

BREASTFEEDING, INEQUALITY, AND STATE POLICY IN THE UNITED STATES

by

ERIC M. EDWARDS

A DISSERTATION

Presented to the Department of Sociology
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

March 2009

University of Oregon Graduate School

Confirmation of Approval and Acceptance of Dissertation prepared by:

Eric Edwards

Title:

"Breastfeeding, Inequality, and State Policy in the United States"

This dissertation has been accepted and approved in partial fulfillment of the requirements for the degree in the Department of Sociology by:

Robert O Brien, Co-Chairperson, Sociology

Richard York, Co-Chairperson, Sociology

Michael Dreiling, Member, Sociology

Gerald Tindal, Outside Member, Educational Leadership

and Richard Linton, Vice President for Research and Graduate Studies/Dean of the Graduate School for the University of Oregon.

March 20, 2009

Original approval signatures are on file with the Graduate School and the University of Oregon Libraries.

© 2009 Eric M. Edwards

to analyze individual mothers within U.S. states to determine how class, race, and state-level policies affect breastfeeding rates. The models show that education level and income are strongly associated with both duration and intensity of breastfeeding. African-American and Hispanic women tend to breastfeed less than their white counterparts. State-level variables, particularly the number of lactation consultants employed in a state per 1000 live births, increase the likelihood of breastfeeding. The results of this research are used to suggest policy recommendations that may increase the duration and intensity of breastfeeding.

CURRICULUM VITAE

NAME OF AUTHOR: Eric M. Edwards

PLACE OF BIRTH: Moses Lake, Washington

DATE OF BIRTH: April 16, 1974

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene
Gonzaga University, Spokane, Washington

DEGREES AWARDED:

Doctor of Philosophy, Sociology, 2009, University of Oregon
Bachelor of Arts, Sociology, 1996, Gonzaga University

AREAS OF SPECIAL INTEREST:

Class Inequality
Political Economy
Environmental Sociology

PROFESSIONAL EXPERIENCE:

Teaching Assistant, Department of Sociology, University of Oregon, 2000-2008

ACKNOWLEDGMENTS

I would like to thank the members of my committee for all of their hard work and critical observations. Special thanks are due to Bob O'Brien; his guidance and knowledge made this dissertation possible. I also thank Richard York for giving me much-needed encouragement at the beginning of this project. Thanks are due to Brett Clark and Philip Mancus, who provided valuable feedback during the early stages of the dissertation (both in the office and on the hiking trails). Finally, I would like to thank Michelle Edwards for the original data that inspired the project, many fruitful conversations about breastfeeding, and the patience and love that she showed as I wandered through many pitfalls and gray areas during my graduate school career.

For Ian Anthony Edwards, my beautiful son, who has taught me that patience and hope have unbelievable rewards.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Benefits of Breastmilk for Infants	5
Benefits for Mothers and Families	11
Benefits for Society	13
Benefits of Infant Formula	16
Obstacles to Breastfeeding in the United States.....	19
The Historical Conflict between Breastfeeding and Formula Companies	23
Backlash against the Marketing of Formula	34
Current State of the Formula Industry	37
Conclusion	38
II. THEORETICAL REVIEW	40
Feminist Political Economy and Cultural Theories	42
Feminist Political Economy	44
Cultural/Weberian Theories of Infant Feeding	49
The “Difference versus Equality” Debate.....	67
Comparison of Theoretical Orientations.....	71
Conclusion	76

Chapter	Page
III. RESEARCH METHODS	78
Details of the Sample.....	79
Methods Used in Research Project: Hierarchical Linear Modeling.....	81
HLM Models	83
HLM – Second Level.....	84
Combined Formula	85
HLM with a Categorical Dependent Variable.....	86
HLM with a Continuous Dependent Variable	87
Independent Variables	89
Miscellaneous Individual-Level Variables.....	90
State-Level Variables.....	92
HLM Logit Regression.....	94
Advantages and Limitations of Study	96
IV. DATA ANALYSIS	100
HLM Analysis 1 – Days that Child Was Breastfed Non-Exclusively.....	101
HLM Analysis 2 – Days that Child Was Breastfed Exclusively	110
HLM Analysis 3 – Did the Child Breastfeed Exclusively for Three Months?.....	113
HLM Analysis 4 – Did the Child Breastfeed Exclusively for Six Months?.....	118
HLM Analysis 5 – Duration of Exclusive Breastfeeding with Non-Breastfeeders Removed	121
Summary	125

Chapter	Page
V. CONCLUSION	130
1. State-Level Recommendation that Are within the Reach of Public Health Budgets	131
2. Steps that Could Make Breastfeeding a Priority	136
3. Breastfeeding's Incompatibility with U.S. Capitalism	147
Further Directions for Research	151
Concluding Remarks	157
APPENDICES	159
A. TEN STEPS TOWARD CREATING A BABY-FRIENDLY HOSPITAL	159
B. BREASTFEEDING POLICY VARIABLES, BY STATE.....	160
C. BREASTFEEDING DESCRIPTIVE STATISTICS, BY STATE	161
D. BREASTFEEDING DESCRIPTIVE STATISTICS, BY RACE.....	162
BIBLIOGRAPHY	163

LIST OF TABLES

Figure	Page
3.1. Duration of Breastfeeding in Days	89
3.2. Income Categories	90
3.3. Education of Mother Categories.....	91
3.4. Race/Ethnicity of Child	92
3.5. Exclusive Breastfeeding: Three and Six Months' Duration	96
4.1. HLMAnalysis 1: Days that Child Was Breastfed Non-Exclusively	105
4.2. HLMAnalysis 2: Days that Child Was Breastfed Exclusively	113
4.3. HLM Analysis 3: Did the Child Breastfeed Exclusively for Three Months?.....	116
4.4. HLM Analysis 4: Did the Child Breastfeed Exclusively for Six Months?.....	121
4.5. HLM Analysis 5: Duration of Exclusive Breastfeeding with Non-Breastfeeders Removed	124

CHAPTER I

INTRODUCTION

Breastfeeding has been a part of human life since its beginning. It is a trait that humans share with all mammals. Breastmilk has been a required form of infant nutrition for nearly all of human history. Until the invention of infant formula, the only other form of milk substitution that was successful was using a wet nurse to feed the infant. This practice usually was the domain of wealthy women who were concerned about maintaining youthful appearance (Baumslag and Michels 1995). It is only within the past eighty years that there has been a viable alternative to breastmilk that did not rely upon human surrogates. Before the era of human milk substitutes, an infant that was not breastfed would not have an adequate intake of nutrients necessary for survival; in all probability, it would die.

In the current era, the formulas available have adequate nutritive value, but they are not the equal of breastmilk. Its constituent substances are too complex to duplicate with existing knowledge and technology. In spite of its high cost relative to breastmilk and its inferiority to breastmilk, artificial formula has been popular in the U.S. Throughout a large portion of the late twentieth century, more infants were fed milk substitutes than breastmilk during their first six months of life. While initiation of breastfeeding has increased substantially since the low point of the 1970s, the majority of women do not continue to breastfeed their children at six months of life or beyond. Even fewer infants receive breastmilk as their sole source of nutrition for this period in their

lives. As Lauwers and Swisher (2005) state, “The prevailing cultural belief in many industrialized societies has evolved to one in which bottle-feeding is the norm and breastfeeding is the exception” (1). Definite historical trends, combined with the efforts of the infant formula industry, have helped create this belief.

The normalization of formula use does not coincide with the recommendations of prominent national and international agencies concerned with infant health. These agencies are concerned with making breastfeeding, not formula use, the norm once again. The American Academy of Pediatrics (AAP) recommends that infants should be breastfed exclusively for six months (AAP 2005). The American Academy of Family Physicians (AAFP) agrees with the above recommendation (AAFP 2007), but states that breastfeeding should continue until the end of the first year, then continue “as long as mutually desired” (AAFP 2007). The surgeon general of the United States takes a similar approach, but advises mothers to continue breastfeeding for twelve months only (NWHIC 2004). The World Health Organization (WHO 2003) and United Nations Children’s Fund (UNICEF 2008), two of the world’s leading health agencies, agree with the above groups in recommending six months of exclusive breastfeeding. They go further than any of the above, however, by stating that the mother should continue to breastfeed the child for at least the first two years of its life while incorporating solid foods after the first six months.

In order to support their recommendations for infant feeding, UNICEF and the WHO crafted the Baby-Friendly Hospital Initiative in 1991. The initiative contains ten steps designed to foster a hospital environment conducive to breastfeeding; see Appendix

A for a list of these steps. As of July 2008, there are sixty-five hospitals and birth centers in the U.S. that are classified as Baby-Friendly (Baby Friendly USA 2008). This is not very many when we consider that there are thousands of hospitals across the U.S. Based upon these statements and actions, we can see that there is a clear consensus among U.S. physicians and international public health agencies that breastmilk is the most important food that infants and young children can have. Artificial milk substitutes, according to these agencies, are inferior to what the human body produces naturally. Agencies like the WHO and UNICEF believe this to be true and have established the above programs in order to encourage more women to breastfeed.

The Healthy People 2010 Initiative, a U.S. government program designed to improve the overall health of its citizens (Healthy People 2007), has established goals for breastfeeding rates based upon the above agencies' recommendations. There are five categories: breastfeeding initiation, continued breastfeeding at six and at twelve months, and exclusive breastfeeding at three and at six months. The Healthy People 2010 program has established the following goals for these categories: 75 percent of women should initiate breastfeeding, 50 percent should continue breastfeeding through six months, 25 percent through twelve months, 60 percent should breastfeed exclusively for three months, and 25 percent should breastfeed exclusively for six months. According to the results from the 2004 National Immunization Survey, twenty-one states met the initiation target, nine met the six month rate, and twelve have met the target for twelve months. No states had met the exclusive breastfeeding goals (CDC 2007). Even though breastfeeding rates have risen from the low they reached in the early and mid-1970s

(Baumslag and Michels 1995), the U.S. has much work to do in order to increase breastfeeding participation to reach its stated goals.

The topic of breastfeeding has wider sociological relevance than just infant nutrition. It is inextricably linked to areas such as gender inequality, racial disparities and social class differences in health outcomes, political struggles, the role of the state in promoting human welfare, and the conflict between the needs of capital and the needs of people living within a capitalist socioeconomic system. This dissertation examines the topic of breastfeeding by compiling a summary of its benefits, discussing obstacles to achieving higher breastfeeding rates, and providing a brief overview of the history of infant feeding in the U.S. In addition, it will evaluate the current state of social scientific theory on infant feeding in the U.S. The ultimate goal of the dissertation is to evaluate breastfeeding rates associated with both individual variables and state-level policies. In order to accomplish this goal, I use five different hierarchical linear models: two using ordinary regression, two using logistic regression, and one using both ordinary and negative binomial regression. These models allow us to see the simultaneous effects of both the individual variables and the policies of the states in which these people live. The results of this data analysis are used to provide specific recommendations for increasing breastfeeding rates.

The research questions that this project will address are the following:

- What effect do social class (as measured by family income and education of the mother) and race have on breastfeeding rates in the United States?

- How do state laws and policies, such as births in facilities qualified as Baby-Friendly, affect breastfeeding rates in each state?

Benefits of Breastmilk for Infants¹

The public health groups discussed in the above section are concerned about breastfeeding rates for a good reason: it is a much better food for infants and small children than artificial formula. Not only is there abundant evidence that human milk has nutritional benefits beyond the capacity of formula manufacturers to replicate, but also it has several advantages that do not relate directly to infant nourishment. Breastmilk creates less of a drain on scarce individual and state-level economic resources, does not harm the environment, and helps to create a closer bond between mother and child.

Breastmilk's major advantage over infant formula is that it is capable of changing over time to meet the nutrition needs of the child. Lauwers and Swisher (2005) state it well: "Human milk continues to change to meet the needs of the growing child from the first few days of colostrum to beyond the second year" (159). Formula is a "one size fits all" mix that is incapable of duplicating these changes. As an example of breastmilk's superior adaptability, we can look at protein. The protein content of breastmilk consists of two components: whey and casein. The ratio of whey to casein varies; in early stages of lactation, the ratio is 90:10 in favor of whey. This ratio decreases as breastfeeding

¹ An exhaustive review of breastfeeding nutrition is beyond the scope of this work. For further information, see Lauwers and Swisher 2005; its intended audience is certified lactation consultants. It is an excellent resource for those who wish to understand the topic from a medical, public health, or social scientific standpoint. Other valuable resources for social scientists, health professionals, and potential breastfeeding women include Riordan (2005), La Leche League (2004), Renfrew et al. (2004), Sears and Sears (2000), and Kitzinger (1998).

continues. By the late stages of lactation, whey and casein have an equivalent presence in milk. Formula companies, in contrast, have a set ratio of milk proteins present in their products (Lauwers and Swisher 2005).

The first substance that breastfed infants consume, colostrum, is produced by the body during late pregnancy and the first few days of nursing. It is secreted from the breasts for several days postpartum; it is the breastfed infant's first source of nutrition before the "mature" milk is produced by the mother. Colostrum acts as an autoimmune "booster" for the infant. It contains many antibacterial and antiviral agents that aid the child's immature immune system. All of the antibodies for diseases to which the mother has become immune through exposure are contained in colostrum. In addition to its boost to the immune system, colostrum supplies the bacterial flora that is essential in a healthy digestive tract (Lauwers and Swisher 2005). For these reasons, it is an ideal first food for the infant; women that have chosen to use formula may wish to consider breastfeeding for the first several days of the child's life in order to aid the child's immune system. Infant formula does not contain any substances that mimic or replace colostrum. The formula companies cannot manufacture a product that contains all (or most) of these immune-enhancing and nutritional substances; only the human body can create these successfully.

The protection from disease that breastmilk confers on an infant continues as the mother transitions from colostrum to "mature" milk production. This advantage over formula applies not only to infancy and childhood, but also to the entire life of the recipient. There are many substances within mature breastmilk that protect against

bacterial, viral, parasitic, and fungal infections, both in infancy and later stages of life. Antibodies that the mother has produced to ward off infectious agents are passed along to the infant through the breastmilk. In addition, breastmilk protects against allergies, diarrhea, and middle ear infections (Lauwers and Swisher 2005). The use of breastmilk causes less dental decay than formula (Baumslag and Michels 1995).

Artificial breastmilk substitutes not only fail to protect infants from childhood illness, but also its use is associated with an increased risk of several debilitating or deadly conditions. These include sudden infant death syndrome, gastroenteritis, juvenile diabetes, necrotizing enterocolitis, bronchitis, pneumonia, childhood cancer, and ulcerative colitis. Formula use can cause an infant to become sensitive to cow's milk that can lead to an allergy later in the first year. Infants who consume formula get sick more often and are sick to a greater degree than their breastfed counterparts (Lauwers and Swisher 2005).

The content of breastmilk is not the only way in which breastfeeding is superior to use of substitutes. The manufacturing and packaging of formula creates risks for infants. There can be residues of aluminum, pesticides, and animal droppings in formula cans. In addition, lack of oversight of manufacturing processes can lead to fraud, the omission of important ingredients, or sales of fake formula (Lauwers and Swisher 2005). This is more of a concern in so-called developing countries than in the U.S. and Western Europe. The manufacturing process is stricter in the latter countries; it is more difficult to get away with deliberate tampering or accidental inclusion of toxins.

Despite the comparatively rigorous system of manufacturing in the U.S., recalls of infant formula occur. According to the National Alliance for Breastfeeding Advocacy (2007), there have been forty-two separate recalls of formula products since 1982. The recalls have occurred for various reasons, such as deficiencies in necessary nutrients, presence of metal particles, contamination with harmful bacteria, failure to list ingredients, and insufficient pasteurization. As one can see, these are not trivial grounds for the recall of these products, particularly when they are intended for infants. A recall is a rare event, but a manufacturing mistake has the potential to endanger thousands of children who consume the affected products. Breastmilk does contain some environmental toxins to which the mother has been exposed (Lauwers and Swisher 2005), but the medical community considers it safe to consume. It is obvious that none of the above dangers associated with a formula recall can occur with breastmilk.

Some ingredients in infant formula mixtures are used not for their nutritional value. Baumslag and Michels (1995) state: "One of the most distressing aspects of the growth of the artificial food industry is that ingredients have often been chosen more for their profitability than for their superior nutritional content" (131). They cite coconut oil, beef tallow, and soybeans as examples. Soybeans are included in some formulas not so much for their nutritive value, but because they are cheap, plentiful, and marketed aggressively by its farming industry.

The contents of formula products are not the only hazards involved with using breastmilk substitutes. The hard plastic bottles used to deliver formula (and expressed breastmilk) contain a chemical, bisphenol-a (BPA), that Canada has deemed a cancer risk

for infants (Austen 2008). In order to protect infants, Canada has banned any bottles that contain BPA. It remains to be seen if the U.S. government will take action on this substance. In the meantime, U.S. bottle manufacturers are phasing out production of plastic bottles containing this harmful substance.

Breastmilk can lead to improved health outcomes later in life in addition to its benefits for infants. A study by Martin, Gunnell, and Smith (2005) provided evidence that breastfeeding in infancy can lead to lower blood pressure in a person's later years. The same appears to be the case for adult obesity. Owen et al. (2005) conducted a review of the available studies on the topic; they found that breastfeeding seems to lower the risk for the occurrence of obesity later in life. As with the studies cited below concerning increased intelligence, it is unclear if the researchers disentangled these improved health measures from social class or other socioeconomic factors.

There is one aspect of the studies on improved health outcomes in later years that has stirred up a bit of controversy: some studies have found support for breastmilk consumption leading to increased intelligence of children and adults. According to these studies, breastfed children are more likely to have a higher IQ score than children who received artificial breastmilk substitutes (see Gomez-Sanchiz et al. [2003] and Mortensen et al. [2002] for examples of this research). These studies have been repeated several times; researchers have come to the same general conclusion. The critique of these studies, as sociologists have pointed out, is that they may not account for everything that leads to increased intelligence. As with the above studies on improved adult outcomes for adult obesity and blood pressure, it is not clear whether these studies took into

account social, economic, and racial factors in determining the effect that breastmilk has on development of intelligence. As Hausman (2003) observes, measures of intelligence and its development are called into question routinely because of cultural bias. However, a new study by Kramer et al. (2008) is different from the ones cited above; in studying the connection between breastmilk and intelligence formation, the researchers attempted to control for class differences. They found evidence that suggests breastmilk consumption leads to increased cognitive development despite controlling for class. While this research lends a much greater degree of credence to the topic of breastfeeding and intelligence development, more studies of a similar nature are needed in order to support its claim.

Research attempting to connect breastmilk with higher intelligence is dangerous territory for another reason: African-American women are less likely to breastfeed their infants than their white counterparts (CDC 2007; Blum 1999). Given the history of using intelligence tests to justify the treatment of African Americans (and other oppressed racial and ethnic groups) in the United States (Gould 1985), the claim that the above researchers are making about the nature of breastmilk and cognitive development needs to be a very strong one before we can accept it.

When we take into account all of these health benefits of human milk (and risks involved with formula use), we find that breastfed infants have lower mortality rates than infants that are fed substitutes. This is true especially in so-called developing countries, where access to safe drinking water to mix with powdered formula can create a truly dangerous situation for children. Within the U.S., most water supplies are potable; the

dangers associated with formula use are less severe, but still present. According to Chen and Rogan (2004), if all U.S. mothers breastfed instead of using formula, it could prevent the deaths of approximately 720 infants per year. These deaths come from a myriad of causes that are discussed above; a diet of breastmilk would be able to prevent or minimize them. This does not take into account the effects of childhood disease that could lead to a lower quality of life for the victims of such maladies. If breastmilk is able to help prevent these diseases, parents should have the opportunity to utilize it.

Benefits for Mothers and Families

The health advantages that the infant receives from breastfeeding relate directly to some of the benefits that the mother enjoys from this form of feeding. Since the child has less illness, the mother or father likely will miss less time from work (if she or he is employed outside the home) in order to see to the child's needs. If, as is stated above, the health advantages of breastmilk for the child are long-lasting, this benefit will last through the child's school years.

Breastfeeding not only helps the health of infants, but also it provides the nursing mother with protection against health-related problems later in life. Women who breastfeed have lower rates of cervical, ovarian, and breast cancer than women that have never breastfed. In addition, breastfeeding offers some protection from age-related bone problems such as osteoporosis and hip fractures (Baumslag and Michels 1995). The act of breastfeeding provides the mother with another sort of benefit—it is a natural form of birth control. Exclusive breastfeeding often causes ovulation to cease during the time the

child is nursing (Lauwers and Swisher 2005). The clearest benefit of this pause in ovulation is that it allows families to space apart the birth of children.

One of the major features of breastmilk that appeals to many women, aside from its health and reproductive benefits, is its price. The price difference between formula and breastmilk is substantial, of course. Breastmilk is free, while artificial substitutes are quite expensive. It is important to make a distinction at this point: breastmilk does not have a *price* in the marketplace, but, within a capital-based economy, it has a *cost* associated with its use. A U.S. mother that breastfeeds exclusively often has difficulty with returning to employment or seeking a new job. This concept will be explored at various points in the dissertation, particularly the theoretical review in chapter two.

I examined prices of formula at a drug store in Eugene, Oregon in June 2008 to determine an approximate price that a family would have to pay for infant formula. The three main brands on the shelves were Similac Advance, Enfamil Lipil, and Nestlé Good Start Supreme. These three products are the most basic type of formula available; there are formulas for infants with various nutritional needs and for those with restricted diets. The price of a 25.7 ounce container of Similac Advance was \$26.99. The 25.7 ounce Enfamil Lipil cost \$27.69. Finally, the Nestlé Good Start cost \$28.99 for a 24 ounce container. An infant consumes formula for approximately the first year of its life. It drinks formula exclusive of all other nutritional sources for about half that time. The amount of formula it consumes increases until it reaches six to eight months of age, after

which it decreases gradually.² During this first year of life, the large-sized containers listed above will supply a child with formula for an average of five or six days before the parent must buy more. A parent would have to buy sixty to sixty-five cans of formula during this time. The cost of sixty cans of the Similac product would be \$1619.40. Enfamil would cost \$1661.40. The Nestlé formula's costs would be \$1739.40. Purchasing formula, according to these estimates, takes up a significant part of a family's budget. If a family buys ready-made formula (i.e. no mixing required) or has a child with special dietary needs, the cost of formula will be even more than the prices stated; these specialty products cost more than the base-level formulas listed above.

Some mothers place a very high value on breastfeeding not only as a source of nutrition for their infants, but also as a source of subjective pleasure or fulfillment. There are reports of breastfeeding mothers (and infants, though researchers cannot ask them directly, of course) having such experiences as a closer bond between herself and the child. These reasons vary between mothers, but some mothers consider them to be very important. The breastfeeding woman's body releases hormones that promote relaxation in the mother; this provides a non-psychological basis for these reports (Lauwers and Swisher 2005). These reports stand out in interview studies (Blum 1999).

Benefits for Society

Infants, mothers, and their families are not the only entities that breastfeeding benefits. Communities and governments receive advantages when more women

² The information about how much formula a "normal" infant consumes was obtained through personal communication with a staff member of the Eugene, Oregon office of Women, Infants, and Children (WIC).

breastfeed their children. As stated above, breastfed infants and children are sick less often than their formula-fed peers. Employers stand to benefit from an increase in breastfeeding rates because their employees will miss less time from work in order to remain with their children. Health insurance companies would be able to decrease the amount that they have to pay to hospitals – this has the capacity to assist everyone through paying lower health insurance premiums, deductibles and co-payments. Health care providers would be able to use their personnel for other patients if more women breastfed – again, this is a potential advantage for the rest of the society because it has the potential to limit crowding in hospitals, clinics, and emergency rooms. Ball and Wright (1999) determined that formula use has a significant effect on the cost of health care. They found that formula-fed infants required more visits to the doctor's office, more days of hospitalization, and more prescriptions for drugs than exclusively breastfed infants required. These additional uses cost the health care system between \$331 and \$475 per infant in its first year of life. In the nearly ten years since Ball and Wright published their study, these dollar amounts likely have increased.

Infant formula manufacturers sell their products in stores, but they rely upon subsidies from the federal government to get the formula to parents of infants. Low-income parents receive funds from the federal Women, Infants, and Children (WIC) program to purchase infant formula. This subsidy accounts for over fifty percent of formula sales in the U.S. (Oliviera and Prell 2004; Kent 2006). If more women breastfed, the federal government could save substantial amounts of money through decreasing this subsidy. Government agencies could use this cost savings to fund other needed public

health programs, particularly those that target pregnant women, lactating mothers, and infants. Lauwers and Swisher (2005) point out that the formula manufacturers' ever-increasing need to "improve" their products for marketing purposes is another wasteful use of monetary resources: "[Formula research] drains time and resources that could go toward unavoidable health concerns, helping women breastfeed and making safe human milk available for infants whose mothers cannot provide it" (176).

Finally, due to the global ecological crisis, it is important to consider the effects of industries and their practices on our shared environment. Breastfeeding is the clear winner of this competition. It creates no waste (other than dirty diapers!). Formula cans end up in the landfill. They have to be manufactured, which uses up resources such as oil (for plastic), tin, and paper. The bottles require the use of glass, petroleum (for plastic bottles), and rubber.³ In addition, the base of most formula mixes is cow's milk. The large-scale use of dairy cattle is the cause of several environmental ills, such as the production of high amounts of methane, a powerful greenhouse gas; pollution and depletion of groundwater through inadequate disposal of cow manure; inefficient use of cropland for growing cattle feed instead of using these lands for direct human nutrition; and soil erosion from overuse of land for pasturage (Steinfeld et al. 2006).

Transportation of the finished product (for both domestic and international use) requires the expenditure of large amounts of fuel. Breastmilk, needless to say, does not come in a package. Its manufacturer is the human body. It does not have to travel to its intended destination. The only resources it uses up are calories, vitamins, and minerals that the

³ It would be an interesting project to measure how many resources are used and how much waste is created in the manufacturing and disposal of infant formula products.

mother has consumed previously. Radford (1991) states the consequences of bottle feeding clearly: “More bottle-fed babies means more deforestation, soil erosion, pollution..., climatic changes and wasted resources. Breastfeeding has a positive effect by providing a renewable resource and by preventing other forms of damage to the environment in the form of increased population and wasted materials, for example” (1).

Benefits of Infant Formula

If all of the above arguments for the use of breastmilk are true, why would anyone feed formula to an infant? When parents use formula, they are risking the health of the infant in both the short and long term, they help to create a strain on the health care system and the environment, and mothers deprive themselves of an act that only they can perform. Many parents use infant formula despite these risks; the use of artificial formula does have some advantages over breastfeeding. Most of these, of course, are related to the specific cultural and political-economic context of infant feeding. The two main concerns related to this context are individualism and the need to be available to engage in paid labor. When seen in this light, the convenience of infant formula for parents becomes understandable. Its use allows the mother to pursue paid employment with greater ease than if she were breastfeeding, for the reasons stated earlier concerning difficulties in pumping milk at work. Returning to work or finding a new job after the birth of a child is a necessity for many women.

The needs of the individual are a powerful behavioral motivator in U.S. culture. Formula facilitates this sense of individualism; it allows the mother to be free from

attachment to the infant. She is not defined in terms of her baby and its needs, but is an individual once more. Carter (1995) refers to this attachment to the infant as a “loss of self” for the mother. Western culture tends to view pregnant and potentially nursing women as inseparable from their children; women can lose a sense of identity outside of their children. When the mother is “freed”⁴ from being the sole provider of infant nutrition, others can participate that were excluded from the process previously. The father, the extended family of the infant’s parents, and workers at daycare facilities are able to take a larger role in feeding the child when formula is its source of nutrition. Breastfeeding cannot offer this type of feeding flexibility. Breastfeeding or pumping breastmilk can feel like a great deal of work: “it was for many women seen as an extra and very time consuming chore” (Carter 1995:218). Galtry (1997a) states the advantages of using formula:

...bottle feeding, especially the use of infant formula, has the potential to diffuse responsibility for child care, enabling mothers to have more time away from infants, whether for paid work, unpaid work or leisure. Further adding to its appeal, bottle feeding also potentially removes a significant barrier to the equal sharing of parenting or care in the early months of a child’s life (p. 2).

This can be a legitimate concern for mothers who are busy with employment, the needs of other children in the household, or are single parents, but also it is a reflection of the cultural values of independence from others. In this case, it shows the need of mothers to be less attached to their infants. Ironically, when a mother uses formula, she becomes more dependent on others, in a way. Breastfeeding involves two people: the mother and

⁴ The word “freed” is emphasized because the notion of freedom and infant feeding is subjective; other women find freedom, or other sorts of positive experiences, through the act of breastfeeding.

the child. If formula allows a mother to return to work more quickly, she must rely upon others (i.e., family members, friends, and the corporations that manufacture formula) to make sure her infant is fed with regularity. In other words, formula use requires a support network that breastfeeding does not.

Although research has established that breastmilk provides the best nutrition for infants, it is important not to blame individual women that either do not or cannot breastfeed their children. We have to examine the social and political-economic structural context of breastfeeding and place mothers within it. Within this structure, as we have discussed, it is difficult to sustain breastfeeding for a long period of time, let alone breastfeed exclusively for six months. Institutions such as formula companies, employers, and federal, state, and local governments make it easier to opt out of breastfeeding. The manufacturers' role in facilitating the use of substitutes is clear: they market their products aggressively, as any company interested in maximizing profits would. It is in their economic interest to keep women from using their own breastmilk. Employers and governments encourage formula use by not encouraging breastfeeding. National and state laws are not necessarily friendly toward breastfeeding at work or in public. Employers are resistant to facilitating breastfeeding on the job or making it easier to pump milk while at work; these activities could decrease worker productivity. As we shall see later, providing a child with breastmilk is not as easy as it would seem.

Despite breastmilk's clear superiority to formula in terms of promotion of infant health and nutrition, formula companies should continue to produce it. Formula has a legitimate role to play in infant nutrition. Some babies are allergic to a substance in their

mother's milk. The mother may be suffering from insufficient milk syndrome; a true case of this syndrome is rare, but does occur. Lauwers and Swisher (2005) claim that insufficient milk syndrome is a manufactured syndrome brought about by using formula and breastmilk simultaneously; this practice creates a low supply of the latter. The mother may have a disease or other medical condition that makes breastfeeding a hazard to the infant's health. An example of this is HIV/AIDS. Public health agencies recommend against breastfeeding infants if this is the case – it can be passed through milk to the infant. In each of these situations, and others, feeding formula to infants can save many lives compared to previous methods of artificial feeding.

Obstacles to Breastfeeding in the United States

Despite the above benefits, breastfeeding is far from a universal practice within the U.S. The rates at which women breastfeed their infants have been increasing since they reached a low in the early 1970s, but they have not reached the goals set by the Healthy People 2010 program. Since breastmilk appears to be superior to artificial substitutes, it is important to identify the barriers to breastfeeding that women face. These obstacles include economic and cultural factors.

The largest barrier to breastfeeding that most women face is the need to return to paid work as soon as possible after the birth of the child. The U.S. Family and Medical Leave Act (FMLA) of 1993 allows for only twelve weeks of unpaid leave for mothers of

newborns.⁵ Many women, especially those employed in low wage service sector jobs, cannot afford to leave paid employment for even this short length of time. If a woman is involved in contingent labor, the law does not apply; her job would not be guaranteed if she went on maternity leave. Over the last several decades, there has been an increasing need for families to have more than one wage earner; it has become a “luxury” to maintain a household with only one employed person. If a woman is a single mother, this need to return to work becomes much more important. The decreasing availability of social services for all parents, let alone single parents, has made having a job almost a necessity. Unfortunately, being employed and trying to breastfeed a child often are incompatible. Roe et al. (1999), using data from the U.S. Food and Drug Administration’s 1993-1994 Infant Feeding Practices Survey, found a significant positive correlation between the duration of maternal work leave and duration of breastfeeding. They concluded that there was a large amount of competition between working and breastfeeding for women.

The FMLA represented a step forward for the rights of employed mothers; unfortunately, it had several restrictions that reduce its usefulness for working mothers. It does require that companies maintain the worker’s job and health insurance, but the entire law applies only to “employers with fifty or more employees living in a radius of seventy-five miles” (FMLA 1993). Additionally, employers can exempt employees that are part time, have worked at their job for less than a year, or are individuals defined as

⁵ Baumslag and Michels (1995) make an interesting observation concerning paid maternity leave: “It should come as no surprise that the two biggest producers of infant formula, the United States and Switzerland, are the only two industrialized countries without mandated, paid maternity leave” (p. 200). Fortunately, this is no longer true of Switzerland; it has joined the rest of Europe in offering paid leave.

“key” to the operations of the business. Women employed by small businesses or who are employed as temporary or contingent labor have no protection under this law. In the view of breastfeeding advocates, needless to say, the FMLA does not go nearly far enough in protecting the rights of employed women.

Not only is federal law inadequate in its promotion of breastfeeding, but also places of employment tend to encourage formula use. Within an employment site, many women do not have access to places to pump milk or feed an infant directly. Some work settings, such as a fast food restaurant, have such a hectic work pace that it is difficult to find enough free time to pump milk. Even if there were time, most women do not have access to clean, quiet, and private rooms to express milk. Some professional women have offices; working-class women, due to the nature of their jobs, typically do not have the benefit of these locations unless an employer provides them. If a nursing mother wishes to pump breastmilk at work, often the best choice of location is the women’s restroom (Baumslag and Michels 1995). For obvious reasons, this location is far from ideal. These work situations are endemic to employment facilities in the U.S., particularly private industries. Most places of employment do not have on-site daycare facilities that would allow a nursing mother to breastfeed her child while at work. Off-site child care facilities are a possibility, but they are both expensive and often not close enough to the job site to make breastfeeding convenient.

The difficulties in employment settings are not the only obstacles that breastfeeding women face. In the U.S., breastfeeding, especially in public, is not the cultural norm. To a large extent, infant feeding has become a commodified process.

New mothers intent on breastfeeding their children have to go against this ingrained notion of infant feeding. As Baumslag and Michels (1995) state, “Even mothers who have the sense that ‘breast is best’ are subjected to ingrained habits and the expectations of a society that does not embrace breastfeeding as a cultural norm. Unfortunately, successful breastfeeding in this culture often requires determination and confidence and support” (xxiv). As stated above, the federal government provides only minimal legal support to nursing mothers, which might help to diminish the cultural norm against breastfeeding; parents who wish to breastfeed their infants do so despite these factors that work against their efforts.

It can be very difficult to go against this cultural norm against breastfeeding, particularly when one does so in a public setting. Due to the U.S. culture’s sexualization of female breasts and taboos against public nudity, many women report feeling discomfort, shame, or embarrassment when breastfeeding in public (Blum 1999). Women should not have to feel embarrassed about feeding their infants in public, but there is a reason to feel that way: breastfeeding women face potential harassment, negative judgment, and, in extreme cases, arrest. Forty-six states have laws that protect a woman’s right to breastfeed in public (CDC 2007), but engaging in this behavior continues to be a challenge for nursing mothers.

Hospital policies have been unfriendly toward breastfeeding, though these policies are beginning to change. The practice in most U.S. hospitals is to provide women who have given birth with free samples of formula, in addition to other promotional materials (see the next section for more details). In addition, women often

have been separated from their infants soon after birth, which interferes with the initiation of breastfeeding. The formula samples that hospitals and formula companies provide at the hospital do not help with the initiation of breastfeeding, either; the difference in natural and artificial nipples can lead to “nipple confusion,” which often leads to premature cessation of breastfeeding (Lauwers and Swisher 2005). To make matters worse, pediatricians and other physicians have very little, if any, formal training in breastfeeding. According to Schanler, O’Connor, and Lawrence (1999), only fifty-eight percent of pediatricians they surveyed had any training or education regarding breastfeeding. Wallace and Chason (2007), in their study of the medicalization of breastfeeding, note this lack of training as well.

The Historical Conflict between Breastfeeding and Formula Companies

The use of breastmilk has been the historical norm for human societies for all of their evolutionary history except for the past century. There was much experimentation conducted in the nineteenth and early twentieth centuries to find a suitable substitute, but typically these strategies involved the use of condensed cow’s milk (Baumslag and Michels 1995). Needless to say, these experiments were not successful. Within most of Europe, it was traditional for wealthy women to use wet nurses, but there was no other viable means of feeding infants until the invention and mass production of infant formula early in the twentieth century. Commercial formulas in their current form were not available universally in the U.S. until the 1920s, when both Alfred Bosworth and the Mead Johnson company created different formulas. Evaporated cow’s milk was the most

popular breastmilk substitute between the 1920s and 1950s; by 1950, parents fed this formula to about half of infants in the U.S. (Schuman 2003). It was not until the 1950s that the intensive marketing of modern infant formula began. This marketing effort allowed formula companies to increase their market share. By the late 1960s, formula had almost completely replaced evaporated milk and other breastmilk substitutes, not to mention breastmilk (Baumslag and Michels 1995).

The implicit goal of formula companies is the commodification of infant feeding. Breastmilk may be extremely useful, but it does not produce a monetary profit for anyone. In Marxian terms, it has an immense use value, but no exchange value. Before the mass production of formula, infant feeding was an untapped realm of potential profit. Untold millions of women had to feed their infants every day—however, they did not have to buy anything in order to perform this function. From the standpoint of a capitalist or corporation, this situation might call for the creation of a product to fulfill the need to nourish infants. This is exactly what happened, but it could not occur overnight.

The creation of a successful formula industry was limited by several factors. First, a usable bottle and artificial nipple had to be invented. The rubber nipple was not created until 1856, and not accepted by the population until “well into the twentieth century” because it had a disagreeable taste and odor (Baumslag and Michels 1995:138). Second, a reliable means of distributing both formula (and the cow’s milk from which it is made) over thousands of miles had not been created until long-distance railways had been established. Third, there was insufficient scientific knowledge of breastmilk’s constitution. The first formula intended for the market was invented by the German soil

scientist Justus von Liebig in 1867; the ingredients he used were cow's milk, flour, potassium bicarbonate, pea flour, and barley malt (Baumslag and Michels 1995). Clearly this concoction would not provide adequate nutrition for an infant; it contains plenty of protein and carbohydrates, but is missing the essential micronutrients and bacterial cultures found in human milk. Formula companies eventually were able to overcome this obstacle to create a formula that satisfied an infant's basic nutritional needs, but their products still do not have all of breastmilk's contents (or its health benefits). Third, public health had to be upgraded in urban areas. For example, water supplies in most urban areas were of questionable safety until chlorination of water supplies began in the 1880s (Baumslag and Michels 1995); this un-chlorinated water would have been unsuitable for mixing formula powders. Fourth, milk-based products were a risky proposition for infant health until the wide-scale development of home refrigeration in the 1930s. Before this time, infants drinking breastmilk substitutes often had diarrhea, especially during the summer months (Baumslag and Michels 1995). Finally, formula ingredients often were difficult to obtain in large quantities. The mechanization of the dairy industry helped to create a surplus of milk products, which the emerging formula industry was able to put to use.⁶

⁶ Baumslag and Michels (1995) point out another aspect behind the growth of the formula industry: the need to increase the demand for another industrial product, cow's milk. "The infant formula industry was created not because of problems with breastmilk but because of improvements in mechanization, transportation, and storage, which allowed the dairy industry to thrive. Faced with an increase in waste products, milk processors sought out additional markets. Infant formula was seen as a lucrative outlet for altered waste products from the dairy industry" (Baumslag and Michels 1995: xxix). Artificial breastmilk substitutes, in other words, provided a means to keep cow's milk prices high while helping to sustain a new market.

By the beginning of the twentieth century, the formula industry had overcome most of these hindrances; breastmilk substitutes, in the form of fortified condensed milk, were available across the U.S., even if they were not entirely safe for consumption (Baumslag and Michels 1995). One problem remained: there was insufficient demand for an artificial substitute for breastmilk. Unless there was a medical reason, why would anyone use an expensive alternative when one's body produces a superior product for free? The task of formula companies, then, was to convince mothers that they needed a breastmilk substitute.

The creation of a demand for formula involved two major factors: the increased medicalization of birth and breastfeeding and the rise of mass marketing of formula products. The process of turning breastfeeding into a medical phenomenon involved the creation of a new disorder: "insufficient milk syndrome." This syndrome does exist for some mothers, but nearly all women are capable of manufacturing enough milk to feed an infant (Lauwers and Swisher 2005). If this situation is the case, it creates a nearly insurmountable barrier to the mass production and sale of a milk substitute through this channel. In order to overcome this obstacle, the formula companies, with the aid of the medical profession, sought to undermine the confidence of lactating women in their capability of feeding their children. According to Wolf (2003), this medicalization of feeding has been a process that has occurred for over a century: "The aphorism 'lots of women can't breastfeed' has appeared continually in discussions of infant feeding from the late nineteenth century to the present day" (95). This medicalization led to the

displacement of mothers and maternal knowledge as the central source of infant feeding information and replaced it with the medical expertise of physicians (Apple 1987).

Medicalization of the birth process and the infant feeding experience helped enable the acceptability of breastmilk substitutes, but it was not sufficient to cause formula use to spread across the globe. Formula companies, through their marketing efforts, were responsible for this phenomenon. The marketing effort has involved both an intensiveness in the home countries of the formula companies and an extensiveness as the effort to sell formula in other nations expanded in the post-World War Two era. These companies depicted themselves as having developed a “scientific” food that was superior to the substance produced by female bodies (Wolf 2003). These messages, along with attempts to associate their product with “images of modernization” (Baumslag and Michels 1995:148) helped to sell formula both in the industrialized nations and, later, in the so-called developing world.

Formula companies, when attempting to sell their product in industrialized nations, have used marketing strategies that are standard fare for the pharmaceutical industry: giving away free product to hospitals and doctors, sponsorship of research friendly to outcomes favoring infant formula, providing free office supplies with the product’s logo, and taking the doctors to dinner (Lauwers and Swisher 2005).

The most important of these attempts to market their product to people is providing free formula to hospitals. It is unusual to receive for free what a hospital should have in ready supply. In a way, receiving free formula is like getting free tongue depressors or blood pressure gauges. Some medical situations call for the use of formula;

in almost all instances, however, breastfeeding is the normal way of feeding newborns. The question, then, is whether this free formula leads to an increase in its use when breastfeeding would be the recommended procedure. If formula were nothing more than a medically necessary backup to situations in which breastmilk is unavailable or not recommended, the substitute's availability should not have a significant effect on breastfeeding rates. If it is nothing more than a standard hospital supply, medical facilities should have to pay for it instead of receiving it for free. The only conceivable reason hospitals receive free formula is for marketing purposes. Formula companies want to use these giveaways to influence physicians' recommendations to lactating mothers.

Not only do formula companies target doctors and other health professionals in the hospital setting; they seek new mothers as well. A standard marketing method is to send mothers home with free formula. It should be noted that the formula industry is only one of several conglomerates that use this strategy; other corporate baby products such as disposable diapers are marketed in this fashion. These items are packaged as part of what are called "commercial hospital discharge packs." It appears that these strategies work, at least for the formula companies; Rosenberg et al. (2008) studied the effect that these discharge packs have on the exclusive breastfeeding rates of new mothers. They used a data set consisting of almost 3000 postpartum women in the state of Oregon who were asked if they had received a discharge pack upon leaving the hospital. The researchers concluded that there was a significant connection between the receipt of a discharge pack and duration of exclusive breastfeeding; women who received the free

products were more likely to breastfeed their children for less than ten weeks than mothers that had not received a discharge pack. Rosenberg et al. caution that we should not see these results as generalizable outside of Oregon because of the nature of their sample. This state has a high rate of breastfeeding compared to other states. One could argue, however, that the study has relevance to other states, particularly those that have similar breastfeeding rates to Oregon.

Formula companies attempt to persuade women to choose breastmilk alternatives not only through product giveaways, but also by attempting to influence parents through “scientific” informational advertisements. These pamphlets contain information on the various formula products the manufacturers make; they provide specific details on which formula is best for an infant based upon the child’s symptoms, such as gas and colic. Hausman (2003), in her informal study of promotional literature intended for new mothers put out by the two main U.S. formula manufacturers, noted that the companies put erroneous or misleading information in this literature to make it appear as though formula was superior to breastmilk. Formula companies use the Internet in a similar fashion; some have created “stealth sites” that allege to be neutral locations of information about infant feeding, but in reality are efforts to promote their breastmilk substitutes (Breastfeeding.com 2008).

Within so-called developing countries, formula companies have marketed formula in ways that would be less conceivable in an industrialized nation. A very effective tactic that formula companies used was the deployment of a “milk nurse” to hospitals. A company employee would enter hospitals in a nurse’s uniform in order to promote and

sell formula to new mothers. It was effective because mothers confused the formula company employee with legitimate hospital staff (Baumslag and Michels 1995). This strategy was complementary with the overall marketing strategy that formula companies used in nations on the economic periphery: they depicted formula as a “westernized” beverage that sophisticated parents fed to their privileged children, while they connected breastmilk with “backward” rural peasantry (Baumslag and Michels 1995).

These marketing strategies worked. By the end of the World War Two, bottle feeding of infants quickly became the preferred way for mothers to feed their infants. By the early 1970s, breastfeeding rates in the U.S. had reached an all-time low (Baumslag and Michels 1995). In-hospital breastfeeding rates reached a low of 21.7 percent of new mothers in 1971. In the same year, the breastfeeding rate at six months was 5.2 percent, while exclusive breastfeeding rate at six months was 3.2 percent (Ryan, Wenjun, and Acosta 2002).

The marketing practices of formula companies have had dire consequences for children, particularly those in developing nations. Infant formula becomes life-threatening for infants in two situations: the water used to reconstitute the formula powder is infested with harmful organisms or is polluted, and through dilution of the formula to make it last longer. The conditions that create these circumstances – extreme poverty and lack of a water sanitation infrastructure – rarely occur within the U.S. or Europe, but they are common within countries on the periphery of the global economy. Both the use of polluted water and dilution of formula have had a harmful effect on infants in these areas. The World Health Organization (2006) estimates that global

adoption of optimal breastfeeding practices could save thirteen percent of the 10.6 million children that die annually before the age of five.

The rampant marketing of artificial formula did not go unnoticed by the world's public health agencies. The World Health Organization felt that the state of marketing of infant formula was such a threat to breastfeeding that they created the International Code of Marketing of Breast-Milk Substitutes in 1981. This code called upon governments, health care systems and workers, and infant formula manufacturers to implement the articles it contained in order to protect breastfeeding. It stated that the above-mentioned groups should institute the following recommendations:

- Advertising of breastmilk substitutes has to contain information about the superiority of breastmilk, the difficulty of re-starting breastfeeding after using formula, and proper use of powdered formula;
- Labels on formula containers must have the above information as well, and must not have pictures of infants or idealized images of infant feeding;
- Formula manufacturers should not provide free samples of their products to individual women;
- Health care systems should protect breastfeeding by not promoting formula, not displaying formula products, and by providing formula only to mothers that cannot breastfeed their infants;
- Formula manufacturers should restrict the information they give to health professionals to “scientific and factual matters” (WHO 1981:12) instead of misleading information that claims formula is equal or superior to breastfeeding;

- Health professionals should not give samples of formula to pregnant or nursing women, nor should the professionals receive samples from manufacturers for this purpose;
- Manufacturers and health professionals should present a full disclosure of any funds, gifts, or grants that the latter has received from the former;
- Manufacturers should not provide education to pregnant or nursing women, especially in a hospital setting; and
- National governments should adopt legislation promoting breastfeeding and regulating the sale of infant formula.

The WHO called upon governmental bodies, nongovernmental organizations, healthcare systems, and the manufacturers themselves to implement the code. The goal of the code was to recognize the potential beneficial role of formula as a source of childhood nutrition, but to minimize the companies' attempts to expand its role as the primary food source for infants. As the WHO (2006) states, "Breast-milk substitutes should be available when needed, but not be promoted" (1). In 1990, UNICEF drafted the Innocenti Declaration on the Protection, Promotion, and Support of Breastfeeding, which was a call for governments to adopt and enforce the WHO code within their own countries (UNICEF 2006). In 2003, the WHO renewed its call for action on breastfeeding promotion with the publication of its booklet "Global Strategies for Infant and Young Child Feeding". This was both an update of the original code and a reemphasis on the urgency of the infant formula problem in developing countries. It is worth noting that the United States failed to ratify the WHO code because the Reagan

administration felt that its enactment would be harmful to U.S. business interests. This country did not sign the code until the Clinton administration ratified it in 1994: up to this time, the U.S. was the lone holdout among member countries of the United Nations (Baumslag and Michels 1995).

In the time since the WHO adopted its code, the world has seen changes in breastfeeding rates. Rates for the industrialized nations in Western Europe and the U.S. have increased (UNICEF 2008). These increases are due to many factors: education of professionals through projects like the WHO code; awareness campaigns targeted toward pregnant and lactating women; increased government support for breastfeeding, particularly through paid maternity leave; laws protecting a woman's right to breastfeed in public; and structural changes in health care institutions, such as the Baby-Friendly Hospital initiative mentioned above. As of 2005, there were approximately 20,000 facilities in the world that had been designated "Baby-friendly" (UNICEF 2006).

Within the United States, state governments have begun to protect women that breastfeed in public settings. As of 2004, forty-six states had laws safeguarding a woman's right to breastfeed in public. Fourteen states had laws supporting lactation within employment settings (CDC 2007). It is worth noting that the U.S. federal government does not guarantee the right to breastfeed in public (Heymann et al. 2007).

California has had a paid maternity leave program since 2002. The state pays for six weeks of parental leave to take care of a newborn child (California EDD 2008a). The benefits are not large; they amount to approximately fifty-five percent of a worker's weekly wages, up to a maximum of \$917 per week (California EDD 2008b). This

amount does not meet the guidelines that the International Labor Organization has established (ILO 2008), but it does recognize the need for compensation of workers with new infants. While most breastfeeding advocates would see both the length of time and the rate of compensation as inadequate incentives, the law represents the first legislation of its kind within the U.S. Even with this legislation in place, the U.S. does not compare favorably to other nations. A team of researchers from Harvard and McGill Universities determined that, out of 173 countries they studied, 168 had some form of paid maternity leave. Ninety-eight of these nations offered at least fourteen weeks of paid leave. The only countries not to have some form of paid maternity leave are the U.S., Lesotho, Liberia, Papua New Guinea, and Swaziland (Heymann et al. 2007). These countries, needless to say, are strange company for the nation with the world's largest economy.

Backlash against the Marketing of Formula

The declining global rates of breastfeeding led to activism by concerned groups both before and during the development of the WHO code. The most significant action that these groups took was a widespread boycott of Nestlé, one of the world's largest manufacturers of formula. U.S. activists formed a new organization called Infant Formula Action Coalition (INFACT), which called for a consumer boycott of all Nestlé products. Since Nestlé is a vast food conglomerate, this boycott had to cover a lot of ground. The point of the boycott was to force Nestlé to end its unethical marketing practices on a global level. Nestlé defended itself with an expensive marketing campaign directed toward U.S. church groups, who were some of the biggest supporters of the

boycott. Nestlé's strategy was ineffective; the boycott expanded and strengthened when the company did not change their practices after the WHO approved its code for the marketing of formula in 1981. The boycott did not end until 1984, when Nestlé agreed to make changes in how they marketed and distributed formula; Nestlé would not admit it, but the boycott was having a significant effect on the corporation's profitability (Baumslag and Michels 1995). The boycott began again in 1988, when Nestlé began to violate the WHO code in its quest to expand its markets. The boycott is an ongoing effort; activist groups such as Baby Milk Action (2008) claim that Nestlé continues to violate to WHO code by marketing their products aggressively throughout the world.

There has been a movement in the U.S., led by health professionals, to limit the access that pharmaceutical companies can have to hospitals and physicians; the main organization involved is called No Free Lunch. While this movement's concern is the connection between marketing to physicians and the effect this has on drug prescriptions, the same logic applies to the formula industry's marketing efforts. As pointed out above, the two industries use similar tactics to sell their products to both hospitals and individuals. No Free Lunch maintains a directory of physicians and medical schools that have a no-gift policy. It is difficult to judge the effectiveness or popularity of the program among physicians; for example, there are two physicians in Eugene, Oregon and six in Portland, Oregon that follow the policy (No Free Lunch 2008). Most of the doctors in these areas either are accepting gifts or not telling anyone that they have a no-gift policy.

The International Labor Organization, a program of the United Nations, has developed a set of maternity leave guidelines for U.N. member countries to observe. First, women should be allowed to take a leave that lasts for at least eighteen weeks, with an extension in the case of birth to twins or triplets. Second, cash benefits that the mother receives during maternity leave should not be less than sixty-six percent of previous wages. As an aside, one should note that the ILO makes the assumption that countries provide compensation during maternity leave. The U.S. has shown that making this assumption is not necessarily a good idea. The one state that provides cash benefits, California, does not even approach this percentage of wages. Third, a woman cannot be fired during maternity leave. Fourth, when the woman comes back from leave, her employer must allow her to take at least one break during the day to breastfeed or express milk (ILO 2008). This list is rather modest due to the fact that most countries (including the so-called developing nations) follow these guidelines. The country of interest in the present study, as has been observed already, provides a limited amount of guaranteed maternity leave if the employer has over fifty employees. It protects a woman from being fired during this leave. It falls short of ILO standards—the standards that nearly every nation in the world has followed—in its failure to provide compensation to mothers taking maternity leave.

Individual states have been attempting to promote breastfeeding by protecting the rights of workers to breastfeed or express milk in their place of employment. As of 2004, fourteen states had some kind of law offering this protection to women on the job. The state of Oregon is one of the more recent additions to this list. The state legislature

passed a law that went into effect January 2008 that requires businesses to provide lactating employees with a place to express breastmilk. All places of business with twenty-five or more workers must make available a private area, such as a vacant office. The room does not have to be dedicated solely to nursing, but it must be private, and it cannot be a restroom. As long as the employee gives the employer ample notice of a need for a private area, the place of business must comply or face a \$1,000 fine for each infraction (Oregon DHS 2008). This law is not very strong due to its reliance on employees to make a request; if an employee were concerned that her job might be jeopardized from requesting a lactation room, she would have to think twice about speaking to her employer about it. At the same time, laws like this represent a recognition that nursing mothers are an important part of the labor force; their rights as employees need to be protected.

Current State of the Formula Industry

There are four major formula manufacturers active in the world market: Nestlé, Mead Johnson, Abbott Nutrition, and Wyeth/American Home Products. Nestlé is based in Switzerland, while the latter three are U.S. companies. All four of the companies have their product available throughout the U.S. Nestlé is one of the world's largest food conglomerates; according to its corporate literature, it makes nearly 10,000 different products that can be found in 130 nations (Nestlé 2006). Its infant formula division, while large, is only a small part of their operations. They make the brand of formula called Nestlé Good Start. Mead Johnson has a long history in the manufacturing of infant

food substitutes. They manufacture Enfamil. Mead Johnson has been a subsidiary of the global pharmaceutical corporation Bristol-Myers Squibb since 1967 (Mead Johnson 2008). Abbott Nutrition is the maker of Similac infant formula (short for “similar to lactation”). The company that made formula used to be called Ross Laboratories before Abbott Nutrition acquired them.⁷ In addition to formula, they manufacture nutritional supplements, feeding devices, and breast pumps. The fourth producer, Wyeth, was known formerly as American Home Products. It is a large pharmaceutical company; as with the above companies, Wyeth’s formula production represents only a part of its product line. Wyeth manufactures drugs such as Advil as the primary source of their revenue; their formula production is based around providing large supermarkets and discount chains such as Target, Wal-Mart, and Fred Meyer with their own “in-house” brand of formula mix (Breastfeeding.com 2008).

Conclusion

The state of breastfeeding in the United States has improved in the last thirty years. However, there is much work to do in order to accomplish, or go beyond, the breastfeeding goals set by the Healthy People 2010 initiative. While a large majority of women in the U.S. at least make the attempt to breastfeed their infants, most mothers either are unwilling or unable to continue to the six-month point recommended by health

⁷ Ross Laboratories was one of the major sources of data on infant nutrition prior to the current decade. They performed a periodic marketing survey that asked the respondent about the means she or he used to feed infants. Its usefulness has been replaced by other data sets, particularly the one used in this study. Besides, it is not a good research practice to obtain breastfeeding information from one of the world’s leading infant formula companies!

agencies, let alone to breastfeed exclusive of all other infant foods. Wallace and Chason

(2007) provide an excellent summary of the current situation for mothers in the U.S.:

Overall, the environment is very difficult for new mothers. Women are in a classic “double-bind” by our society’s hypocrisy. Many mainstream messages, including those from medical publications and advertisements, advocate long-term breastfeeding. At the same time, many are appalled by breast exposure, and we fail to enable mothers to feed naturally by providing comprehensive parental leave policies and work accommodations. Mothers who discontinue working or have flexible jobs and are willing to resist cultural norms against extended breastfeeding are able to breastfeed successfully with pride. But most mothers are asked to do the impossible and subsequently make adjustments to their own maternal expectations in order to survive (p. 435).

In order to create a situation in which exclusive breastfeeding is possible for all women, our society has much work to do. When many women in the U.S. are “asked to do the impossible” in order to provide the best possible nutrition to their infants, and when these women tend to be nonwhite or working class, there is something wrong.

CHAPTER II

THEORETICAL REVIEW

The topic of infant feeding has been a relative latecomer to feminist theories of reproduction and the family. According to Carter (1995), Galtry (1997c), and Hausman (2003), the topic of breastfeeding has not been developed adequately by either feminist or sociological theorists. The above authors place this in contrast with subjects that have been developed extensively by theorists: pregnancy, childbirth, and “traditional” women’s work. The first two are, due to biological differences, activities that only women can perform, while the last is a gender-based social construction. It is strange that breastfeeding has not received similar attention; it is an activity that only women can perform, it varies across racial and class lines, and there are contradictions between it and the liberal feminists’ goal of female/male equality. Carter (1995) states this “equality vs. difference” dilemma accurately:

Breast-feeding in fact represents one of the central dilemmas of feminism: should women attempt to minimize gender differences as the path to liberation or should they embrace and enhance gender difference through fighting to remove the constraints placed on them by patriarchy and capitalism, thus becoming more “truly” women? One might see bottle feeding as freeing women from the demands and restrictions of lactation or, on the other hand, as imposed on women by the manufacturers of baby milk depriving them of a unique womanly experience, based on centuries of skill and knowledge. Feminism has been attributed with both these points of view in the infant feeding literature. The women’s movement in the early part of the century has been described as supporting bottle feeding, while the post 1968 women’s liberation movement is seen to support the “naturalness” of breast feeding (pp. 14-15).

Breastfeeding represents one of the central questions with which feminist theorists have struggled: should women embrace difference from men, or should women strive to attain equality in the public sphere? The act of breastfeeding is, by its nature, an activity that only women can perform. Often it is associated with so-called traditional women's work, such as tending a household and caring for children. However, unlike these activities, breastfeeding can be done only by women. On one hand, if feminists defend breastfeeding, it could lead to decreases in economic standing for and public participation by women. On the other hand, the support of formula by feminists in the pursuit of equality with men leads to a rejection of a specific and valuable biological role that makes women different from men. Of course, this role has no economic value within the U.S. or world economy. It is not surprising, given these contradictory positions, to find that feminists have an ambivalent relationship with breastfeeding. Some see its advocates as representatives of a conservative movement designed to minimize the involvement of women in the public sphere, while others view it as a liberating and essential aspect of femininity. This division between equality and difference will be one of the central themes of this section.

Breastfeeding's conflict with participation in the labor force is one of the most important aspects of the equality/difference divide within feminist theory. Employment influences the type of feeding method that a woman uses. Women employed in specific types of jobs, particularly jobs that are seen traditionally as working class or low-level service work, are much more likely to use infant formula than to breastfeed. Culture-based vs. political-economic perspectives explain this topic in opposing ways. Theories

of culture maintain that social class is important in determining breastfeeding rates, but they place greater emphasis on aspects of infant feeding that are outside the world of work, such as the sexualization of women's breasts and the race of the mother. For these theorists, labor and class are one of many factors involved in explaining breastfeeding rates. In contrast, political-economic theories use labor and class as key explanations of breastfeeding rates. It is important to note that neither of these perspectives ignores what the other emphasizes. Each of these theoretical positions attempts to provide what its proponents consider a well-rounded view of infant feeding.

In this chapter, we will examine how these theorists have developed the topic of breastfeeding. While much of this information is beyond the scope of the research questions that the current project addresses, it is essential to look at all aspects of infant feeding, not just those that apply to the research undertaken here. Theorists of breastfeeding have many important observations regarding the specific questions that this project is using, especially regarding class, race, and breastfeeding education programs.

Feminist Political Economy and Cultural Theories

The two competing theories of infant feeding share some aspects, but their differences are pronounced enough that they qualify as two distinct explanations of the subject. Feminist political economists emphasize the needs of infant formula corporations within a capitalist economic system as the major forces behind decreasing breastfeeding rates. This production-centered theory regards the cultural shifts regarding infant feeding as secondary to the power of corporations to change breastfeeding norms.

According to the political economists, the needs of capital not only shape the type of feeding method available by commodifying infant nutrition, but also by changing the type of work that women perform. This change has caused working-class women to have less time and flexibility to breastfeed infants, which increases their reliance on breastmilk substitutes. In summary, the two biggest themes for feminist political economists are corporate power and class inequality in ability to breastfeed. These theorists see breastfeeding as the most beneficial method of providing nutrition to infants. Not only is it advantageous for infants, they argue, but also for the mother and for society in general. Because of this preference, the political economy theorists fall upon the side of female difference in the “difference vs. equality” debate.

Cultural theorists approach infant feeding in a different way: their main concerns revolve around the social construction of feeding methods. In order to address these concerns, they place less of an emphasis on production, corporate power, and economic measurements than the political economists. Instead, they focus on shifting cultural patterns to explain why formula became so popular, and why breastfeeding has made a comeback since its low in the 1970s. The needs of formula companies are not the primary explanation for these changing patterns, according to these theorists.

The cultural theorists focus more than political economists on the uncertain role that breastfeeding should play in women’s lives; they claim that it causes a conflicting role for many women. They are ambivalent about breastfeeding for two main reasons: first, there are some groups, most notably African-American women, that breastfeed less often than others because of a shared cultural heritage. Second, unlike the political

economists, cultural theorists do not subscribe to either side in the “difference vs. equality” discussion. They admit to feelings of ambivalence regarding methods of infant feeding because of this uncertain effect breastfeeding has on equality. Blum (1999) and Hausman (2003) consider themselves breastfeeding advocates, yet cannot place their full support behind exclusive breastfeeding because of the potential consequences it carries for women’s struggle for economic and political equality. This ambivalence comes from the cultural theorists’ mother-centered analysis, as opposed to the political economists’ infant-centered approach.

Feminist Political Economy

One of the pioneers of the feminist political economy perspective is Marilyn Waring (1999 [1988]). The main argument she makes in her book *Counting for Nothing: What Men Value and What Women Are Worth* is that the labor of women (whether it is sex-specific biological reproductive activities or socially-imposed duties) has little or no value attached to it in a capitalist economy. The reason behind the devaluation of “traditional” women’s work is that it is not measured as part of a country’s Gross Domestic Product (GDP) because typically it is unpaid labor; therefore, according to economic measures, it has no economic value. Waring argues that the work women tend to perform, such as child care, meal preparation, and infant feeding, provides immense value for national economies regardless of whether national accounts recognize the contribution. Traditional women’s work is necessary for the continuation of the species, both on a day-to-day and a long-term level. Women who perform “traditional” labor are

considered to be unemployed, even though their work is vital for the good of their families and their community. In order to illuminate the consequences of this logic to a greater extent, Waring observes that wars (and other sorts of destructive activity) have a positive effect on GDP growth. Because of this, economists see this type of activity as a contribution to the economy. When compared to the harmful, yet profit-expanding, practice of manufacturing military equipment, the significance of excluding women's labor from national accounts becomes even more apparent. The narrow focus of GDP on paid labor and profits above labor that is socially necessary reflects the world's "ideology and practice of patriarchy" (1988 [1999]:166).

Infant feeding is a good example of the lack of value placed upon women's labor, according to Waring. The act of breastfeeding is labor: it takes time, requires that the practitioner do little else while performing it, and it is a necessary aspect of caring for infants. Breastmilk is free of charge, of course; therefore, it has no economic value. In Marxian terms, it has no *exchange* value, but an immense *use* value. Its lack of exchange value means that breastmilk and breastfeeding do not show up in GDP figures. The activity that does appear is the manufacturing and sale of infant formula. This, according to the logic of economics, is the activity that contributes the most to the well-being and stability of a nation. Infant formula is a way of turning a necessary activity—breastfeeding—into a commodified process. Breasts have their role as well, according to Waring: corporations use them as objects to catch the eyes of men in advertising, women are forced to sell their breasts (along with the rest of their bodies) in the illegal sex trade and pornography industry, and they are the subject of cosmetic enhancement. All of

these activities that turn the female breast into a commodity contribute much more to GDP than breastfeeding; according to economic logic, they must be more important for national well-being. In order to make breastfeeding more central to our understanding of what constitutes a healthy economy, Waring argues that we need to account for the benefits of breastfeeding that fall outside the sphere of GDP.

Aside from Waring (1988 [1999]), Baumslag and Michels (1995) are the main proponents of the feminist political economy perspective concerning breastfeeding. While their work is less a theoretical treatise than a review of breastfeeding's history and nutritional value, their outlook falls clearly within the confines of the above perspective. Baumslag and Martin contend that the low levels of breastfeeding around the globe were (and continue to be) the result of actions that multinational formula companies took to market their products. The interests of these corporations are not the same as the interests of infants, women, and society, Baumslag and Michels (1995) argue:

In the infant-feeding arena, private profit and public health are at odds. The goals of the baby food industry are in direct conflict with the best interests of babies. ... a baby's best interests are met when it receives the nutrition and immunologically protective benefits of breastfeeding. The goal of the baby food industry is to maximize its market size by maximizing the number of mothers who buy the products and the length of time they use them (p. 148).

The actions of these corporations, in other words, have turned an activity outside the capitalist sphere into a market phenomenon. In doing so, these corporations have exchanged the best interests of children for the private gain of investors. Baumslag and Michels are claiming that the change from breastmilk to formula was not the result of a cultural change in the society at large, but by the needs of capital—in this case, large food

conglomerates—to create new markets for the sale of products. In addition, formula continues to be an attractive option for mothers, despite the health risks associated with its use, because of the need for working-class women in the U.S. to return to work as soon as possible after the birth of a child. Baumslag and Michels see this exchange of paid labor for infant health needs as a dangerous public health problem that deserves our collective attention.

An example of what Baumslag and Michels mean by the power of formula corporations to help shape the state of infant feeding is the U.S. Family and Medical Leave Act of 1993. They claim that the 1993 act is the most family-unfriendly parental leave policy in the industrialized world. It is probably not a coincidence, according to Baumslag and Michels, that this country has only twelve weeks of unpaid leave while hosting three of the world's four largest infant formula companies within its borders. They argue that this lack of a satisfactory leave program is not a cultural product, but rather it is due to the influence of big business on U.S. political affairs.

They examine this problem by expanding on Waring's (1988 [1999]) notion that there are costs associated with seeing infant feeding as a choice between breastmilk and formula; these costs are outside of the sphere of economic analyses such as GDP. These costs include an increase in infant illnesses and a decrease in maternal satisfaction (Baumslag and Michels 1995).

Galtry (1997c) has similar positions to Baumslag and Michels: she argues that seeing infant feeding in terms of "choice" of different types of method obscures the importance of breastfeeding and fails to recognize the structural position of many

mothers. For many women, there is little choice involved in their decision to use breastmilk substitutes. As pointed out in the first chapter, working-class women often have to return to work soon after giving birth. While they are at work, it is difficult to find either the time or the space to express milk via a pump. Because of this, it appears that “the underlying assumption...that individual mothers are able to exercise choice over how they feed their infants” (1997c:6) is not a convincing argument. The only groups in the U.S. that have a real choice in the matter, typically, are women that can afford to not work in order to breastfeed or that have a flexible employment situation allowing them to breastfeed or express milk while working. Galtry concludes that this problem is not individual in nature, but part of the social structure: “An awareness of the structural factors which impact on the ability to combine breastfeeding and paid work highlights the way in which the discourse of personal preference serves to disguise, in effect, the privilege, in particular the greater access to economic and material resources, which enables the integration of these two activities” (1997c:7). As Galtry states, public health agencies should concentrate on the racial and class inequalities present in U.S. society in order to explain breastfeeding rates and to attempt to increase them. Focusing on personal preference is unproductive because women have differential access to making a choice on infant feeding methods. A statement like the following from the World Health Organization (2006) would be an example of how not to frame infant feeding: “Exclusive breastfeeding from birth is possible for most women who choose to do so” (2). This may be the case for women in Western Europe, but U.S. women (and many women in developing countries) face an entirely different set of circumstances.

Galtry's (1997c) work is similar again to Baumslag and Michels (1995) because it represents an extension of Waring's (1988 [1999]) argument that there are benefits to breastfeeding that exist outside of traditional economic measures. Galtry (1997c) points out that breastfeeding has benefits that are hidden from GDP-based analyses; these advantages include not only the improved health status of breastfed babies, but also benefits for mothers, employers, and society in general. Similarly, there are costs associated with infant formula use, such as increased use of health services and parental sick leave, that economists do not take into account. One of these costs, according to Galtry, is an expansion of class inequality due to U.S. federal policy of providing only unpaid leave for women that have given birth: "it appears that many women in higher-paid, higher-status occupations not only have more opportunity to recover from childbirth but can also accrue the benefits of breastfeeding for themselves and their offspring, while minimizing the cost of time out of paid work" (1997c:12).

Cultural/Weberian Theories of Infant Feeding

Linda Blum's (1999) book *At the Breast: Ideologies of Breastfeeding and Motherhood in the Contemporary United States* is the most comprehensive treatise on breastfeeding that a sociologist has performed to date. As Wallace and Chason (2007) state, it "stands alone as [a] systematic study of infant feeding that combines sociology and feminism" (407). Blum draws upon the Weberian interpretive theoretical tradition to examine the current cultural context of breastfeeding in the U.S. She talks about the rationalization of infant feeding; our society has attempted to turn feeding into a more

efficient process so that women can participate more fully in paid employment. She explores the topic of breastfeeding through interviews she conducted with working-class African-American and white mothers and with a group of white middle-class mothers. The main themes of Blum's work are: 1) she emphasizes the importance of sexualized views of the breast as a deterrent to breastfeeding; 2) breastfeeding, according to Blum, is a white middle-class activity in the U.S.; 3) African-American women face greater obstacles to breastfeeding than white women; 4) she views breastmilk as less central to infant nutrition than public health researchers and the feminist political economists discussed above; and 5) she feels that the importance of mothers has been minimized by the emphasis on supplying infants with breastmilk. Within this last point is an argument that contradicts the feminist political economists: Blum claims that breastfeeding can be a negative activity for women. This is not the only conflict that the two theoretical perspectives have; we will explore these differences in a separate section.

Members of U.S. society, particularly adult males, have a fascination with female breasts as an object of sexual beauty and desire. Blum (1999) argues that this sexualization of breasts is one of the primary factors leading to low levels of breastfeeding in this country, particularly in a public setting. Bottle feeding, according to Blum, allows mothers to leave the home without fear of exposing their breasts to strangers. Not only does the act of breastfeeding in public expose the breast, but also it shows women using a breast for a purpose other than to bring about male sexual pleasure: "Breastfeeding threatened to expose the breasts to the heterosexual gaze, but also to compromise the object of that gaze, the stiff, uplifted breasts of Barbie" (38). What this

problem illustrates, then, is ownership of the female body by men. As Blum points out, lactating women have changed their behavior regarding infant feeding because of the needs of males; it “seemed to violate husbands’ ownership of their wives’ breasts” (39). The point of making this observation is that the sexualization of breasts prevents many women from breastfeeding because they have received the message from U.S. culture (from all manner of sources, including personal experiences of the “heterosexual gaze”) that breasts are primarily for sex. Any other use of breasts (i.e. feeding a child) constitutes a violation of the separation between the sexual and maternal: “while women’s bodies are expected to be sexual and to be displayed, they are expected to signal only sexual availability to men” (128). In other words, the potential exposure of the female breast is not the aspect that leads to a decrease in breastfeeding; it is the act of natural feeding itself that is disruptive to the norms of “compulsory heterosexuality” (129). Breastfeeding represents a threat to male use of women for sexual gratification if men have to share women with an infant. The child’s survival-based relationship with the mother reminds men that women do not exist solely for male pleasure. It is worth noting that Baumslag and Michels (1995) point out as well that sexualization of female breasts is a hindrance to breastfeeding, but do not attach as much importance to it as Blum does, nor do they analyze it to such an extent.

Blum (1999) argues that one’s ability to expend the time and effort to breastfeed is subject to class and racial privilege. She agrees with the political economists (and the available data) in making this assertion; this is the area in which both groups find the most common ground. Rather than focus on the structural causes of class and racial

difference in infant feeding methods, Blum looks at the meanings that these differences have for mothers. In order to explore the reasons behind these class and racial differences, she interviewed three separate groups of women: the largely white middle-class members of La Leche League, a nonprofit organization that provides support to nursing mothers; working-class mothers from Flint, Michigan; and working-class African-American mothers in southeastern Michigan.⁸ Most of the women she interviewed from La Leche League were white and middle class; only one group member was African American. They saw breastfeeding as a mandatory part of raising a child. The women of La Leche League appear to emphasize gender difference, claiming that women have a special role to play in the feeding of children: “most [League mothers] also held on to a belief in a ‘natural’ maternal advantage that recognized and honored their care” (1999:73). The League’s main publication directed toward nursing women is called “The Womanly Art of Breastfeeding” (Blum 1999:75); the title further illustrates the emphasis they place upon the female role in infant feeding.

According to Blum, the middle-class women she interviewed had trouble recognizing their class and racial privilege. Most of the women she interviewed lived in relative material comfort and have difficulty understanding the constraints of working-class women: “League mothers can approve of some range of differences among women, but they deplore mothers who literally reject the embodied intimacy as well as the

⁸ The interviews that Blum performed for this project are not ideal for purposes of making generalizations about the above racial and class groups. The interviews for middle class women were conducted through an organization which may have only a select portion of that class. It may or may not be representative of all middle class women. The same is true for both the white and African-American working class women she interviewed. Both interview groups were regionally based; perhaps something is true of this area that would not be the case in other areas of the country. The interview design for the African-American sample is particularly troublesome because it was a “snowball” design (1999:210).

intensive attention-giving” (1999:90). In other words, women who are forced (or choose) to feed formula to their infants are not exercising the “true” role of motherhood, even though their life circumstances do not permit exclusive breastfeeding. Not all mothers are able to devote themselves to their children to such an extent; others might consider breastfeeding only one type of “devotion” to children.

The working-class white women she interviewed were having a difficult time with managing breastfeeding and employment. The difference between working-class white women and working-class African-American women, according to Blum, is the level of guilt over using infant formula to feed children. The white mothers felt a large degree of shame over not being able to breastfeed their infants; the African-American mothers typically had little or no regret. Blum spends considerable time looking at this difference; her observations are summarized below in the section on African-American mothers. She points out that both groups of women were aware of breastfeeding’s benefits; this awareness, coupled with perceived failure at breastfeeding, was the cause of the white mothers’ guilt. However, the working-class women were able to differentiate between their needs and the needs of the infant. As one white interviewee said, “Breastfeeding is best for the baby, it’s just not the best thing for me” (1999:120). Hausman (2003) confirms this observation; she states that women who use formula are not “selfish”, “uneducated”, “stupid”, or “lazy”. Instead, these women “make their decisions based upon *other* ideas about child care, nutrition, and the maternal body, as well as on life priorities and material constraints that may preclude breastfeeding” (92: emphasis in text). In this sense, Hausman and Blum agree with Galtry (1997c) and the

other feminist political economists. All three indicate that one's "choice" of infant feeding methods is constrained by forces beyond the control of the individual.

Existing studies, including the National Immunization Study used in the current project, have observed that African-American women breastfeed their children at significantly lower rates than white women. One of Blum's (1999) goals in her research project was to explore the reasons behind these low rates; to accomplish this goal, she interviewed working-class African-American women. Through this research, Blum found several causes: unequal access to health care, a desire for an increase in autonomy from medical professionals and white (i.e. two-parent household) family structures, a lack of time and space to breastfeed, and the legacy of white-black relations during the period of slavery.

Public health agencies that lament the lower breastfeeding rates for African Americans have failed to recognize that this group has less access to health care due to racial discrimination. Blum argues that African Americans' higher rates of infant mortality are related more to this discrimination than to a lower use of breastmilk in infant feeding than whites.

Similarly, public health efforts to educate women about the benefits of breastmilk for their infants have reached African-American women, but the programs are having little effect. Many of the mothers in Blum's interview project said that they had encountered plenty of information on the nutritional superiority of breastmilk, but were not interested in breastfeeding. This result is similar to her findings for working-class white women; these women had plenty of information about breastfeeding, but were

unable to perform this activity at the same rates as middle-class white women. The difference between the working-class African-American and working-class white women was that the former group had less desire to breastfeed, while the latter saw breastfeeding as “a mother’s moral duty” (Blum 1999:160). According to this logic, expansion of public education programs concerning the benefits of breastmilk over formula would have minimal positive results for the African-American (or white working-class) population. According to Blum, these groups know that “breast is best,” but are either unable or unwilling to breastfeed for reasons other than knowledge of the subject. If this is the case, future efforts to educate women about infant nutrition will have little effect on increasing breastfeeding rates.

African-American women’s resistance to infant feeding education may have its roots in a desire for increasing their autonomy within U.S. society. It is an important theme in the interviews that Blum conducted; the title of the chapter featuring African-American women is: “To take their own independence” (147). This title refers to independence from both medical professionals and traditional white familial social structures. Carter (1995) refers to this desire for autonomy from the medical establishment as well; by rejecting medical advice, African-American women may be strengthening their feelings of independence. However, Blum (1999) points out that rejecting the medical establishment’s advice to breastfeed may be a way to protect the mother from failure to provide adequate nutrients for the child through breastmilk. Working-class women of all races face “a lack of time, space, and health that would help make breastfeeding a positive experience” (161). In the case of working-class African-

American mothers, the tendency to reject breastfeeding may represent a self-defense against failure.

The African-American women in Blum's interview project "take their independence" in another way: by rejecting the white norm of marriage and two-parent families in favor of an extended network of relatives and friends. This family arrangement makes it easier for others in the mother's social network to care for the infant as she performs other activities. It is a departure from the dominant white ideal of a family led by a man and a woman; Blum argues that this explains the difficulty that medical professionals, social scientists, middle-class groups like La Leche League, and public health advocates have in understanding African-American family structure and the role that it plays in infant care. If one sees "independence" as "freedom from physical attachment to others" then the African-American alternative family arrangement promotes exactly that. This would be true for all mothers who use formula to feed their infants: the mother and the infant are not connected physically to the same extent as breastfed infants and their mothers. Instead, the work is shared among more people. However, one could argue that breastfeeding is an activity that exhibits more independence than formula. Only two people are necessary: the mother and the infant. In this sense, "independence" would mean "freedom from reliance on others".

Independence and autonomy are important explanations for African-American women rejecting breastfeeding, but Blum (1999) sees the central reason as the historical oppression the ancestors of these women faced in the antebellum South. She provides a detailed explanation of what this oppressive socioeconomic system looked like: "Under

slavery, African-American mothers labored like men, but were also ‘breeders’ enriching the stock of plantation owners. Women’s bodies were owned and available for sexual exploitation—and breasts, which sometimes suckled white babies, were examined like part of the livestock at auctions” (1999:13). The women, in addition to their role as enslaved “breeders”, were used by slave owners to serve as wet nurses to white children. According to Blum, the women she interviewed did not talk about this legacy of slavery directly, but that it was “refracted through the meanings they attached to breastfeeding, as they primarily rejected the practice for the exposure of sexuality and the physicality or animal-like qualities it represented to them” (1999:13-14). In other words, these women talked about breastfeeding in terms of its association with other animals, not necessarily in terms of its direct link with the treatment of African Americans during slavery. One of Blum’s respondents said that “[women] should do it through a bottle rather than feed the baby off the chest. She feels we’re like animals if we have to nurse our kids like that” (1999:169). Blum is arguing that this depiction of breastfeeding is a result of past negative social relations; she points out that the interviewees from La Leche League spoke of breastfeeding’s association with other animals in a positive light. Even though slavery ended officially nearly one hundred and fifty years ago, and the social movements of the fifties and sixties brought considerable gains for African Americans, breastfeeding remains a difficult activity for these women to perform. Blum explains it thusly: “...there is still pain in the historical meaning of the breast and body, which some African-American mothers may wish to avoid in the face of continuing objectifying representations” (1999:198). Breastfeeding remains as both a legacy and a continuing

representation of racial inequality in the U.S. Due to the nature of Blum's study, we are not sure if this reason for resistance to breastfeeding is true for all African-American women or just those belonging to the working class. However, there is no reason to believe it would not be the case for all African-American women as the legacy of slavery is both a shared economic and a shared cultural experience.

Blum (1999) claims that breastmilk is less important a factor in infant nutrition than current levels of research would lead the public to believe. Unfortunately, this argument is a weak point in her analysis. She claims more than once in her book that, in the context of industrialized nations, formula use is not inferior to breastfeeding. She states that "anticorporate activists (many of whom were women) have been as likely to inflate the benefits of breastmilk as those interested in traditional femininity or family values" (45), but offers no evidence that these "activists" have engaged in this activity. Similarly, Blum observes that the benefits that breastmilk researchers claim it provides, such as the decreased likelihood of adult obesity and the potential enhancement of speech development, are not as important as prior claims of breastmilk's ability to help prevent chronic disease. According to Blum, what these new research projects point to are "new kinds of middle-class anxieties about children as much as rational health-enhancing advice" (50), rather than evidence strengthening the case for breastmilk. Blum makes these observations despite the wealth of scientific information that has provided clear evidence pointing to the conclusion that breastmilk offers many different advantages to children that formula cannot provide. The claims of public health advocates, physicians, and scientific researchers appear to be substantial, even when controlling for

sociologically important topics such as income. According to the best available evidence and the recommendations of all the major world public health organizations, breastmilk is the clear winner over formula. Blum is trying to say that breastfeeding is contested terrain, and that the scientists providing evidence supporting it may have motivations other than gains in understanding, but questioning the superiority of breastmilk to formula may not be the most effective way to convey this thought. In a similar vein, Hausman (2003) points out that a shift to bottle feeding coincided with a decline in infant mortality rates in the U.S. This claim ignores medical and public health advances that coincided with the popularization of artificial infant foods (Apple 1987). As such, there is likely no causal link between formula use and the decrease in infant mortality rates. Hausman acknowledges that there is likely no causal relation between the two events, but it is a strange thing to say if she recognizes the lack of connection between the two events.

Due to her critique of the science behind breastfeeding advocacy, and for other reasons, Blum considers breastfeeding as a potentially negative experience in a mother's life. Her primary concern here is a rollback of political and economic power for women: "In the late twentieth century two seemingly contradictory trends have reshaped mothering: the dramatic increase in mothers' wage-earning and the revival of breastfeeding prescriptions" (42). She is arguing that scientific and public health groups have played a role in attempting to marginalize women's public power and to scale back the gains that women had made during the feminist movement of the 1960s and 70s. On its own, this argument has little merit; the movement for increasing breastfeeding rates

was not a monolithic product of male science, but also it was a grassroots attempt (led by women, primarily) to decrease the power of corporations that marketed formula in all areas of the globe. One could argue that this movement attempted to give women *more* power, not less. In Blum's defense, she does point out that the feminist health movement and the boycott of Nestlé during the 1970s played a big role in encouraging U.S. women to use less infant formula.

Bernice Hausman's (2003) work *Mother's Milk: Breastfeeding Controversies in American Culture* contains arguments that are similar to those of Blum (1999), but with different emphases. The purpose of her book is an attempt to "produce a feminist interpretation of the meanings of breastfeeding in contemporary cultural contexts" for the purpose of illuminating "women's place in American society and... some current difficulties of maternal practice" (3). She is not a sociologist, but her work is grounded in cultural/Weberian analysis and postmodern theory, both of which are common in sociology. The research contained in the above work revolves around discourse analysis. She does not state explicitly that this is her research method, but her descriptions make it clear. Hausman is using "rhetorical and semiotic readings" of documents intended for mothers and their health care practitioners to determine the meanings that infant feeding methods hold for these groups. Also, she looks at scientific and medical literature for the same purpose.

Hausman cites the following reasons as causes for the decline in breastfeeding since the nineteenth century: the desire of pediatricians to control infant feeding in order to safeguard infant well-being; "the popularity of rationalized breastfeeding practices

among physicians trying to Americanize foreigners, regulate women, and bring up independent American children” (13); a taboo on public nursing; changes in women’s roles within the family with regard to spouses and children; and women’s desire for equality with men in the public sphere. It is interesting to note that she does not cite the marketing efforts of corporations as a cause of the decline in breastfeeding.

Part of Hausman’s discourse analysis is an examination of nutrition claims put forward by infant formula manufacturers. The goal of this marketing information, according to Hausman, is to make it seem to the potential purchaser of formula that it and breastmilk are nutritionally equivalent. This message attempts to override any information that parents may have received concerning the benefits of breastmilk. This information tends to match with the hegemonic notions that Americans have concerning infant and maternal behavior. She states that formula feeding is the more “natural” practice within the U.S., not breastfeeding: formula use is “more comfortable within customs, practices, and ideas common in American life” (2003:93). It becomes more natural because it is a reflection of our dominant ideals, values, and behaviors: according to Hausman, these are “self regulation” and “autonomy” (93). Formula use supports these ideals because it tends to put infants on a regimented feeding schedule and it allows the mother to be “unattached” from the infant. Formula has become the paradigm method of infant feeding for another reason: mothers in the U.S. (and in the rest of the world) have lost the cultural memory of how to breastfeed. Bottle feeding is the “inevitable result” of this change in our collective expectations of maternal behavior: “In this view, bottle feeding answered a specific social need to realign the relations of

mothers and infants according to emerging values about mother-infant separateness and the mother's companionate relationship with her spouse" (93). Breastfeeding represents the ideals that Americans reject, such as sharing of physical space with another, a lack of infant regulation, and "ambivalence about the mother's body as simultaneously a reliable source of nourishment for her baby and a site of sexual excitation" (94). Hausman believes that this may be the reason that middle-class white women breastfeed more often than other mothers. These women have a different culture that promotes breastfeeding in ways that the dominant culture does not. While this reason may be a bit of a reach, Hausman's point is that the cultures to which people belong have shaped how different women have breastfed.

The medicalization of childbirth and infant feeding has been the main cause of the expansion of formula use within the U.S., according to Hausman (2003). Instead of giving birth at home under the supervision of a midwife, U.S. women give birth almost exclusively in a hospital setting. Not only did this change the perception of childbirth, but also infant feeding. The baby's first feeding sessions happen within the hospital. This allows for both the monitoring of the process and for the introduction of alternate feeding systems (i.e. formula). This process of medicalization has "destabilized maternal authority and replaced it with the figure of the doctor" (22). In this way, the displacement of traditional knowledge of feeding by medical expertise has led to the loss of the "cultural memory" of breastfeeding for U.S. women. The medicalization of breastfeeding has altered the types of acceptable evidence that its advocates provide. Proponents of breastmilk are much more likely to rely upon scientific research

concerning its biochemical properties instead of making more generalized claims about breastfeeding being “healthful and natural” (21), as La Leche League did in its early days. Medicalizing breastfeeding to such an extent that its lay proponents have to be familiar with the latest scientific evidence is an unproductive development, Hausman argues. She believes that this sort of evidence has the possibility to increase incidences of lactation failure; more knowledge is concentrated in the hands of “elite experts,” rather than with the “ordinary individuals” that have to feed their children (49). She states the following to support her argument: “The tangle of medicalization in relation to infant feeding suggests why it is problematic for breastfeeding advocates to rely on a medicalized discourse concerning the biological benefits of breastfeeding. Biological arguments are not free from social developments and institutional pressures; that is, they are inflected with ideological meaning.” (25) This argument is a reflection of the postmodern critique of science, which states that scientists cannot extricate themselves from their social and political world; therefore, the validity of scientific claims of “truth” is suspect. For postmodernists, “scientific authority” becomes only one of many competing claims about the world. The major complaint about this position is that it leaves power relations out of its assessment of the competing claims involved with any social problem or debate. In other words, some claims are louder and/or more persistent than others based upon the amount of power they wield in a society. In the example of infant feeding, formula companies would be the institutions with the greater ability to have their voices heard.

Hausman is wary of the arguments of breastfeeding advocates such as Baumslag and Michels (1995) because “[t]here are numerous points at which breastfeeding advocacy colludes with traditional scientific misogyny” (2003:15). Hausman, on the other hand, claims that she does not take the scientific evidence at face value; she engages with it “as both discourse and information” (15). The way this engagement happens in her work is that she treats the existing scientific evidence as a competing claim among others, in addition to looking at the evidence based on its merit. According to Hausman, “[t]he trick is to balance the analysis: to note where arguments rooted in biomedical evidence ignore political realities, and to suggest when interpretations of sociocultural conditions should pay attention to biomedical claims about health” (15). Baumslag and Michels (1995) probably would argue that this type of approach minimizes the power relations involved within the discursive frame. In this case, formula corporations have more economic and political resources in the U.S. than grassroots activists or even world public health organizations wield.

The final cultural theorist discussed here, Pam Carter (1995), is from England. Due to this, some of her observations would not apply to a U.S. setting, even though the English experience with infant feeding seems similar to the U.S. The main theme of her book *Feminism, Breasts, and Breast-Feeding* is that concern over infant feeding methods represents a patriarchal attempt at control of women’s behavior. She sees this attempt occurring through the medicalization of breastfeeding, the education programs that try to increase breastfeeding, and the sexualization of female breasts. Carter points out that the patriarchal attempts at controlling breastfeeding occurred before the rise of an

industrialized formula manufacturing system. She feels that this weakens the argument of political economy theorists such as Baumslag and Michels (1995) that place more emphasis on the needs of capital instead of patriarchal social relations in influencing infant feeding patterns.

Carter (1995) claims that most research on breastfeeding has adopted a stance that favors increasing breastfeeding rates. The goal of her project was to approach the subject in a different way: “In order to provide different answers to these breast-feeding questions, and perhaps to reframe them, it seems not only necessary to see it through the eyes of women, it is also important to be more cautious about explicitly adopting a pro-breast-feeding stance. . . .my more fundamental concerns are with how breast and bottle feeding can be understood in relation to gender differences and inequality” (13). She is taking this stance toward breastfeeding for an additional reason: she is concerned about putting her support behind a feeding method that is performed unequally among different classes and races. Poor and black women are much more likely to be reluctant to breastfeed than their white or middle-class counterparts. According to Carter, previous research has not done a satisfactory job of emphasizing this difference between women. Since the publication of her book, feminist theorists and researchers have done a much better job of taking class and race into account when discussing women’s experiences of breastfeeding; no longer are they treating women as a monolithic category.

Class and race are important aspects of the breastfeeding awareness programs that federal governments have instituted in order to increase rates of natural feeding. Carter is critical of these programs precisely because they focus on women from the working class

and racial minorities. There is a paternalistic relationship involved with these programs; medical authorities assume that these women need to be educated about the superiority of breastmilk. According to Carter, these programs see working-class women as being “*both poor and ignorant*” (45; emphasis in text). As Blum (1999) observed, working-class and African-American women in the U.S. are well aware of the benefits of breastmilk; for the reasons she cited (see above), these women often either are unwilling or unable to breastfeed their children. Carter (1995) claims that educational programs have another motive: to decrease the cost associated with providing infant formula to low-income women. While this observation is somewhat cynical in nature, it does merit consideration.

Public health agencies and middle-class advocates for breastfeeding often see women using formula for their children as being victims. Carter sees their situation differently: “bottle feeders can be seen not as victims, but as women resisting oppression through managing the varied demands of femininity which seek to prescribe their behavior and shape their subjectivity” (221). In other words, Carter is claiming that women that do not breastfeed are active participants in resisting the dominant means of infant feeding, even if “for the most part their resistances were individual and reactive” (221). Calling the acts of these women “resistance” may be an exaggeration; as several of the theorists have noted previously, working-class women are constrained in their choices of infant feeding due to the nature of the labor they have to perform, among other factors. While they are active subjects in their own lives, they live within a socioeconomic system that has negative consequences for the type of nutrition they can

provide to their children. In the case of African-American women, the topic of resistance may be more appropriate, especially if Blum's thesis regarding the effect of prior white-black relations is accurate.

The "Difference versus Equality" Debate

Feminists and feminist theory have been ambivalent about breastfeeding, as the above discussion demonstrates. It brings out a fundamental conflict in women's lives. The general problem that women in the U.S. face is a choice between supporting gender difference or gender equality. In the specific case of infant feeding, mothers⁹ have to make a choice between providing their children with the best food alternative and being employed in order to support the child. They are among our society's fortunate members if they have a true choice in the matter. As both sets of theorists mention, the choice between infant feeding methods is not a true choice, but one constrained by race and class position. The act of breastfeeding, needless to say, is a female activity; males can engage in all other aspects of infant care except for this one. At the same time, women are expected to achieve equality with men in the employment sphere. These two demands upon women are contradictory. Focusing on breastfeeding often involves missing significant time from work, which can harm one's career advancement, lead to termination of employment, or result in less time spent earning money which is required to support the child. Placing emphasis on economic equality with men has the potential

⁹ The use of the word "mothers" here is noteworthy. Most of the authors discussed above make the assumption—and it is probably an accurate one—that mothers are the people who are responsible for making decisions regarding infant feeding. They are, after all, the people that are affected most by the decision, aside from the infant.

to cause harm to infants by expanding the number of children using infant formula. It is a difficult position for feminists, to say the least; according to Carter (1995), the equality vs. difference debate is the central reason why feminists have been ambivalent about endorsing breastfeeding as the best infant feeding practice.

Feminists have viewed breastfeeding in two different ways. First, some theorists see breastfeeding as a strong illustration of gender difference. This divergence of opinion on how to view breastfeeding is reflected in some of the questions that Carter (1995) poses:

Does breast-feeding offer greater possibilities of control by women? or is bottle feeding equivalent to contraception in allowing women greater control over their bodies and their lives? Should feminists support pro breast-feeding policy in order to strive to recapture the time when infant feeding was within the control of lay women? should they try to recreate the kind of conditions where all women breast-feed? or does a safe and (relatively) healthy alternative offer women more control and autonomy? (pp. 19-20)

As we can see, there can be no unified feminist position on infant feeding when there are so many questions involved with it. These questions are not peripheral; instead, they represent some of the central problems that feminists have faced and continue to face. For some women, breastfeeding means a return for women to the era of being expected to stay at home with the children. In other words, there is a perception that breastfeeding contributes to holding back women from achieving full equality with men. For others, it means something entirely different. As Wallace and Chason (2007) state, "Breastfeeding advocacy may be seen as conservative, and supportive of gender essentialism (difference), while on the other hand it may be seen as supporting mothers in the most

essential way—by valuing women’s contributions and calling for a family-centered society” (407). However, the question remains to be answered – in a capitalist society, exactly how do we value the contributions of women? Recognizing the value and placing a monetary equivalent on that value are two different things entirely.

The theorists reviewed above do not necessarily fall on either side of the difference/equality fence. Baumslag and Michels (1995) are the exception. They are representatives of the side of gender difference. Economic equality between men and women is important for them, but women should not have to give up breastfeeding as the cost for this equality. Instead, they present a different notion of equality: “The liberation women need is the ability to breastfeed free of social, medical, and employer constraints. Instead, they have been presented with the notion that liberation comes with being able to abandon breastfeeding without guilt” (1995: xxx). Baumslag and Michels are promoting breastfeeding above all other concerns; because of this, they are promoting gender difference. They understand that there are a number of social and economic obstacles in the way of recognizing the true value of women’s contribution to infant feeding, but they see it as a goal worth pursuing.

Galtry (2000) believes that women should not have to make a choice between the two conflicting positions of gender equality and difference. She suggests that we should try to accommodate both as much as possible. She portrays this solution as one in which we allow women to achieve equality in the workplace while at the same time allowing them ample opportunity to breastfeed their infants. Her suggestions are vague; one is left wondering how our society will achieve this marriage of gender equality and gender

difference. The two seem to be incompatible within a U.S. capitalist context. Baumslag and Michels (1995) recognize this incompatibility. They state that we should view women's paid employment in a different light:

In the United States, where individualism reigns and children are viewed as a personal decision, social reformers have focused on equality and parity between genders. *Instead of assuming that a man's and a woman's career patterns are inherently different* (as European feminists have), the focal point has been proving that women could perform equally in a man's world. Since women working in a man's world are expected to behave like men, maternity and family needs complicate this picture (p. 199; my emphasis).

There is a problem with this line of reasoning: if the career patterns of men and women are different, how do we account for that in a market system? It is difficult to do, to say the least. It is unclear what these different career patterns would look like while maintaining gender equality in the economic sphere. Should women be paid for what has been unpaid work in the past, or would women just have to settle for less money and opportunity for advancement? These are the sorts of questions left unresolved by attempts to combine the positive aspects of gender difference and the liberal feminist goal of equality. Unless there are significant legislative or economic changes in this country, attempts to align these two differing needs probably will meet with frustration.

The cultural theorists' position on gender difference/equality and infant feeding reflects the wider view of feminists: they are ambivalent about the topic. On the one hand, they see the positive aspects of breastfeeding for both children and women; Blum (1999) and Hausman (2003) refer to themselves as breastfeeding advocates. On the other hand, these theorists, especially Carter (1995), sympathize with the above argument that

breastfeeding has the potential to be a conservative, regressive activity for women. Blum (1999), in a summary of her work, raises the following points:

To nurse our babies at the breast may offer a way to revalue our bodies and force a public reevaluation of caregiving—*or*—at the same time, it may represent acquiescence to dominant regimes of self-sacrifice, overwork, and surveillance. It can blur into a disembodied regime and threaten an overriding sense of failure. Bottlefeeding can thus be empowering, a refusal to be tied to our biology, to always be marked by gender and race, to always be vulnerable to oversexualization. But, at the same time, it can represent capitulation to inhumane public and workplace demands, to compulsory heterosexuality, to letting external forces interpret our embodied choices (pp. 198-199; emphasis in text).

It is important to recognize, as Blum has done here, that breastfeeding can carry many different consequences in women's lives, both currently and in the future. She is pointing out that increasing breastfeeding rates has the strong potential to cost women much of what they have gained in the past several decades.

Comparison of Theoretical Orientations

The feminist political economy and cultural perspectives share several similarities in their analysis of infant feeding. First, both emphasize that one's ability to breastfeed is influenced strongly by race and class position. Both theoretical groups agree that exclusive breastfeeding is a privileged act within the U.S.; the women most likely to sustain this level of breastfeeding are white and middle class. This position is not controversial; all of the relevant research agrees that class and race are significant determinants of likelihood of breastfeeding. The location of difference in this area is in the emphasis placed upon race. The cultural theorists, especially Blum (1999), explore the differences between whites and African-American women much more thoroughly

than the political economists. Because of this, they place much stress on race's ability to explain breastfeeding. However, there are some problems in their approach to race. It is important to note that Blum's study of race and infant feeding is limited in its ability to describe this difference for two reasons. First, she interviewed working-class African-American women only; she did not look at differences between this group and middle-class African-American women. Second, Blum's study contains a limited representation of race in the U.S. In other words, there are more races and ethnicities in this country than just African Americans and whites. It is unfair to criticize Blum for leaving out these other groups; her study was about the differences between white and African-American women. In so doing, she addressed a number of important topics that aid in explaining the difference in breastfeeding rates between these two groups. However, the cultural theorists—or anyone else, for that matter—have not undertaken a complete study of race and infant feeding in the U.S.; this work remains to be done.

As stated previously, the two groups of theorists agree that social class location has a profound effect on infant feeding. Both groups disagree with the notion that infant feeding options represent a true choice for mothers and infants. Most mothers in a working-class position cannot “choose” to breastfeed their infants exclusively because of the need to return to work. In this sense, the only choice they are able to make is to provide their infants with artificial formula. Both theoretical groups point out that having to choose formula exacerbates existing class inequalities; however, the political economists place much more emphasis on this. For these theorists, the continuation of inequality is their primary concern with the need for reliance on formula by the working

class. These children are not able to have the same nutritional advantages that their middle-class peers enjoy; according to current research, this disadvantage will affect their mental and physical well-being. The cultural theorists, due to their mistrust of the scientific evidence, do not put as much stress on this factor.

Political economists and cultural theorists do not agree on everything; for the most part, the way they view the topic of breastfeeding is quite different. The most fundamental difference is reflective of one of sociology's deepest theoretical divides: idealism and materialism. The cultural theorists tend to explain changing patterns of infant feeding in terms of shifts in the general culture. We can see this explanation in action when looking at the emphasis these theorists place on the sexualization of breasts and the subsequent downturn in breastfeeding. Sexualized breasts represent a change in U.S. culture from that experienced by previous generations. Political economists place greater weight on changes in economic production in order to explain the difference in infant feeding over time. For these theorists, the increased need for women to enter the work force due to the inadequacy of a single wage to support a family leads to decreases in breastfeeding rates. In other words, it has become more difficult physically for women to breastfeed. We can see the effects of an idealist or materialist philosophy also in terms of how each group views the "naturalness" of breastfeeding. Blum, Carter, and Hausman take a social constructionist approach; they are much more hesitant to label breastfeeding as the "natural" way to feed an infant. They are much more interested in the cultural meanings attached to these feeding behaviors. Baumslag and Michels, on the other hand, do not hesitate to identify breastfeeding as the natural method of infant feeding.

The idea of seeing infant feeding practices as “contested terrain” or as containing equally valid competing claims is a theme that Blum’s, Hausman’s, and Carter’s studies share. Each theorist claims that science and medical expertise have displaced maternal knowledge as the basis for making infant feeding decisions. In order to see infant feeding in its proper context, they argue, we should focus on the lived experiences of women and the stories they tell. This will allow us to see the different voices involved in breastfeeding. The goal of this perspective is to expand our knowledge of how women in the U.S. experience infant feeding. The result of this approach, however, is that it minimizes the contribution of scientists that have explored the topic of infant feeding. In addition, it ends up minimizing power differences among groups involved in the infant nutrition debate. Groups such as the formula industry have more economic and political power than scientists researching the effects of different types of infant feeding. Through advertising and other forms of marketing discussed in the previous chapter, formula companies are able to reach more people than any other group or individual involved in the discussion. In other words, the arguments of the formula industry have a much greater potential to influence the outlook of others than scientists or “traditional” maternal authority do. This is the aspect of “contested terrain” that the political economists would emphasize.

The two approaches have strong differences in their assessment of the effectiveness of education programs in increasing breastfeeding rates. The political economists, particularly Baumslag and Michels (1995), believe that education programs can have a positive effect on breastfeeding. Baumslag and Michels are interested

primarily in improving the conditions in which women with infants work. These improvements include providing paid family leave for longer than the current period of twelve weeks; providing lactating women with places to express milk while at work; and placing daycare facilities close to employment sites in order to facilitate breastfeeding. Education programs, in their view, are instrumental in informing women not only about the advantages of breastfeeding, but also in overcoming negative cultural attitudes of employers and employees regarding public exposure of breasts. The cultural theorists have a much more negative view of the effectiveness of breastfeeding education. Blum (1999) and Carter (1995) both feel that women have reached a saturation point regarding infant feeding education. More education will have very little effect on rates of breastfeeding because women know already that “breast is best.” Further, Blum and Carter both are concerned that the emphasis of national governments on breastfeeding is not due to anxiety over infant nutrition, but to decreasing public health expenditures in the so-called “war on Welfare” taking place in the U.S. and England. They see it as a way of transferring public resources away from women in poverty: “the state’s interest in maternal bodies is both instrumental and symbolic, oriented to potential cost savings...” (Blum 1999:141). They may have a point about the pressure to decrease budgets, but it is a bit cynical to claim that this is the primary reason for the expansion of breastfeeding education.

The two theoretical groups differ in the importance they attach to infant feeding and the needs of the mother. Baumslag and Michels (1995), through their emphasis on the nutritional needs of the infant, end up taking an infant-centered approach. They do

not ignore the needs of mothers—they are interested in workplace equality, among other concerns—but they state repeatedly and unequivocally that infants should be breastfed. They do not believe that the conflict between infant and maternal needs is as large as the cultural theorists do. Baumslag and Michels' standpoint is a contrast with the perspectives of Hausman (2003), Carter (1995), and especially Blum (1999). These theorists take a mother-centered approach. They believe that the emphasis on the needs of children has caused the needs of the mother to have a much lower priority within the U.S. Carter sees the development of a child-centered approach as being negative for women due to the displacement of the mother's needs. In addition, one could argue that Baumslag and Michels start from a normative position—that is, assuming that “breast is best”—and that this takes precedence over all other concerns, such as the wishes of the mother. However, breastfeeding does not affect only the mother and child. Galtry (1997a) claims that an increase in breastfeeding is positive for all parties: the infant, the mother, employers, and society in general. She would claim that this way of looking at the situation focuses neither on the infant nor the mother. However, significant changes in our society must occur before breastfeeding becomes ideal for mothers.

Conclusion

Theories concerning breastfeeding, as stated above, have not been developed to the same extent that other areas of reproduction and parenthood have been. This appears to be the case in both quantity and quality. There are not very many feminist or sociological works that contend with infant feeding specifically; those that do,

particularly the book-length studies (Baumslag and Michels [1995], Blum [1999], Hausman [2003], and Carter [1995]) are incomplete or inadequate in some important way. Baumslag and Michels (1995) have a less developed theoretical approach to their topic. One has to read between the lines in order to determine their theoretical stance. In a sense, this is an unfair evaluation of their work; their goal is not to expand our theoretical understanding of the topic, but to illustrate the history of breastfeeding, the power of large formula corporations, and the benefits of breastmilk. The theoretical critique, then, would be reserved for proponents of feminist political economy in general. Galtry (1997b; 1997c) has done an admirable job developing some of the theoretical background, but more work needs to be done. Marxist feminist accounts of infant feeding's role in the capitalist economy would be a welcome addition to the literature.

Both groups of theorists believe that class and race affect breastfeeding rates in the U.S. The only difference between the two is a matter of emphasis: the political economists favor class as an explanation, while the cultural theorists place a great deal of stress on the effect of race on infant feeding. The cultural theorists, most notably Blum (1999), have claimed that pregnant women and women with infants have been overwhelmed with information about the positive aspects of breastfeeding. More education about the topic, according to these theorists, is going to have little to no effect on increasing breastfeeding rates. Baumslag and Michels (1995) feel that programs that educate and support women in their efforts to breastfeed will have a positive result in increasing breastfeeding.

CHAPTER III

RESEARCH METHODS

Most of the studies of infant feeding from a social science perspective have involved the use of in-depth interview data. The current study is based on a large national survey and utilizes hierarchical linear modeling in the attempt to understand the influence of significant variables on breastfeeding rates. The use of national survey data and this method have two major advantages over previous interview-based studies. First, its results will be generalizable to the population of the United States. Second, it allows an analysis of state-level variables that will allow us to examine state policies designed to encourage breastfeeding.

Five regression models are used to measure the effects of theoretically significant variables (class, race and others) and current state policies on breastfeeding rates in the United States. The five models have different dependent variables; otherwise, they are the same. Two have continuous dependent variables: number of days the child breastfed and number of days of exclusive breastfeeding. The next two models will have dichotomous dependent variables: yes/no responses to whether a child was breastfed exclusively at three and six months, respectively. The final model will be analyzed as both a continuous and a negative binomial distribution; the dependent variable for this model is duration of exclusive breastfeeding with non-breastfeeding women removed from the sample. There will be several independent variables used in order to explain variation in the dependent variables: these include household income, race of the child,

education of the child's mother, and number of children in the household. The key component of these models is that they measure relationships at both the individual and state levels. Each individual in the survey is placed within the state in which they reside; this "nesting" of individuals within states allows for an estimation of the effects of policies that differ across states. This approach is novel within the sociology of breastfeeding; no other research has used a hierarchical linear model to examine this topic. Based upon the results of these hierarchical linear models, we can to assess infant feeding in the U.S. for two separate levels: individuals and states. This is not the case for studies that examine aggregate data at the state level or typical interview data that does not take into account that individuals are nested within states. In this project, it will allow us to make observations about state-level policies in a way that individual level studies are not able to do. This direct relevance to state policies is a great advantage of using a hierarchical linear model for this research project.

Details of the Sample

The data for this research comes from the National Immunization Survey (NIS). This survey is conducted by the National Opinion Research Center (NORC) for the U.S. government; the specific governmental agencies on whose behalf they conduct the surveys are the Centers for Disease Control and Prevention (CDC), the National Center for Immunization and Respiratory Diseases, and the National Center for Health Statistics. The survey was established in 1994 primarily as a tool to both assess and increase vaccination rates across the U.S. (NIS 2006). In 2001, the survey designers began asking

questions about infant feeding; these are the questions of interest to the current study. These new questions involved estimating the number of days a child was breastfed, bottle fed, and exclusively breastfed. Adding the above questions to the NIS was a much-needed addition to research on infant feeding; before this addition, U.S. researchers relied upon private surveys to assess the topic. The NIS data set is available free for public use at the Centers for Disease Control and Prevention website.

The NIS is a random sample of U.S. households that contain at least one child between the ages of nineteen and thirty-five months of age. In order to obtain this sample, the researchers used a random digit dialing telephone survey to find households that have children in the above age range. This survey involved selecting a random sample of telephone numbers from groups of one hundred consecutive numbers (e.g. 541-555-0000 to 541-555-0099). These random samples were drawn from eighty areas in the U.S.; fifty states and thirty urban areas (including the District of Columbia). The interviewers contacted 33,960 households that met the survey's requirements; that is, these households had at least one child within the specified age range. Of these, 29,065 households (85.6 percent) completed the household interview. After the interview, the researchers contacted the child's health care provider to check the accuracy of vaccination records. 70.4 percent of the sample had adequate health care provider data. The researchers conducted the interviews with the primary caregiver that would know the most about the child's infant feeding habits and immunization records. Typically, this person was the mother of the child, but also fathers, grandparents, foster parents, and others were interviewed (NIS 2006).

It is worth noting that prior to the addition of the breastfeeding questions to the National Immunization Survey, the only large-scale data set on the subject was the marketing survey undertaken by Ross Laboratories, the manufacturers of the formula brand Similac (Baumslag and Michels 1995). A formula maker's main concern is with selling more of its product; it is less than ideal to have them both selling formula and providing data for independent researchers to use. Needless to say, it calls into question the reliability of their statistical information. The NIS has rectified this situation by adding the questions on breastfeeding to their survey. While the range of questions is limited, the NIS is a more trustworthy source.

Methods Used in Research Project: Hierarchical Linear Modeling

The goal of hierarchical linear modeling (HLM) is to allow the researcher to measure effects on a dependent variable of independent variables at two different levels. It improves the researcher's ability to estimate individual-level effects by putting those individuals within a context. In the case of HLM, the individuals are "nested" within a particular context, or within a hierarchical structure. The classic example from education research is individual students nested within schools. In this project's case, we have individual children contained within U.S. states. Most HLM analysis involves two levels only; however, there can be more levels to a HLM. The second group would be contained within a third group. In the current example, individual infants could be part of a census tract or zip code, which is contained within a state. For the purposes of this project, the two selected levels (individuals and states) will be sufficient. The reason

behind this is that infant feeding policies are much more likely to be determined at the state or national level instead of the local level. There would be little point in subdividing states into census tracts when states are the level of interest for policy changes.

Within HLM, each of the levels in the hierarchical structure is represented by a submodel. “These submodels express relationships among variables within a given level, and specify how variables at one level influence relations occurring at another” (Raudenbush & Bryk 2002:7). The submodels allow for improved estimation of individual-level effects (and standard errors) by incorporating the influence of the hierarchical structure into the model. Use of this model answers the question: how does one level affect another? In this study, one of the topics of interest is: how do institutional policies at the state level affect breastfeeding rates? HLM will allow us to examine these effects. Each second-level category (or, in the case of this project, each state) has a different y-intercept.

HLM has a relatively short history of use. According to Raudenbush and Bryk (2002), the term did not exist until 1972. Even then, it was difficult to apply: not until the late 1970s and early 1980s was a broadly applicable approach to covariance component estimation available in easily accessible computer software. Various versions of HLM are now available on many statistical software platforms.

There are many different settings in the social sciences where HLM is applicable: employees within types of occupations, students within universities, and individuals within nation-states. Any of the above situations would be an ideal candidate for HLM

because there may be variables associated with the second level of the hierarchy that would be able to explain the dependent variable of interest.

The most compelling reason to use HLM in the current research is that it allows us to examine the effect of state policies on how often women choose to breastfeed. If we did not use HLM, the estimates of these effects would be either unobtainable or would be less meaningful. Many of the potential programs designed to improve breastfeeding rates can be implemented at the state level. HLM is the best tool to assess the effectiveness of these programs because it allows the researcher to group people into a second-order category. Without HLM, we would have to look at infant feeding on an individual level only or at the state level only. This would still be of interest—for example, we could look at the effects of class and race on infant feeding, among other concerns—but the model would be of less use for policy planning and we would not control the effects of class and race on infant feeding for differences in state level policies. In other words, with standard multivariate regression we would lose information of practical and theoretical interest.

HLM Models

The general level-one regression model for a dependent variable and one independent variable is the following (it is straight-forward to extend this to a situation with more than one independent variable):

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + r_{ij},$$

where Y_{ij} is equal to the dependent variable score of the i th person in the j th second-level category, β_{0j} is the value of Y_{ij} when X_{ij} equals zero (the state-level intercept), β_{1j} is the slope associated with the independent variable, X_{ij} is the value of the independent variable for the i th person in the j th level-two category, and r_{ij} is the unique error term associated with i th person in the j th second-level category. We assume that r_{ij} is normally distributed with homogeneous variance across the level-two categories (Raudenbush and Bryk 2002). In the typical HLM there is not just one intercept but j intercepts and often the researcher allows the slopes to differ between the j groups.; in other words, for each independent variable at level one there can be as many slopes and as there are categories in the level-two variable. For the current research project, the subscript j is associated with a value for a given U.S. state, while the subscript i corresponds to an individual within a state. There will be fifty-one units (i.e. the fifty states and the District of Columbia) in the second level of the model.

HLM – Second Level

At this point, we can insert a level-two predictor variable. In this case with one independent variable, there will be two regression equations that result from this insertion:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + u_{0j} \quad \text{and}$$

$$\beta_{1j} = \gamma_{10} + u_{1j}$$

For our analysis, W_j is the second-level independent variable used to predict the dependent variable differences in the state level intercepts β_{0j} . The gammas in these two

models are level-two coefficients. γ_{00} corresponds with the mean of the dependent variable across the level-two units, or the grand mean of Y_{ij} . The coefficient γ_{01} is the slope associated with the level-two variable W_j effect on the state-level intercept. The last coefficient, γ_{10} , represents the average slope for the level-two units. There will not be a variable to predict the changes in the slopes. The error term u_{0j} is the variation of level-two intercepts around the overall intercept after W_j is used to predict the state-level intercepts. The final error term, u_{1j} , is the variation associated with the slope across the level-two units j . For the current project, there will be three variables associated with state-level intercepts; each will be a part of the above equation.

Combined Formula

In the formula below, we have substituted both level-two regression equations into the original level-one model. The equation becomes a hierarchical linear model when we make this substitution:

$$Y_{ij} = \gamma_{00} + \gamma_{01}W_j + \gamma_{10}X_{ij} + u_{0j} + u_{1j}X_{ij} + r_{ij}$$

Instead of using the original Y-intercept (β_{0j}) and slope (β_{1j}) of the level-one equation, we have exchanged these for their level-two equivalents. Instead of one error term as we saw in the level-one model, the combined HLM has two random error terms; one is associated with individuals only (r_{ij}) while the other (u_{0j}) is associated with the groups (the intercepts for the groups). The other term $u_{1j}X_{ij}$ represents the random variation in slopes from state to state. This combined model allows for an estimation of the dependent variable based upon variation for individuals and variation among states.

The above combined model represents an example of how HLM works to predict a dependent variable. However, the example contained only one individual-level and one second-level independent variable. The models in the current project will have several independent variables at level-one and three level-two independent variables. Adding in more level-one variables is a straightforward procedure; as with any multiple regression analysis, we add each independent variable and its associated slope to the level-one equation. Similarly, we would add more level-two variables to the second-level equation that substitutes for β_{0j} , or the y-intercept. For example, here is a level-two equation with three level-two variables:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_{1j} + \gamma_{02}W_{2j} + \gamma_{03}W_{3j} + u_{0j}$$

The only change from the one-variable case above is the addition of more level-two variables and the slopes associated with them.

HLM with a Categorical Dependent Variable

The process used in analyzing a categorical variable is similar to a continuous dependent variable. The same structure as above is used to construct the HLM; only the nature of the dependent variable and its interpretation change. There will be more detail on this different interpretation in the following chapter. We will analyze two different types of non-continuous dependent variables: one a dichotomous dependent variable using binomial HLM and another a count based dependent variable using negative binomial HLM. The former applies to the yes/no dependent variables measuring whether a woman exclusively breastfeeds her infant for three months or six months. The negative

binomial variable represents an alternative way to analyze the duration of breastfeeding in days. One could argue that this duration is a count variable, rather than continuous. If this is the case, it would be more proper to treat using a negative binomial distribution.

HLM with a Continuous Dependent Variable

Dependent variable, analysis 1: Duration of breastfeeding in days

Dependent variable, analysis 2: Duration of *exclusive* breastfeeding in days

Breastfeeding, according to the data set, can mean anything between “attempted once” to exclusive breastfeeding. If a mother has not attempted to breastfeed her child, then breastfeeding duration would be zero days. A drawback to this measure is that it counts intermittent breastfeeding in the same fashion as a more consistent breastfeeding regimen. For example, a mother who breastfed her infant for the first and last days of a given month would have the same number of days counted as a mother that had engaged in breastfeeding every day of that month. According to Lauwers and Swisher (2005), however, the above feeding pattern is unlikely to occur. The amount of breastmilk a woman produces is determined primarily by how often she feeds. Therefore, women that engage in sporadic breastfeeding are much less likely to continue feeding than their counterparts that breastfeed their infants daily.

The definition of “exclusive breastfeeding,” in contrast, is unambiguous. If a child has been breastfed exclusively, it has not received nutrition from any other sources, with the exception of small amounts of vitamin supplements. If the NIS did not ask respondents about exclusive breastfeeding, we would receive a very different (and

incomplete) picture of infant nutrition. This has been a problem with past surveys (Baumslag and Michels 1995); because these surveys asked questions about breastfeeding only, they missed the frequency of feedings. Using the exclusive breastfeeding variable represents a step forward in the analysis of breastfeeding because it illustrates the difference between types of infant feeding much more clearly than earlier, cruder measures.

Table 3.1 – Duration of Breastfeeding in Days

Type	Mean	Median	Minimum	Maximum	Std. Dev.	Observations
Breastfeeding	228.81	182.63	1	730.5	174.9	21,865
Exclusive Breastfeeding	60.64	3	0	273.9	78.44	22,558

It is important to include two measures of breastfeeding because there are two main ways that mothers breastfeed their infants: mixing breastmilk with other food sources (particularly infant formula) and exclusive breastfeeding. Using both allows for a comparison between the two feeding methods. The medical associations and public health agencies discussed in chapter one advocate for mothers to breastfeed their infants exclusively for six months, so it is a significant variable to examine. These groups feel that any increase in breastfeeding, whether it is exclusive or not, is important to measure. In addition, not all mothers have the time or economic resources that would allow them to breastfeed exclusively. These are good reasons to have a measure of all types of breastfeeding.

Independent Variables

Income. The data categorizes the income of respondents within intervals; it does not report actual dollar amounts that the respondents earned.

Table 3.2 – Income Categories

Category	Number	Percent
\$0 - \$7500	1152	3.9
\$7501 - \$10000	1190	4.0
\$10001 - \$17500	1737	5.8
\$17501 - \$20000	1272	4.3
\$20001 - \$25000	1412	4.7
\$25000 - \$30000	1583	5.3
\$30001 - \$35000	1180	3.9
\$35001 - \$40000	1460	4.9
\$40001 - \$50000	2364	7.9
\$50001 - \$60000	2178	7.3
\$60001 - \$75000	2776	9.3
\$75001+	8367	28.0
Subtotal	26671	89.3
Other Categories:		
Don't Know	1929	6.5
Refused to Answer	1280	4.3

Education. This variable, along with income, provides a measure of an individual's social class. The data set does not contain any information on the type of occupation that the respondent holds; this information would provide a more complete picture of social class. Income, however, is the key variable in any measure of socioeconomic status. The education variable does not provide the number of years of education, but puts them into categories.

Table 3.3 – Education of Mother Categories

Type	Number	Percent
Less than HS Education	3815	12.8
HS Diploma	6746	22.6
Attended Some College	6712	22.5
College Graduate	12607	42.2
Total	29880	100

Miscellaneous Individual-Level Variables

Race/ethnicity of child. First of all, it must be stated that the race/ethnicity of the child is not necessarily the same as that of the child's mother. As mentioned in the previous chapter, there has been significant theorizing about the role of race and its connection to infant feeding, but the work has been incomplete. Blum (1999) studied the differences between working-class African-American and white women. Her work represents a step forward in understanding how race affects breastfeeding rates, but focusing on two races is inadequate for analyzing racial difference in the U.S. The variable in the current study goes beyond Blum's study of infant feeding. She looked at only white and black mothers. Sometimes, as citizens of the U.S., we get caught up in the black/white divide and forget that there are many other racial and ethnic groups within this society. It is important to determine how they fit into the picture so that we can see if different strategies would work for different groups in order to increase breastfeeding rates.

Table 3.4 – Race/Ethnicity of Child

Category	Number	Percent
Black	3623	12.1
Hispanic	6863	23
White	16585	55.5
Other or Multiple Race	2809	9.4
Total	29880	100

The categories in the data set (see table 3.4) offer only a limited conception of race and ethnicity. Compiling all children who are not black, white, or Hispanic into an “other” category does not capture the true diversity of races and ethnicities in the U.S.; the fact that 9.4 percent of children fall into this category confirms this observation. However, the race/ethnicity variable still has relevance for explaining breastfeeding. Blum (1999) devotes a considerable portion of her interview research and theoretical development to exploring the differences between white and African-American mothers; her conclusion, as stated above, is that African-American mothers are much less likely to breastfeed than their white counterparts. While this racial dichotomy may be overemphasized in both Blum’s work and the larger society, the data will help in seeing if this difference is meaningful for the purposes of breastfeeding.

The presence of the “Hispanic” category will allow for the analysis of an ethnic group that has been left out of the theoretical literature to this date. The absence of Latinos from the existing literature is difficult to understand. There is a large population of this ethnic group in this country; according to the U.S. Census Bureau (2001), there are more Hispanic people in the U.S. than African Americans. Also, they are the fastest-growing ethnic or racial group in the United States (Campbell 1996).

State of residence. We will use this variable to set up the hierarchical linear model discussed above. There are differences in policies and support for breastfeeding among states, which is discussed below. See Appendix C for descriptive statistics of breastfeeding variables by state. All states have a high level of representation in the sample; Utah, at 280 participants, has the lowest number of research subjects of any state.

State-Level Variables

Percent of births occurring in hospitals designated as Baby-friendly (by state)

Number of board-certified lactation consultants per 1000 live births (by state)

State legislation supporting lactation and employment (y/n)

These variables were chosen in order to assess the effectiveness of national, state or health care policy in encouraging more women to breastfeed. The data for these variables was not part of the NIS data set, but was obtained separately from the CDC web site (2007). See Appendix B for a state-by-state listing of these policy variables. Baby-friendly hospital births and the number of lactation consultants relate to education of mothers; part of the mission of a Baby-friendly facility is to inform women about the benefits of breastfeeding and to provide them with training in how to perform this activity (UNICEF 2008b). Part of a lactation consultant's mission is to educate mothers on proper methods of breastfeeding (IBLCE 2008). All three variables relate to supporting mothers in their efforts to breastfeed their infants. Baby-friendly facilities are not allowed to provide formula or to accept free formula from industry representatives. Lactation consultants are a source of support to which mothers can turn when they are having

difficulty breastfeeding their infants. State legislation supporting lactating mothers on the job relates directly to making the process of breastfeeding easier for employed mothers to perform. There would have been a state-level variable for measuring support of breastfeeding in public, but forty-six states have such a law already (CDC, 2007). There is not enough variation to be able to use it in the model. The effectiveness of these laws is questionable; despite legal protection, women report feeling uncomfortable with breastfeeding in public (Baumslag and Michels 1995; Blum 1999; Hausman 2003).

Baby-friendly facilities, as discussed in the first chapter, are childbirth facilities that have decided to adhere to the Baby-Friendly Hospital Initiative adopted by the World Health Organization and UNICEF in 1991. These agencies designed the code in order to increase the frequency with which women breastfeed their infants. See Appendix A for a list of the ten principles that a Baby-friendly facility has to follow in order to receive this designation. The reason behind looking at the percentage of births that occur in these facilities rather than the raw number of facilities with the Baby-friendly designation is that the number of births at each facility varies. It is more accurate to use the percentage in this case.

An international board-certified lactation consultant is “a health care professional who specializes in the clinical management of breastfeeding and have demonstrated their competence to practice by passing an internationally recognized criterion-reference examination” (IBLCE 2008). These consultants provide consultation and support for lactating mothers, teach breastfeeding classes, solve breastfeeding problems in a clinical setting, design breastfeeding programs, and work to encourage a positive social

environment that supports breastfeeding as a viable option for women. Lactation consultants work in a variety of settings, such as pediatric clinics, hospitals, and public health settings (IBCLE 2008). They may have a significant effect on the duration and intensity of breastfeeding; they are included as a state-level variable because of this potential effect.

These three variables are from 2004 data, which does not match the date of the individual surveys in the NIS; these surveys took place during 2006. However, it is important to note that the children in the sample were born between January 2003 and July 2005. A large percentage of them would have received some form of infant feeding during 2004. In other words, data from 2004 would be a more accurate representation of the context in which the caregivers in the sample were feeding their children than if we used data from the same year as the NIS.

HLM Logit Regression

Dependent variable, model 1: was child exclusively breastfed at *three* months? (y/n)

Dependent variable, model 2: was child exclusively breastfed at *six* months? (y/n)

These two dependent variables were chosen because of their relationship to both the reality of breastfeeding and the goals of breastfeeding advocates. They are new variables created from the data set. Three months of exclusive breastfeeding corresponds with the language of the 1993 Family and Medical Leave Act; it states that a mother of a newborn may take up to three months' unpaid leave from her place of employment while retaining health insurance and being assured of the same job upon return (FMLA 1993).

This dependent variable, in other words, represents the level of exclusive breastfeeding that is realistic for most mothers with out-of-home employment to achieve, particularly those women (and families) that are in a financial position to not work for pay during this period. We would expect it to be the “high point” in exclusive breastfeeding, with a decrease in rates as women return to their place of employment. It is difficult to sustain exclusive breastfeeding within the employment setting; as stated in chapters one and two, breastfeeding on the job is one of the major obstacles that women who wish to breastfeed their children have to face.

The other dependent variable, six months of exclusive breastfeeding, was chosen to reflect the consensus of agencies that advocate the use of breastmilk as the best source of infant nutrition. As stated in chapter one, groups such as the World Health Organization, UNICEF, and the American Academy of Pediatrics believe that mothers should breastfeed their children exclusively for six months. The number of women in the U.S. that are able to do this (or that have chosen to do it) is quite small; the goal of the research, then, is to attempt to assess why so few women breastfeed their children to this extent. Also, we will be able to detect if the current state policies within the model are having an effect on this rate.

Table 3.5 – Exclusive Breastfeeding: Three and Six Months’ Duration

Category	Number	Percent (of 22,558 Observations)
Three Months	8,152	36.14
Six Months	3,093	13.71

Independent variables: same as the continuous dependent variable regression.

State-level variables: same as the continuous dependent variable regression.

Advantages and Limitations of Study

The clearest advantage that the current study has over other studies is the ability to generalize its results to the population of the United States. The data set consists of nearly 30,000 people sampled randomly from across the U. S. No other study of infant feeding, particularly those that involve in-depth interview data, can make the same claim of national generalizability. When we consider the limited nature of the interview study contained within the leading sociological work on infant feeding—Blum’s (1999) book—the current project has the potential to make a large contribution to the understanding of breastfeeding in a U.S. context. As stated in the preceding chapter, Blum’s study raised methodological concerns that made it nearly impossible to make general statements about how mothers feed their infants in the U.S.

No other current study is able to look at the effects of state-level variables on the frequency and intensiveness of breastfeeding. This project, through the use of a hierarchical linear model, is able to analyze breastfeeding with these variables. This is important because both national and world health agencies have emphasized breastfeeding as an essential part of childhood nutrition; the state-level variables represent attempts to do something about this public health concern. With these variables as part of the analysis, we can assess how effective they have been in making breastfeeding a more viable option for women. In other words, this project has the

potential to address policy concerns at the state and national level. If one of the above policies seems to be working well for states, we can recommend that it be considered for other states. Similarly, if a policy appears not to have a significant effect on breastfeeding rates, there would be less reason for states or the federal government to adopt a new policy. The reason that states cannot encourage breastfeeding in all possible ways is that public health budgets are limited. It is more effective to highlight the most effective ways to increase breastfeeding so that public health systems can focus their efforts in the most efficient way possible.

The above advantages represent a significant step forward in the analysis of infant feeding. However, there are some drawbacks to the use of the NIS data to examine this topic. First, there is a lack of depth in the survey data. We know the answers that the infant care providers gave, but not necessarily the reasons behind them. This, of course, is the main reason that sociologists choose to undertake an interview or participant-observation study. These types of studies offer the researcher the ability to perform an in-depth exploration of a given topic. Surveys, especially those not designed as part of the current research project, cannot hope to capture this amount of information. In this case, the benefits of having the results be applicable to the U.S. population are worth the lack of depth. At the very least, previous researchers have captured depth of information already. The current project allows for more attention to be given to breadth; that is, this research project is opting for less in depth information, but a much larger probability sample of people and their responses. This represents a novel approach in the sociological study of infant feeding.

The use of existing data, rather than a data set generated for the specific needs of this research project, is not ideal. The theorists discussed in the previous chapter indicated several variables that may have the ability to explain infant feeding patterns in the U.S. These variables include type of employment for the mother, feelings about breastfeeding in public, the sexualization of breasts, and the effect of formula companies' advertising/marketing on infant feeding decisions. Unfortunately, data on these variables is not included as part of the NIS data set. Due to their absence, there is no way to operationalize these variables for the regression models presented here. Designing and implementing a survey with these other potentially significant variables included would be preferred, but an individual researcher has no practical means of obtaining a similar data set. Because of this limitation in the data, it would be beneficial to researchers if the government agencies responsible for the NIS expanded the breastfeeding portion of the survey to include more variables relevant to the topic.

There are only three state-level variables used in the models to assess breastfeeding promotion programs. It would be ideal to have more than just three variables, but both a lack of data and/or an absence of variation in existing data limit the choices available. There are more programs that states could promote other than lactation consultants, Baby-friendly birth facilities, and legislation protecting on-the-job lactation. These programs include paid maternity or parental leave, creation of daycare facilities close to places of employment, or adopting into law portions of the World Health Organization's Code for the Marketing of Breastmilk Substitutes, or instituting laws to protect breastfeeding in public, to name four possibilities. The last possibility, legislation

on public breastfeeding, has been adopted by forty-six states (CDC 2007); since states have adopted these laws to such an extent, there is little point in attempting to measure its effect on breastfeeding rates. There is no available data for the other three possible programs listed above; as a consequence, we cannot address them in this study. We can only look at existing state efforts to promote breastfeeding.

The final limitation is related to the nature of the survey. When reporting their infant feeding practices, the caretakers of the infants in the survey are relying upon their memories. Since the children were between the ages of nineteen and thirty-six months at the time the survey was administered to their caregivers, there may have been as many as three years between the initiation of infant feeding and the time of the survey. Thus, there is some concern that the caregiver of the child would not be able to recall the duration of breastfeeding and formula use accurately, particularly if the caregiver was not the person responsible for the feeding of the infant. Li et al. (2005) studied the ability of mothers to recall the duration and type of infant feeding they had provided for their infants. They found that maternal recall of breastfeeding patterns was reliable if the period between the feeding and the interview or survey was no greater than three years. Since the period of time between the NIS survey and cessation of breastfeeding would be less than three years, the conclusion that Li et al. reached supports the reliability of the caregivers' recall to depict breastfeeding accurately. However, the researchers concluded that maternal memory is less reliable for other fluids – infant formula, for example. This last finding may have negative consequences for the accuracy of the data; it should be taken into account when analyzing the findings of the regression models.

CHAPTER IV

DATA ANALYSIS

The data for this project was analyzed using the SAS 9.1.3 statistical software program. It has commands that allow for the construction of hierarchical linear models for continuous, Poisson, negative binomial, and binary dependent variables (the PROC MIXED function for the former and PROC GLIMMIX function for the last three).

For each of the HLM analyses, I examined six models in order to determine if individual variables were contributing significantly to the explanation of the variation in the dependent variable. Each analysis began with a model in which there was a level two state category and no independent variables; that is, I used the level two category to determine if state-level variation was significant for the dependent variable in each of the first four analyses. In each case, there was a strong level of variation among states. If this had not been the case, there would have been little reason to construct additional models; the lack of a significant result would have indicated that states have little to do with explaining variation in breastfeeding rates.

There are a total of five HLM analyses in this section. The first two involve continuous variables—duration of non-exclusive and exclusive breastfeeding in days—while the next two involve a binary variable (i.e. whether the mother exclusively breastfed her infant for three months or six months, respectively). The fifth analysis is the same as the one that measures duration of exclusive breastfeeding, except that we remove all of the research subjects who reported zero days of exclusive breastfeeding. In

other words, the final HLM analysis examines the factors within breastfeeders that cause them to perform this activity for a longer duration than other women.

The default (reference) person in each analysis is a white woman who has less than a high school education and lives in a state without legislation supporting lactation in the workplace. As indicated in the previous chapter, there is missing data for each of the five dependent variables and for the income independent variable. The number of people in each analysis will be noted.

HLM Analysis 1 – Days that Child Was Breastfed Non-Exclusively

This analysis uses the number of days that a child was breastfed as a dependent variable.¹⁰ This measure ignores whether the breastfeeding was exclusive or mixed with infant formula. We will add relevant variables through six separate models. The final model will contain all the variables mentioned in the previous chapter. The reason for adding variables one or two at a time is that it provides a way to measure differences between the fit models. The key indicator in the first two HLMs for determining their fit is negative two multiplied by the residual log likelihood estimate. As variables are added to each model, we can subtract the $-2 \times$ residual log likelihood of the previous iteration from the current one. The result will be a number in the chi-square family of distributions. The degrees of freedom are determined by subtracting the number of

¹⁰ One can make the argument that the dependent variables for the first and second HLM analyses (days spent non-exclusively breastfeeding and days spent exclusively breastfeeding, respectively) are count variables, rather than continuous. This would make it more appropriate to treat them as having a negative binomial distribution. In order to account for this problem, I analyzed the data for both dependent variables as both a continuous and negative binomial distribution. The results for the latter did not differ substantially from the former in strength or direction of relationship. The results for the HLM analysis using a continuous dependent variable are presented here due to ease of interpretation.

variables in the previous iteration from the number in the current one. If the chi-square result is significant, the variable or variables have a significant effect on the dependent variable.

All models within the HLM analyses used 19,602 out of 29,880 sample participants. There were 8,015 respondents who did not report how long they breastfed their infants. In addition, 2,263 people were removed from the analysis because of missing data for the income variable.

Model 1 – State only. This model indicates that variation by state has a significant relationship with the number of days a woman provides breastmilk for her infant. The z-score for the covariance parameter estimate is 4.26; the probability of states not having an effect on breastfeeding duration is less than .0001. If the covariance had not been significant, there would have been little basis for continuing with a hierarchical model with states as the level two category. As we can see from the table below, states were determined to have a significant effect on breastfeeding for all models in the analysis.

The -2 residual log likelihood (-2RLL) for the state-only model is 287,629.3. We will use this number as a base in order to compare the next iteration to it. The difference between the log likelihood of the two iterations produces a chi-square test; if it is significant, we can conclude that the variable (or variables) included in the most recent model significantly improves the fit of the model to the data.

Model 2 – One level-one predictor. As we can see from Table 4.1, the income slope estimate is 4.147. The t-test associated with income produces a value of 11.49, which is highly statistically significant: the income variable has a significant effect on

breastfeeding duration within this rudimentary model. However, we will find that the effect of income is not the same in all of the models in this analysis. When we add the next set of class variables—education level of the mother—to the full model, there will be a strong effect on income's power to explain breastfeeding rates.

The -2 residual log likelihood for the second iteration is 257,696.8. When subtracted from the log likelihood of the previous iteration, we produce a chi-square result that measures the degree to which the included variable(s) have improved the fit of the model. Subtracting these two values creates a chi square of 29,932.5. When we subtract the number of variables in this iteration (two) with the previous (one), we find that there is one degree of freedom for this chi-square test. The extremely large value of this chi-square makes it exceedingly probable that income is related to days spent breastfeeding.

Model 3 – Two level one predictors. The difference between this model and the preceding one is the addition of a variable indicating whether the child is African American or not. The table indicates that if a child is black, that on average the child will be breastfed for almost thirty-three less days than a white child. A t-value of -7.32 indicates that this variable has very strong significance in the model. As we will see in the next steps, this variable remains significant through all models. The -2RRL this model is 257,656.9. When subtracted from the previous log likelihood, we derive a chi-square of 39.9. This result is statistically significant ($p < .001$, which indicates that the addition of the race variable statistically significantly improves the fit of the model.

Table 4.1 – HLM Analysis 1: Days that Child Was Breastfed Non-Exclusively

Fixed Effects	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	228.39** (3.6133)	183.16** (5.2855)	189.65** (5.3518)	186.00** (5.6783)	165.23** (7.4099)	186.69** (8.6717)
Income		4.1466** (0.3608)	3.7602** (0.3664)	3.7544** (0.3663)	3.7359** (0.3661)	-0.1007 (0.4545)
Black			-26.9816** (4.5543)	-26.7357** (4.5556)	-26.7015** (4.548)	-27.4591** (4.723)
Hispanic						-9.4223* (3.6963)
Other Race						7.0500 (4.5222)
HS Education						-10.1532* (5.067)
Attended Some Coll.						8.2237 (5.2021)
Coll. Graduate						44.1252** (5.2682)
Baby-Friendly				1.4847 (0.8219)	0.1620 (0.7997)	0.09166 (0.831)
Legislation					12.3045* (6.0916)	11.899 (6.3525)
Lac. Consultant					7.3184** (2.1289)	7.1796** (2.2123)
Random Effects						
State	567.18** (15.85)	537.07** (130.15)	513.55** (125.12)	489.52** (122.09)	355.51** (95.792)	394.56** (103.94)
Residual	30043 (303.88)	29846 (301.90)	29797 (301.41)	29797 (301.41)	29797 (301.41)	29393 (297.36)
Fit Statistics						
-2 Res Log Likelihood	257828.2	257696.8	257656.9	257652.3	257628.6	257337.7
AIC	257832.2	257700.8	257660.9	257656.3	257632.6	257341.7
Chi Square		131.4**	39.9**	4.6*	23.7**	290.9**
DF		1	1	1	2	5

*p<0.05 **p<0.01

Model 4 – Adding a level two predictor. For this iteration, I inserted a variable measuring each state's percentage of live births that occur in a Baby-Friendly facility. Each individual was assigned the percentage for the state in which he or she resided at the time of the survey. The model shows that Baby-Friendly facilities are associated with increases in the number of days that women breastfeed their infants, and that this increase is significant at $\alpha = 0.05$ level for a one-tailed t-test. The -2RLL indicates that the addition of the Baby-Friendly variable improves the fit of the model: subtracting its value in this model (257,652.3) from the previous log likelihood yields a chi-square value of 4.6. This chi-square is significant ($p < 0.05$), which is significant at the 0.05 level for a two-tailed t-test. The final note to make about this model is that the estimates and significance levels for the income and race variables remain similar to the previous models.

Model 5 – Adding all level two predictors. When we add in the final two state-level predictors of breastfeeding, we observe some interesting effects. These two variables are the number of international board-certified lactation consultants in a state per 1000 live births and whether the state has a law protecting lactation and employment. Both of these variables have a significant relationship to the duration of breastfeeding. Lactation consultants increase breastfeeding length, on average, by 7.32 days for every additional consultant employed per 1000 residents in the state. States that have laws are associated with an increase in breastfeeding length of approximately twelve days. Both variables are statistically significant according to the t-test. The -2RLL supports their inclusion: subtracting its value of 257,628.6 from the previous model's score yields a chi-

square of 23.7. This result is significant at $\alpha = .001$ with two degrees of freedom. This chi-square has two degrees of freedom because two variables were added in this iteration, rather than one.

The addition of these two new state-level independent variables causes the Baby-Friendly variable to become statistically insignificant. The previous model placed this variable's t value at 1.81, while the current one has a t-value of 0.20 for the Baby-Friendly variable. It is not immediately apparent why this is happening; one strong possibility is that there is not enough data on Baby-Friendly facilities in the U.S. from which to work with in this model. See the chapter summary and chapter five for more discussion of this variable. In addition, collinearity of the state-level variables could be causing the Baby-Friendly predictor to drop from significance. In order to test this, I constructed a linear regression model with the Baby-Friendly variable as the dependent variable and other two state-level variables (lactation consultants and state legislation) as predictors. The R squared value for this regression analysis was 0.2058; this result indicates that 20.58 percent of the variation in the Baby-Friendly variable can be explained by the two predictors. This may indicate that multicollinearity is part of the reason that the Baby-Friendly variable is driven to insignificance in the model.

Model 6 – All independent variables. This model includes all of the previously unused race and education variables. Adding in these variables decreases the -2RLL from the previous iteration to 257,337.7. Subtracting these two values generates a chi-square value of 290.9, indicating (with $p = .001$ with five degrees of freedom) that these additional variables (as a group) improve the fit of the model of breastfeeding rates.

The covariance parameter estimates shown in Table 4.1 indicate that the level-two category of each model—state of residence—is significant for all models in the analysis. This significance means that there is variance between states that is not accounted for by the variables in each model. It is important to note, however, that in Model 1 that variance between states is 567.18 and in Model 6 this variance is 394.56. The variables in Model 6 account for 30.03 percent of the variance between states.

The new variables that have a significant effect on breastfeeding duration controlling for the other variables in the model are the Hispanic ethnicity of the child, the mother's attainment of a high school education, and the mother's attainment of a college degree. Hispanic ethnicity is associated with a decrease in breastfeeding of almost ten days. While this result is not as drastic a level as for African-American children, it is a substantially lower level than white children experience. The remaining racial/ethnic category, "other race," is not significant; if it were, interpreting it would be difficult. There are many different racial and ethnic groups represented in this group, such as Asian-Americans, Native Americans, Pacific Islanders, and children of multiple races. I am unsure why the survey designers chose to put all of these groups into one category, as it is nearly useless for analytical purposes. It is included in this analysis in order to incorporate all races and ethnicities into the models.

According to the full model, education, not income, appears to be the class variable that affects breastfeeding the most. This applies particularly if the mother has completed at least an undergraduate degree. In this case, the average duration of breastfeeding increases by 44.13 days, or more than six weeks, beyond the length of time

a mother without a high school diploma breastfeeds her child. The other significant education result is interesting; according to the model, a mother with a high school education breastfeeds for a *shorter* time (10.15 days) than a woman with less than a high school diploma. None of the theories discussed in chapter two suggest a reason for this difference. It is uncertain why there would be a significant result in this case; in order to understand it, further study and theoretical exploration would be necessary. One possibility is that women with a high school education are more likely to be employed full time than women with a lower level of education, which would create a situation in which formula use is more practical than breastfeeding.

Income appears to be a highly significant contributor to explaining breastfeeding length until the introduction of the education variables into the full model. According to the model, education is the most important class variable by far. While this is an unexpected result, it does validate the hypothesis that class is having a significant effect on the duration of breastfeeding. College-educated women are much more likely than other women to have a job that is flexible in allowing time away from work for maternity leave, has a compensation policy for maternity leave, and has fewer constraints on pumping breastmilk while at work. In addition, these women are likely to have more power and authority in their place of employment, which might create for them an advantage in negotiating time and privacy requirements for breastfeeding or pumping breastmilk on the job. Finally, college-educated women may be better informed about the benefits of breastfeeding than other women. The combination of these factors, in addition to other possible reasons, creates a social structure in which women with a high

level of education appear to be able to breastfeed their children for a much longer period of time than women with less education.

In summary, when examining the model with all independent variables added, we find that the most significant individual-level factors in determining breastfeeding length relate to the race/ethnicity of the child and the mother's level of education. If the child is black or Hispanic, the number of days the child is breastfed decreases. If the mother has completed college, the likelihood of breastfeeding for a longer duration increase by a large factor, while having a high school education decreases breastfeeding length. These results correspond with the expectations that the theorists depicted in chapter two; the exceptions to this, most notably income, are noted above.

In the model with all independent variables included, the results from this previous model remain true for the state-level predictors, with one exception. As the number of lactation consultants per 1000 live births in a state increases, we find a large increase in the average breastfeeding length. The exception to the previous model is that we no longer find a significant result for state legislation regarding lactation and employment. However, the result is still significant if we replace the two-tailed test with a one-tailed test. In this case, the probability value is 0.0306, which is significant at the .05 level. We can apply a one-tailed test in this circumstance because the hypothesis for this variable stated that legislation would increase breastfeeding duration.

HLM Analysis 2 – Days that Child Was Breastfed Exclusively

For this analysis, I followed the same procedure as with the non-exclusive breastfeeding model above. All of the same variables are used in the same order for each model within the analysis. The only factor that has changed for this analysis is the dependent variable: instead of measuring breastfeeding, these models examine the duration of *exclusive* breastfeeding. As with the first HLM analysis, all models in the analysis contain 20,204 individuals because of missing data in the income variable and in the dependent variable.

The results for the models two and three are very similar to the first HLM analysis in both direction and t-values. Higher-income women are more likely to feed their infants breastmilk for a longer period of time, and African-American infants breastfeed exclusively for less time than their white counterparts. The estimates are smaller than the first HLM analysis because the mean duration of exclusive breastfeeding is much shorter than non-exclusive breastfeeding.

The findings for the exclusive breastfeeding HLM analysis with all independent variables added appears to be similar to the non-exclusive breastfeeding analysis. The race/ethnicity of a child is still significant in determining duration of breastfeeding. Education has a larger effect than income on breastfeeding length. In this model, attending college without attaining a degree significantly improves exclusive breastfeeding; in the first HLM analysis, it did not appear to have an appreciable effect on non-exclusive breastfeeding. An increase in the number of lactation consultants in a state has a positive effect on how long women in that state breastfeed exclusively. The one

major difference between analyses one and two is the significance of the income variable. Unlike the non-exclusive breastfeeding model, income retained its significance in explaining exclusive breastfeeding rates when we applied the full model. It is important, however, to note that the t-value decreased by over ten standard error units when we added in the education variables.

The reason income stayed significant for exclusive breastfeeding may well involve the ability of women from families with higher incomes to take time away from paid employment to supply the child a breastmilk-only diet. As discussed in the previous chapters, providing breastmilk (either through direct feeding from the breast or by pumping milk) is time-consuming and must occur periodically throughout the day. Unfortunately, this amount of time may not be as readily available to lower-income mothers; returning to work soon after the infant arrives may be necessary in order to support the family.

According to the fit statistics shown in Table 4.2, the variables added for each model resulted in a significant improvement in the fit of the model. As with the first HLM analysis, the “difference” column corresponds to a chi-square value derived by subtracting the current -2RLL score from the previous one. The insertion of additional predictors enhanced the ability of the model to explain the variation in the dependent variable.

Table 4.2 – HLM Analysis 2: Days that Child Was Breastfed Exclusively

Fixed Effects	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	62.3847** (1.4237)	38.0594** (2.2059)	40.2125** (2.2259)	38.574** (2.3265)	29.0052** (2.7518)	37.5517** (3.3693)
Income		2.235** (0.1589)	2.1075** (0.1613)	2.1047** (0.1613)	2.0837** (0.1609)	0.5639** (0.2019)
Black			-9.2639** (2.0158)	-9.1504** (2.0161)	-9.3894** (2.0064)	-12.9596** (2.0898)
Hispanic						-9.6749** (1.6242)
Other Race						-4.429* (1.9785)
HS Education						1.201 (2.237)
Attended Some Coll.						9.3026** (2.2961)
Coll. Graduate						16.6761** (2.3255)
Baby-Friendly				0.6649* (0.3108)	0.01897 (0.2729)	0.01058 (0.2835)
Legislation					1.6842 (2.0402)	2.3706 (2.1319)
Lac. Consultant					4.0796** (0.7277)	3.8457** (0.7561)
Random Effects	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
State	84.1666** (20.9333)	76.6997** (19.4326)	70.0694** (18.1420)	64.1301** (17.2383)	32.5776** (10.4687)	37.0103** (11.5084)
Residual	6067.10 (60.4424)	6009.62 (59.8719)	6004.74 (59.8255)	6004.75 (59.8263)	6004.54 (59.8202)	5957.68 (59.3616)
Fit Statistics						
-2 Res Log Likelihood	233412.3	233217.5	233193.3	233189.4	233158.7	232985.1
AIC	233416.3	233221.5	233197.3	233193.4	233162.7	232989.1
Chi Square		194.8**	24.2**	3.9*	30.7**	173.6**
DF		1	1	1	2	5

*p<0.05 **p<0.01

The covariance parameter estimates shown in Table 4.2 illustrate that the level-two category of the hierarchical linear model (i.e. state of residence) continues to be significant for all models of the HLM analysis. This means that there is variance between states that is not explained by the variables in the model. Note, however, that in Model 1 the variance between states is 84.166 and in Model 6 the variance between states is only 37.010. Over half of the variance between states is accounted for by the variables in Model 6; more specifically 56% of the variance is accounted for by these independent variables.

HLM Analysis 3 – Did the Child Breastfeed Exclusively for Three Months?

Unlike the above two analyses, the third analysis uses a dependent variable with only two possible results: one or zero (i.e. yes or no). If the child in the survey was breastfed exclusively for at least ninety days, he or she was coded as a “1.” Otherwise, the child received a zero. It is inappropriate to analyze this binary dependent variable with a normal mixed model. In order to get meaningful results, we have to use the SAS PROC GLIMMIX macro. The command GLIMMIX stands for generalized linear mixed model. The generalized hierarchical linear model used in this project is a type of generalized linear mixed model. This SAS command is capable of analyzing hierarchical linear models that have a dependent variable with binary, Poisson, or negative binomial distributions, among other types.

The generalized linear mixed models described in the third and fourth HLM analyses use a residual pseudo-likelihood to analyze the variables. It uses a pseudo-

likelihood rather than a true likelihood because the dependent variable is not continuous, which violates a key assumption of both linear regression and HLM analysis. The SAS program computes a linear approximation of a true likelihood by engaging in a two-step iterative process. First, it approximates a generalized linear mixed model based on the covariance parameter estimates. Next, it attempts to fit this model until it converges or fails to do so. The technique that SAS uses for this estimation is restricted pseudo-likelihood. This estimation technique (METHOD=RSPL in PROC GLIMMIX) involves “an expansion around the current estimate of the best linear unbiased predictors of the random effects” (Schabenberger 2006:10).

The log-odds ratios for the predictors are obtained by taking the exponential function of the estimates. An odds ratio of one would indicate that there is an equal chance of breastfeeding or not breastfeeding. If the odds ratio is greater than one, the chance of breastfeeding exclusively is increased. Similarly, if the odds ratio drops below one, there is a decreased chance of breastfeeding exclusively for three months.

The third and fourth HLM analyses have the same number of individuals with missing data as the first and second analysis: all models within the analyses include 20,204 people from the data set.

Table 4.3 – HLM Analysis 3: Did the Child Breastfeed Exclusively for Three Months?

Fixed Effects	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.5181** (0.03562)	-1.2348** (0.06004)	-1.1727** (0.06055)	-1.2224** (0.06241)	-1.4345** (0.07361)	-1.2111** (0.09274)
Income		0.06481** (0.004437)	0.06118** (0.004496)	0.0611** (0.004493)	0.06059** (0.004484)	0.01577** (0.005595)
Black			-0.2845** (0.05791)	-0.2807** (0.05789)	-0.2846** (0.05762)	-0.3913** (0.05976)
Hispanic						-0.2928** (0.04507)
Other Race						-0.1831** (0.05344)
HS Education						0.0648 (0.06593)
Attended Some Coll.						0.3168** (0.06637)
Coll. Graduate						0.5131** (0.06691)
Baby-Friendly				0.02006* (0.007597)	0.00535 (0.006934)	0.005342 (0.00727)
Legislation					0.01944 (0.05193)	0.04263 (0.05479)
Lac. Consultant					0.09399** (0.01842)	0.08769** (0.01932)
Random Effects	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
State	0.05122 (0.01318)	0.04663 (0.01232)	0.0422 (0.01146)	0.03608 (0.01034)	0.01981 (0.006854)	0.02317 (0.007631)
Fit Statistics						
-2 Res Log Pseudo-Likelihood	86415.93	87337.73	87368.34	87345.42	87381.63	87638.84
Generalized Chi Square	19845.53	20148.63	20148.72	20150.4	20157.36	20154.84
Gen. Chi Square / DF	0.98	1.00	1.00	1.00	1.00	1.00

*p<0.05 **p<0.01

The second model shows that income has a strong effect on 3-month exclusive breastfeeding. For every point of increase in the income category, the odds of breastfeeding exclusively for three months increases by 1.0670. This number is found by calculating the exponential function of the independent variable's estimate. If this HLM follows the same pattern as the previous two, we would expect the t-value for this variable to decrease considerably when we add the education variables to the full model.

The results for models 3, 4, and 5 are similar in strength and direction to the same models for the first two HLM analyses. An African-American child has a decreased chance of breastfeeding exclusively for three months compared to a white child. Lactation consultants appear to have the greatest effect on 3-month breastfeeding when compared to the other state-level variables. The variable measuring lactation-friendly workplace laws in states does not appear to be significant in this model. This lack of significance makes theoretical sense; since a large number of women have not yet finished their maternal leave at three months, these laws would not apply to their employment situation.

The first aspect of the third HLM analysis that is important to note is its consistency with the previous models. The direction of the estimates (i.e. whether the estimate is positive or negative) and the tests of significance are similar to the first and second HLM analysis. For instance, both the income and college graduate variables are significant, but the latter variable appears to have a greater influence on the likelihood of breastfeeding exclusively for three months. As with the previous HLM analysis that measured the length of days of exclusive breastfeeding, both income and education have

a positive effect on the dependent variable's likelihood of indicating exclusive breastfeeding. The race/ethnicity variables all have a significant negative effect on the likelihood of breastfeeding for three months. Finally, the state-level variables have an effect similar to the prior analyses. The number of lactation consultants in a state per 1000 births has the largest influence on exclusive breastfeeding likelihood, while the other two variables do not appear to be significant. We would expect the variable measuring legislation to be significant in the next analysis (i.e. six-month exclusive breastfeeding) because most women employed outside the home prior to childbirth will have returned to work.

The negative of twice the residual log pseudo-likelihood is presented in Table 4.3. It is called *pseudo*-likelihood in order to denote that it is not computed from a true likelihood. We can use these pseudo-likelihoods to calculate a deviance score, which is a measure of goodness of fit. A deviance determines whether the full, or saturated, model improves the fit over the hypothesized model. The pseudo-likelihood of the full model is assumed to be zero—that is, the full model explains all of the variance in the dependent variable—so we calculate deviance as follows: $-2 * \ln L(M_u)$. $L(M_u)$ corresponds to the pseudo-likelihood of the hypothesized model. In other words, the negative of twice the residual log pseudo-likelihood corresponds to the deviance score. In general, smaller deviance values indicate models that fit better (Hoffmann 2004). The data analysis software provides a generalized chi-square computation, which we use to estimate the model's goodness of fit when it is divided by the degrees of freedom. The generalized chi-square divided by degrees of freedom should be close to 1.00, which it is for all

iterations of the HLM. This closeness to 1.00 indicates that the data's variability has been modeled properly and that there is no residual overdispersion (Schabenberger 2006).

HLM Analysis 4 – Did the Child Breastfeed Exclusively for Six Months?

The dependent variable for this analysis was coded in the same way as model three: if a child breastfed exclusively for at least 180 days, he or she received a "1" for this variable; any other response resulted in a zero. Otherwise, the structure of the models in this analysis remains the same as the third HLM analysis.

The results for the model with all predictors included are similar to the previous analyses in the direction of the relationship. With the curious exception of the Baby-Friendly variable, all of the variables exhibit the same negative or positive direction as they did in the first three analyses. Most of the variables have a lower t-test result than the previous analyses, which causes some (most notably income) to decline in significance. This decline occurred probably because the number of women who breastfeed exclusively for six months is very low. The income variable no longer passes a one-tailed significance test if $\alpha = 0.05$. The race variables remain significant; the HLM analyses in this project have made it clear that African-American and Hispanic women breastfeed for less time than their white counterparts controlling for other variables in the analysis. Finally, it is interesting to observe that the variable measuring laws pertaining to lactation and the workplace is significant in the six-month exclusive breastfeeding analysis and not in the three-month analysis. As pointed out above, this legislation was not significant in the three-month exclusive breastfeeding analysis because many women

had not yet returned to work at that time. By six months, of course, mothers that work outside the home very likely have returned to their jobs; the legislation designed to support their breastfeeding efforts would have an effect only in the current model.

The interpretation of the goodness of fit statistics is the same as in the third analysis above. The negative value of twice the residual log pseudo-likelihood is equal to the model's deviance. The deviance scores for this HLM analysis are larger than the values listed for the previous analysis, which indicates that the models of this analysis do not fit as well as the ones for the three-month dependent variable. The generalized chi-square divided by degrees of freedom is close to 1.00 for each model, which indicates the proper modeling of the variation of the data.

Table 4.4 – HLM Analysis 4: Did the Child Breastfeed Exclusively for Six Months?

Fixed Effects	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-1.8278** (0.04059)	-2.3357** (0.08037)	-2.2785** (0.08154)	-2.306** (0.08432)	-2.6021** (0.09388)	-2.4044** (0.1204)
Income		0.04483** (0.006285)	0.04154** (0.006359)	0.04146** (0.006359)	0.04057** (0.006332)	0.01258 (0.007891)
Black			-0.2761** (0.08595)	-0.2719** (0.08602)	-0.2829** (0.0854)	-0.3207** (0.08804)
Hispanic						-0.1721** (0.0633)
Other Race						0.04822 (0.07024)
HS Education						-0.05226 (0.09346)
Attended Some Coll.						0.07522 (0.09381)
Coll. Graduate						0.2637** (0.09391)
Baby-Friendly				0.01137 (0.009071)	-0.00708 (0.007907)	-0.0076 (0.008029)
Legislation					0.1339* (0.05804)	0.1412* (0.05925)
Lac. Consultant					0.1119** (0.01971)	0.1079** (0.0201)
Random Effects						
State	0.0581 0.01717	0.04954 0.01479	0.04531 0.014	0.04381 0.014	0.01691 0.007659	0.01822 0.008011
Fit Statistics						
-2 Res Log Pseudo-Likelihood	100037.6	100828.0	100875.4	100888.1	100968.8	101133.5
Generalized Chi Square	19885.33	20027.82	20036.07	20037.63	20093.02	20098.32
Gen. Chi Square / DF	0.98	0.99	0.99	0.99	0.99	1.00

*p<0.05 **p<0.01

HLM Analysis 5 – Duration of Exclusive Breastfeeding with Non-Breastfeeders

Removed

The four previous HLM analyses examined the dependent variable with all available women in the sample. In this analysis, we observe the effect of independent variables on duration of exclusive breastfeeding while removing women from the sample who did not exclusively breastfeed their infants. The reason behind this exclusion is that it allows us to determine the variables that exert the greatest influence on women that have already made the choice to breastfeed exclusively. In other words, we have changed the focus in this model from all mothers of infants to only women who breastfeed exclusively. There is a practical reason for excluding non-breastfeeders from the sample: it allows us to focus on two different levels of breastfeeding policy. At one level we can encourage women to attempt breastfeeding; at the other level, we can promote continuation of breastfeeding for women that have begun to use this form of infant feeding. The fifth HLM analysis presented here will help with the latter goal.

There is a large number of women in the sample ($n = 9,460$) who exclusively breastfed their infants for zero days; these women were left out of this analysis. This exclusion left the sample with 20,420 women. Due to missing information in the dependent variable and the independent variable measuring income, the total number of women in the current analysis is 11,850.

This HLM indicates that income and education, with the exception of high school graduates, are not significantly associated with the dependent variable when non-breastfeeders are removed from the model. All other variables are similar to the previous

models in strength and direction of relationship. The most probable conclusion we can make concerning the income and education variables is that they have an effect on the decision women make to breastfeed, use infant formula, or combine the two; they have little effect on how long women provide breastmilk for their infants once they have made the choice to exclusively breastfeed.

According to both sociological theory in general and the theories reviewed for this project in particular, race and class in the U.S. have a strong influence on each other. It seems likely, then, that race and class are related to each other in having an effect on breastfeeding duration. In order to study this relationship more closely, I examined class effects on the dependent variable while controlling for race. This process was similar to the method used above of introducing one variable at a time to the HLM. In this case, I examined three models: an income-only model, an education-only model, and one that has both income and education as predictors.

Table 4.5 – HLM Analysis 5: Duration of Exclusive Breastfeeding with Non-Breastfeeders Removed

Fixed Effects	Income only	Education only	Income and Education	Full Model
Intercept	94.0667** (2.8607)	103.16** (2.8177)	100.67** (3.5234)	97.781** (4.3088)
Income	0.9447** (0.2160)		0.3489 (0.2584)	-0.1084 (0.2658)
Black				-19.8184** (2.7354)
Hispanic				-7.752** (2.1469)
Other Race				-4.7236 (2.4979)
HS Education		-6.8549* (2.8943)	-8.2218* (3.239)	-8.7944* (3.2717)
Attended Some Coll.		-2.1395 (2.7805)	-3.1276 (3.2086)	-4.1736 (3.2836)
Coll. Graduate		5.5848* (2.5820)	3.9549 (3.2316)	1.9296 (3.3126)
Baby-Friendly				.003071 (0.3022)
Legislation				2.9169 (2.2463)
Lac. Consultant				4.3734** (0.7976)
Random Effects	Income only	Education only	Income and Education	Full Model
State	88.5999** (24.1771)	99.7149** (26.0909)	91.6864** (24.787)	32.3288** (12.5403)
Residual	5866.11 (76.3815)	5913.41 (73.2284)	5849.39 (76.1735)	5825.86 (75.8669)
Fit Statistics				
-2 Res Log Likelihood	136519.5	150990.2	136473.7	136371.8
AIC	136523.5	150994.2	136477.7	136375.8

*p<0.05 **p<0.01

We can see that income has a significant effect on exclusive breastfeeding length, but when compared to the above analysis that included non-breastfeeding women, the strength of the effect has diminished; the estimate decreased from 2.235 to 0.9447. As stated above, it is likely that income has a greater effect on whether or not one breastfeeds exclusively instead of the duration of breastfeeding for women already performing this activity.

The next model uses only the education variables to predict duration of exclusive breastfeeding. The same decreased strength that happened to the income variable's ability to explain exclusive breastfeeding duration has occurred to the education variables, particularly to college graduation. In the HLM analysis of this dependent variable with non-breastfeeders in the model, the estimates for college graduates and women who attended some college were 16.6761 and 9.3026, respectively. In this model, these variables' ability to explain how long breastfeeding women continue to nurse their infants is not as strong; the "attended some college" variable has dropped from statistical significance and has an estimate of -2.1395. The college graduate variable is still significant, but its estimate has decreased to 5.5848. While these variables are not as important in this model, it appears that the high school education variable contributes to determining the number of days exclusive breastfeeders spend feeding their infants. In this case, as with the other analyses, it has a negative effect on breastfeeding duration.

The next model includes both income and education variables; it measures their effect on duration of exclusive breastfeeding. When all of these predictors are added to

the model, they seem to cancel out the effect of each other on the dependent variable. Income and education are related strongly, of course, but in previous models the education variables appeared to have a much stronger effect than income on breastfeeding duration.

The lack of significance of college education on exclusive breastfeeding is odd in that it contradicts the results of the HLM analyses for three and six months' exclusive breastfeeding. In these analyses, college educated women were much more likely to breastfeed exclusively for these lengths of time than women without a college degree. It is not apparent why this variable would be significant in these analyses and not in the current one.

Summary

The five HLM analyses used here provide consistent results when compared to each other, with only a few exceptions. In each, education and race play a large role in determining how long a mother breastfeeds her infant. Income appears to play a role in exclusive breastfeeding, but not in breastfeeding mixed with formula use. The mother's education level, particularly if she has a college degree, seems to be much more significant than income in determining both type of feeding and its duration. As discussed above, there are several reasons why college-educated women would be more likely to breastfeed; the most important factors likely relate to the type of employment a woman with a college degree is able to obtain. These jobs are more likely to facilitate an

increase in maternity leave duration and to provide the mother with more power in the workplace.

The literature has concentrated on the relationship of African-American women to infant feeding. According to the results of the five analyses, this focus has been justified. These women have a significantly shorter duration of breastfeeding and are less likely to exclusively breastfeed than white women. Blum's (1999) work provides a possible reason: African-American women are less likely to breastfeed because of the history of race relations in the U.S. (Footnote: there are other conceivable explanations for the low rate of African-American participation in breastfeeding. See the following chapter for more details.) The results obtained in this project's analyses, in other words, are consistent with much of the existing literature on the subject. However, African-American women are not the only racial or ethnic group that is less likely to breastfeed; according to the models, it appears that Hispanic women have a lower duration of breastfeeding than white women. In each HLM analysis, these women experienced either a shorter mean breastfeeding length or a lower probability (compared to white mothers) of breastfeeding exclusively for three or six months. Since the existing literature does not contain any references to Hispanic women, we cannot form any solid conclusions based upon these results. More research is necessary in order to explore why this group of women has a lower breastfeeding rate than white women.

Results for the state-level predictors were similar in all five analyses. In each, the evidence suggests that the number of international board-certified lactation consultants per 1000 live births in each state has the largest effect on breastfeeding length and

frequency. Each additional lactation consultant (per 1000 live births) increases the duration of breastfeeding—both exclusive and non-exclusive—by a significant number of days. Additionally, the availability of lactation consultants increases the probability that a mother will breastfeed her child exclusively for three or six months. The other two state-level variables (legislation protecting lactation in the workplace and the percentage of births occurring in a Baby-Friendly facility) cannot make this claim; the full version of each HLM analysis illustrates that these two variables did not pass a two-tailed significance test. The legislation variable received some support in the non-exclusive breastfeeding model; it passed a one-tailed t-test at $\alpha = 0.05$ level of significance. However, based on the evidence the data provides, it is clear that lactation consultants are a more important factor in increasing breastfeeding duration and intensiveness than favorable legislation in encouraging mothers to breastfeed.

The Baby-Friendly facilities variable did not turn out to be significant, which is puzzling. These facilities are designed to promote and facilitate breastfeeding; they should have an effect on the type of infant nutrition a child receives. The reason for this departure from the expected result, in all likelihood, is the sheer lack of these facilities across the United States. The percentage of births that occur in these facilities is quite low. The U.S. national mean is 1.93 percent. The state with the highest percentage is Maine; 16.82 percent of births occur at a Baby-Friendly birthing facility in that state. Twenty-eight states (including the District of Columbia) do not have any of these facilities, while twelve other states have less than five percent of births occur there (see Appendix B for data). There is no logical reason why Baby-Friendly facilities would not

have an effect on breastfeeding. Other data shows support for the Baby-Friendly initiative; see Philipp et al. (2001) and DiGirolamo, Grummer-Strawn and Fein (2001) for two examples of studies that found positive results associated with these practices. These other studies make it difficult to believe that the results obtained in the models of the current project are indicative of the actual effect of Baby-Friendly facilities. I believe that the Baby-Friendly variable would have been significant if there were enough of these facilities in existence in the U.S. Even though the analyses did not demonstrate their effectiveness in increasing breastfeeding rates, Baby-Friendly facilities would likely increase breastfeeding in the U.S. if there were sufficient numbers of them in existence. The hierarchical linear models provide evidence that they do not significantly affect state level rates in their current numbers; I contend that an increased amount of data on Baby-Friendly facilities would produce a quite different result.

The fifth HLM analysis, intended to examine the influence of the independent variables on how long exclusive breastfeeders nurse their infants, produced some results that differed from the other models presented here. The influence of income and education, particularly college graduation, is minimized. This tells us that these social class-derived variables appear to have an influence on the decision to exclusively breastfeed one's infant, but not the duration of exclusive breastfeeding to a significant degree. Race continues to play a large role in determining exclusive breastfeeding duration when non-breastfeeders are taken out of the sample. The effect of state-level variables in this model is similar to the other HLM analyses.

The overall conclusions that we can reach from the five models is that breastfeeding length and intensiveness are likely influenced by measures of an individual's race and class. In addition, breastfeeding appears to vary significantly among states; policies undertaken at the state level can have an effect on breastfeeding rates. The most significant state-level variable, the number of lactation consultants employed in a state per 1000 births, is not something that is controlled directly by state governments, but there are ways that governments can influence the number of consultants employed in the state. The following chapter is devoted to how states can encourage parents to breastfeed their infants both for a longer period of time and without use of formula.

CHAPTER V

CONCLUSION

The U.S. government has made increasing breastfeeding rates a priority as part of its Healthy People 2010 initiative. In order to accomplish this objective, we must identify aspects of individuals that tend to help or hinder breastfeeding. In addition, we can examine programs that occur (or that can be measured) at the state level in order to determine their effectiveness. Based on the evidence from the hierarchical linear models described in the previous chapter, it appears that there are some key individual and state level variables that have a strong influence on the duration and intensiveness of breastfeeding. We can apply these findings to both state policy and theoretical development of the sociology and political economy of infant feeding.

This chapter contains three levels of recommendations and a concluding section on possible future research. The first recommendation level will involve steps that states can take that are within the reach of public health budgets and that match the results from this research project. There will be one exception to this: the Baby-Friendly hospital variable did not receive support in this research project, but these facilities will be part of the recommendations in this section. The second level will be general recommendations that states and the federal government can undertake in order to increase breastfeeding rates. These recommendations are less concerned with budgetary constraints than the first level; instead, their focus is to maximize exclusive breastfeeding by whatever public means is necessary. The final section considers the conflicts that a capitalist mode of

production and exclusive breastfeeding have with each other. I will make the claim that the amount of breastfeeding recommended by public health agencies (six months exclusive of all other nutrition sources) is incompatible with U.S. capitalism.

1. State-level Recommendations that Are within the Reach of Public Health Budgets

The five HLM analyses in this research project indicate that breastfeeding duration varies significantly according to state of residence. While this finding indicates that breastfeeding outcomes in some states are much worse than in others, it is also encouraging; it means that states may have the ability to affect breastfeeding rates. The steps that states take to achieve this goal do not need to cost a large sum of money; indeed, some of the most effective measures require a lower level of expenditure. According to the World Health Organization (2006), “[i]nterventions to improve breastfeeding practices are cost-effective and rank among those with the highest cost-benefit ratio. The cost per child is low compared to that for curative interventions” (p. 3). States can achieve improvements in breastfeeding rates while keeping costs at a minimal level by doing three things: encouraging the training and employment of international board-certified lactation consultants, instituting laws to protect lactation in the workplace, and supporting the switch of birth facilities to a Baby-Friendly model of infant care. Even though the current study did not support the latter program, other research has demonstrated its effectiveness in increasing breastfeeding duration.

This study indicated that international board-certified lactation consultants have the largest effect on increasing breastfeeding rates of any state-level variable examined in

the project. Not only did lactation consultants have the greatest impact on breastfeeding, but also they were the only state-level variable to retain significance in all models and analyses. This significance means that increasing the number of lactation consultants in each state should be considered by state governments. As stated in chapter three, lactation consultants have many responsibilities in promoting breastfeeding, including one-on-one support for lactating mothers and design of education projects. This ability to work with breastfeeding mothers on an individual level probably is the most important factor in a lactation consultant's positive influence on increasing breastfeeding rates. The breastfeeding relationship between a mother and infant can be very difficult, especially at the beginning stages; lactation consultants can provide expertise that allows mothers to bridge the gap between frustration and successful breastfeeding.

There is a high level of variation in the number of lactation consultants employed in each state. The national rate of lactation consultants per one thousand births is 2.20. The state with the lowest rate is Mississippi; it has 1.33 consultants per one thousand births. The District of Columbia is not a state, but its rate of lactation consultants per one thousand births is even lower than Mississippi's rate: 1.31 per one thousand. Vermont, at 9.86 per one thousand births, has the highest rate of consultants in the nation. Not surprisingly, Vermont is one of the national leaders in achieving high breastfeeding rates. See Appendix B for a list of the number of consultants for all states.

According to the HLM analyses, increasing the number of lactation consultants employed in the U.S. likely would lead to an increase in the length of both exclusive and non-exclusive breastfeeding. This increase would not be negligible. However, there is a

problem associated with employing more consultants: these health care practitioners usually are employed by hospitals and other health facilities, not directly by the state. This feature makes a direct increase in the number of lactation consultants difficult for states to achieve without an incentive plan for private health institutions. This plan likely would involve subsidies, increased support for training programs, and tax incentives. States can subsidize nurses and other health professionals to complete the training to become lactation consultants. Also, states and/or the federal government can subsidize these new positions in order to provide incentives for these professionals to receive board certification. The number of professionals receiving training and increased pay would be relatively low; even an increase of one lactation consultant per one thousand live births in a state would likely lead to a significant rise in breastfeeding rates according to our models. In addition, state governments could provide health care facilities tax incentives if the facilities employed enough lactation consultants to meet a state-established level.

The subsidizations and incentives designed to train and employ more lactation consultants would decrease the socialized costs of formula use, as pointed out in the first chapter. Formula use leads to increased use of medical facilities by formula-fed infants, as Ball and Wright (1999) found. This increased use of facilities leads to higher insurance costs for everyone. The national government subsidizes the use of formula through the Women, Infants, and Children program. When looked at from this perspective, the subsidization of lactation consultants perhaps could be a cost-saving measure for states, hospitals, and insurance companies to undertake.

The subsidies and incentives discussed above are an indirect method of reaching the goal of higher breastfeeding rates. A more direct route that states could utilize to possibly increase breastfeeding is to enact legislation protecting lactation in the workplace. This variable did not receive as much support in the models as the employment of lactation consultants, but it did appear to have a positive relationship to breastfeeding rates in the first and fourth HLM analyses. It was not significant in the analysis in which the dependent variable was three-month exclusive breastfeeding because many women have not returned to employment at this point. These laws are designed to help women employed outside the home; by three months, a large proportion of women with infants either have not yet returned to work or have reentered the workforce only recently. However, this variable was significant in the analysis in which six-month exclusive breastfeeding was the dependent variable. Twenty-one states have established this legal protection for women employed outside the home. The only cost that states would encounter with this legislation would be in its enforcement. This measure might meet with opposition from private employers; they may make the claim that providing breaks for an employee to express breastmilk and establishing a clean, private area for this purpose would be too large a burden for the company to bear.

The final measure that states can implement is to encourage hospitals and other birth facilities to adopt Baby-Friendly practices as outlined by UNICEF and the World Health Organization. It is important to note that this variable did not receive support in any of the five HLM analyses discussed above. For reasons stated in the preceding chapter, however, it probably is (or has the potential to be) a significant factor in

increasing breastfeeding rates. There are two likely reasons that the model does not show this significance: first, there are probably too few of these facilities in the U.S. to provide large enough effects to be detected in the models used in this project. The variability for the estimates for Baby-Friendly facilities in the models of each HLM analysis are very small, which provides support for this conclusion. In addition, there appears to be some multicollinearity among the three state-level variables in the analyses. As stated in the previous chapter, the evidence outside of the models presented here indicates that Baby-Friendly facilities have a strong positive effect on increasing breastfeeding duration. The expansion of these birth environments that encourage the consumption of breastmilk by infants remains an essential strategy to increase both duration and frequency of breastfeeding.

The institution of these practices by states would involve a process similar to the employment of more lactation consultants. States would have to encourage the adoption of the Baby-Friendly principles by private hospitals through economic incentives, such as tax relief for participating institutions. Monetary incentives may prove necessary for another reason: the role that hospitals play in the marketing of formula can be a source of revenue for these health care facilities. Strategies designed to minimize the presence of formula in these facilities would have to take this factor into account. Needless to say, the subsidization of Baby-Friendly practices would meet with strong opposition from the infant formula industry. As Rosenberg et al. (2008) demonstrated, the giveaway of formula upon discharge from the hospital after birth has a strong negative effect on breastfeeding (see the first chapter for more information on this study). It is worth noting

that this giveaway is only one of many marketing strategies that infant formula manufacturers employ within a hospital setting, so the effect of this marketing is understated in the study cited above. Efforts by the state to reduce the effectiveness of these hospital-based marketing efforts would cut into the formula manufacturers' sales. Of course, this decline in formula use would be the point of expanding the number of Baby-Friendly facilities; states should not let this factor influence their support for expansion of programs that support breastfeeding.

2. Steps that Could Make Breastfeeding a Priority

The strategies discussed above are practical programs or legislation that states can undertake in order to potentially increase breastfeeding rates. The steps discussed in this section would not be as straightforward in their implementation. Most of these strategies are beyond the scope of individual states to accomplish; the federal government would have to play a role. There are various obstacles to their implementation, such as cultural restraints, lack of economic incentive, and the probable objection of U.S. capitalist enterprise and/or the infant formula industry.

Maternity/family leave. The most important change that the federal government could make in order to facilitate breastfeeding duration would be to expand the Family and Medical Leave Act (FMLA) of 1993 to provide *paid* leave for mothers for a longer period of time. Currently, the FMLA allows mothers to take twelve weeks of unpaid time upon the birth or adoption of a child. This amount of leave and nonexistent level of compensation is not adequate for the encouragement of successful breastfeeding. Many

families are not able to meet their economic needs if the mother is not being paid for twelve weeks. Further, the lack of a supportive leave policy illustrates the level of importance our economy and its leaders attach to establishing the parent-infant breastfeeding relationship—little or none.

The amount of leave that women should be able to take is at least six months. This leave time should be compensated by either the federal government, the woman's employer, or by a combination of the two. Six months is an appropriate time of leave for several reasons. First, it is the amount of time that medical groups and public health agencies have established as an optimal length for exclusive breastfeeding of infants. An extended maternal leave would assist in facilitating this goal. Second, the data and the models used in the current project indicate that there is a very large drop in exclusive breastfeeding between three and six months. According to the National Immunization Survey data, 35.3 percent of U.S. women in the sample breastfeed exclusively for three months, while only 13.1 percent of women maintain this level of breastfeeding for six months. It is probably not a coincidence that this drop in the breastfeeding rate corresponds with the amount of leave that most women are guaranteed to receive in the U.S. A longer amount of leave would be a strong contributor to bringing U.S. rates in line with the global and national medical community's recommendations. It would allow low-income mothers and mothers with lower education levels greater freedom to breastfeed their infants instead of having to choose between paid labor and breastfeeding. Also, a longer paid leave policy probably would allow members of nonwhite races to breastfeed with greater frequency.

It is clear that increasing the amount of maternal leave a woman receives would potentially increase breastfeeding rates, but what sort of impact would it have on a woman's career? Missing six months from one's paid employment could have drastic effects on a woman's potential for promotion and increase in pay. It could lead to an increased use of an unofficial "mommy track" within places of employment in which women with children have limited opportunities for advancement. One partial solution to this problem is the Swedish model of *family*, not maternal, leave. In this system, both parents of the infant (assuming there are two parents) are required to use part of a one-year leave period in order to stay home with a new child (Baumslag and Michels 1995). The careers of both parents are affected by this type of leave policy. While this is not a perfect solution, it guarantees that men and women have to share (at least partially) the potential career-affecting burdens of having a child, rather than placing this burden solely on the mother.

While a six-month paid maternal leave policy makes a great deal of sense for establishing successful breastfeeding relationships between mothers and infants, it is unlikely to become a reality in the U.S. The resistance that such a measure would face from multiple groups, the ideologies of individualism and small government in the U.S., and its impact on the federal government's budget create a hostile environment for such a progressive social program. The main groups that would work to defeat this measure would be employers and social conservatives. Employers likely would perceive a six-month paid family leave as an assault on their profitability. They would be hesitant to support a program that allows employees to stay away from work for half a year. The

increase in taxes to support such a program would invoke the ire of conservatives interested in maintaining a small federal government. In addition, some conservatives might resent the increased power that the improved leave policy would give to workers in general and women in particular. These obstacles, and others, make it extremely unlikely that either a paid leave time or a six-month leave period would become standard in this country. However, if the U.S. truly is committed to increasing breastfeeding rates, this change remains one of the most essential that we can make. As discussed in the first chapter, the U.S. is one of the only industrialized countries without a paid maternal leave policy.

Race/ethnicity and infant feeding. Increasing breastfeeding rates for African-American and Hispanic women is a challenge just as important as instituting a longer paid family leave policy. These two groups face decreased health outcomes for their children because of their low breastfeeding rates; this becomes a contributor to already existing social and economic inequalities. Our society should see increasing the breastfeeding rate for these groups as a priority. According to the existing sociological literature, performing this task may not be easy; this is true especially for African-American women. Blum (1999) claims that African-American women breastfeed less than whites because of cultural reasons, particularly the legacy of slavery in the U.S. If this is indeed the case, increasing the breastfeeding rates for these women will be extremely difficult; our society has made progress on racism and racial inequality, but it still has much work to do in order to overcome this problem. However, there is some good news: the breastfeeding rate for African-American women has been increasing

along with the rates for other women (Baumslag and Michels 1995; CDC 2007). This increase indicates that factors other than the cultural ones that Blum cites may have a role in determining breastfeeding rates for African Americans.

Blum's (1999) theory of cultural causes to of breastfeeding inequality is not completely convincing due to the tendency of race and class to correlate. As we have seen in the current project, class (through its proxies, education and income) has a strong effect on the length of breastfeeding. Race has a similarly strong effect even with the controls for income and education in the models. It is more likely the case that both cultural and economic factors have an influence on the initiation, duration, and exclusivity of breastfeeding for African-American women. Blum's interview data indicates that cultural considerations were more important; however, we must take into account the small size and regional "snowball" nature of her sample, which creates a limited ability to generalize the results to the U.S. population. The fact that Latina women tend to breastfeed less than their white counterparts may remove some support from Blum's theory that African-American women breastfeed less due to cultural factors. Alternatively, lower breastfeeding rates among Hispanic women may be attributable to cultural reasons that are not shared with African-American women. If the decreased breastfeeding levels are caused partially by the lower mean incomes that Latinos earn compared to whites, we may conclude that there is an economic factor involved in the decreased breastfeeding rate of African-American women as well. The evidence suggests, however, that race has an effect on breastfeeding rates that is independent of

class. More research is needed on the effect of race and ethnicity on breastfeeding in general, and Latinos and African Americans in particular.

Because African-American and Hispanic people are more likely to have lower incomes than whites, it would be a good idea to explore the effect that the federal Women, Infants, and Children (WIC) program has on the breastfeeding rate for these groups. As stated previously, WIC is a major source of free infant formula for low-income families that do not breastfeed exclusively. There is good reason to suspect that WIC plays a role in suppressing breastfeeding among African-American and Hispanic women.

The discussion above applies mostly to African-American women. There has been little or no research on the reasons for low breastfeeding rates among Hispanic women; more needs to be done before we can assess how to increase this rate. An increase in educational and community outreach programs might be a good start, in addition to the above changes recommended for all women and infants.

Employer outreach. As stated above, one of the main strategies for increasing breastfeeding in the U.S. is to institute laws protecting lactating women within the workplace. The current research project provided evidence that these laws helped women to continue breastfeeding exclusively between three and six months of infant age; three months is the infant age at which many women return to paid employment. Some employers, justifiably or not, would see these legal changes as unfairly burdensome. There is a cost for employers in making their workplaces lactation compatible; they would have to provide both ample break time for lactating employees and a suitable area

in which to pump milk. These changes should not pose a threat to profits for large companies, but small businesses might have more trouble providing an adequate space for pumping. There could be a federal fund to assist small business owners in creating a suitable space, though hopefully it would not be necessary for most companies.

Infant formula manufacturing and marketing. The marketing of formula likely plays a role in keeping breastfeeding rates at low levels. Even though the result of this sales effort may not be as strong as it was during the nadir of breastfeeding (from the 1950s through the early 1970s), it is still having an effect on the infant feeding decisions that women make. As stated previously, infant formula should not be banned outright; it has a role to play in infant feeding when the mother is unable to supply milk to her child. In addition, there are many women, for various reasons, that would not consider feeding their infants anything but artificial milk substitutes. Their wishes and/or needs must be respected; however, it is clear that infant formula production and use in the U.S. should be decreased substantially. In order to decrease production (and demand), one major route to take is to restrict the marketing practices of the formula industry.

There are five approaches to curtailing the marketing and sale of infant formula products. First, there should be limits placed on the amount of access that formula companies have to physicians. These limits could be included as part of the general movement against free gifts from pharmaceutical corporations, which is best exemplified by the physician-led No Free Lunch movement mentioned in the first chapter. Alternatively, health care facilities could institute a ban on direct marketing of formula to their physicians. Health care professionals have a large influence over the infant feeding

decisions women make; if they were less susceptible to the formula industry's marketing practices, they would be less likely to recommend formula to parents. Second, hospitals should restrict or eliminate formula giveaways to new mothers. As Rosenberg et al. (2008) found, this marketing practice is linked directly with increased formula use. For many women, this practice makes it seem as if the hospital is endorsing the use of formula. Combining this strategy with the increased implementation of Baby-Friendly practices—elimination of free formula is one of the Baby-Friendly code's principles—would be a powerful stimulus for increasing breastfeeding rates. Third, direct marketing of infant formula to families should be regulated to a greater degree. Magazines geared toward parents of young children feature advertisements for infant formula; perhaps the content of these ads should be regulated more closely, if not prohibited altogether. Formula products, similar to alcohol or tobacco, could contain a warning about the potential health effect of formula use. Over two decades ago, infant formula companies agreed, with a great degree of reluctance, to follow the World Health Organization's code for the marketing of breastmilk substitutes. It would be worthwhile for the federal government to examine their marketing practices to see if these companies are living up to their end of the bargain. Fourth, federal subsidies to the infant formula industry should decrease. The federal Women, Infants, and Children (WIC) program gives formula to low-income families with infants if the mother is not breastfeeding. WIC accounts for over half of the infant formula consumed in the U.S. (Oliviera and Prell 2004; Kent 2006). There is a strong belief that this formula giveaway amounts to both a large subsidy of and free marketing for the infant formula industry. Unfortunately, the WIC

program is caught in a “Catch-22” situation; the state of the U.S. labor market obliges low-income women to seek alternatives to breastfeeding their infants. Because of this situation, calls to end WIC’s distribution of free formula (see Kent [2006] for an example) are premature at best and harmful to low-income families at worst. Combining a decrease in formula giveaways at WIC with some of the other measures outlined previously probably would be the best step to undertake in order to increase breastfeeding in low-income families. Fifth, state governments could impose greater regulation on the sale of infant formula products. Baumslag and Michels (1995) suggest that infant formulas could be the subject of a “sin tax”; there are similar taxes on tobacco and alcohol products. This tax would have the added benefit of generating revenue for state governments. However, the people most likely to use formula are working class, African-American, or Latina women. This tax would mean only that these women would have to pay more for the formula that they need. In other words, it would be a regressive tax measure. It would be more appropriate to regulate the products in a way that does not harm the purchasing power of these women, such as providing more benefits to women who breastfeed exclusively.

Cultural changes. Perhaps the most difficult change that we can attempt to make, aside from the institution of a more family-friendly parental leave policy, is to change U.S. culture to make it more compatible with breastfeeding. Women in the U.S. face obstacles to breastfeeding that women in many other countries do not, such as the close association of female breasts with sexuality, the accompanying fear or shame concerning breastfeeding in public, and the relatively extreme individualism in this country. The

first two obstacles are self-explanatory; the latter interferes with breastfeeding because it makes it less likely that lactating women will receive any kind of support for breastfeeding. These cultural qualities will be very difficult to change, even with a conscious effort. The sexualization of breasts seems to be entrenched in this country, but it is impossible to say how long this cultural trend will continue. However, we can see the beginnings of a change regarding the consequences of the sexualization of female breasts: nearly every state now has a law that protects the rights of women to breastfeed in public (CDC 2007). These laws do not guarantee that women will not be harassed, but it is a noteworthy step in the right direction.

One other potential solution to the problems outlined above is to develop peer support networks for lactating women. La Leche League, a private nonprofit organization dedicated to supporting breastfeeding mothers, is an example of this type of group, but these groups need to exist on a much larger and more formal scale. Hospitals, health professionals, and local and state governments need to play a role in establishing these support groups. The creation of these groups is one of the principles of the Baby-Friendly hospital initiative; birth facilities should “[f]oster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic” (UNICEF 2008a). These support groups would help by both countering the tendency toward individualism in the U.S. through the transmission of shared knowledge and giving women greater confidence to breastfeed wherever they like. It is important to note, however, that this is a female-centered solution to a primarily male-generated problem. Men need to be just as responsible as women for changing the culture of

“compulsory heterosexuality” involved with breastfeeding (Blum 1999), though it is not as immediately apparent how men can accomplish this task. They certainly have more work to do than women in order to establish an environment in which breastfeeding is seen as natural and normal.

Any of the above changes, or others not discussed here, that our society decides to implement should be balanced with the needs of mothers. Breastfeeding is an activity that only women can perform; because of this, women will carry the burden of the effects of any changes that we institute. Galtry (2000) states this need eloquently:

In recognizing the uniquely female-specific nature of breastfeeding, both the development of theory and the implementation of appropriate policies must not reinforce either essentialist notions of motherhood or existing labor market inequalities. It is important, however, that in those situations in which downplaying notions of difference appears to represent the optimal strategy, women who currently have no option over integrating breastfeeding and paid employment are not further disadvantaged (p. 309).

In this quote, Galtry gets to the root of the problem of breastfeeding in the United States. It will not be as easy as instituting changes and waiting to see the results; each of these changes will have potentially a profound effect on both women and infants. Decreasing the amount of subsidized infant formula available at WIC, for example, could put a huge financial strain on families that have to rely on artificial substitutes because of maternal employment or other reasons. Asserting the needs of infants above those of mothers (or vice versa) can have deep consequences. Indeed, as I argue below, successfully meeting the needs of both women and infants in the U.S. within the context of breastfeeding will be very difficult, if not impossible.

3. Breastfeeding's Incompatibility with U.S. Capitalism¹¹

Infant feeding in the United States is a zero-sum situation. In most circumstances, using breastmilk or formula causes one person's interests to lose. The mother may gain workplace benefits by choosing to feed formula to her infant (or having that choice forced upon her by an employer or by the need to return to work as soon as possible), but the baby loses its best possible source of nutrition. If a mother who works outside the home decides to breastfeed her infant, she gives the child the best food it can receive. The mother's position at her place of employment is likely to suffer; she may miss out on promotions, opportunities for training, raises, or other positive outcomes. It goes without saying that she does not receive her normal wage or salary when taking time off to breastfeed. The literature reviewed in this project is clear in stating that breastfeeding requires a large time commitment that often interferes with a woman's ability to work for pay outside the home. How, then, do non-wealthy women solve this problem? The answer is that they cannot overcome it in a way that is satisfactory to everyone involved.

Other countries, particularly the Scandinavian nations, have been able to make breastfeeding work well for both infants and women. Sweden's year-long family leave policy is a good example of taking meaningful steps to achieve both gender equality and optimal infant nutrition levels. However, the accomplishment of these two goals will never occur in a U.S. capitalist context. The changes involved would require our economic and political systems to change so radically that they would no longer be recognizable as the U.S. capitalist system of the last several decades. What are the

¹¹ A full exposition of this subject is not practical within the context of the current project. As such, this will be a brief outline that will be expanded at a later date.

qualities of U.S. capitalism that prevent it from being able to establish both breastfeeding and gender equality? The most important characteristic is the overwhelming power of capital and corporations compared to the working class. People in European countries do not have generous maternity leave policies because it was handed to them by an enlightened government; they received these benefits because the working classes in these countries have had a much stronger role in shaping governmental policies than their counterparts in the U.S. The breastfeeding/formula problem is a conundrum for any society that is based on the unequal distribution of wealth (such as the aforementioned European countries), but in other nations, the working class (and, by extension, working women) have a much greater say in the political operations of national governments. If the U.S. working class were more powerful compared to capitalists and corporations, there might be some meaningful changes in the importance our institutions attach to breastfeeding.

In addition to the above obstacle, the U.S. economy shares a characteristic with many other countries in both the economic core and periphery: the undervaluation of so-called traditional women's work. Breastfeeding, of course, is seen as a part of women's labor because they are the only ones capable of performing it. It is undervalued because it is not a compensated activity in the U.S. With rare exceptions, women perform this valuable economic service for free. Breastfeeding is seen as having no economic value at all, when in fact it provides immeasurable benefits for our collective good (Waring 1988 [1999]: also see chapter 1 for a discussion of these benefits). Since it has no objective economic measurement—unlike paid employment—it is not a part of our nation's GDP.

According to Waring, this type of valuation is a gross misrepresentation of how women, both traditionally and contemporarily, have contributed to the maintenance and function of societies. Actually, breastfeeding and other traditional women's labor have a negative economic value for women because women could be engaging in paid labor or advancing their careers instead of taking care of the needs of children. Even if women are able to continue their career, often they face having to perform the "second shift" upon returning home; i.e., taking care of the household and children's needs (Hochschild 1989 [1999]). While this situation is not unique to the U.S., it has a powerful effect on both female equality and infant nutrition. The clearest place to see this effect is in the lack of an adequate maternal leave policy.

Feminist and sociological theorists have recognized this problem; Galtry (2000; 1999; 1997c) referred to the breastfeeding/paid labor predicament as a subset of the "difference versus equality" debate within feminism. Most women have to make a choice or a compromise between breastfeeding their infants (the "difference" position) and engaging in paid employment (the "equality" stance). At the same time, our society expects women to do both. Theorists such as Carter (1995) view breastfeeding as being negative for women because it could end up costing them some of the gains they have made through movements for equality in the public sphere. Blum (1999) also sees the revival of breastfeeding as a possible attempt to roll back the gains that women have made over the past several decades. These theorists emphasize the "equality" side of the feminist debate; they see the needs of mothers as paramount. This is why these theorists are ambivalent about breastfeeding. Indeed, it may be why each was willing to minimize

the health benefits of breastmilk in their studies, even though the evidence against such a conclusion is overwhelming. Breastfeeding is the clear nutritional winner over artificial substitutes; downplaying this superiority in order to make one's position look stronger is not conducive to developing an understanding of infant feeding in the U.S. Baumslag and Michels (1995), in contrast to the above position, are advocates for gender difference; they see breastfeeding as an important activity for both women and infants, and that this activity should have primacy over maternal economic considerations. They believe that our society should do all it can to allow women to combine breastfeeding and paid employment; for them, this successful combination can happen by understanding that women have a different (and equally important) career path than men. The problem with this stance is that many women, especially African Americans, Hispanics, and those from the working class, have a great deal of difficulty combining breastfeeding and working. The context in which these women live does not permit an easy resolution to this debate between equality and difference. If we had a society with a cooperative economy, as opposed to one in which competition and inequality are the norms, this debate would lose much of its meaning. If women had little fear of losing ground at work or losing income by breastfeeding, the debate would be resolved.

The above discussion is not meant to lead anyone to believe that the U.S. cannot improve its breastfeeding rates, for we have done exactly that since the mid-1970s. The rates may increase even more in the coming years. The above measures, especially the hiring of more lactation consultants and the institution of paid family leave, would improve breastfeeding rates considerably. We may, given enough time and effort, even

be able to overcome the cultural causes of racial and ethnic inequalities in infant feeding. However, as long as the current model of U.S. capitalism is in place, the breastfeeding inequalities caused by class divisions will persist. If our societal goal is to maximize breastfeeding, we have the wrong sort of economic system for its accomplishment.

Further Directions for Research

There are many areas of research within infant feeding to which social science can make a contribution toward our shared understanding of the topic and to finding ways to increase a woman's ability to breastfeed her infant. Hopefully, the current research project has made a contribution to both of these areas; at the very least, it can be considered a beginning step toward these goals. However, there is much more work to be done on this topic. The following suggestions represent possible areas of research that are either beyond the scope of the current project or that need to receive further attention from researchers.

Cross-national studies. First of all, there seems to be a lack of cross-national studies of breastfeeding rates. This oversight is odd because there is a clear difference in levels of breastfeeding among different countries. Women in Scandinavian countries, for example, breastfeed their infants for much longer than women in the U.S. (Baumslag and Michels 1995). It is well known that these cross-national variations exist, but the exact causes of these differences are uncertain. There are a large number of factors that could provide the answer, such as length of parental leave after birth, compensation during that leave, breastfeeding-friendly policies at hospitals, and discouragement of formula

advertising. Making comparisons among different nations would allow the researcher to examine the factors affecting their breastfeeding rates. The main point of interest in this project, from a U.S. perspective, would be to illustrate ways that this country could increase the amount of time that women breastfeed their infants. Baumslag and Michels (1995) provide potential reasons that Scandinavian women breastfeed for a longer period of time than their U.S. counterparts; the large amount of support they receive from their government, especially the long duration of parental leave and the fact that parents receive compensation during this leave period, is the primary factor. Unfortunately, the U.S. federal and state governments would not be able to do much with this information; as stated above, these policies would be nearly impossible to institute in this country. Other reasons that Baumslag and Michels mention to explain the high Scandinavian breastfeeding rates include the lack of a cultural taboo on female breast exposure, high levels of mother-to-mother support, and “a growing and vocal feminist movement” (1995:167). These means seem a little easier to achieve than the year-long paid family leave provision.

Baby-Friendly practices. The absence of data on Baby-Friendly birthing facilities was troublesome for the current research project. As discussed earlier, the current project did not demonstrate the effectiveness of these facilities in increasing reliance on breastmilk. Despite not finding the expected result, there is a high probability that Baby-Friendly facilities increase breastfeeding; other studies have found that these facilities have a positive effect on duration and intensiveness of breastfeeding. In order to measure their effectiveness properly, a different research approach would be necessary. One

possibility would be to research hospitals that have converted to following the Baby-Friendly code. The researcher could analyze the facilities' practices and breastfeeding results both before and after the Baby-Friendly switch. Philipp et al. (2001) have taken this approach; they found significant differences in breastfeeding outcomes between the so-called traditional and Baby-Friendly approaches.

Employment and breastfeeding. Baumslag and Michels (1995) argue that the nature of employment in the U.S. interferes with successful breastfeeding. Unfortunately, the current project was unable to capture employment-related variables as part of the hierarchical linear models. Important obstacles to mixing breastfeeding and paid employment include the type of work one performs, lack of day care facilities close to the employment site, the distance the mother has to commute to work, the level of security of the mother's job, the availability of breaks in order to pump breastmilk, and hostile attitudes of supervisors, management, and coworkers (Baumslag and Michels 1995). Additionally, some companies either may have too few employees to be under the jurisdiction of the Family and Medical Leave Act of 1993, or they may choose to ignore this legislation. Although the FMLA's lack of monetary compensation does not help families with infants very much, it does allow for a limited amount of time for mothers and infants to establish a breastfeeding regimen. When we take all of these variables into account, it appears likely that a mother's place of paid employment has a profound effect on how long she is able to provide breastmilk for her infant. This would be an excellent interview or survey project for a researcher to undertake.

More research on state-level initiatives. The current project has illustrated that policies instituted at the state level are associated with breastfeeding rates. Due to this potential to increase the likelihood of breastfeeding, more research is necessary for both the three variables studied in this project and other state-level programs that may have effects on how long a woman breastfeeds her infant. The former project would involve an in-depth analysis of how lactation consultants, Baby-Friendly practices, and legislation supporting lactation in the workplace help mothers to breastfeed. However, these are only three of the possible ways that states can increase breastfeeding; more research is needed in order to identify and encourage other ways that states can contribute toward this end. This is important especially for states in which the breastfeeding rate is particularly low, such as Arkansas and West Virginia.

Changes over time in breastfeeding rates. The insertion of questions pertaining to breastfeeding into the National Immunization Survey in 2002 is a very positive contribution to our understanding of breastfeeding rates in the U.S. Now that the survey has been ongoing for several years, it is possible to look at the accumulated data in order to determine changes over time in breastfeeding rates. This would be helpful particularly if states and the federal government institute policies that either encourage or discourage breastfeeding. We could examine the year in which a change took place, then look at subsequent years in order to see if the change was having an effect on infant feeding. The NIS data, assuming the survey continues in the future, would make this sort of project possible. The longer the survey project continues, the more fruitful the comparisons possible.

Infant formula industry research. The infant formula industry has been the subject of scrutiny ever since the boycott against Nestlé began in the mid 1970s. The World Health Organization's 1978 code delineating how breastmilk substitutes should be marketed added greater emphasis to the analysis of this industry. Strangely, it appears that very little academic research, particularly within sociology, has been devoted to the formula industry or the individual companies that comprise it. One has to go outside of the social sciences to obtain analysis of this industry; this is due partially to the cultural/Weberian bent of previous social science studies (Blum 1999 and Hausman 2003 are the best examples). While this method does not preclude political economy as a focus for study, it has not appeared in the existing literature. Baumslag and Michels (1995), while not academics, offer an excellent overview of infant formula's role in dissuading women from breastfeeding, but their research is not detailed enough and it is over ten years out of date. More research needs to be done on the infant formula industry's marketing efforts since 1995, the companies' ownership and corporate board structure, and their global sales and profits from selling infant formula. In other words, we need to develop a stronger political-economic analysis of the formula industry. This type of research would be of great help to breastfeeding advocacy groups and grassroots infant formula industry monitors.

Infant formula and the environment. It is clear that there are environmental costs associated with infant formula production that do not apply to breastmilk "production". Some of these costs have been detailed in the first chapter. The reliance on cows' milk to manufacture infant formulas, the fuel costs for transporting both the raw materials and the

finished product, the resources used for packaging formulas, and the need for plastic bottles to feed the formula to an infant all tax the environment considerably.

Breastfeeding is a much more ecologically friendly practice because it involves only the consumption of increased quantities of food by the mother. An interesting research project could quantify these ecological costs of formula production. Radford (1991) has done this to a limited extent, but his work needs to be both updated and expanded. This project could be part of the above research on the political economy of the infant formula industry.

Race/ethnicity and infant feeding. Both the current project and previous studies have demonstrated that there is a clear difference in the type and duration of infant feeding practices for different racial and ethnic groups in the U.S. Most studies have concentrated on the infant feeding disparities between whites and African Americans. The lower breastfeeding rate for Latina mothers is a topic that the literature has ignored until now. More research needs to be done in order to explore why these racial and ethnic differences exist, particularly the difference between Latinas and whites. This research is important because some reasons for high levels of formula use are more “solvable” than others. For example, Blum’s (1999) conclusion that African-American women are less likely to breastfeed due to cultural, rather than economic, factors has a profound effect on our collective ability to address breastfeeding inequality. A change in our cultural beliefs and the resulting social structure, especially deeply entrenched ones such as the legacy of slavery, historical racism, and continuing racial inequality, seems to be a much greater challenge to our collective ability to alter breastfeeding rates than the

attempt to minimize economic inequalities that interfere with providing breastmilk for infants. It is likely that both causes are involved, in addition to others; more research into the subject will allow us to clarify all of the factors that cause this racial/ethnic inequality and to begin to address them appropriately.

Concluding Remarks

Breastfeeding, as this project demonstrates, is a complicated subject that has not received enough attention from social scientists. There are many factors to take into account when determining what contributes to a woman's decision to provide formula or breastmilk to her infant. The current project captured several of these variables, but it was beyond its scope to present a full picture of breastfeeding in the United States. Future researchers, including this author, still have much work to do in order to contribute to understanding the infant feeding decision and in helping to make breastfeeding the most feasible alternative for all women. It is not a trivial concern, but an important public health problem.

While we know for certain that breastmilk is the best possible nourishment for infants, it is important not to place value judgments on mothers and families who feed formula to their children. Despite the rhetoric of some breastfeeding advocates, infant formula is not a poison. It can play a valuable role in infant health and nutrition, but only with its initial goal in mind: to be a source of nutrition when an infant does not have access to an adequate breastmilk supply. Examples of this situation are infant adoption

or maternal/infant health related concerns, such as the mother being HIV positive¹². The use of formula, rather than being an individual decision, is a structural problem related largely to the economic (and, to a lesser extent, cultural) needs of families. How deep this structural problem runs in our society is the subject of debate, but it is clear that class and racial divisions have a strong effect on the ability of mothers to breastfeed their infants. It is clear also that many changes to promote breastfeeding have the deep potential to cost women a great amount in terms of career advancement or even the ability to detach themselves from the “domestic” sphere. Researchers, policy makers, feminists (both male and female), and families must be vigilant against such changes that codify essentialist notions of motherhood. Breastfeeding rates can be improved—perhaps substantially—but our society will not be able to solve the problem fully until we go beyond a socio-economic system that depends heavily on class and race divisions and gender inequality.

¹² The HIV virus passes through breastmilk and can infect an infant. The World Health Organization recommends that an HIV-positive mother should provide infant formula for her child if she has access to a clean, safe water source; otherwise, she should breastfeed. There are other health related situations when breastfeeding is not recommended, such as the use of heroin and similar drugs by the mother, phenylketonuria in the child, maternal congestive heart failure, and maternal chemotherapy treatment (Lauwers & Swisher 2005).

APPENDIX A

TEN STEPS TOWARD CREATING A BABY-FRIENDLY HOSPITAL

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one half-hour of birth.
5. Show mothers how to breastfeed and maintain lactation, even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breastmilk, unless medically indicated.
7. Practice rooming in – that is, allow mothers and infants to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Source: UNICEF (2008a).

APPENDIX B

BREASTFEEDING POLICY VARIABLES, BY STATE

State	% of Live Births Occurring at Baby-Friendly Facilities	Number of IBCLCs per 1000 Live Births	Legislation Supporting Lactation in the Workplace
U.S. National	1.93	2.20	21
Alabama	0	1.78	No
Alaska	0	6.06	No
Arizona	0	1.43	No
Arkansas	0	1.56	No
California	4.55	1.77	Yes
Colorado	2.07	2.17	Yes
Connecticut	12.45	4.03	Yes
Delaware	0	3.06	No
DC	0	1.31	Yes
Florida	1.7	1.62	No
Georgia	0	1.81	Yes
Hawaii	9.81	2.46	Yes
Idaho	5.61	1.92	No
Illinois	1.46	2.15	Yes
Indiana	2.89	2.61	Yes
Iowa	0	2.06	No
Kansas	0	2.18	No
Kentucky	5.35	2.06	No
Louisiana	0	1.47	No
Maine	16.82	5.85	No
Maryland	0	3.08	No
Massachusetts	2.8	4.55	No
Michigan	0	2.06	No
Minnesota	0	2.6	Yes
Mississippi	0	1.33	Yes
Missouri	0	1.97	No
Montana	0.32	1.93	Yes
Nebraska	13.13	1.71	No
Nevada	0	0.78	No
New Hampshire	5.77	6.04	No
New Jersey	0	2.27	No
New Mexico	0	2.5	Yes
New York	1.41	2.21	Yes
North Carolina	0	2.89	No
North Dakota	0	1.47	No
Ohio	2.33	2.83	No
Oklahoma	0	1.7	Yes
Oregon	6.13	4.58	Yes
Pennsylvania	0.08	2.35	No
Rhode Island	13.02	4.08	Yes
South Carolina	0	1.58	No
South Dakota	0	1.86	No
Tennessee	0.24	1.86	Yes
Texas	0	1.36	Yes
Utah	0	1.36	No
Vermont	3.76	9.86	Yes
Virginia	0	3.07	Yes
Washington	8.3	4.2	Yes
West Virginia	0	2.57	No
Wisconsin	8.86	2.74	No
Wyoming	0	1.78	No

Source: CDC (2007).

APPENDIX C

BREASTFEEDING DESCRIPTIVE STATISTICS, BY STATE

State	Mean duration of breastfeeding	Median duration of breastfeeding	Mean duration of exclusive breastfeeding	Median duration of ex. breastfeeding	Proportion that breastfed exclusively for three months	Proportion that breastfed ex. for six months
U.S. National	228.81	182.63	59.14	3	0.353	0.131
Alabama	219.73	182.63	57.22	14	0.342	0.108
Alaska	274.90	243.50	90.04	91.31	0.512	0.246
Arizona	223.83	182.63	58.78	1	0.341	0.144
Arkansas	173.80	121.75	46.53	2	0.254	0.096
California	255.53	213.06	66.55	14	0.393	0.164
Colorado	239.74	213.06	65.36	7	0.415	0.133
Connecticut	232.22	182.63	63.10	14	0.399	0.138
Delaware	223.85	182.63	55.90	1	0.328	0.120
DC	270.13	273.94	66.10	30.44	0.388	0.145
Florida	206.21	182.63	49.63	1	0.308	0.108
Georgia	216.91	182.63	53.04	1	0.309	0.133
Hawaii	283.98	273.94	71.50	30.44	0.423	0.181
Idaho	241.83	182.63	68.44	30.44	0.424	0.130
Illinois	221.96	182.63	54.37	1	0.326	0.124
Indiana	217.20	182.63	61.52	3	0.382	0.143
Iowa	214.09	182.63	66.09	10.5	0.385	0.142
Kansas	226.38	182.63	64.48	7	0.385	0.134
Kentucky	190.31	152.19	49.60	2	0.307	0.096
Louisiana	180.62	121.75	50.60	1	0.309	0.096
Maine	252.22	213.06	79.02	60.88	0.483	0.178
Maryland	234.98	213.06	62.87	7	0.383	0.128
Massachusetts	235.82	197.84	59.94	2	0.363	0.132
Michigan	216.73	182.63	52.85	1	0.335	0.098
Minnesota	235.73	213.06	68.76	30.44	0.393	0.180
Mississippi	190.93	152.19	49.32	2	0.297	0.104
Missouri	204.74	182.63	53.75	2	0.350	0.109
Montana	249.66	213.06	76.18	60.88	0.461	0.163
Nebraska	225.57	182.63	56.41	5	0.347	0.098
Nevada	227.58	182.63	54.18	1	0.311	0.109
New Hampshire	277.95	243.50	76.52	60.88	0.454	0.182
New Jersey	222.03	182.63	44.92	1	0.264	0.100
New Mexico	232.54	182.63	63.42	7	0.361	0.147
New York	253.01	213.06	50.18	1	0.291	0.120
North Carolina	207.30	182.63	60.99	14	0.360	0.125
North Dakota	228.32	182.63	70.53	30.44	0.412	0.173
Ohio	215.90	182.63	65.07	14	0.384	0.147
Oklahoma	207.19	182.63	60.96	7	0.344	0.155
Oregon	278.90	273.94	82.78	60.88	0.476	0.220
Pennsylvania	223.17	182.63	62.26	10	0.382	0.122
Rhode Island	220.16	182.63	66.54	14	0.407	0.135
South Carolina	172.93	121.75	47.57	1	0.308	0.089
South Dakota	223.20	182.63	63.05	14	0.370	0.140
Tennessee	203.20	182.63	51.16	1	0.298	0.110
Texas	210.29	182.63	49.48	1	0.295	0.104
Utah	259.82	273.94	67.24	30.44	0.403	0.133
Vermont	283.65	273.94	88.75	91.31	0.524	0.242
Virginia	248.82	213.06	65.53	14	0.390	0.160
Washington	254.17	243.50	73.57	30.44	0.423	0.194
West Virginia	193.14	152.19	48.77	0.5	0.274	0.099
Wisconsin	216.71	182.63	60.55	1	0.365	0.142
Wyoming	231.12	182.63	65.28	14	0.396	0.153

Source: CDC, NCRID and NCHS (2007), 2006 National Immunization Survey.

APPENDIX D

BREASTFEEDING DESCRIPTIVE STATISTICS, BY RACE

Race/Ethnicity	Mean duration of breastfeeding	Median duration of breastfeeding	Mean duration of exclusive breastfeeding	Median duration of exclusive breastfeeding	Proportion that breastfed exclusively for three months	Proportion that breastfed exclusively for six months
Hispanic	214.52	182.63	48.95	0	0.286	0.114
Non-Hispanic White	236.52	213.06	67.47	28	0.407	0.150
Non-Hispanic Black	194.76	152.19	45.96	1	0.270	0.099
Other or Multiple Race	250.69	213.06	62.60	4	0.361	0.156

Source: CDC, NCRID and NCHS (2007), 2006 National Immunization Survey.

BIBLIOGRAPHY

- American Academy of Family Physicians. 2001. "Breastfeeding (Position Paper)." Retrieved May 5, 2008 (<http://www.aafp.org/online/en/home/policy/policies/b/breastfeedingpositionpaper.html>).
- 2007. "Breastfeeding (Policy Statement)". Retrieved May 5, 2008 (<http://www.aafp.org/online/en/home/policy/policies/b/breastfeedingpolicy.html>).
- American Academy of Pediatrics Section on Breastfeeding. 2005. "Breastfeeding and the Use of Human Milk: Policy Statement." *Pediatrics* 115(2):496-506.
- Apple, Rima D. 1987. *Mothers and Medicine: A Social History of Infant Feeding, 1890-1950*. Madison, WI: The University of Wisconsin Press.
- Austen, Ian. 2008. "Canada Takes Steps to Ban Most Plastic Baby Bottles." *New York Times* April 19. Retrieved April 19, 2008 (<http://www.nytimes.com/2008/04/19/business/worldbusiness/19plastic.html>).
- Baby Friendly USA. 2008. "Birth Centers in the United States." Retrieved July 21, 2008 (www.babyfriendlyusa.org/eng/03.html).
- Baby Milk Action. 2008. "The Nestlé Boycott." Retrieved July 15, 2008 (<http://www.babymilkaction.org/pages/boycott.html>).
- Ball, Thomas M. and Anne L. Wright. 1999. "Health Care Costs of Formula-Feeding in the First Year of Life." *Pediatrics* 103(4, Part 2):870-876.
- Baumslag, Naomi L. and Dia L. Michels. 1995. *Milk, Money, and Madness: The Culture and Politics of Breastfeeding*. Westport, CT: Bergin & Garvey.
- Breastfeeding.com. 2008. "List of Baby Formula Manufacturers." Retrieved July 22, 2008 (http://www.breastfeeding.com/advocacy/advocacy_mfgs.html).
- Blum, Linda. 1993. "Mothers, Babies, and Breastfeeding in Late Capitalist America: The Shifting Contexts of Feminist Theory." *Feminist Studies* 19(2): 291-311.
- 1999. *At the Breast: Ideologies of Breastfeeding and Motherhood in the Contemporary United States*. Boston: Beacon Press.

- California Employment Development Department. 2008a. "FAQs for Paid Family Leave." Retrieved June 5, 2008 (http://www.edd.ca.gov/Disability/FAQs_for_Paid_Family_Leave.htm).
- California Employment Development Department. 2008b. "Disability Insurance and Paid Family Leave Weekly Benefit Amounts." Retrieved June 5, 2008 (http://www.edd.ca.gov/pdf_pub_ctr/de2588.pdf).
- Campbell, Paul R. 1996. *Population Projections for States by Age, Sex, Race, and Hispanic Origin: 1995 to 2025*. U.S. Bureau of the Census, Population Division, PPL-47.
- Carter, Pam. 1995. *Feminism, Breasts, and Breastfeeding*. New York: St. Martin's Press.
- Centers for Disease Control and Prevention. "Breastfeeding Report Card 2007: Outcome Indicators." Retrieved December 6, 2007 (http://www.cdc.gov/breastfeeding/data/report_card2.htm).
- Chen, Aimin and Walter J. Rogan. 2004. "Breastfeeding and the Risk of Postneonatal Death in the United States." *Pediatrics* 113(5): e435-e439.
- DiGirolamo, Ann M., Lawrence M. Grummer-Strawn, and Sara B. Fein. 2001. "Maternity Care Practices: Implications for Breastfeeding." *Birth* 28(2):94-100.
- Dykes, Fiona. 2005. "'Supply' and 'Demand': Breastfeeding As Labour." *Social Science and Medicine* 60:2283-2293.
- Flacking, Renee, Kerstin Hedberg Nyqvist, and Uwe Ewald. 2007. "Effects of Socioeconomic Status on Breastfeeding Duration in Mothers of Preterm and Term Infants." *European Journal of Public Health* 17(6):579-584.
- Fomon, Samuel J. 2001. "Infant Feeding in the 20th Century: Formula and Beikost." *Journal of Nutrition* 131:409S-420S.
- Galtry, Judith. 1997a. "Lactation and the Labor Market: Breastfeeding, Labor Market Changes, and Public Policy in the United States." *Health Care for Women International* 18:467-480.
- 1997b. "'Sameness' and Suckling: Infant Feeding, Feminism, and a Changing Labour Market." *Women's Studies Journal* 13(1):65-88.
- 1997c. "Suckling and Silence in the USA: The Costs and Benefits of Breastfeeding." *Feminist Economics* 3(3):1-24.

- , 2000. "Extending the 'Bright Line': Feminism, Breastfeeding, and the Workplace in the United States." *Gender and Society* 14(2):295-317.
- , 2003. "The Impact on Breastfeeding of Labour Market Policy and Practice in Ireland, Sweden, and the United States." *Social Science and Medicine* 57:167-177.
- Galtry, Judith and Paul Callister. 2005. "Assessing the Optimal Length of Parental Leave for Child and Parental Well-Being." *Journal of Family Issues* 26(2):219-246.
- Gatrell, Caroline Jane. 2007. "Secrets and Lies: Breastfeeding and Professional Paid Work." *Social Science and Medicine* 65:393-404.
- Gómez-Sanchiz, Manuela, Ramón Cañete, Immaculada Rodero, J. Enrique Baeza, and Octavio Ávila. 2003. "Influence of Breastfeeding on Mental and Psychomotor Development." *Clinical Pediatrics* 42(1):35-42.
- Gould, Stephen Jay. 1981 [1996]. *The Mismeasure of Man*. New York: W.W. Norton and Company.
- Hausman, Bernice. 2003. *Mother's Milk: Breastfeeding Controversies in American Culture*. New York: Routledge.
- Healthy People 2010. "About Healthy People 2010." Retrieved April 2, 2008 (<http://www.healthypeople.gov/About/>).
- Heymann, Jody, Alison Earle, and Jeffrey Hayes. 2007. "The Work, Family, and Equity Index: How Does the United States Measure Up?" Boston: Project on Global Working Families. Retrieved May 13, 2008 (<http://www.mcgill.ca/files/ihsp/WFEIFinal2007.pdf>).
- Hochschild, Arlie Russell. 1989 [1999]. *The Second Shift*. New York: Avon Books.
- Hoffmann, John P. 2004. *Generalized Linear Models: An Applied Approach*. Boston: Allyn & Bacon.
- International Board of Lactation Consultant Examiners. 2008. "Scope of Practice for International Board-Certified Lactation Consultants". Retrieved July 16, 2008 (<http://www.iblce.org/documents/IBCLCSOP0308.pdf>).
- International Labour Organization. 2008. *Guide to International Labour Standards*. Geneva, Switzerland: International Labour Standards Department.

- Kelleher, Christa M. 2006. "The Physical Challenges of Early Breastfeeding." *Social Science and Medicine* 63:2727-2738.
- Kent, George. 2006. "WIC's Promotion of Infant Formula in the United States". *International Breastfeeding Journal* 1(8). Retrieved December 8, 2008 (<http://www.internationalbreastfeedingjournal.com/content/1/1/8>).
- Kitzinger, Sheila. 1998. *Breastfeeding Your Baby*. London: Dorling Kindersley.
- Kramer, Michael S. et al. 2008. "Breastfeeding and Child Cognitive Development: New Evidence from a Large Randomized Trial." *Archives of General Psychiatry* 65(5):578-584.
- Kurini, Natalie, Patricia H. Shiono, Sandi F. Ezrine, and George G. Rhoads. 1989. "Does Maternal Employment Affect Breast-Feeding?" *American Journal of Public Health* 79(9):1247-50.
- La Leche League International. 2004. *The Womanly Art of Breastfeeding*, 7th ed. New York: Plume.
- Lauwers, Judith and Anna Swisher. 2005. *Counseling the Nursing Mother: A Lactation Consultant's Guide*, 4th ed. Sudbury, MA: Jones and Bartlett Publishers.
- Li, Ruowei, Zhen Zhao, Au Mokdad, Lawrence Barker, and Laurence Grummer-Strawn. 2003. "Prevalence of Breastfeeding in the United States: The 2001 National Immunization Survey." *Pediatrics* 111:1098-1109.
- Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage Publications, Inc.
- Li, Ruowei, Kelly S. Scanlon, and Mary K. Serdula. 2005. "The Validity and Reliability of Maternal Recall of Breastfeeding Practice." *Nutrition Review* 63:103-110.
- Martin, Richard M., David Gunnell, and George Davey Smith. 2005. "Breastfeeding in Infancy and Blood Pressure in Later Life: Systematic Review and Meta-Analysis." *American Journal of Epidemiology* 161(1):15-26.
- Mead Johnson. 2008. "Our History." Retrieved June 8, 2008 (<http://www.mjn.com/app/iwp/MJN/Content2.do?dm=mj&id=-9685&iwpst=MJN&ls=0&csred=1&r=3413495175>).
- Mortensen, Erik Lykke, Kim Fleischer Michaelsen, Stephanie Sanders, and June Machover Reinisch. 2002. "The Association between Duration of Breastfeeding

and Adult Intelligence.” *Journal of the American Medical Association* 287(18):2365-2371.

Murphy, Elizabeth. 1999. “‘Breast Is Best’: Infant Feeding Decisions and Maternal Deviance.” *Sociology of Health and Illness* 21(2):187-208.

National Alliance for Breastfeeding Advocacy. 2007. “Recalls of Infant Feeding Products.” Retrieved June 18, 2008 (<http://www.naba-breastfeeding.org/images/Recalls.pdf>).

Nestlé S. A. 2006. “Nestlé around the Globe.” Retrieved June 8, 2008 (<http://www.nestle.com/Resource.axd?Id=602C42FE-04D6-4669-BEE1-1027492FE5E8>).

No Free Lunch. 2008. “Doctor Search.” Retrieved June 6, 2008 (<http://nofreelunch.org/doctors.asp>).

Oliviera, Victor and Mark Prell. 2004. “Sharing the Economic Burden: Who Pays for WIC’s Infant Formula?” *USDA/ERS Amber Waves*: September 2004. Retrieved May 6, 2008 (www.ers.usda.gov/Amberwaves/September04/Features/infantformula.htm).

Oregon Department of Human Services. 2008. “Oregon Breastfeeding Law HB 2732.” Retrieved June 5, 2008 (<http://www.oregon.gov/DHS/ph/bf/hb2732.shtml>).

Owen, Christopher G., Richard M. Martin, Peter H. Whincup, George Davey Smith, and Derek G. Cook. 2005. “Effect of Infant Feeding on the Risk of Obesity across the Life Course: A Quantitative Review of Published Evidence.” *Pediatrics* 115(5):1367-1377.

Philipp, Barbara L., Anne Merewood, Lisa W. Miller, Neetu Chawla, Melissa M. Murphy-Smith, Jennifer S. Gomes, Sabrina Cimo, and John T. Cook. 2001. “Baby-Friendly Hospital Initiative Improves Breastfeeding Initiation Rates in A US Hospital Setting.” *Pediatrics* 108(3):766-768.

Radford, Andrew. 1991. “The Ecological Impact of Bottle Feeding.” London: Baby Milk Action. Retrieved June 5, 2008 (<http://www.reducepackaging.com/article.html>).

Raudenbush, Stephen W. and Anthony S. Bryk. 2002. *Hierarchical Linear Models: Applications and Data Analysis Methods, Second Edition*. Newbury Park, CA: Sage Publications.

- Renfrew, Mary, Chloe Fisher, and Suzanne Arms. 2004. *Bestfeeding: How to Breastfeed Your Baby*. Berkeley, CA: Celestial Arts.
- Riordan, Jan. 2005. *Breastfeeding and Human Lactation*, Third Edition. Sudbury, MA: Jones and Bartlett Publishers.
- Roe, Brian, Leslie A. Whittington, Sara B. Fein, and Mario F. Teisl. 1999. "Is There Competition Between Breast-Feeding and Maternal Employment?" *Demography* 36:157-171.
- Rosenberg, Kenneth D., Carissa A. Eastham, Laurin J. Kasehagen, and Alfredo P. Sandoval. 2008. "Marketing Infant Formula through Hospitals: the Impact of Commercial Hospital Discharge Packs on Breastfeeding." *American Journal of Public Health* 98:290-295.
- Ryan, Alan S., Zhou Wenjun, and Andrew Acosta. 2002. "Breastfeeding Continues to Increase into the New Millenium." *Pediatrics* 110:1103-1109.
- Schabenberger, Oliver. 2006. "Introducing the GLIMMIX Procedure for Generalized Linear Mixed Models." Retrieved November 18, 2008 (<http://www2.sas.com/proceedings/sugi30/196-30.pdf>).
- Schanler, Richard J., Karen G. O'Connor, and Ruth A. Lawrence. 1999. "Pediatricians' Practices and Attitudes Regarding Breastfeeding Promotion." *Pediatrics* 103(3):e35.
- Schuman, Andrew J. 2003. "A Concise History of Infant Formula (Twists and Turns Included)." *Contemporary Pediatrics* 20 (2):91-103.
- Sears, Martha and William Sears. 2000. *The Breastfeeding Book*. Boston: Little Brown.
- Steinfeld, Henning, Pierre Gerber, Tom Wassenaar, Vincent Castel, Mauricio Rosales, and Cees de Haan. 2006. *Livestock's Long Shadow: Environmental Issues and Options*. Rome: Food and Agriculture Organization, United Nations. Retrieved July 15, 2008 (<http://www.fao.org/docrep/010/a0701e/a0701e00.HTM>).
- U. S. Department of Health and Human Services and National Center for Health Statistics. 2007. *The 2006 National Immunization Survey*. Hyattsville, MD: Centers for Disease Control and Prevention.
- United Nations Children's Fund. 2006. *Celebrating the Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding: Past Achievements, Present Challenges and Priority Actions for Infant and Young Child Feeding*, 2nd ed. Florence, Italy: UNICEF Innocenti Research Centre.

- 2008a. "The Baby-Friendly Hospital Initiative." Retrieved March 3, 2008 (<http://www.unicef.org/programme/breastfeeding/baby.htm#10>).
- 2008b. "Infant and Young Child Feeding and Care." Retrieved May 5, 2008 (http://www.unicef.org/nutrition/index_breastfeeding.html).
- United States Census Bureau. 2001. "Population by Race and Hispanic or Latino Origin, for the United States, Regions, Divisions, and States, and for Puerto Rico, 2000." Retrieved December 15, 2008 (<http://www.census.gov/population/www/cen2000/briefs/phc-t6/tables/tab01.pdf>).
- Vogel, Lise. 1993. *Mothers on the Job: Maternity Policy in the U.S. Workplace*. New Brunswick, NJ: Rutgers University Press.
- Wallace, Lora Ebert and Holly Chason. 2007. "Infant Feeding in the Modern World: Medicalization and the Maternal Body." *Sociological Spectrum* 27:405-438.
- Waring, Marilyn. [1988] 1999. *Counting for Nothing: What Men Value and What Women Are Worth*, 2nd ed. Toronto: University of Toronto Press.
- Wolf, Jacqueline H. 2000. "The Social and Medical Construction of Lactation Pathology." *Women & Health* 30:93-110.
- 2003. "Low Breastfeeding Rates and Public Health in the United States." *American Journal of Public Health* 93(12):2000-2010.
- World Health Organization. 1981. *International Code of Marketing of Breast-milk Substitutes*. Geneva, Switzerland: World Health Organization.
- 2003. *Global Strategy for Infant and Young Child Feeding*. Geneva, Switzerland: World Health Organization.
- 2006. "The International Code of Marketing of Breast-Milk Substitutes: Frequently Asked Questions." Retrieved January 10, 2008 (http://www.who.int/nutrition/publications/Frequently_ask_question_International_code.pdf).