with careful sensitivity to dominant ideologies about the care-taking roles of mothers, emotional benefits derived exclusively by the mother may be another approach to promoting the benefits of breastfeeding.

Along these same lines, based on the strength of mothers' concerns for themselves in negatively predicting infant feeding behavior, it is important that mothers' concerns for themselves are not discounted in counseling mothers in their infant feeding behaviors. In particular, healthcare professionals should be careful not to displace mothers' concerns about their own needs and desires with automatic praise of the benefits of breastfeeding, regardless of whether the benefits are exclusive to the mother, the infant, or shared between both. Wall (2001) has noted the abundance of breastfeeding promotion materials that address mothers' concern for others, with relative ignorance of mothers' concern for themselves. Following from this research and results of the current study, it is important that healthcare delivery professionals give credence to the very real, and predictive, concerns of mothers regarding impacts of breastfeeding on themselves and their lifestyle.

Research Implications

Contrary to the proposed models of infant feeding behavior for the current investigation, discourses of maternal and sexual femininity and the authority of external influences were not significant predictors of mothers' infant feeding behavior. However, extracted factors of the Positive and Negative Breastfeeding Sentiment Scales appeared to address themes related to maternal femininity and concerns about mothers' autonomy.

Based on this result, measurement of the constructs warrants further assessment in future studies. For the current investigation, instrumentation developed by Janke (1994) was used to measure external influence on mothers' feeding decisions, while instrumentation developed by Kumar, Robson and Smith (1984) was used to measure body image and attitudes toward motherhood and the baby. Factor analysis was performed on all of these instruments to extract factors of each of these constructs which, when entered into predictive models, were not significant predictors of feeding behavior. The statistical insignificance of these measures in predicting feeding behavior contradicts previous research suggesting the influence of external actors (Humphreys et al., 1998; Isabella & Isabella, 1994; Matich & Sims, 1992), sexuality (Jones, 1987; Maehr et al., 1993; Shaw, 2003; Stearns, 1999; Young, 1990), and maternal femininity (Arafat et al., 1981; Murphy, 2000) on mothers' feeding decisions.

Based on these results, it is recommended that future research qualitatively examine this instrumentation to enhance reliability of the measures and validity of the constructs. In particular, qualitative review of items on the existing instruments is recommended to determine the reliability of existing items in relation to more recent findings on infant feeding behavior. Relying on qualitative assessment of infant feeding issues relevant to populations of low-income women, future research may attempt to modify items on these existing scales to contain items and issues supported in qualitative literature.

Quantitative exploration of the existing scales may also be advisable using experimental design, wherein influence, body image, and attitudes toward motherhood and the baby are explored during pregnancy (potentially at several intervals) and after

birth to temporally track changes in expectant mothers' transition into motherhood. Existing subscales of the Maternal Attitudes and Maternal Adjustment Questionnaire (Kumar et al., 1984) already contain these two item formats that facilitate asking questions during pregnancy and after birth. Formats of the external influence items would need to be revised to facilitate this exploration.

Also in relation to the wording of questionnaire items, it is recommended that future research examine the extent to which instrumentation that combines positively-worded and negatively-worded items affects the reliability of the instrument. For the current investigation, factor analysis of the existing instrumentation on body image and attitudes toward motherhood and the baby almost exclusively extracted factors that contained items with either positively-worded items or negatively-worded items. As indicated, the intention of factor analysis on these items was to extract subfactors of meanings—not grammatical structure—related to these constructs. Revision of these existing instruments might therefore incorporate an alignment of all questionnaire items so that they are either positively-worded or negatively-worded to explore whether factor analysis extracts similar categories of items.

This recommendation also extends to the items on beliefs about breastfeeding, wherein items almost exclusively grouped on the Positive Breastfeeding Sentiment Scale by whether they were oriented toward breastfeeding or away from formula feeding. The recommendation to further assess instrumentation using qualitative techniques also applies to this scale, as existing items may be worded to measure something altogether different from the intention of the item or whole categories of beliefs about breastfeeding supported in the literature may not yet exist on the current instrument.

It should also be noted that beliefs about breastfeeding were included in the study to control for mothers' personal beliefs about the advantages and disadvantages of breastfeeding. However, based on the results of data analysis, beliefs about breastfeeding were the strongest predictors of infant feeding behavior. Based on these results, it is advised that future research conduct further exploration of the antecedents of beliefs about breastfeeding, including how and when beliefs about breastfeeding are shaped, the individuals that have the potential to influence beliefs, experiences and observations that affect beliefs, and other factors that are associated with the development and change in beliefs about breastfeeding.

Study Limitations

Stemming from the above issues related to measurement, it must be noted that individual measures and complete scales used for the current study were limited in their ability to capture the immense complexity of concepts such as sexual femininity, maternal femininity, social influence, and beliefs about breastfeeding. Admittedly, issues surrounding body image provide only one slice of information about women's feelings of sexual femininity, just as maternal adjustment can only illuminate a small portion of mothers' interpretations of their own maternal femininity. Acknowledging this limitation in the development of the study instrument, it was nonetheless decided that the information that could be provided from the items and scales included on the instrument were indicators of these concepts. Suggestions for use of these scales in future studies has been discussed among the research implications of the current investigation.

Additionally, several factors associated with the process and outcomes of data collection were also limiting characteristics in this study. The first of such characteristics

was sample size, which was considerably smaller than proposed in the original study proposal. Following discussions in April/May 2003 with WIC administrators and staff at the state and local level, it was anticipated that a sample of 100-200 study participants could be recruited from each of the participating urban locations in a span of three weeks of questionnaire administration in June/July 2003. During this three week data collection period, discussions were conducted approximately once every week with the WIC coordinator at each urban location to determine progress of data collection. In these discussions, it became apparent that three weeks of data collection was insufficient to recruit the desired number of study participants from each urban location. Accordingly, the study timeline was extended by a period of four weeks to obtain larger study samples from each site.

Throughout the data collection timeline, conversations were held with the WIC coordinators to explore reasons for low participation. There were several reasons cited by coordinators for the apparent discrepancy between anticipated study participation and actual study participation, which ultimately led to an extended timeline for survey administration. First, the coordinators expressed concern with the amount of internal WIC paperwork required from WIC participants that were recently postpartum and that were also being recruited for the study. As expressed by the coordinators, in order to obtain WIC certification for herself and her newborn infant, new mothers were obligated to complete a Postpartum Health History for herself and an Infant Health History for her newborn infant. Each of these documents consisted of approximately six pages of questions about mothers' and infants' demographics and household characteristics, general health, nutrition and environmental characteristics, and infant feeding behaviors.

Based on this amount of intensive information required from new mothers for internal WIC records, WIC coordinators were uncertain about mothers' willingness to complete an additional six pages of questions for the study. Regardless of this internal WIC paperwork, mothers may have been intimidated by sheer length of the instrument, which is contained in Appendix B.

Second, the study made use of self-administered questionnaires to collect primary data on study participants. Questionnaires were only made available in English and, in most cases, WIC clinics did not have staff resources available to read the questionnaire orally to study participants. This required that potential study participants were literate in English and that they were able to independently read and understand items on the questionnaire. Acknowledging these factors, attempts were made to adjust the language of the instrument to an appropriate reading level for WIC populations that were literate in English and to minimize the effect of education on ability to participate in the study. The instrument was reviewed by WIC staff and administrators prior to administration and approved for WIC participants. Nonetheless, the nature of the methodology may have limited participation by some potential study participants.

Third, WIC coordinators' observations of new mothers in the waiting area included the reflection that many new mothers attended their WIC appointment with their newborn infant and potentially other children. Although some mothers attended their appointment with another adult, WIC coordinators noted that the majority of women were caring for their newborn infant, and potentially other children, independently in the clinic waiting area. Mothers' priority to attend to her children during the waiting period, which could potentially last for an hour or longer, may have been a factor in deterring

some mothers from participating in the study. These observations were confirmed by the researcher during a visit to one of the WIC clinics managed by the Detroit City Health Department.

An additional issue related to the small obtained sample size was related to sensitive management of staff and management at the participating WIC clinics by the researcher. Throughout the data collection period, minimal direct contact was maintained between the researcher and WIC clinic staff. Specifically, most study-related information was mediated through a third party, namely the WIC coordinator for each urban location. Considering the large amount of responsibility placed on WIC clinic staff for data collection, neglect of this specific relationship may have induced negative sentiment toward the study or limited widespread knowledge of the study among staff employed throughout the sixteen participating WIC clinics. In retrospect, greater attention would have been directed to WIC staff and this relationship would have been treated much more sensitively. The researcher's experience administering questionnaires at the WIC clinic in Detroit confirmed the need for additional resources to assist staff in administering questionnaires and to ease the burden on the WIC clientele. However, owing to the extensive costs of placing research personnel at all sixteen clinics, this was outside the scope of the current investigation.

Based on the extension of the data collection timeline, the date of secondary data extraction was another limiting characteristic of the current investigation. Specifically, this limited the ability for the current investigation to draw conclusions about the two urban WIC populations based on results of the study. Relying on the original study timeline of three weeks, secondary data extraction was conducted at the end of June 2003

to capture WIC clients that were active WIC participants at the same time of data collection. However, as indicated, this timeline was extended by four weeks owing to the small number of completed questionnaires collected after the initial three weeks of data collection. As a result, approximately four weeks of new enrollees were not captured in the secondary data set and secondary data on several study participants was unmatched.

Further, despite the ability to compare characteristics of the study sample with other WIC clients at the same location, sampling procedures for the current study were not random. Survey administration commenced in mid-June and concluded at the end of July 2003, accounting for only a portion of the yearly WIC client base. All WIC clients that met the eligibility requirement of zero to three months postpartum and that were willing to participate in the study were given the opportunity to complete a questionnaire. Absence of random sampling procedures limited the ability to generalize results to the larger WIC client groups at each of these locations.

However, one particular strength of the current investigation was the availability of secondary data on the study sample and the larger group of active WIC clients enrolled at each WIC clinic, which enhanced the researcher's ability to ascertain the degree to which the study sample was representative of other WIC clients at the same location. Three groups were compared to investigate the degree to which the study sample was representative of other WIC clients that were eligible to participate in the study (0-3 months postpartum) and other WIC clients that were ineligible to participate in the study (pregnant or greater than 3 months postpartum). Overall, comparisons between the three groups indicated that the study sample from each urban location was moderately representative of other WIC clients that would have been eligible to participate in the

study and slightly less representative of ineligible WIC clients from each urban location. More specifically, in the context of socio-demographic characteristics, the study sample recruited for the current investigation was, for the most part, representative of other WIC clients in the same urban location.

Most notably, differences between the study sample and the eligible and ineligible WIC client groups from each location were statistically significant on education level obtained, whereby the study sample at each location possessed a larger proportion of women that had obtained at least some college-level education. As the literature suggests a positive relationship between breastfeeding initiation and duration and level of education (Grossman et al., 1989; McLeod et al., 2002; Quarles et al., 1994), this difference in education level obtained between the study sample and the eligible and ineligible WIC client groups at each location was one limitation of the current study. In particular, based on the significant role of education suggested by these previous studies, the ability for the current investigation to make predictions about other WIC clients at each urban location may have been limited by this result.

Other significant socio-demographic predictors of infant feeding behavior cited in the literature (Kurini et al., 1988; Maher, 1992; Oyeku, 2003; Quarles et al., 1994), including race/ethnicity and mother's age, were similar between each location's study sample and its corresponding eligible and ineligible WIC client groups. In the context of other characteristics of the study sample and the eligible and ineligible WIC client groups at each urban location, the study sample was representative of other WIC clients to a fair extent. Although there were relatively few significant differences between the study sample and the WIC client groups on participation in other maternal-child support

programs or characteristics associated with prenatal care, there were significant differences on infant feeding behavior between these three groups. However, upon further analysis, these differences were more likely attributable to differences in infant age across the three groups. Based on these results, the study sample from each urban location was similar to the larger eligible WIC client group on more characteristics than they were different.

Conclusion

This study commenced with the purpose of exploring breastfeeding in its social context, both with reference to mothers' systems of social influence and mothers' beliefs about their maternal and sexual femininity. One of the most prominent results in this exploration was the significance of mothers' concerns about themselves in predicting infant feeding behaviors. From a Foucaultian perspective, this result suggests the potential for decision-making conflict in the presence of maternal discourses on infant feeding. Other discourses of femininity and resulting bodies of knowledge on infant feeding, although supported in the literature, were not supported in the current study.

This apparent incongruence with previous literature underscores the need for further research on discourses of femininity, sources of external influence that espouse diverse discourses, and resulting bodies of knowledge surrounding infant feeding. One of the most fundamental directions in which future research may move is toward enhanced measurement of these constructs using both qualitative and quantitative methods. Existing quantitative instrumentation on these constructs, some of which was used in the current investigation, remains in early stages of testing and refinement. The results of this

study stress the importance of even further theme development and testing to attempt to enhance measurement of these complex constructs.

Based on the results obtained in the current investigation, this research also has multiple implications for practice, particularly with reference to maternal discourses on femininity and mothers' beliefs about breastfeeding. In practice, mothers may outwardly express concerns about their personal lifestyle or, on the basis of prevailing norms regarding motherhood, may inwardly struggle with standards of responsible motherhood that necessitate breastfeeding. This may signal considerable conflict for some mothers in assessing their infant feeding options. For healthcare professionals, these concerns may require particular sensitivity to mothers' beliefs about the constraining effects of breastfeeding on their lifestyles and personal autonomy.

Indeed, the results of this study underscore the importance of greater sensitivity toward mothers from multiple members of their social networks. It is apparent that mothers' infant feeding choices are not made in the isolated context of the mother-infant dyad. Rather, mothers' understandings of responsible motherhood suggest that their behaviors and beliefs are shaped in a larger social context. Consistent with the Foucaultian perspective taken in this study, it is paramount that mothers' infant feeding choices are treated as complex decisions that reference these multiple social contexts.

Appendix A

MEASUREMENT OF FACTORS RELATED TO MOTHERS' INFANT FEEDING BEHAVIOR

Several scales have been developed that measure factors related to motherhood and infant feeding choices, outlined in Table A1.

Table A1: Measurement of Factors Related to Motherhood and Infant Feeding

	# of Items	Reliability
Maternal Adjustment and Maternal Attitudes <i>Kumar, Robson and Smith (1984)</i>	60	
1) Body image	12	0.72
2) Somatic symptoms	12	0.58
3) Marital relationship	12	0.74
4) Attitudes to sex	12	0.82
5) Attitudes to pregnancy/motherhood and the baby	12	0.73
Infant Feeding Questionnaire <i>Dusdieker, Booth, Seals and Ekwo (1985)</i>	37	
1) Worries about own health and family's health	4	0.92
2) Maternal beliefs in preventive health behavior	4	0.71
3) Maternal breastfeeding beliefs	6	0.87
4) Maternal beliefs in personal satisfaction from breastfeeding	3	0.70
5) Maternal breastfeeding worries	6	0.75
6) Maternal anxiety before breastfeeding began	2	0.78
7) Maternal worries about lack of psychosocial support	2	0.91
8) Influence of resource materials	2	0.74
9) Influence of breastfeeding women	2	0.65
10) General support for breastfeeding	2	0.84
11) Public influences on decision to breastfeed	4	0.75
Social Support for Breastfeeding Scale <i>Matich and Sims (1992)</i>	17	
1) Tangible support	7	0.88
2) Emotional support	5	0.94
3) Informational support	5	0.93
Breastfeeding Attrition Prediction Tool <i>Janke (1994)</i>	51	
1) Negative breastfeeding sentiment	15	0.83
2) Positive breastfeeding sentiment	14	0.79
3) Social and professional support	12	0.85
4) Breastfeeding control	10	0.81
Breastfeeding Self-Efficacy Scale <i>Dennis and Faux (1999)</i>	39	
1) Technique	21	0.94
2) Intrapersonal thoughts	13	0.93
3) Support	5	0.75

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Mothers' ability to adjust to maternal roles was the topic of the Maternal Adjustment and Maternal Attitudes Questionnaire, developed by Kumar, Robson and Smith (1984). Although the scale was not developed with specific emphasis on mothers' infant feeding choices, specific subscales may contribute to understanding the maternal role negotiation processes that influence mothers' decision-making processes. Survey items were developed from unstructured interviews with mothers involved in prenatal education and childbirth classes. The instrument, containing 91 items related to the maternal role, was tested among two samples of clients at an antenatal clinic in London.

Following item analysis, five subscales were extracted that each contained twelve items: body image, somatic symptoms, marital relationship, attitudes to sex, and attitudes to pregnancy/motherhood and the baby. Sample items ask about mothers' feelings in the past four weeks and included: "Have you felt attractive?" (body image), "Have you felt faint or dizzy?" (somatic symptoms), "Have you found it easy to show affection to your partner?" (marital relationship), "Have you found your partner sexually desirable?" (attitudes to sex), and "Have you enjoyed caring for your baby's needs?" (attitudes to pregnancy/motherhood and the baby). Items were randomly scattered throughout the 60-item instrument and were measured on two four-point Likert scales: never, rarely, often, very often and not at all, a little, a lot, and very much.

Although several items on the questionnaire developed by Kumar, Robson and Smith (1984) related to infant feeding, the questionnaire was not developed as an instrument specific to this discursive field. As one of the first attempts to standardize measures related exclusively to infant feeding choices, the Infant Feeding Questionnaire (Dusdieker et al., 1985, p. 695) was a scale that added complexity to "oversimplified"

models of the specific discursive field of infant feeding. Although previous studies had attempted to quantify influences on infant feeding choices, the researchers critiqued these studies for exploring relationships of distinct constructs with infant feeding choices. As a result, the Infant Feeding Questionnaire was developed for two purposes: (1) to quantify and standardize concepts involved in women's initial infant feeding decision and (2) to use multivariate analysis to examine primary and secondary influences on infant feeding choices.

Survey items were developed by the researchers following semi-structured interviews with women that had chosen to breastfeed their infants. The final instrument contained 49 items that addressed personal and familial health concerns, maternal beliefs in preventive health behaviors, positive attitudes toward breastfeeding, worries about breastfeeding, social influences on the initial infant feeding decision, and availability of sources of social support. The researchers surveyed 157 first-time mothers that had chosen to exclusively breastfeed ($n = 100$) or exclusively formula feed ($n = 57$). The sample was recruited from four pediatric practices in two Midwest towns.

Factor analysis extracted 11 subscales involved in the initial infant feeding decision: worries about their own and family's health (4 items, $\alpha = 0.92$), maternal beliefs in preventive health behavior (4 items, $\alpha = 0.71$), maternal breastfeeding beliefs (6 items, $\alpha = 0.87$), maternal beliefs in personal satisfaction from breastfeeding (3 items, $\alpha = 0.70$), maternal breastfeeding worries (6 items, $\alpha = 0.75$), maternal anxiety before breastfeeding began (2 items, $\alpha = 0.78$), maternal worries about lack of psychosocial support (2 items, $\alpha = 0.91$), influence of resource materials (2 items, $\alpha = 0.74$), influence of breastfeeding women (2 items, $\alpha = 0.65$), general support for breastfeeding (2 items, α

= 0.84), and public influences on the decision to breastfeed (4 items, $\alpha = 0.75$). Among the twelve items removed following factor analysis, two items were removed from the instrument that would appear particularly influential in mothers' infant feeding choices. "The influence of the baby's father" and "advice from health care personnel" clustered together and both were removed because they appeared to measure different concepts. Nonetheless, these items were included separately as independent variables in regression analysis and causal diagram due to their face validity.

The instrument's multidimensional treatment of mothers' infant feeding choices allowed researchers to move beyond bivariate analyses of factors related to infant feeding decisions. However, the sampling method for the study may have limited the content validity of the instrument. The researchers recommended further testing of the instrument with ethnically and racially diverse populations, as participants for the study were recruited from towns with predominantly white populations. Even so, the Infant Feeding Questionnaire (Dusdieker et al., 1985) was a foregoing attempt at synthesizing multiple constructs into a model of mothers' infant feeding choices.

Subsequent scales added complexity to constructs measured in the Infant Feeding Questionnaire (Dusdieker et al., 1985). Responding to the alleged absence of a model addressing the complexity of the social support construct alone, Matich and Sims (1992) developed a social support instrument to measure the sources, types and amounts of mothers' perceived social support. The researchers argued that the social support construct in particular "is complex and appears multidimensional in nature" (Matich & Sims, 1992, p. 920). Indeed, measures of social support in previous research focused on one aspect of social support with little attention to multiple aspects of the construct.

Accordingly, the model developed by Matich and Sims (1992) attempted to identify sources of social support with particular focus on aspects and amounts of perceived social support from each source. Questionnaire items were developed to reflect three aspects of support – tangible, emotional, and informational – which the researchers suggested may have independent effects on physical and mental health outcomes (Matich & Sims, 1992).

Respondents were asked to consider 23 items for each of nine sources of social support. Sample items included: “Takes me to the doctor’s or other places I need to go” (tangible), “Cares about how I’m feeling and how the pregnancy is going” (emotional), and “Teaches me how to do some things like getting prepared for breastfeeding” (informational) (Matich & Sims, 1992). For each item, respondents were presented with five Likert-type responses: no help at all, helps a little, fairly helpful, very helpful, and extremely helpful.

Questionnaires were administered to 159 women in their third trimester enrolled in prenatal classes and clinics, including a WIC clinic, in a rural area of Pennsylvania. A greater number of respondents indicated an intention to breastfeed their baby (breastfeed, $n = 85$; formula feed, $n = 74$), and only women that indicated an intention to breastfeed were asked to complete a second questionnaire at four weeks postpartum. Following factor analysis, three subscales composed of seventeen total items were included in the revised social support scale (tangible: 7 items; emotional: 5 items; informational: 5 items).

Just as the Social Support for Breastfeeding Scale (Matich & Sims, 1992) enhanced the complexity of the social support construct in predicting women’s infant feeding choices, the scale developed by Dennis and Faux (1999) added complexity to

maternal confidence as a predictor of these choices. The Breastfeeding Self-Efficacy Scale (Dennis & Faux, 1999) was developed to explore the relationship between maternal confidence in ability to breastfeed and breastfeeding duration. The instrument was based on self-efficacy theory, which locates individuals' decisions and endurance in the context of individuals' evaluation of their own ability to perform those behaviors. As a result, the instrument was developed as a predictor of premature weaning among breastfeeding mothers.

The researchers identified and developed measures for three dimensions of self-efficacy: technique, intrapersonal thoughts, and support. Following a review of literature, expert review and an initial pilot-test, the final instrument contained 43 items. Items began with the phrase, "I can always..." and listed specific experiences or feelings related to breastfeeding. Sample items included: "Manage the breastfeeding situation to my satisfaction" (technique), "Keep feeling that I really want to breastfeed my baby for at least six weeks" (intrapersonal thoughts), and "Express my breastmilk if I need to" (support). Respondents were asked to reply using a five-point Likert scale that ranged from "not at all confident" to "always confident."

The Breastfeeding Attrition Prediction Tool (Janke, 1994) was developed to examine predictors of premature weaning among breastfeeding mothers. The instrument relied on the assumptions of the Theory of Reasoned Behavior, which situates individuals' decisions and behaviors within the context of three constructs: desired outcomes (attitude), social reaction (subjective norm), and perceived control (control). Focusing on measures that were largely social, questionnaire items were developed from

a review of literature, clinical experience, and personal interviews with postpartum women.

Following an initial pilot of the instrument to refine items, a sample of 201 breastfeeding mothers was recruited from postpartum units of two urban hospitals to test scale reliability (Janke, 1994). Study participants were eligible if they had indicated an intention to breastfeed for at least eight weeks. The instrument contained 51 unique items measuring mothers' attitudes toward breastfeeding (attitude), influence of others (subjective norm), and perceived ability to overcome constraints to breastfeeding (control). The attitude and subjective norm constructs were each measured in two sets of questions to explore perception and importance of each item.

Factor analysis extracted four subscales: negative breastfeeding sentiment (15 items, $\alpha = 0.83$), positive breastfeeding sentiment (14 items, $\alpha = 0.79$), social and professional support (12 items, $\alpha = 0.85$), and breastfeeding control (10 items, $\alpha = 0.81$). These subscales drew on the strengths of the Infant Feeding Questionnaire (Dusdieker et al., 1985) by treating mothers' infant feeding choices as a multidimensional construct. Further, the instrument drew on the strengths of the Social Support for Breastfeeding Scale (Matich & Sims, 1992) in that it operationalized the social support variable as a multidimensional variable composed of perception of support and motivation to comply.

Nonetheless, as an evolving instrument, Janke (1994) acknowledged that study limitations warrant further testing of the instrument. All items remained in the instrument following factor analysis due to a low criterion for removal (factor loading less than 0.30). Only one item loaded below this level (social and professional support: "the baby's father"), but remained in the instrument due to the item's face validity. Further, the

sample for this instrument was adult women that were primarily white (88%), married (80%), educated beyond high school (66%), and middle- to upper-income (69%) (Janke, 1994, p. 101). As a result of these limitations, the researcher advised testing the instrument among larger samples and diverse populations to further refine and shorten subscales, emphasizing the need to maintain subscales' reliability and validity (Janke, 1994, p. 104).

Based on a review of these studies that used these scales, a decision was made based on three criteria to include two subscales of the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984) and three scales from the Breastfeeding Attrition Prediction Tool (Janke, 1994) in this study. The decision criteria in order of priority was: (1) the applicability of the scale to the objective of this study; (2) description and discussion of the reliability of the measure; (3) applicability to the sample in this proposed study.

From the Maternal Adjustment and Maternal Attitudes Questionnaire (Kumar et al., 1984), two subscales of Body Image and Attitudes toward Motherhood and the Baby were used to measure respondents' feelings of sexual attractiveness and maternal femininity. Reliability for the original subscales was established through test-retest and split-half methods; reliability reported in Table A1 is based on the split-half test of reliability. However, the sample drawn to test reliability of the original instrument was predominantly married or stably cohabiting with the baby's father (Kumar et al., 1984). For the current investigation, marital status among the sample was considerably more diverse and, based on extracted factors of these two subscales, added to the reliability of the subscales among a more diverse sample on the basis of the marital status

characteristic. Consistent with the objectives of this study, the decision was made to test the reliability of these two subscales among this sample and to evaluate the predictability of mothers' feeding behavior on these two measures.

From the Breastfeeding Attrition Prediction Tool (Janke, 1994), three scales were selected to measure beliefs about breastfeeding (Negative Breastfeeding Sentiment Scale and Positive Breastfeeding Sentiment Scale) and sources of external influence (Social and Professional Support Scale). Scales were developed separately and tested using exploratory factor analysis. However, as with the scale above, the sample drawn to test this instrument was predominantly married, and the majority of the sample was white, educated beyond high school, and middle- to upper-income. As a result, the decision was made to test the reliability of instrument scales with a more diverse sample, particularly with reference to race, education and marital status. The scales were used to accomplish Study Objective 2, which aimed to test instrument reliability among the current sample, and Study Objective 3, which aimed to predict mothers' feeding behavior on sources of external influence.

Appendix B
SURVEY INSTRUMENT



Infant Feeding Decision Study

Dear WIC Client,



Our WIC Clinic is working with a student at Michigan State University. We want to learn how women make choices about infant feeding. You can help us by filling out a survey while you wait for your appointment. The answers you provide can help WIC staff better serve WIC clients.

Women who take part in this study will be entered into a prize drawing. The prize is one of eight \$25 gift certificates to a local grocery store. If you wish to be included in this drawing, please enter your name and contact numbers on the card attached to this survey.



Your opinions are very important to us! Thank you for participating in this study!

Sincerely,

Nancy Erickson
WIC Coordinator
Detroit City Health Department

Allison Churilla
Graduate Student
Michigan State University



Please write your WIC identification number: _____



Please answer the following questions about your baby and how you feed your baby. Your name will not appear in any reports and your answers will only be reported by group.

1) When was your baby born? _____ / _____ / _____
Month Day Year

2) Is your baby? (Please only one.)
 Male Female

3) Have you ever—at any time—fed your baby breastmilk? (Please only one.)
 Yes No
 ↓ ↓

If Yes:

a) When did you first decide that you would feed your baby breastmilk? (Please only one.)

- Before I became pregnant
- In the first 3 months of my pregnancy
- In the second 3 months of my pregnancy
- In the third 3 months of my pregnancy
- After my baby was born

b) Have you ever used a breast pump to pump breastmilk for your baby? (Please only one.)

Yes No

c) Has your baby been fed breastmilk in the past week? (Please only one.)

Yes No
 ↓

If **no**, how old was your baby when you stopped feeding breastmilk?
 _____ weeks old

If No:

a) When did you first decide that you would not feed your baby breastmilk? (Please only one.)

- Before I became pregnant
- In the first 3 months of my pregnancy
- In the second 3 months of my pregnancy
- In the third 3 months of my pregnancy
- After my baby was born

4) Currently, how many times is your baby usually fed...

a) Formula? _____ times each day
 (number)

b) Pumped breastmilk? _____ times each day
 (number)

c) Breastmilk from the breast? _____ times each day
 (number)

5) Other than breastmilk or formula, do you feed your baby anything else? (Please only one.)
 Yes No
 ↓

If **Yes**, please describe any other things you feed your baby:



6) Please respond to these items about whether certain individuals thought you should definitely breastfeed. (Please circle only one.)

When I first decided how to feed my baby, these people thought that I should definitely breastfeed my baby...	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Don't Know OR Does Not Apply</i>
a) My baby's father	1	2	3	4	5	<input type="checkbox"/>
b) My mother	1	2	3	4	5	<input type="checkbox"/>
c) My mother-in-law	1	2	3	4	5	<input type="checkbox"/>
d) My family	1	2	3	4	5	<input type="checkbox"/>
e) My best friend	1	2	3	4	5	<input type="checkbox"/>
f) My other friends	1	2	3	4	5	<input type="checkbox"/>
g) My doctor(s)	1	2	3	4	5	<input type="checkbox"/>
h) My midwife	1	2	3	4	5	<input type="checkbox"/>
i) WIC staff	1	2	3	4	5	<input type="checkbox"/>
j) Breastfeeding Peer Counselors	1	2	3	4	5	<input type="checkbox"/>
k) Other people at my school	1	2	3	4	5	<input type="checkbox"/>
l) Other people at my work	1	2	3	4	5	<input type="checkbox"/>
m) My community	1	2	3	4	5	<input type="checkbox"/>
n) People in public places	1	2	3	4	5	<input type="checkbox"/>



7) How much do you value others' opinions about how you should feed your baby? (Please circle only one.)

I value these people's opinions on how I should feed my baby...	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>	<i>Don't Know OR Does Not Apply</i>
a) My baby's father	1	2	3	4	5	<input type="checkbox"/>
b) My mother	1	2	3	4	5	<input type="checkbox"/>
c) My mother-in-law	1	2	3	4	5	<input type="checkbox"/>
d) My family	1	2	3	4	5	<input type="checkbox"/>
e) My best friend	1	2	3	4	5	<input type="checkbox"/>
f) My other friends	1	2	3	4	5	<input type="checkbox"/>
g) My doctor(s)	1	2	3	4	5	<input type="checkbox"/>
h) My midwife	1	2	3	4	5	<input type="checkbox"/>
i) WIC staff	1	2	3	4	5	<input type="checkbox"/>
j) Breastfeeding Peer Counselors	1	2	3	4	5	<input type="checkbox"/>
k) Other people at my school	1	2	3	4	5	<input type="checkbox"/>
l) Other people at my work	1	2	3	4	5	<input type="checkbox"/>
m) My community	1	2	3	4	5	<input type="checkbox"/>
n) People in public places	1	2	3	4	5	<input type="checkbox"/>



8) Please respond to these items about infant feeding. For each item below, please circle the number that shows your opinion. (Please circle only one for each item.)

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>
a) Breastfeeding is more convenient than formula feeding.	1	2	3	4	5
b) Breastfeeding is painful.	1	2	3	4	5
c) Formula feeding gives you more freedom.	1	2	3	4	5
d) Infant formula can cause allergies.	1	2	3	4	5
e) Breastmilk is healthy for the baby.	1	2	3	4	5
f) No one else can help feed the baby when you breastfeed.	1	2	3	4	5
g) It is embarrassing to breastfeed in public.	1	2	3	4	5
h) Formula fed babies tend to get sick.	1	2	3	4	5
i) Breastmilk is more nutritious than infant formula.	1	2	3	4	5
j) Breastfeeding makes your breasts sag.	1	2	3	4	5
k) Formula feeding is easier than breastfeeding.	1	2	3	4	5
l) Formula fed babies are more fussy than breastfed babies.	1	2	3	4	5
m) Breastfeeding makes you closer to your baby.	1	2	3	4	5
n) Breastfeeding makes returning to work difficult.	1	2	3	4	5
o) Formula fed babies are easier to satisfy than breastfed babies.	1	2	3	4	5
p) Formula fed babies tend to be overweight.	1	2	3	4	5
q) Breastfeeding is more economical than formula feeding.	1	2	3	4	5
r) When you breastfeed you never know if the baby is getting enough milk.	1	2	3	4	5
s) Mothers who formula feed get more rest than breastfeeding mothers.	1	2	3	4	5
t) Breastfeeding is natural.	1	2	3	4	5
u) Breastfeeding is more time consuming than formula feeding.	1	2	3	4	5
v) Formula feeding lets the father become close to the baby.	1	2	3	4	5
w) Infant formula can cause constipation.	1	2	3	4	5
x) Breastfeeding is best for the baby.	1	2	3	4	5
y) Breastfeeding is personally satisfying.	1	2	3	4	5
z) Breastfeeding is messy.	1	2	3	4	5
aa) Breastfeeding ties you down.	1	2	3	4	5
bb) Breastfeeding helps you bond with your baby.	1	2	3	4	5
cc) Mothers who formula feed get back into shape sooner.	1	2	3	4	5
dd) It is difficult to find places to breastfeed outside your home.	1	2	3	4	5



9) These questions ask about **how you felt during your last 3 months of pregnancy** (your third trimester). For each item below, please circle the number that shows your opinion. (Please circle only one for each item.)

During my last 3 months of pregnancy...	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>
a) I felt proud of my appearance.	1	2	3	4	5
b) I liked the shape of my body.	1	2	3	4	5
c) I felt that my face was attractive.	1	2	3	4	5
d) I felt that my breasts were too big.	1	2	3	4	5
e) I felt that my breasts were attractive.	1	2	3	4	5
f) I felt that my breasts were too small.	1	2	3	4	5
g) I felt that my body was soft and cuddly.	1	2	3	4	5
h) My body felt awkward and clumsy.	1	2	3	4	5
i) I felt that my complexion was poor.	1	2	3	4	5
j) I felt that I had gained too much weight.	1	2	3	4	5
k) I felt attractive.	1	2	3	4	5
l) I felt that my body smelled bad.	1	2	3	4	5



10) These questions ask about **how you have been feeling since your baby was born**. For each item below, please circle the number that shows your opinion. (Please circle only one for each item.)

Since my baby was born...	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>
a) I have enjoyed caring for my baby's needs.	1	2	3	4	5
b) I have felt that life has been more difficult since the baby was born.	1	2	3	4	5
c) I have enjoyed feeding my baby.	1	2	3	4	5
d) I have been wondering whether my baby will be healthy and normal.	1	2	3	4	5
e) I have felt disappointed with motherhood.	1	2	3	4	5
f) I have been worrying that I might not be a good mother.	1	2	3	4	5
g) I have regretted having the baby.	1	2	3	4	5
h) I have felt proud of being a mother.	1	2	3	4	5
i) I have worried about accidentally hurting my baby.	1	2	3	4	5
j) I have had enough time for myself.	1	2	3	4	5
k) I have been feeling happy that I have a baby.	1	2	3	4	5
l) The thought of having more children appeals to me.	1	2	3	4	5



Please answer the following questions about you and the people that you live with. Your name will not appear in any reports and your answers will only be reported by group.

- 11) What year were you born? _____
year
- 12) Are you? (Please only one.)
- | | |
|---|---|
| <input type="checkbox"/> White | <input type="checkbox"/> Black or African-American |
| <input type="checkbox"/> American Indian and Alaska Native | <input type="checkbox"/> Asian |
| <input type="checkbox"/> Native Hawaiian and Other Pacific Islander | <input type="checkbox"/> Hispanic or Latino(a) |
| <input type="checkbox"/> Bi-Racial or Multi-Racial | <input type="checkbox"/> Other (Please specify _____) |
- 13) What is your highest level of education? (Please only one.)
- Less than 9th Grade
- 9th to 12th Grade (*no diploma*)
- High School Degree or GED
- Some College (*no degree*)
- College Degree or higher
- 14) Are you? (Please only one.)
- | | |
|---|--|
| <input type="checkbox"/> Married | <input type="checkbox"/> Divorced or Separated |
| <input type="checkbox"/> Single and Never Married | <input type="checkbox"/> Widowed |
| <input type="checkbox"/> Other (Please describe: _____) | |
- 15) How many adults **including yourself** (18 years and older) live in your household? _____
number
- 16) Who are the other adults that live in your household? (Please all that apply.)
- | | |
|--|---|
| <input type="checkbox"/> My mother | <input type="checkbox"/> My father |
| <input type="checkbox"/> My mother-in-law | <input type="checkbox"/> My father-in-law |
| <input type="checkbox"/> My best friend | <input type="checkbox"/> Other friend(s) |
| <input type="checkbox"/> My baby's father | <input type="checkbox"/> Other family member(s) (e.g., sibling, etc.) |
| <input type="checkbox"/> Other (Please describe: _____) | |
| <input type="checkbox"/> There are no other adults that live in my household. | |
- 17) Other than your newborn baby, do you have any other children? (Please only one.)
- Yes No

If Yes:

a) How many other children do you have? _____ child(ren)
number

b) Did you ever—at any time—feed your other child(ren) breastmilk? (Please only one.)

Yes No



Please answer the following questions about your work and school schedule. Your name will not appear in any reports and your answers will only be reported by group.

18) Do you currently work for pay? (Please only one.)

Yes



If **Yes**:

- a) Where do you work? (Please only one.)
- Only outside of my home
 - Mostly outside of my home
 - Equally inside and outside of my home
 - Mostly inside my home
 - Only inside my home

b) How many hours do you work each week? _____
number

- c) Did you work for pay while you were pregnant with your baby? (Please only one.)
- Yes No

No



If **No**:

- a) Did you work for pay while you were pregnant with your baby? (Please only one.)
- Yes No

19) Do you currently attend school? (Please only one.)

Yes



If **Yes**:

a) How many hours do you attend school each week? _____
number

- b) Did you attend school while you were pregnant with your baby? (Please only one.)
- Yes No

No



If **No**:

- a) Did you attend school while you were pregnant with your baby? (Please only one.)
- Yes No

20) **Interviews:** Interviews may be held at a later date with some women that fill out this survey. If you participate in an interview, you will be given a \$10 gift certificate to a local grocery store. These 30 minute interviews will explore the factors that influence women's infant feeding choices. Interviews will be done at the WIC clinic or at another location convenient to you.

If you are chosen, you would be contacted by telephone and may refuse to participate at any time.

Would you be willing to participate in an interview if selected? (Please only one.)

Yes No



If **yes**, may we contact you? Please write a phone number where you can be reached.

Phone Number: (____) _____

Thank you for taking the time to participate in this survey!

Appendix C

APPROVAL LETTER FROM
MICHIGAN STATE UNIVERSITY
COMMITTEE ON RESEARCH INVOLVING HUMAN SUBJECTS

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